SUSTAINABLE AGROFORESTRY CACAO META, COLOMBIA

Project title	Sustainable Agroforestry Cacao Meta, Colombia
Project ID	3450
Crediting period	06-07-2017 to 05-07-2057
Project lifetime	06-07-2017 to 05-07-2057
(CCB) GHG accounting period	06-07-2017 to 05-07-2057, 40 years total period
Original date of issue	21-07-2022
Most recent date of issue	01-05-2024
Version	V14-0
VCS Standard version	VCS 4.6
CCB Standards version	CCB 3.1
Project location	Colombia, Meta, Cabuyaro
Project proponent(s)	**BACAO SAS** Lina Marcela Guzman lguzman@bacao.com.co **Terra Global Capital, LLC** Leslie Durschinger info@terraglobalcapital.com
Validation/verification body	EPIC Sustainability Services Pvt. Ltd.
History of CCB status	There are no issuance date(s) of earlier validation statements or dates of previous attempts at verification available, not applicable
Gold Level criteria	Gold Level Climate Change Adaptation Benefits
Expected verification schedule	Audit Field Visit 07-July-2023

	Validation/Verification Report Estimated 01-May-2024
Prepared by	Terra Global Capital

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1 SUMMARY OF PROJECT BENEFITS

1.1 Unique Project Benefits

Expected benefits of the project not captured by the standardized benefit metrics in Table *1*.

Table 1. Project Outcomes (climate, community, and biodiversity)

Outcome or Impact Estimated by the End of Project Lifetime	Section Reference
1) Climate. • Land rehabilitation & soil restoration through sustainable agroforestry practices to restore degraded land	3.4.2
2) Community. • Increased income for employees (community members, including women) through formal long-term employment. • Improved livelihoods of small farmers (including women) through income diversification and increased cocoa production.	4.2.1
3) Biodiversity. • Increase biodiversity and awareness of the importance of conservation of vulnerable species in the Project Activity Instances	5.2.3

1.2 Standardized Benefit Metrics

Table 2 shows the metrics of the benefits that the project aims to achieve during the project lifetime.

Table 2. Metrics of the benefits to be achieved by the project.

Category	Metric	Estimated by the end of project lifetime	Section reference
GHG emission reductions or carbon dioxide removals	*Net estimated removals in the project area, measured against the without-project scenario*	*Net estimated removals for the project lifetime (40 yrs.) are 200,936 tCO2e (before buffer discount)*	*3*
	Net estimated reductions in the project area, measured against the without-project scenario	*N/A*	*N/A*
Forest[1] cover	*For REDD[2] projects: Estimated number of hectares of reduced forest loss in the project area measured against the without-project scenario*	*N/A*	
	For ARR[3] projects: Estimated number of hectares of forest cover increased in the project area measured against the without-project scenario	*1,767 hectares of forest cover increased in the Project Activity Instance measured against the without-project scenario*	*3*
Improved land management	*Number of hectares of existing production forest land in which IFM[4] practices are expected to occur as a result of project activities, measured against the without-project scenario*	*N/A*	*N/A*
	Number of hectares of non-forest land in which improved land management practices are expected to occur as a result of project	*1,767 hectares of non-forest land in which improved land management practices are expected to occur as a result of project activities, measured against the without-project scenario*	*3*

[1] Land with woody vegetation that meets an internationally accepted definition (e.g., UNFCCC, FAO, or IPCC) of what constitutes a forest, which includes threshold parameters, such as minimum forest area, tree height and level of crown cover, and may include mature, secondary, degraded and wetland forests (VCS Program Definitions)

[2] Reduced emissions from deforestation and forest degradation (REDD) - Activities that reduce GHG emissions by slowing or stopping conversion of forests to non-forest land and/or reduce the degradation of forest land where forest biomass is lost (VCS Program Definitions)

[3] Afforestation, reforestation and revegetation (ARR) - Activities that increase carbon stocks in woody biomass (and in some cases soils) by establishing, increasing and/or restoring vegetative cover through the planting, sowing and/or human-assisted natural regeneration of woody vegetation (VCS Program Definitions)

[4] Improved forest management (IFM) - Activities that change forest management practices and increase carbon stock on forest lands managed for wood products such as saw timber, pulpwood, and fuelwood (VCS Program Definitions)

Category	Metric	Estimated by the end of project lifetime	Section reference
	activities, measured against the without-project scenario		
Training	*Total number of community members who are expected to have improved skills and/or knowledge resulting from training provided as part of project activities*	*300 people who are expected to have improved skills and/or knowledge resulting from training provided as part of project activities*	*4*
	Number of female community members who are expected to have improved skills and/or knowledge resulting from training as part of project activities	*75 female (workers and small farmers) who are expected to have improved skills and/or knowledge resulting from training as part of project activities*	*4*
Employment	*Total number of people expected to be employed in project activities[5], expressed as number of full-time employees[6]*	*350 people to be employed in project activities*	*4*
	Number of women expected to be employed as a result of project activities, expressed as number of full-time employees	*87 women will be employed in project activities*	*4*
Livelihoods	*Total number of people expected to have improved livelihoods[7] or income generated as a result of project activities*	*350 (direct and indirect workers) have improved livelihoods or income generated as a result of project activities*	*4*
	Number of women expected to have improved livelihoods or income generated as a result of project activities	*87 women (workers) have improved livelihoods or income generated as a result of project activities*	*4*
Health	*Total number of people for whom health services are expected to improve as a result of project*	*300 employees that have access to health services*	*4*

[5] Employed in project activities means people directly working on project activities in return for compensation (financial or otherwise), including employees, contracted workers, sub-contracted workers and community members that are paid to carry out project-related work.

[6] Full time equivalency is calculated as the total number of hours worked (by full-time, part-time, temporary and/or seasonal staff) divided by the average number of hours worked in full-time jobs within the country, region or economic territory (adapted from the UN System of National Accounts (1993) paragraphs 17.14[15.102];[17.28])

[7] Livelihoods are the capabilities, assets (including material and social resources) and activities required for a means of living (Krantz, Lasse, 2001. The Sustainable Livelihood Approach to Poverty Reduction. SIDA). Livelihood benefits may include benefits reported in the Employment metrics of this table.

Category	Metric	Estimated by the end of project lifetime	Section reference
	activities, measured against the without-project scenario		
	Number of women for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	*80 women that have access to health services*	*4*
Education	*Total number of people for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario*	*9 employees are receiving higher education*	*4*
	Number of women and girls for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario	*4 women are receiving higher education*	*4*
Water	*Total number of people who are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario*	*404 people who experienced increased water quality and/or improved access to drinking water as a result of project activities*	*N/A*
	Number of women who are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	*87 women who experienced increased water quality and/or improved access to drinking water as a result of project activities*	*N/A*
Well-being	*Total number of community members whose well-being[8] is expected to improve as a result of project activities*	*300 workers whose well-being is expected to improve as a result of project activities*	*4*
	Number of women whose well-being is expected to improve as a result of project activities	*80 women whose well-being is expected to improve as a result of project activities*	*4*

[8] Well-being is people's experience of the quality of their lives. Well-being benefits may include benefits reported in other metrics of this table (e.g. Training, Employment, Livelihoods, Health, Education and Water), and may also include other benefits such as strengthened legal rights to resources, increased food security, conservation of access to areas of cultural significance, etc.

Category	Metric	Estimated by the end of project lifetime	Section reference
Biodiversity conservation	*Expected change in the number of hectares managed significantly better by the project for biodiversity conservation[9], measured against the without-project scenario*	*2,253 hectares managed significantly better by the project for biodiversity conservation, measured against the without-project scenario*	*5*
	Expected number of globally Critically Endangered or Endangered species[10] benefiting from reduced threats as a result of project activities[11], measured against the without-project scenario	*0 IUNC listed as Critically Endangered (CR) or Endangered Species (EN) that will benefit from Project Activities are expected to be found in and around the Project Area Instance.*	*5*

[9] Managed for biodiversity conservation in this context means areas where specific management measures are being implemented as a part of project activities with an objective of enhancing biodiversity conservation, e.g. enhancing the status of endangered species
[10] Per IUCN's Red List of Threatened Species
[11] In the absence of direct population or occupancy measures, measurement of reduced threats may be used as evidence of benefit

2 PROJECT DETAILS

2.1 Project Goals, Design and Long-Term Viability

2.1.1 Summary Description of the Project (VCS, 3.2, 3.6, 3.10, 3.11, 3.13, 3.14; CCB, G1.2)

Located in the department of Meta, Cabuyaro is a municipality whose surface equals to 832 square kilometers, with a population of 5,432 inhabitants, and an altitude of 151 meters above sea level (DANE, 2018). The Project Activity Instance is located in Guayabal, a small town in Cabuyaro composed of 204 inhabitants who mainly work the land, growing a variety of crops such as plantain, cassava, papaya, passion fruit, corn, soy, and cacao which are mainly sold in the local market of Villavicencio, Meta's capital city.

This is a grouped project. The plantation consists of a total of 2,253 hectares composed of eligible and non-eligible areas of degraded pastures and cropland in majority (2,051 hectares), with environmental stripes of native species (moriche and galleria forest- 202 hectares). Soil condition at project start was assessed revealing favorable physical properties, some type of structural degradation due to the effect of compaction as a result of its prolonged rice and cattle production and drainage problem due to the effect of flooding.

The initial area to be verified is composed of degraded soil that will be rehabilitated through the establishment of a multilayer agroforestry system, with cacao being the main perennial crop planted along with other trees for shading (*Glyricidia sepium*) and boundary purposes (windbreaks -*Cariniana pyriformis*). This agroforestry system has the goal of increasing soil organic carbon, as well as the aboveground and below ground biomass, to rebuild the soil health and fertility through time. Other relevant agricultural practices that will be implemented are i) improved residue management of the crop materials that are periodically pruned and left in the soil for decomposition to build organic matter, ii) partially processing the cacao husks to be reincorporated back in the field, iii) planting cover crops in bare soil areas, iv) establishment and management of an irrigation system (micro sprinklers), and iv) planting boundary trees to prevent erosion and to reduce wind damage in the main crop (cacao).

The First Project Activity Instance will provide employment to a total of 300 local people working on the farms, who live in the surrounding communities of the Project Activity Instance and are new to cacao production. Individuals employed will have financial security from a fixed steady income and will have access to the country's legal benefits through their employment (health insurance and retirement/pension) as well as additional benefits such as food assistance. The farms have the objective of paying employees a living wage and will provide opportunities for both youth and women in an area where they are particularly limited.

The project will also promote biodiversity in the Project Activity Instance by maintaining conservation areas where species have made their habitats. Also, it will establish and reinforce a non-hunting policy, to prevent this practice in the Project Activity Instance. Also, employees will receive training and information about the species present in the Project Activity Instance and how to maintain and not disturb their habitats. Additionally, biodiversity studies will be conducted periodically to ensure population and numbers of present species are maintained.

The estimated annual emission reductions (including stand replacements) for the lifetime of the project is 5,023 tCO2e and total GHG emissions and removals anticipated is 200,936 tCO2e over the next 40 years.

Furthermore, the project will establish Impulsa Bacao, a subsidiary company who aims to produce cultural changes at different levels of the cacao value chain, the agricultural sector, and rural communities. Operations will be developed in Boyacá and Meta to build social enterprises in partnership with smallholder associations to increase competitiveness and to obtain an international

cacao market opportunity. The Company's business model has four main components that address the main constraints of cacao smallholders:

1. Transfer technical knowledge to improve small farmers' crop productivity
2. Establish and operate centralized cacao post-harvest areas
3. Facilitate access to financing for farmers and decreased intermediation by buying cacao directly from the farmers
4. Commercialize outstanding quality product (Cacao)

2.1.2 Audit History (VCS, 4.1)

Audit Type	Period	Program	VVB Name	Number of years
Validation/ Verification	06-July-2017 to 05-July-2022	VCS/CCB	EPIC Sustainability Services Pvt. Ltd.	Five years

2.1.3 Sectoral Scope and Project Type (VCS, 3.2)

Sectoral Scope	14: Agriculture, forestry, and other land use
AFOLU Project Category	Afforestation, Reforestation and Revegetation (ARR)
Project Activity Type	Afforestation/Reforestation

2.1.4 Project Eligibility (VCS, 3.1, 3.6, 3.8, 3.18, 4.1; CCB Program Rules, 4.2.4, 4.6.4)

ARR, which is the main project activity, is included under VCS Scope 14, all related category requirements are met, for additional evidence on eligibility review Section 3.1.1.1.

The project underwent public comment twice, first in April 14th. to May 14th. 2023 prior to the opening meeting with the validation/verification body, and then from May 22nd. to June 22nd., 2024. There were no comments received in both periods.

The project meets requirements related to all relevant deadlines. The pipeline listing for the project was completed before July 21, 2022 and confirmed by Verra.

The applied methodology for the project (CDM AR-ACM0003) is eligible under the VCS Program.

2.1.5 Transfer Project Eligibility (VCS, 3.23, Appendix 2)

2.1.6 Project Design (VCS, 3.6)

Indicate if the project has been designed as:

☐ Single location or installation

☐ Multiple locations or project activity instances (but not a grouped project)

☒ Grouped project

2.1.6.1 Eligibility Criteria for Grouped Projects (VCS, 3.6; CCB, G1.14)

The Project Activity Instance fulfils all the criteria below. Thus, when adding new Project Instances, they must be eligible according to the same criteria:

- Be located on areas of non-forest at project start.
- Adopt and apply the project activities (i.e., tree planting), technologies and/or measures in the same manner as specified in this project description
- Meet the applicability conditions set out in the methodology
- Areas are subject to the same community and biodiversity without-project scenarios as determined for the project
- Areas are subject to the baseline scenario determined in the project description for the specified project activity and geographic area
- Project Zone Instance uses similar analysis to define stakeholders
- Have characteristics with respect to additionality that are consistent with the initial instances for the specified project activity and geographic area

Areas are subject to the same processes for stakeholder engagement described in G3 and respect for rights to lands, territories and resources including free, prior and informed consent described in G5.

In the case an instance needs to leave the grouped project, the project will follow the instructions in the VCS standard 4.6.

2.1.7 Project Proponent (VCS, 3.7; CCB, G1.1)

Organization name	Bacao SAS
Contact person	Lina Guzman
Title	Director HSE
Address	Carrera 9 Number- 80-45, Office 301 Bogota, Colombia
Telephone	+57 318 3589678
Email	lguzman@bacao.com.co

Organization name	Terra Global Capital, LLC
Contact person	Leslie Durschinger
Title	Founder and CEO
Address	6114 La Salle Ave, Suite 441. Oakland CA 94611
Telephone	+1 415 400 4491
Email	info@terraglobalcapital.com

2.1.8 Other Entities Involved in the Project

Organization name	Impulsa Bacao
Contact person	Martino Bonato
Title	Head of Post-Harvest and Sourcing
Role	Company who is part of Bacao SAS dedicated to post-harvest processes as well as the marketing and commercialization of cocoa with high quality standards. As well as providing technical support and direct purchase of cocoa beans with small farmers in the Bacao project instance zone.
Address	Bogotá, Colombia
Telephone	
Email	mbonato@impulsabacao.com

Organization name	DyA
Contact person	Jose Gerardo Erazo
Title	Advisor DyA
Role	Local company hired to strengthen the link with the communities and provide support to Bacao workers.
Address	Cl. 66 #11 - 37, Bogotá, Colombia
Telephone	+57 317 8951738
Email	josege@dya.com.co

2.1.9 Project Ownership (VCS, 3.2, 3.7, 3.10; CCB, G5.8)

Project ownership is supported by laws that grant Bacao S.A.S. the tenure over the production area and rights to manage the natural resources that will be managed to generate emissions reductions. Bacao S.A.S. has the legal right to operate the project activities, which is establishing an agroforestry system in degraded pastures (under the baseline condition) and managing it (under the project).

Bacao S.A.S. through their legal rights to carbon, demonstrate Project Proof of Right under a statutory, property or contractual right in the land, vegetation or management process that generates GHG emission reductions and/or removals.

2.1.10 Project Start Date (VCS, 3.8)

Project start date	06-July-2017
Justification	The start date of this AFOLU project is the date when planting activities initiated which led to the generation of reductions.

2.1.11 Benefits Assessment and Project Crediting Period (VCS, 3.9; CCB, G1.9)

Crediting period	The projects crediting period of 40 years, minimum number of years required by VCS.
Start date of first or fixed crediting period	06-July-2017 to 05-July-2057
CCB benefits assessment period	06-July-2017 to 05-July-2057

2.1.12 Differences in Assessment/Project Crediting Periods (CCB, G1.9)

There is no difference between these accounting periods.

2.1.13 Project Scale and Estimated Reductions or Removals (VCS, 3.10)

Estimated annual GHG emission reductions/carbon dioxide removals (ERRs) of the project:☒ < 300,000 tCO_2e/year (project)

☐ ≥ 300,000 tCO_2e/year (large project)

Table 3. estimated annual GHG emission reductions/carbon dioxide removals (ERRs) of the project

Calendar year of crediting period	Estimated reductions or removals (tCO_2e)
06-Jul-2017 to 05-Jul-2018	291
06-Jul-2018 to 05-Jul-2019	2,142
06-Jul-2019 to 05-Jul-2020	2,049
06-Jul-2020 to 05-Jul-2021	2,592
06-Jul-2021 to 05-Jul-2022	7,403
06-Jul-2022 to 05-Jul-2023	14,348
06-Jul-2023 to 05-Jul-2024	15,436
06-Jul-2024 to 05-Jul-2025	19,857
06-Jul-2025 to 05-Jul-2026	22,430
06-Jul-2026 to 05-Jul-2027	18,627
06-Jul-2027 to 05-Jul-2028	15,696
06-Jul-2028 to 05-Jul-2029	14,094
06-Jul-2029 to 05-Jul-2030	12,691
06-Jul-2030 to 05-Jul-2031	11,649
06-Jul-2031 to 05-Jul-2032	10,844
06-Jul-2032 to 05-Jul-2033	10,201
06-Jul-2033 to 05-Jul-2034	9,675
06-Jul-2034 to 05-Jul-2035	9,237
06-Jul-2035 to 05-Jul-2036	1,676
06-Jul-2036 to 05-Jul-2037	0
06-Jul-2037 to 05-Jul-2038	0
06-Jul-2039 to 05-Jul-2040	0
06-Jul-2040 to 05-Jul-2041	0
06-Jul-2042 to 05-Jul-2043	0
06-Jul-2043 to 05-Jul-2044	0
06-Jul-2044 to 05-Jul-2045	0
06-Jul-2045 to 05-Jul-2046	0
06-Jul-2046 to 05-Jul-2047	0

Calendar year of crediting period	Estimated reductions or removals (tCO_2e)
06-Jul-2047 to 05-Jul-2048	0
06-Jul-2048 to 05-Jul-2049	0
06-Jul-2049 to 05-Jul-2050	0
06-Jul-2050 to 05-Jul-2051	0
06-Jul-2051 to 05-Jul-2052	0
06-Jul-2052 to 05-Jul-2053	0
06-Jul-2053 to 05-Jul-2054	0
06-Jul-2054 to 05-Jul-2055	0
06-Jul-2055 to 05-Jul-2056	0
06-Jul-2056 to 05-Jul-2057	0
06-Jul-2057 to 05-Jul-2058	0
06-Jul-2058 to 05-Jul-2059	0
Total estimated ERRs during the first or fixed crediting period	**200,936**
Total number of years	**40**
Average annual ERRs	**5,023**

2.1.14 Physical Parameters (CCB, G1.3)

2.1.14.1 Basic Physical Parameters

Soils

According to the soil map (IGAC, 2022), the soils that predominate in the project activity instance are:

- Typic Hapludox: they are deep, well drained, and extremely acidic soils with low fertility.
- Association of Oxic Dystropepts and Plinthic Tropaquepts: deep to shallow soils, well to poorly drained, extremely acidic and of low fertility.

To a lesser extent, there are also Typic Trópofluvents, Typic Tropaquepts, Oxyaquic Dystropepts, Typic Tropofluvents and Tropic Fluvaquents, which are poorly drained surface soils with high acidity.

The low fertility of the soils, together with the high acidity and concentration of aluminum, make the establishment of crops only possible with the application of fertilizers and other inorganic products that end up further deteriorating the productive capacity of the soils in the long term (Buriticá, 2016).

Temperature

The temperature of the Municipality of Cabuyaro (Meta), ranges between 26 and 27 degrees Celsius; the months with the highest temperature values are January, February, and March; and the lowest June and July. The highest evapotranspiration in the region occurs in the months of highest temperature and lowest rainfall (IDEAM, ND).

Winds

The dominant trade winds come from the East-North direction, with an average speed of 7.2 km/hour. In the morning and in the afternoon the wind speed decreases, at six in the morning the average has been calculated at 1.5 km/hour and at 7 p.m. is 2.9 km/hour. The highest speeds are recorded in the months of December to March. In June, July, and August the average monthly wind speed is between 2.5 and 2.9 km/hour.

Precipitation

Rainfall reaches its maximum in the months of April, May, June, and July, while the minimum corresponds to December, January, and February. There is a dry period that lasts from two (2) to four (4) months and lasts from December to March.

Relative Humidity

Relative humidity varies considerably between dry and rainy periods, it can be estimated at 75%, keeping in mind that its maximum and minimum values are 90 and 65%, respectively. These values are subject to the light intensity that exists during the day.

The Municipality of Cabuyaro (Meta), is located 235 meters above sea level.

Hydrology

The Municipality is rich in water resources, which are located within its geography, being the home and shelter for a great diversity of fauna and flora. Among the main rivers are: El Meta, El Upía, El Humea and El Cabuyarito. The main spouts "caños" are the following: Caño guio, Pirigua, Yarico, Naguayas, El Boral, El Barro, Caño grande, Cañadas, Macapay, San Juanito and Naranjitas. The hydrographic network of the area facilitates the communities between communities and transportation of products.

Topography

The municipality is made up mainly of alluvial clays, with a flat-concave microrelief, and presents periodic flooding. The relief is divided into four classes:

- Upper-level aggradation terrace: It is made up of alluvial clays with localized layers of aeolian sand and layers of gravel at different depths. They are surfaces with flat relief and slopes between 1 and 3%. It has a flat-concave micro-relief with extensive plains interrupted by channels. They are subject to flooding. (Cepeda Rosas, 2019)
- Terrace slopes: This unit belongs to the great landscape called "alluvial plain". It is made up of mixed alluvial deposits. They are inclined surfaces with slightly broken relief with slopes that vary between 7 and 12% and are prone to slight erosion. (Cepeda Rosas, 2019)
- Small alluvial valleys: Flat surfaces with a slope of 0-1 and 1-3%, flat-concave micro-relief, with frequent floods that cross the terraces and an active alluvial plain. (Cepeda Rosas, 2019)
- Alluvial Valley of the Melua and Yucao Rivers: They have slopes that vary between 1 and 12%. The microrelief is concavo-convex. There are lagoons, meanders, and abandoned channels (Cepeda Rosas, 2019)).

2.1.14.2 Types and Condition of Vegetation

The Project is situated in the Altillanura, or eastern plains of Colombia. The characteristic vegetation of the Altillanura is distributed in gallery forests, pastures, and grasslands.

Gallery Forest: It refers to the covers constituted by arboreal vegetation located on the banks of permanent or temporary watercourses. This type of coverage is limited by its width since it borders watercourses and natural drainages. It generally has a narrow, elongated shape, a dendritic-type drainage pattern and is surrounded on both sides by savannas.

According to the depth of the channel and the slope, there are two types of gallery forest, the floodable and the non-floodable. Non-flooded gallery forest has little herbaceous cover and a thin layer of superficial litter. The tree stratum, with evergreen and a few deciduous species, reaches 20 to 30 m in height, the "cachicamo" (*Calophyllum Brasiliense*), the "orejero" (*Enterolobium cyclocarpum*) and

other timber and resin-producing species such as “anime” (*Protium apiculatum*) and “caraño” (*Trattinnickia aspera)* stand out; palms abound, such as “choapo” (*Dictyocaryum lamarckianum*), “cumare” (*Astrocaryum chambira*), or “palma real” (*Roystonea regia*). In the understory can be found “platanillos” (*Heliconia L*.) and herbs with giant leaves such as “tarriago” (*Phenakospermum guyannense*) and “guadua” (*Guadua* spp.). Shrubs are scarce in the lower strata and “piñuela” (*Bromelia pinguin*) stands out forming large patches among the herbs. The floodplain gallery forest occupies wide depressions in the terrain and with abundance of “moriche” (*Mauritia flexuosa*), mixed with timber trees such as “sangre de toro” (*Virola parvifolia*), among other species that are also tolerant of high-water tables almost all year round (Efraín Otero Álvarez, 2005).

Clean pastures: This coverage includes land occupied by clean pastures with a coverage percentage greater than 70%. The implementation of management practices (cleaning, liming and/or fertilization, etc.) and the technological level used prevent the presence or development of other covers.

The most common in the eastern plains of Colombia (Altillanura), is the flat and hilly savannah mainly with “pasto saeta” (*Trachypogon sp*.), a grass specie that tolerates conditions of maximum drought and nutrient deficiency and in extreme conditions reaches little height and grows spaced in a good part of the soil that appears naked.

This type of grassland has an herbaceous stratum, which in good soil conditions can reach 40-60 cm in height and is mixed with other species of *Cyperaceae* with threadlike leaves and tall grasses of the genus *Hyptis*, with abundant labiate leaves and highly aromatic white flowers. Occasionally low bushes of *Melastomataceae* are found (Efraín Otero Álvarez, 2005).

Weedy grasses

They are the covers represented by land with grasses and weeds forming associations of secondary vegetation, mainly due to poor management practices or the occurrence of abandonment processes. In general, the height of secondary vegetation is less than 1.5 m.

This is another type of savannah in which the grassland matrix is maintained, but mixed with tree species, it is the wooded savannah; in the savannah known locally as “saladillal”, saladillo (*Caraipa llanorum*) trees are spaced sufficiently apart to maintain good grass cover (Efraín Otero Álvarez, 2005).

Grasslands or Stubble

Cover constituted by a plant community dominated by typically herbaceous elements developed naturally in different densities and substrates, which form a dense cover (>70% occupation) or open cover (30% - 70% occupation).

A grass is a non-lignified or barely lignified plant, so that it has a soft consistency in all its organs, both underground and epigeal. These plant formations have not been intervened or their intervention has been selective and has not altered their original structure and functional characteristics. They are commonly known as stubble. It is to be expected that over time and in the absence of fire, the large stubble extensions will join each other or with the neighboring gallery forests and thus constitute large extensions of highland forest, with a high diversity of flora and fauna, surrounded by for sheets (Efraín Otero Álvarez, 2005).

2.1.15 Social Parameters (VCS, 3.18; CCB, G1.3)

The municipality of Cabuyaro is located in the department of Meta which is 85,635 square kilometers (Economicos, 2022). To the north it limits with the municipality of Barranca de Upía, to the south with the municipalities of Puerto López and Cumaral, to the east with the Department of Casanare and to the west with the Department of Cundinamarca (Cabuyaro M. , 2022). The foundation of Cabuyaro dates back to the second half from the 18th century, located on the left bank of the Meta River. Historically, Cabuyaro has been a port in the navigation of domestic and foreign steamships from the

Meta River to the Atlantic Ocean, whose distance from the port of Cabuyaro it is 679 nautical miles. A wide range of international products entered this port and the ships have been supplied with agricultural production from the area. Electricity was brought in 1956 to the municipality (Diagnostico Socio-Economico del Area de Proyecto Los Espejuelos, 2016).

The department of Meta has been one of the largest affected in the country by the armed conflict and the presence of armed groups outside the law (mainly *Fuerzas Armadas de Colombia Revolucionarias*- "FARC"). The groups fought for the power of strategic corridors of the department and the most suitable areas for cultivation, processing, and transportation of coca. Since 1998, the government attempted to regulate the presence of these groups through different Peace agreements, some more effective than others. At present, Cabuyaro has not been a municipality in which the consequences of the armed conflict have been felt in the civilian population. However, Cabuyaro has been characterized as receiving population displaced from other areas due to the conflict. In addition, as the municipality stands out as one of the most relevant oil productions in the country, it is a quiet area in terms of public order.

The municipality of Cabuyaro, according to DANE 2018 census, has a total population of 5,432 inhabitants of which 2,995 are men and 2,437 are women. The municipality has a rural population of 1,667 (close to 30%) inhabitants and an urban population of 3,765 inhabitants, with a population density of 5 inhabitants per square kilometer. Regarding the age ranges of the population, the municipality has 3,408 people between 15 and 59 years of age, as an economically active population. While 2,024 people, are economically inactive population, that is, people under 15 years of age and over 59 years of age (DANE, 2018).

In the urban area of the municipality, the following services are available potable water (85% of the population have access), sewage (60% of the urban population have access), and electricity (82% of the population have access). In rural areas such as Viso and Guayabal de Upía, inhabitants have access to water through deep wells, but distribution is not constant, and the water quality is not suitable for consumption. Due to the lack of sewage systems, most homes have non-technical septic tanks.

The municipality's main economic activities are livestock production, agriculture, and fishing. In terms of agricultural production, the most common short-term crops are rice which represents 67% of this category followed by soy and corn. In terms of semipermanent crops for consumption the following crops are grown banana, plantain, cassava, citrus, mango, cashew, and papaya which occupy a total of 390 hectares. While permanent crops like palm oil are increasing in area, occupying 8,000 hectares in 2008, to 11,531 ha in 2011, representing an increase of 44% in four years. According to the National Federation of Palm Growers Oil (Fedepalma), by 2013 there were more than 12,000 hectares cultivated with palm in Cabuyaro.

As far as animal production, livestock is the most predominant activity with 46,369 animals mostly under extensive systems. From this total, there are animals for doble purpose production (meat and milk), and single purpose production (milk). There is also swine production but in small quantities, with a total population of 305 registered animals. The meat is mainly sold in Villavicencio and Bogotá.

In terms of fish production, the most predominant species are cachama (16%), red tilapia (40%), bocachico (44%), and in less percentages palometa, catfish, amarillo, and dorado. People used to fish from the river, but over time because of the decreasing amounts of fish they have turned into intensive fish production if they have funds available. In the other hand, fishermen that now have other job opportunities like the oil sector or in the palm oil farms or processors prefer the daily jobs (Guaycaramo, 2016).

At the beginning of the 2000s, the department of Meta remained close to the average national GDP, but later in 2008 there was a noticeable increase that made it exceed the national average. By 2016, Meta's GDP represented 3.3% of the national GDP (28,693,000 COP). This evident economic growth didn't necessarily translate into a local economic bust, as the unemployment rate during the same period in Meta oscillated poorly between 12.0 and 9.5 points (Guaycaramo, 2016).

The largest productive sector for employment in Cabuyaro is the oil field (85% in 2016), followed by intensive agricultural production such as palm oil production, and in small percentages, civil construction, hunting and fishing.

In the municipality there are eight registered community-based organizations which promote agricultural and livestock production in the area. Through these organizations farmers and ranchers seek access to credits and projects and/or market opportunities. These 8 organizations are included in Table 4.

Table 4. Name and description of community base organizations in Cabuyaro.

CBO Name	Description
Asociación de palmicultores de Guarupay (ASOPAY)	Provides resource management for the implementation of the oil palm projects/production
Asociación de productores agropecuarios del Viso de Upía (ASOPAVO)	Farmers and ranchers' association from Viso Upía
Asociación de agricultores del Viso de Upía (AGROVISO)	Farmers' association from Viso Upía
Asociación de productores agropecuarios del Yarico (AGROPAY)	Farmers and ranchers' association from Yarico
Asociación de Pescadores (ASPECAB)	It strives for economic prosperity of the organized fisherman and their families.
ASOAGRUPIN	Cacao Farmers association from Cabuyaro and Villavicencio
ASOCAUPIA	Cacao Farmers Association from Guayabal and Barranca de Upía
Asociación de Cacaoteros de Cabuyaro	Cacao farmers Association from Cabuyaro

According to the Colombian Institute for Rural Development INCODER del Meta, the adjudication of vacant lots in the Municipality of Cabuyaro was given according to the Family Agricultural Unit (UAF), which in this case is 34 hectares. Among the requirements that must be met by applicants to get land, is having occupied or operated the property directly for 10 years continuously.

For Cabuyaro, 47% of the urban population is active and for the rural areas it is 45%, showing more opportunities in the urban area. The most common jobs available in the area are agriculture (palm oil plantations or individual farms), livestock production, oil production (wells), fishing, and other jobs such as welding, construction, and laborer.

In terms of education, there is a total of 10 schools (including all levels, pre kinder, elementary, middle, and high school) in the urban and rural area of Cabuyaro. In the rural area there are mainly elementary level schools, in the case of the rural communities of Viso and Guayabal de Upía there are two schools. The high school level is only located in the urban area of Cabuyaro, reason why the % for this level drops dramatically to 24%, as shown in

Table 5. The illiteracy rate for the municipality for 2008 was 14%.

Table 5. Student distribution per age group in the Cabuyaro Municipality

	Total population in the age group	Registered students	% covered by school system
Pre-Kinder	83	74	89
Elementary/Básica Primaria (1st-5th grade)	419	385	91
Middle School/Básica Secundaria (6th-9th)	354	199	56
High School (10th-11th)	361	65	24

In terms of health services available, there are five community health centers in the urban areas, and 4 in the rural area. These centers have a general doctor, radiology, odontology, and emergency services. Critical medical cases are transferred to the Villavicencio hospital (Llanos, 2008).

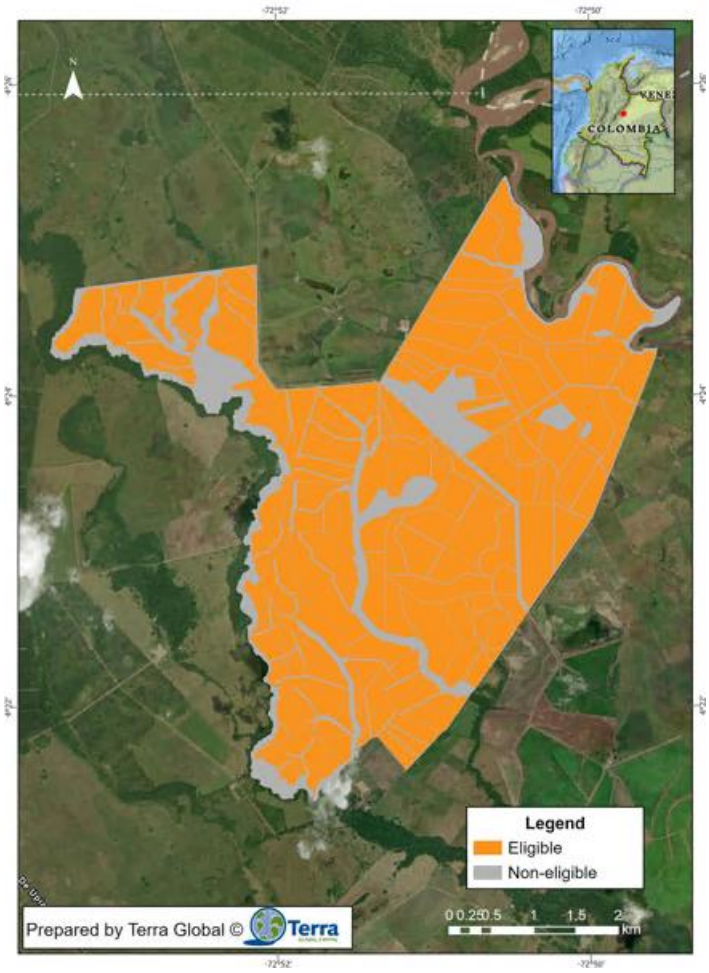
2.1.16 Project Zone Map and Project Location (VCS, 3.11, 3.18; CCB, G1.4-7, G1.13, CM1.2, B1.2)

As a grouped project, the project boundary includes any areas in the Orinoquia Region in Colombia where a new Project Activity Instances that meets the requirements in Section 2.1.4 can be added in the future, as shown in Map 1. Future instances shall not overlap with the project area of another VCS AFOLU project.

Map 1. Project Eligibility Area-Geographic Project boundary for potential future expansion.

The Project Activity Instance is in the department of Meta, Colombia, in the municipality of Cabuyaro at coordinates 4°23'24"N 72°51'26"W, approximately 90 km east of Villavicencio, the capital of the department, as show in **Error! Reference source not found.**. The Municipality of Cabuyaro (Meta), is located at a height of 235 meters above sea level. The initial Project Activity Instance encompasses a total area of 2,253 hectares. The eligible and non-eligible areas are on *Map 2*.

Map 2. Project Activity Instance Eligibility

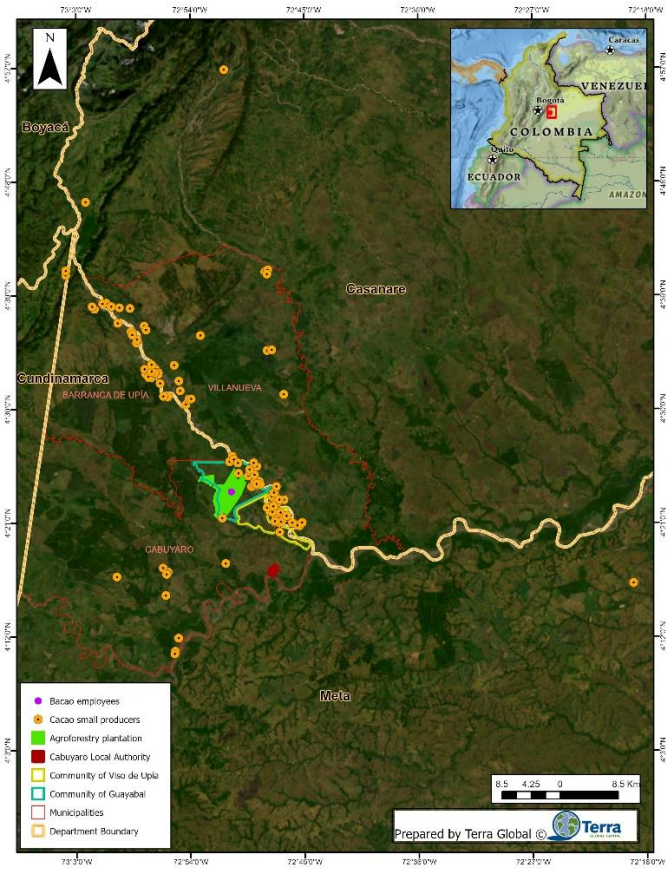


The Project Area is the area in which activities are implemented that generate GHG emission reductions or removals, which has met the applicability criteria and is being monitored and verified to generate Verified Carbon Units (VCU). Coordinates for the project area are 4°23'24"N 72°51'26"W.

The Project Zone is defined as the area encompassing the Project Activity Instance(s) which is impacted by social benefits such as facilitating agricultural extension, technical training on agroforestry systems and market access to small farmers growing cacao to provide alternative livelihoods and community development for them and their families, as shown in Map *3*. The goal is to include farmers from surrounding Municipalities such as Cabuyaro, Villanueva and Barranca de Upía. Farms are located in the following veredas Buenos Aires Bajo, El Amparo, Flor amarillo, El encanto, Caiman Bajo, Caracoli, Vegas del Upia, Leche Miel, Las Mercedes, Guayabal, Viso de Upia, El Vergel, El Yarico, La Embajada, San Isidro, San Miguel (Guarupay), Las Moras, Pavitos, and San Ignacio. The number of farmers included will increase according to the expansion of the activities. Climate and biodiversity impacts are limited to the Project Activity Instance.

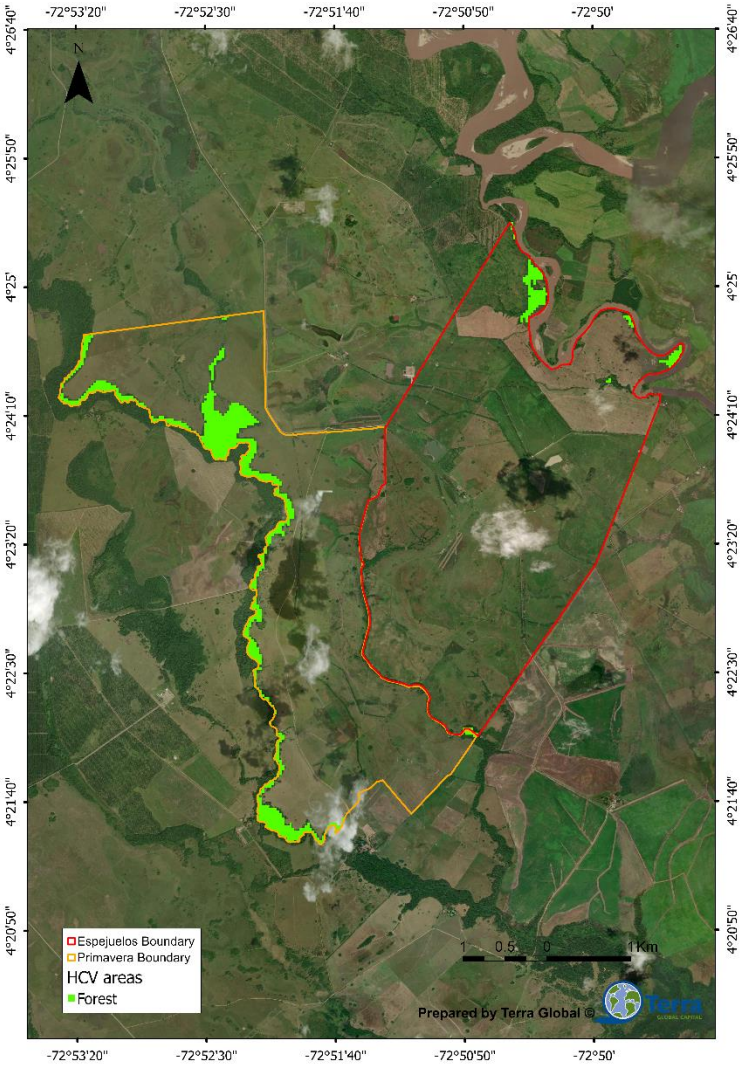
Potential communities that may be included in the project zone at future verifications might be located in the municipalities of Puerto Lopez, Monterrey y Sabana Larga.

Map 3. Project Activity Zone



The gallery forest was identified as High Conservation Value (HCV) areas in the Project Activity Instance (Map 4), as it is an important ecosystem that provides habitat for preservation of a variety of species.

Map 4. HCV areas in the Project Activity Instance 1



2.1.17 Project Activities and Theory of Change (VCS, 3.6; CCB, G1.8)

One of the main objectives of the project is to promote Sustainable Agriculture Land use Management (SALM) practices for improving degraded lands and mitigation of greenhouse gas emissions. SALM activities promoted by the project include a large number of practices which go beyond the objective of soil carbon sequestration. The project's theory of change proposes the following framework:

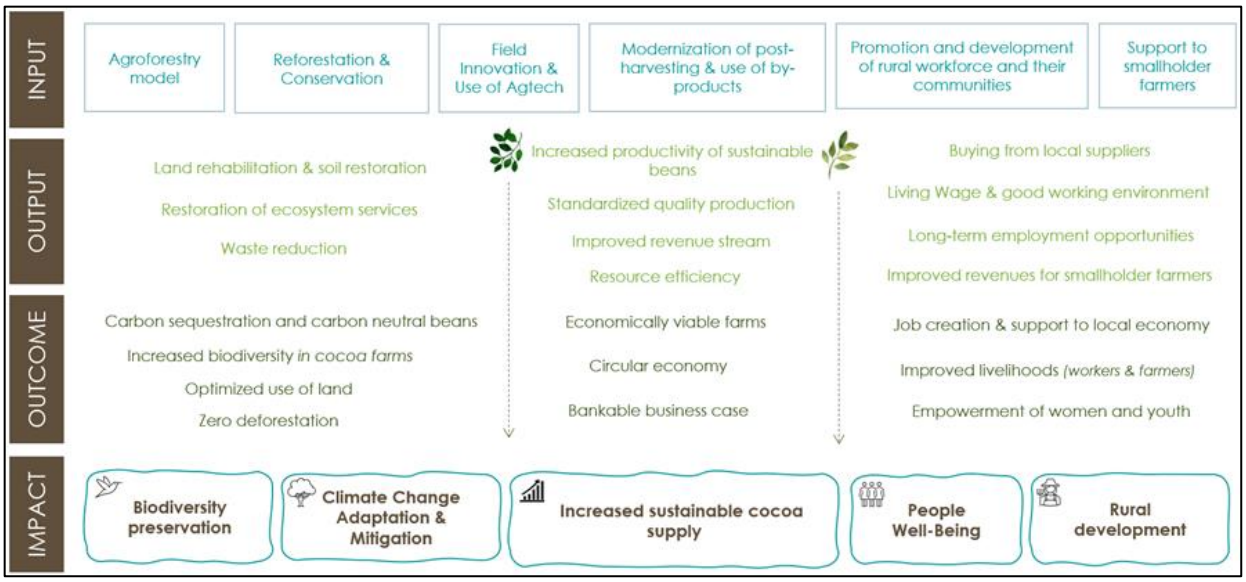


Figure 1. Project's Theory of Change (ToC)

The proposed project activities are centered on establishing a multilayer agroforestry system which is composed of cacao, a temporary shade specie (*Glyricidia sepium*), and a permanent species used as a windbreak (*Cariniana pyriformis*) to increase soil organic carbon. In addition to planting and managing cover crops, the farm will also conduct proper residue management and ensure an effective use of nitrogen fertilizers. The system will be established in different phases during the next 5-7 years as shown in Map 5.

Map 5. Project Activity Instance showing progressive planting to establish the multilayer agroforestry system.

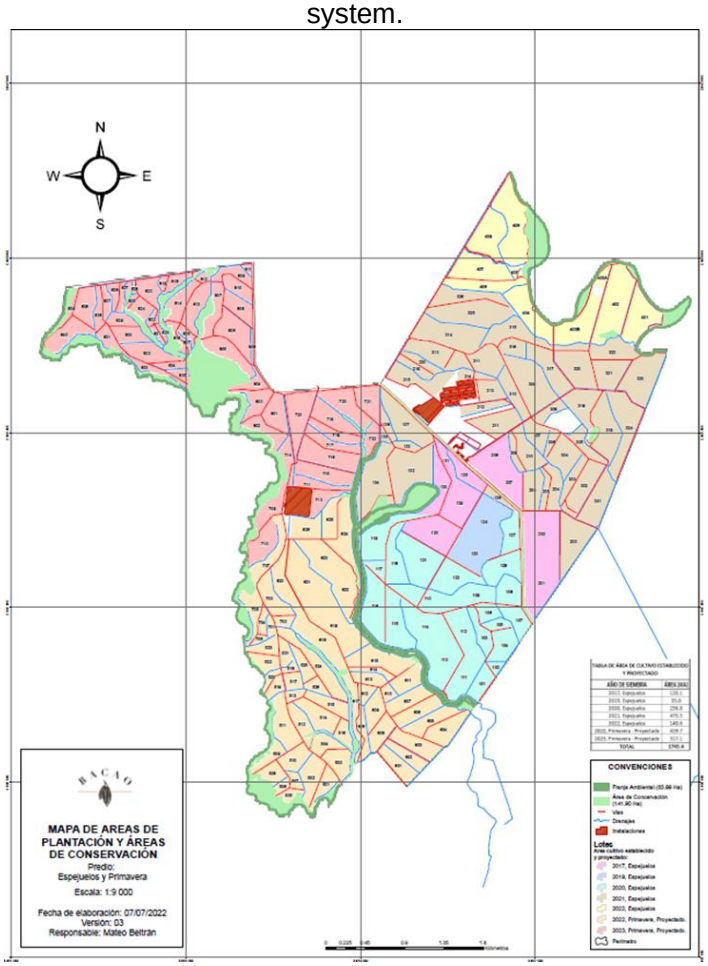


Table 6 lists and describes the agricultural practices which are accounted in terms of emission reductions and carbon sequestration.

Table 6. Agricultural practices that will be implemented for emissions reductions and carbon sequestration.

Project Activity	Description
Establishment of Agroforestry for cacao production on degraded pastures	The establishment of the agroforestry system will increase tree cover which contributes to increased biomass above and belowground including soil carbon. Several practices will be implemented: • Tree planting of *Cariniana pyriformis* along plots, in the boundaries, borders and roadsides which will create a micro-climate for cacao and will serve as a windbreak to stabilize the soil. • Tree shading of a perennial crop, cacao, in a combination with temporary trees (*Glyricidia sepium*). This system will potentially increase the productivity of the soils through increased litter inputs, enhanced microclimatic conditions and soil nutrient availability.

Project Activity	Description
Residue management	Residues from cacao as well as deciduous tree litter will be left on the soil. This organic matter will create favorable microclimatic conditions that optimize decomposition and mineralization of organic matter and protect soil from erosion.
Cover crops	Cover crops will be planted on bare soil to reduce erosion and mineralization of organic matter. Kudzu (*Pueraria phaseoloides*) and Desmodium (*Desmodium adscendens*) are fast growing species that will be planted after soil has been prepared. Once it covers the soil, it will be mowed/pruned every 260 days to incorporate the biomass to the soil.

Other proposed outputs and activities will be conducted to achieve the overall goals of the proposed theory of change. The following list of activities describes how these goals and objectives will be achieved.

2.1.17.1 Objective: Land rehabilitation & soil restoration through agro-ecological practices to restore degraded land.

Output: Soil restoration through improving health and fertility

Activities:

- Assess soil and water conditions through periodical analysis
- Investigate, design, and implement the agroforestry system – including types of species (native and introduced) adapted to the area, density of planting, soil improvement practices

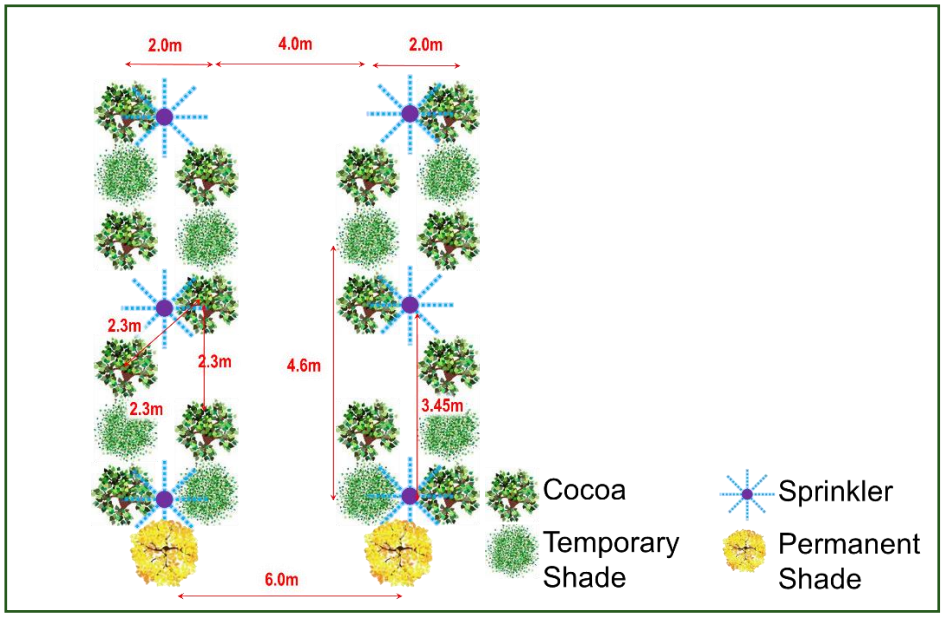


Figure 2. Diagram of agroforestry planting scheme.

Table 7. Planting density for agroforestry system.

Agroforestry components	Role	Density (plant/ha)	Comments
Cacao (varieties CCN51, FEAR5 /FTA2/FSA)	Main Crop	1,450	Planting scheme: Double row: 2.3m x 2.3m x 4m
Mataraton (*Glyricidia Sepium*), **Botón de oro (*Tithonia diversifolia*)**	Temporary shade for main crop and cover crop	1,450 (2017) and 850 (since 2020)	Planted in between the cacao plants (same lines). One year prior to cacao plants
Abarco de Río (*Cariniana pyriformis*)	Permanent shade and Windbreaks	60 (120 ha-2017) and 33-108 (since 2019)	Planted to prevent wind damage and reduce erosion, • Contour lines around plots. Planting scheme: 6 mts. between plants. Density: 33 trees/ha • In between cocoa rows • Planting scheme: 40 m between rows x 2.3m between trees • Density: 108 trees/ha • Across cocoa rows. Planting scheme: 40 m between rows x 3.45m between trees • Density: 105 trees/ha
Kutzu, Desmodium, Mucuna	Cover Crop	4kg/ha	

- Design and implement an irrigation system for effective use of water. A micro sprinkler system will be established to provide the required amounts of water to the plants through very fine drops, preventing soil erosion caused by water. It also maintains favourable soil conditions (moisture) for the maximum growth and development of the agroforestry system.
- Establish and management of green covers in the soil. Different species such as Kudzu (*Pueraria phaseoloides*), Desmodium (*Desmodium adscendens*), Mucuna (*Mucuna Pruriens*) are planted in the soil to provide cover. These species (as shown in Figure 3) are planted in between the cocoa tree lines.

Figure 3. Cover crop planted in cocoa lines.

- Organic matter into the soil. Organic matter from the controlled decomposition of postharvest material from cocoa (chopped and mixed with lime) will be reincorporated into the soil to improve organic matter content and fertility.

Figure 4. Application of organic matter around cocoa plant.

Output: Increasing biomass (aboveground and below ground)

Activities:

- Nursery establishment and management to reproduce plants for agroforestry system

Figure 5. Nursery plant production.

- Staggered planting of main crop-cacao. The varieties to be planted are CCN51, FEAR5 /FTA2/FSA, in a distance of 2.3x2.3x4 with a total density of 1,450 plants per hectare. The cocoa trees are subject to an established pruning regime where trees are cut at 30 cm height for multiple stems to grow and manage the maintenance practices better.
- Staggered planting of temporary shade trees. Nitrogen fixing species - *Glyricidia sepium* is planted one year prior to the cocoa trees to provide temporary shade. This specie is planted in between cocoa plants, with a density of 850 trees per hectare. The temporary shade is pruned to maintain a 35% of shade, and progressively eliminated through the first 4 years. In year 2, 50% of the trees are eliminated, then in year 3 the density is reduced to 25% and finally in year 4, 10% of the density is left. All the pruned material is chopped into smaller pieces and left in the soil for decomposition.

Figure 6. Temporary shade interplant with cocoa trees.

- Staggered contour planting of permanent shade to serve as a windbreak to prevent increased surface water runoff and soil erosion. The windbreak is structured by rows of trees (Abarco de

Río-Cariniana pyriformis) planted in such a way that will develop to a high and dense barrier in order to protect the cocoa from mechanical damage and soils from wind erosion. The barriers have a direct effect on erosion by absorbing the momentum of the wind flow, preventing soil dragging and, on the other hand, an indirect effect by inducing changes in the area's microclimate by blocking the flow of heat, humidity, and weather conditions. Plants are produced in the farm nursery, planted in the plots' contour and in between plots. Permanent shade is not pruned.

Figure 7 Windbreak nursery production.

Figure 8. Windbreak being transplanted at the field.

Output: Restoration & Conservation of forest areas

Activities:

- Conservation of areas with native species (morichales)
- Promote and monitoring the Zero deforestation policy (in plantations and smallholder farms)

Output: Innovation, use of agricultural technology and good agricultural practices

Activities:

- Design and implement a fertilization plan based on soil needs (analysis) through ferti-irrigation
- Follow up fossil fuel emission
- BPA (Good Agricultural practices) and HSE (Health, Security) compliance
- Maintain environmental permits with local authority-CORMACARENA

2.1.17.2 Objective: Support an inclusive model among communities around the project activity instance

Output: Improve working conditions for project's workers

Activities:

- Social benefits provided to workers in plantations (Life policy payments, social security, food vouchers (based on performance),
- Establish living wage program to improve workers livelihoods
- Perception of improved wellbeing of workers and their families according to local conditions
- Facilitate employee Training (inc. training on environmental, technical, and occupational risk prevention)

Output: Promote inclusion of local actors

Activities:

- Inclusion of women in workers' population
- Develop local partnerships

Output: Reduce the level of vulnerability of smallholder farmers through improve cocoa farm management and productivity

Activities:

- Identify and select smallholder farmers to be included in Impulsa network
- Provide technical assistance farmers to establish or maintain agroforestry systems (topics such as pruning techniques, pest control, soil fertility, diversification)
- Conduct Farmers Field Schools to train small farmers on sustainable practices (pruning, soil fertility, shade management in agroforestry systems, diversification)
- Facilitate access to seedlings to small farmers

Output: Direct and effective commercialization system of cacao for small farmers.

Activities:

- Establish a direct and transparent buying system of wet cacao beans (purchase at farmgate)
- Establish collection routes to purchase wet cacao
- Digital payments to farmers for purchased product (paid within a week)

Output: Increase biodiversity in the project area and awareness of the importance of conservation

Activities:

- Provide training on existing biodiversity and conservation to workers
- Locate camara traps for continuous monitoring of biodiversity in Project Activity Instance

Output: Monitoring, Reporting, Verification:

Activities:

- Conduct biomass plot inventory and satellite imagery analysis of carbon stocks
- Conduct training on biomass inventory data collection
- Acquire and process satellite imagery
- Perform QA/QC on biomass inventory stocks and incorporate into monitoring report
- Conduct social appraisals per VCS/CCB requirements
- Collect, review, and analyse data collected on social appraisals (household social surveys/participatory Rural Appraisal)
- Conduct social surveys for every verification period
- Perform QA/QC and incorporate into monitoring report.
- Conduct biodiversity monitoring per VCS/CCB requirements.
- Training on biodiversity monitoring/partnership with local university to collect data on biodiversity yearly. Gather, prepare, and disseminate on-going monitoring reports in line with VCS/CCB monitoring.
- Conduct biodiversity assessment (for every verification period).
- Perform QA/QC and incorporate into monitoring report.

The project gathers data on the activities they are responsible for monitoring.

- Yearly monitoring reports are prepared and distributed.

2.1.18 Sustainable Development Contributions (VCS, 3.17)

Recognizing the effects of climate change on its development, Colombia is proactively prioritizing low carbon growth resilience and environmentally sustainable development principles in its planning and green growth strategy. Thus, the Government of Colombia (GoC) announced in December 2020 that the country will commit the National Determined Contributions (NDCs) to a 51% emissions reduction by 2030 with respect to BAU (Business as Usual) and reach carbon neutrality by 2050. Colombia's Long-Term Climate Strategy 2050, led by the Ministry of Environment and Sustainable Development, is a State policy instrument that seeks to define socioeconomic development objectives and realistic long-term goals for reducing greenhouse gas emissions to strengthen Colombia's climate resilience by building a carbon-neutral development with high adaptability ((AFD), 2022).The GoC made an emphasis on sustainable management of its immensely rich natural capital (mainly nonrenewable oil and mining, but also land, water, biodiversity, and forests), and also committed to net deforestation of natural forest will be reduced to 0 hectares/year by 2030.

One of the three engagement areas of the government strategy was ensuring sustainable growth with enhanced climate change resilience. An important focus of the pillar was to develop Law 1931 (2017) which establishes Nationally Determined Contributions (NDCs) and the National Climate Change Policy (NCCP). which set the strategy to reduce vulnerability and prepare the country for climate change adaptation and leverage opportunities derived from the voluntary carbon market. Colombia has been a partner country in the REDD+ where it supports market base mechanisms and has been

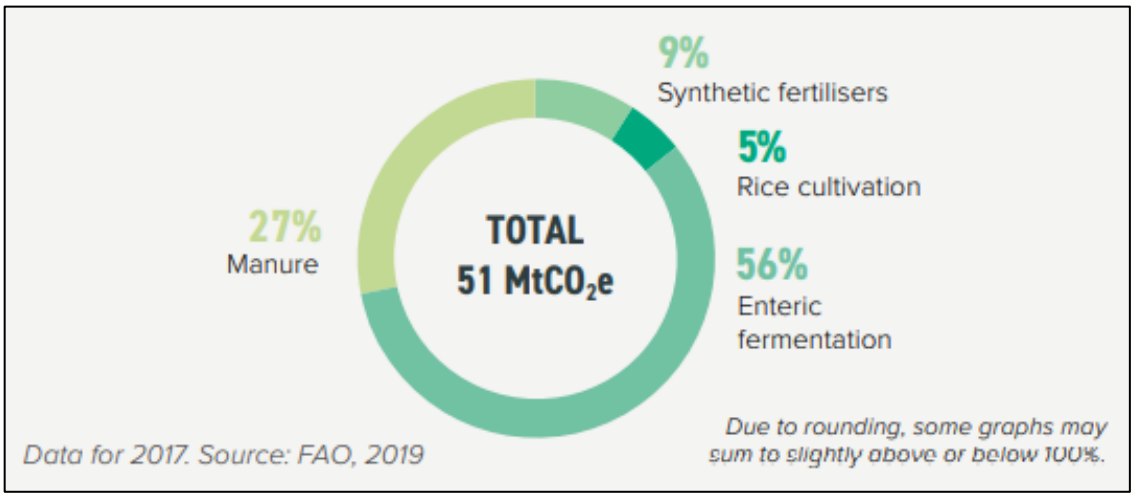
part of the World Bank Forest Carbon Partnership Facility (FCPF), these two programs set a solid base and roadmap to develop the above-mentioned policy.

Regarding the development of carbon markets, the following steps have been taken by the GoC:

- A national inventory of GHG emissions
- The National Registry of Reduction of Emissions and Removal of Greenhouse Gases (RENARE) will be created in order of enabling transactions in carbon markets
- The National Climate Change Information System is created as an instrument for mandatory consultation in the decision-making on this matter.
- The national carbon tax was created with Law 1819 of 2016 in order to encourage the mitigation of greenhouse gases (GHG). The lax consists of the payment of a fee on those fuels, which, through their combustion, release GHG, for therefore, the passive subjects will be all those users who acquire fossil fuels from the producer or importer and/or the producer or importer who makes withdrawals for their own consumption.
- The Low Carbon Development Implementation and Follow-up Plan is created to follow up on the goals established within this law (Makenzie, 2022).

Deforestation-driven emissions accounted for almost half of emissions in 2014 and are mainly driven by land use change toward pastureland, crop land and illegal activities. Changing this trend represents a significant opportunity for Colombia to reduce its emissions. The largest sources of GHG emissions in the agricultural sector are enteric fermentation (56%), livestock manure (27%) and the use of synthetic fertilizers (9%), as shown in Figure 9.

Figure 9. Major sources of agricultural emissions in Colombia.



According to Rogelj et al. 2018, methane emissions (mainly enteric fermentation) need to decline to 10% by 2030 and to 35% by 2050 (from 2010 levels). While nitrous oxide emissions (mainly from fertilizers and manure) need to be reduced by 10% by 2030 and by 20% by 2050 (from 2010 levels) (Transparency, 2020).

The goals to reduce emissions related to agriculture are the following:

- Increasing GHG removal through forests and sustainable production
- Efficient use of fertilizers

- Education and prevention of deforestation and sustainable/organic agriculture
- Use of biomass for biofuel and bioenergy production

In this scenario the project is proposing to establish a sustainable agroforestry system that will contribute to GHG removals and contribute to the efficient use of fertilizers, in addition to providing small farmers with education about sustainable agriculture through Impulsa.

In terms of the Sustainable Development Goals (SDGs), Colombia has committed to the fulfillment of the 2030 Agenda. The SDGs that the project will contribute through the implementation of activities are the following, details of the specific indicators can be reviewed in Table 8.

Table 8. Sustainable Development Goals and Project Targets

Row number	SDG target	SDG indicator	Net impact on SDG indicator
1	1.1	1.1.1 Proportion of the population living below the international poverty line, disaggregated by sex, age, employment status, and geographic location (urban or rural)	The project will contribute to this target by focusing on reducing the living wage gap of employees working for the project.
2	2.1	2.1.2 Prevalence of moderate or severe food insecurity in the population	The project will contribute by supporting improved nutrition to field employees.
	2.3	2.3.2 Average income of small-scale food producers, by sex and indigenous status	
	2.4	2.4.1 Proportion of agricultural area under productive and sustainable agriculture	The project will recover degraded areas and convert them into sustainable agroforestry systems
3	3.8	3.8.1 Coverage of essential health services	The project will guarantee 100% social insurance and access to healthcare for employees.
4	4.3	4.3.1 Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex	The project will contribute to this goal by conducting trainings to the employees
5	5.1	5.1.1 Whether or not legal frameworks are in place to promote, enforce and monitor equality and non-discrimination on the basis of gender	The project will contribute to this goal by not having a salary gap between men and women for each employee category. Also, HR policies will promote inclusion and empowerment.
6	6.6	6.6.1 Change in the extent of water related ecosystems over time	The project will contribute to this goal by monitoring the water intake in Project Activities and will follow the limits of national regulations
7	8.2	8.2.1 Annual growth rate of real GDP per employed person	The project will pay wages that allow decent living conditions for workers. In terms of achieving the specific targets.

Row number	SDG target	SDG indicator	Net impact on SDG indicator
8	10.3.1	10.3.1 Proportion of population reporting having personally felt discriminated against or harassed in the previous 12 months on the basis of a ground of discrimination prohibited under international human right law	The project will contribute to this goal by following HR guideline against discrimination and harassment
9	12.2	12.2.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP	The project will implement sustainable practices such as efficient use of water through irrigation systems, crop diversification, and efficient use of fertilizers. 100% of the production will be certified on Good Agricultural Practices. .
	12.4	12.4.2 (a) Hazardous waste generated per capita; and (b) proportion of hazardous waste treated, by type of treatment	
	12.5	12.5.1 National recycling rate, tons of material recycled	
	12.6	12.6.1 Number of companies publishing sustainability reports	
	12.8	12.8.1 Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment	
10	13.2	13.2.2 Total greenhouse gas emissions per year	The project will increase carbon sequestration by boosting biomass production and organic carbon in the soil through the implementation of sustainable agroforestry systems that promote crop diversification, soil health and no deforestation.

2.1.19 Implementation Schedule (CCB, G1.9)

A comprehensive implementation workplan has been developed and is included in Table 9 provides the timeline for the key milestones for initial implementation.

Table 9. Timeline for project development and implementation

Date	Milestone(s) in the project's development and implementation
Dec 2016	Land was purchased by Bacao
2016	Socio-economic diagnosis of the area around the Project Activity Instance
Jul 2017	Project Start-Soil preparation and planting of first phase of agroforestry system (120 ha). Start of GHG accounting period for first monitoring period
2021-2022	Agreements with Jose Gerardo Erazo - later "DyA" who provides support to workers and their families (agreements provided to VVB)
2017-2019	Signed contract with Activos, local company that was responsible for temporary hiring
2018	Signed contracts with local companies (Bio entorno, Ecolcim, Municipality) who are responsible for waste management
2019	Soil preparation and planting of second phase of agroforestry system (36 ha)
2019	Signed contract with Nexarte, local company, responsible for temporary hiring
2020	Soil preparation and planting of third phase of agroforestry system (249 ha)
Mar 2020	Social Impact Baseline created using Social data from Workers Survey
2021	Soil preparation and planting of fourth phase of agroforestry system (475 ha)
Jun 2021	VCS/CCB Project start-Signed contract with Terra Global Capital who provides technical support for carbon development and introductory meeting
Jan 2022	Confirm VCS project eligibility and proper methodology to be used
Jan 2022	Define and review long term implementation plan
Jan-April 2022	Gather field data (Biodiversity, Biomass and social data-living wage, HCVs)
July 2022	End of GHG accounting period for first monitoring period
July 2022	Establish procedures for on-going monitoring responsibilities.
July 2022	Develop 1st VCS/CCB monitoring report
October 2022-Jan 2023	Project Socialization
Jul 2023	Conduct and finalize VVB field visit audit
Jul-September 2023	VVB findings and reply to findings by developer

Date	Milestone(s) in the project's development and implementation
June-July 2024	Validation and Verification reports completed by VVB
March 2024	Issue VCUs
On-going (July 2017 to July 2057)	Monitor and report performance (operational and impact), refer to Monitoring Plan for scope, roles, responsibilities and schedule
July 2017 to July 2057	GHG accounting/CCB benefit period

2.1.20 Risks to the Project (CCB, G1.10)

As this project is registered under the VCS, a comprehensive risk assessment has been prepared for the VCS risk buffer determination. This identified both natural and human induced risks which are documented in the Risk Report in Annex. The non-permanence risk analysis was assessed for the first project activity instance. For future instances to be added, the analyses, where required, shall be assessed following the Standard's instructions for grouped projects.

In addition, other risks have been identified by project participants, and the measures to mitigate these risks are detail in Table 10.

Table 10. Risk for the project and actions for mitigation.

Identify Risk	Potential impact of risk on climate, community and/or biodiversity benefits	Actions needed and designed to mitigate the risk
Lower/non profitable cacao market price	Affect Bacao's revenues and investment capacity to continue sustainable management of the plantation	-Diversify markets options -Negotiate floor price -Constant monitoring of cacao market prices
Fire	Uncontrolled fire can burn the agroforestry system area	-Establish a protocol for fire prevention to forbid burning any kind of vegetation or open fires for the establishment of crops. -Establish a policy to refrain from smoking inside the plantation because cigarette butts can cause fires. -Plant shade trees and the use of the irrigation system
Longevity	The agroforestry system could be replaced for another crop if another more profitable option presents itself.	Bacao will negotiate a 15-year offtake, in the case the farm does not produce the predicted volumes, so they can cover the deficiency by buying cacao on the market.

Identify Risk	Potential impact of risk on climate, community and/or biodiversity benefits	Actions needed and designed to mitigate the risk
		The project will also establish a project longevity agreement to ensure management activity maintenance throughout the crediting period
Lack of skilled labor force to implement project activities	Lack of efficiency in the implementation of project activities	HR support, retain trained staff, provide support and constant training to new staff, establish alliances with other institutions for training
Lack of safety conditions to implement project activities	Safety issues with staff and plantation production	The company will maintain a low profile at the local and national level to avoid potential threats
Lack of national regulations on cacao production and marketing	No price regulation	Advocacy at the local, regional, and national level

2.1.21 Benefit Permanence (CCB, G1.11)

The project lifetime is that of 40 years; however, the project is designed to create benefits and impacts that are expected to last far beyond this time frame.

The efforts to institute agroecological and regenerative farming practices to this region of Colombia are part of a larger, longer-term effort to effectively break the cycle of unstainable land management that has caused the continued degradation of these lands. The restoration of the soil, the increase in above and below ground biomass, the maintenance and conservation of remaining forested areas, and the efficient use and management of available resources, all constitute practices that we hope will be adopted and maintained well after the crediting period of the project, and as part of a larger movement to revolutionize the way agriculture and food-production are practiced in the region to finally bring about a much needed long-term sustainable natural resource management approach.

Comparing agricultural practices focused on maximizing short-term yields to the adoption of long-term carbon positive farming is beginning to show that the later has lower costs, lower risks, and higher productivity, even without the added value of carbon revenue. The integrative carbon positive systems to be implemented and promoted in this landscape focus on such critical components as soil health and fertility, which are prioritized to then build and maintain the long-term productivity of the land. Local employees and farmers will now be afforded the practical and accessible knowledge and technologies needed to measure, monitor, and observe the changes of carbon in the soil and reduction in nitrous oxide, helping them to better understand the possible effects of these on their crops and their profits. Through the continued adoption of these sustainable carbon positive practices, future farmers and stakeholders in the region will be able to increase their long-yield and crop revenue while lowering their costs and reducing their risk.

These long-term practices and benefits are also all achieved by creating a more inclusive, modern, and sustainable supply chain where human rights are respected, existing biodiversity is protected and improved upon, and where local employees and farmers are given the opportunity to continue to improve upon their livelihoods. Achieving this goes beyond ensuring proper incomes and premiums are in place, and also involves supporting workers and neighboring farmers to increase their long-term productivity by helping them develop alternative farm models where communities can continue to find decent job opportunities and wages, and by building local capacity and providing on-going technical guidance and training for everyday farming decisions that will continue to reap benefits long after the project's crediting period is over. Through these longer-term capacity building and employment opportunities, local communities and stakeholders will continually be able to reduce their vulnerability through improved management and productivity approaches, will have more and better opportunities to access markets and commercialization systems, and will have access to more inclusive and beneficial sustainable development models for their hopes and aspirations.

2.1.22 Financial Sustainability (CCB, G1.12)

This project was started knowing that it would operate with negative cumulative cashflows for the first several years before breakeven, considering the costs of establishing new agroforestry systems for cacao and incremental carbon revenue. The project is currently projected to break even in 19 years (2037), which is dependent on the yield of cacao, cacao market prices, actual GHG emissions removals produced and carbon prices. There is no prepaid component of this project, so the negative cashflows of the project's early years will be covered by a combination of equity investments into Bacao, shareholder loans, and debt. Bacao is capable of covering all negative cashflows in the project's early years.

A majority of the project's projected lifetime costs (just under 60%) are related to nursery establishment and management, field opex and capex (e.g., irrigation), and planting-related expenditure. A vast majority of the project's projected lifetime revenues (over 99%) will come from the sale of cacao. Over the project's first thirty years, $366.1m USD in revenue is projected from the sale of cacao, while $1.9m USD in revenue is projected from the sale of carbon credits.

2.2 Without-project Land Use Scenario and Additionality

2.2.1 Conditions Prior to Project Initiation and Land Use Scenarios without the Project (VCS, 3.13; CCB, G2.1)

2.2.1.1 Ecosystem Type

The Colombian Orinoquia is located in the east of the country, it has an approximate extension of 26 million hectares, which are distributed in three subregions: Piedemonte with 2 million hectares, flooded or poorly drained Orinoquia savannah with 5 million ha and the well-drained Orinoquia savannah with 19 million ha (Buriticá, 2016).

The transitions of the ecosystems of the Orinoquia are attributed to the economic and population context. During the period from 1987 to 2007, the most important transition was from flooded savannahs to croplands, introduced grasses and cattle ranching. One of the predominant plantations responsible for the transition is the cultivation of African palm (Buriticá, 2016).

2.2.1.2 Current and historical land use

Although traditionally the predominant activity was extensive cattle ranching, mainly on the humid savannahs and to a lesser extent on the dry savannahs, the economy of the region has shifted towards monocultures of large extensions such as the aforementioned palm, rice, soybean, and sugar cane,

in addition to plantations of timber species such as pines and eucalyptus. However, the establishment of crops turns out to be a challenging activity given the nature of the region's soils, which are not very fertile and acidic, which is why it is only possible with careful fertility treatments and the application of inorganic products (Buriticá, 2016).

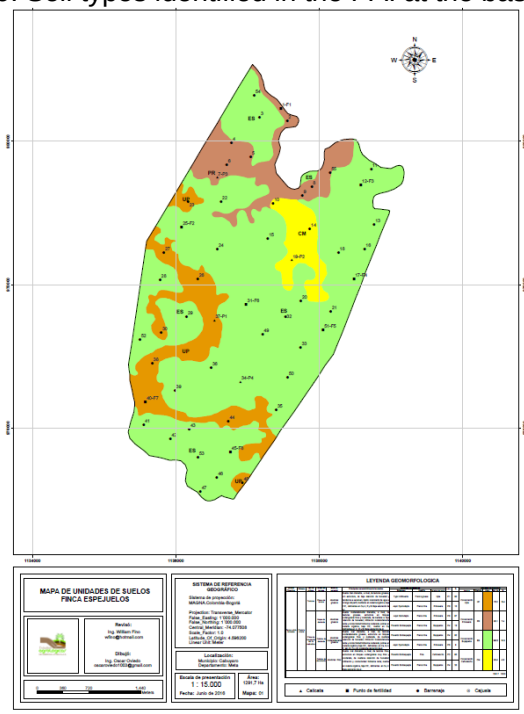
The intensive implementation of agriculture in the savannahs led to the introduction of machinery, the use of high doses of fertilizers, the introduction of agrochemicals for pest control, and the introduction of exotic pastures with higher nutritional value. Although these treatments have increased productivity, they are also responsible for an accelerated deterioration of the soil, reflected in compaction and a negative impact on the water balance of the soil, decreasing infiltration and gas exchange, which affects the activity and number of microorganisms, resulting in nutritional disorders and soil toxicities. The deterioration of the soil is reflected in the low productivity and the increase in weeds. On the other hand, the dynamics considered natural, such as fires added to deforestation rates have increased, in extent and frequency, in such a way that they could affect the water dynamics of the region (Buriticá, 2016).

The intensification of land use and population growth in the last forty years has made the region one of the most threatened ecosystems in the country. However, in Colombia not much attention has been paid to the ecosystem of flooded savannahs in terms of conservation and if prominence has been given to better known areas such as the Amazon and Andean forests, despite that the ecosystem of flooded savannahs contributes to high biodiversity and gives unique dynamics between aquatic and terrestrial systems, with great ecological value, also associated with multiple ecosystem services (Buriticá, 2016).

The PAI has characteristics of low fertility acidic soil and typical savannah vegetation with riparian forest fragments, as in most of the Orinoquia region. A soil study was conducted at project start (Fino, 2016), where the landscape was defined as alluvial flat and two types of elevations were identified i) terrace (13%), and ii) flood plan (87%). In the flood plan category, there were 4 landforms identified being the overflow bucket type the most predominant covering 74% of the PAI (as shown in Map 6, in color green). This landform shows a coarse texture, fine subangular blocky structure. In terms of fertility the soil shows low levels of organic matter and deficiencies in various minor elements such as Ca, S, K, P, Mn, Zn, Cu and B. Some types of structural degradation are observed due to the effect of compaction as a result of its prolonged use in rice cultivation. The soil has natural drainage problems, it shows moderately slow infiltration rates and moderate to medium moisture retention, thus when water occurs due to rain or river fluctuations (Rio Upia) it accumulates causing puddles and floodings. Puddles can be corrected through drainage, but floods are a more difficult problem to mitigate.

The PAI is susceptible not only to the implementation of mechanized crops, but also to extensive livestock farming with long-term unsustainable management practices, leading to a degradation of the natural pastures and the soil.

Map 6. Soil types identified in the PAI at the baseline.



There are several environmental laws in Colombia, such as Law 99/93, Decree 2811/74, Law 165/94, Decree 216/93, and in there is no specific regulations that seek the preservation and good management of pastures, the carbon stocks in soils and pastures in the project area and the PAI would be negatively impacted. Additionally, gallery forests could also be harvested, thus reducing their ecosystem benefits and carbon storage.

There is no specific law nor regulation regarding cocoa plantation and land preservation. However, the Colombian Government agreed to be part of a Joint Framework for Action, agreeing to prevent activities that contribute or cause further deforestation and forest degradation in the cocoa sector, and promote sustainable cocoa production (Cocoa and Forest Initiative, 2018).

2.2.2 Most-Likely Scenario Justification (CCB, G2.1)

For this project, the baseline scenario is assumed to be the same as the conditions described in Sections 2.2.1 and 3.1.4.

The agricultural soils of farms in the Meta department show levels of degradation of 30%, with 100% being total desertification. They are also naturally very acidic and have high levels of iron and aluminum, thus their response to the use of agrochemicals is lower in productivity and higher in degradation. The use of synthetic fertilizers is common in short term crops such as corn, soybeans and rice and they are frequently applied (every 6 months) contributing to the increase of GHG. As a fact, a study showed that fertilizers applied in short term/temporary crops have an average contribution of 25% more nitrous oxide, 15% more carbon dioxide and 5% more methane than the application rate in perennial crops (palm oil) in the area. Also the study states that the amount and diversity of synthetic fertilizers is higher in short term crops (14) than the ones used in pastures and permanent crops (9). (Rodriguez E. , 2019).

The Project Area and Zone will also experience the same conditions prior to the project initiation. In absence of the project, it is likely that factors that lead to a degradation of natural pastures and a small area of subsistence cropland would continue. Drivers of land-use change will increase and the pressure on pastures and forest will remain steadfast.

2.2.3 Community and Biodiversity Additionality (CCB, G2.2)

In Colombia, forests and plant species in general are being destroyed indiscriminately and this is caused by forest fires caused by humas, the excessive use of land for livestock, grazing, among others. In addition until very recently (2023), policies regarding the rational use of natural resources have been insufficient affecting the land use change and a decline in biodiversity. According to a report from the Institute of Hydrology, Meteorology and Environmental Studies (IDEAM), deforestation levels in Colombia have increased, In 2021, 174,103 hectares (hectares) of forest were deforested, which represents an increase of 1.5% in this phenomenon compared to 2020 (Environment, 2022).. The lack of environmental law reinforcement would likely continue affecting land use change in the absence of the project.

A group of significant barriers in relation to the community and biodiversity would prevent the implementation of the proposed project has been identified.

In terms of community, there are two main groups that are part of project activities, i) employees hired by the Project and 2) small farmers that are part of the Impulsa program. In terms of social barriers, it has been identified that there is lack of skilled and/or properly trained labor force specifically for cacao production; thus the project will provide proper technical theorical and practical training to employees to improve their skills and knowledge about sustainable cocoa production to implement project activities. Employees will also receive a steady long-term income from their salaries by working at the plantation. A study conducted in the area shows that permanent crops showed the best results in employment generation, since workers were hired more regularly and not only for harvest seasons (Rodriguez E. , 2019).

Without this Project, in the farmers' case, local tradition, specifically market conditions and traditional practices would be barriers for the implementation of sustainable agriculture at small scale. Through project activities small farmers will receive financial support through access to a steady market and better prices for their cacao, they will also receive technological support as they receive improved varieties of cacao to be planted in their farms (that they would have access to in this region without the project). The project will also provide technical assistance through training and visits to provide guidance to facilitate the transition to the adoption of sustainable practices. Additionally, there is a social barrier, as there is a lack of organization of local communities, specifically cocoa farmers. Thus the project will initially work with individual farmers and will provide organizational training and support to promote the organization of farmers' associations to facilitate their development in the cocoa sector.

In terms of biodiversity, the Savanah is host to vulnerable species and studied flora and fauna, including the Orinoco alligator *(Caiman Crocodilus*), Tucan (*Ramphatos tucanus*), Jaguar (*Panthera onca*) and the giant anteater (*Myrmecophaga tridactyla*). Most of these species are threatened mainly by habitat loss and fragmentation, due to increasing deforestation and degradation that destroy their habitat. The project will increase tree cover through the establishment of the agroforestry system in non-forest degraded pasture areas, providing corridors for these species of the area providing them with shelter and improving their mobility between forest areas.

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

The Project will validate and verify under the VCS and CCB, to generate VCUs "tagged" with CCB to reflect the positive community, biodiversity, and adaptation benefits in addition to climate mitigation benefits. At this time the market for distinct community and biodiversity credits is not well developed and thus there is no plan to use these uniquely to offset. That said, the program retains the right and flexibility to uniquely use the biodiversity and community benefits in the future if it deems it is valuable to delivering on the program objectives. If this occurs, the program will provide rational at the next verification of the additionality of using unique biodiversity and/or community benefits as offsets beyond the VCUs "tagged" with CCB.

2.3 Safeguards and Stakeholder Engagement

2.3.1 Stakeholder Identification (VCS, 3.18, 3.19; CCB G1.5)

Various stakeholders have been identified and analyzed through a participatory assessment conducted with a group of the plantation's field workers in 2016. The stakeholder matrix considers the following attributes power, legitimacy, and urgency; and according to this, all identified actors were evaluated, and the ones that fulfilled all three categories were selected. The following list names the main stakeholders identified:

- Community of Guayabal
- Community of Viso de Upía
- Urban area of Cabuyaro
- Cabuyaro Mayor's Office
- Cabuyaro Council
- Cocoa producers of Cabuyaro
- CORMACARENA
- Community Action Boards of Cabuyaro
- Neighbors
- Employees

2.3.2 Stakeholder Descriptions (VCS, 3.18, 3.19; CCB, G1.6, G1.13)

2.3.2.1 Guayabal Community

Guayabal has a total of 204 inhabitants and 97 houses (Community Action Board, 2016). This community is highly dependent on agricultural activities, 50% of the community's income comes from crops like plantain, cassava, banana, papaya, passion fruit, corn, rice, soybeans, and cocoa. Crops are mainly sold in the neighboring municipality of Villavicencio. The other 50% of the income comes from daily labor (Guaycaramo, 2016). This is one of the main stakeholders, as people from this community will potentially work in the organization, in different roles.

2.3.2.2 Viso de Upía Community

According to local records (Junta de Acción Comunal, 2016), Viso de Upía has 500 inhabitants. A percentage of them are displaced from other regions of the country, creating a floating population in the last four years. The majority of the population live in houses which they own, while others live in rented houses (paying an average of $150,000 COP per month). Houses in this community are mostly made from "bareque", a local material.

Viso is mainly an agricultural community, as 50% of their income derives from selling crops such as banana, cassava, papaya, passion fruit, corn, rice, and soybeans in the Villavicencio market. The other 50% of the income originates from daily labor in farms, ranches, and oil wells in the area. Community members have access to a sports center and playground that are in deteriorated condition, as local authorities have reported there is no budget for maintenance.

This community is identified as main stakeholder due to its close proximity to the Project Activity Instance, thus members could be part of the project personnel, and/or farmers could be potential participants of the program that will support small producers to be implemented in the next years.

2.3.2.3 Cabuyaro

In order to have a better understanding of the Cabuyaro municipality, visits were made to the different sites of public interest, and a photographic record was collected to illustrate the condition of public services, roads, urban settlements, and equipment.

Cabuyaro has been identified as a main stakeholder as most of the project's staff will come from this community, including administrative personnel and field workers.

2.3.2.4 Cabuyaro Mayor's Office

The Cabuyaro mayor's office has among its functions to promote the development of its territory and build the roads that municipal progress demands, it also manages municipal affairs and provides public services as determined by law. On the other hand, the mayor's office prepares Municipal Development Plans, in accordance with the Departmental Development Plan, the life plans of the indigenous territories and reservations.

For the project, the mayor's office will be a key interest player because it regulates part of the local regulations and through them specific procedures regarding permits and development of activities are carried out (Cabuyaro A. M., nd).

2.3.2.5 Cabuyaro Council

The Municipal Council of Cabuyaro is a public corporation, in charge of exercising political control, facilitating democratic participation, debating, and issuing agreements. To ensure the proper use of the municipality's resources, in order to contribute to the comprehensive development of the community.

For the project, it is a key actor since, as well as the mayor's office, they regulate part of the local laws that apply to the Project Activity Instance (Consejo Municipal de Cabuyaro, nd).

2.3.2.6 Cabuyaro Cocoa Farmers

In the municipality there is a diversity of farmers' associations and a few dedicated specifically for cocoa growers, who in the last few years have incorporate cocoa to their agricultural activity. Cocoa has been defined as a priority crop for the region, as a way of bringing farmers back to the land and to facilitate a peaceful and productive occupation of the territory (Semillas, 2015). Due to the reasons mentioned above, the cocoa producers of Cabuyaro will be a strategic interest group for the project by creating commercial alliances, improving their technical and organizational capacity to contribute to the value chain's strengthening and the development of the area.

2.3.2.7 CORMACARENA

It is the highest environmental authority in the area of jurisdiction in accordance with the guidelines drawn up by the Ministry of the Environment. In addition, Cormacarena grants the environmental concessions, permits, authorizations and licenses required by law for the use and exploitation of renewable natural resources or for the development of activities that affect or may affect the environment (Cormacarena, nd).

2.3.2.8 Cabuyaro Community Action Boards- *Junta de Acción Comunitaria*

Community Action Board is a civic corporation made of community members, who join forces and resources to seek the solution of the most felt needs of the community (Bogota, n.d.). For the project, the Junta will be relevant when approaching the community to establish relationships and collaborate.

2.3.2.9 Neighbors around the project area

The neighbors around the Project Activity Instance will be part of the strategic allies, making sure property limits are respected and the use of shared natural resources such as water is respected. The project will establish an open communication and fluid relationship that will allow the activities to take place in a safe environment.

2.3.2.10 Employees

The project's employees will represent an important stakeholder as they will be hired to implement activities according to the strategic and operational plan.

2.1.9.11 Impulsa Bacao Farmers

The farmers participating in Impulsa Bacao are important stakeholders, as the company will be designed and operated as a social business in partnership with the farmers. Because the company´s business model aims to address the major challenges faced by farmers in the region, their involvement in strategic planning, operations, and monitoring will be critical for ensuring the success of the Project.

2.3.3 Stakeholder Access to Project Documents (VCS, 3.18, 3.19; CCB, G3.1)

All stakeholders will have access to the project document that is necessary to ensure that they are fully informed of the aspects of the project that are relevant to them. Bacao will ensure that the documents are fully accessible to the various stakeholders, including considerations of the format (print, digital), the language and level of detail (full document, summary), and the channel of dissemination (direct, in-person from Bacao; digitally; publicly available on-line at https://registry.verra.org/app/projectDetail/VCS/3450). Table *11*. Stakeholders access to information and project documents provides a summary of how project documents and related information will be shared with different stakeholders.

Table 11. Stakeholders access to information and project documents

Stakeholders (2.1.9)	Information Sharing, Document Dissemination (G3.1: 2.3.1, 2.3.2, 2.3.5)
Employees (2.1.9.10)	• Project summary presented in informational meeting. Summary materials distributed directly or upon request (print, digital) • Validation and Verification process and progress summary shared in informational meeting (relevant aspects). Summary materials distributed directly or upon request (print, digital) • Monitoring results shared in informational meetings (relevant aspects);
Impulsa Bacao Farmers (2.1.9.11)	• Project summary presented in informational meeting. Summary materials distributed directly or upon request (print, digital) • Validation and Verification process and progress summary shared in informational meeting (relevant aspects) • Monitoring results shared in informational meetings (relevant aspects)
Cabuyaro Mayor's Office, Cabuyaro Council, CORMARENA (2.1.9.4, 5, 8)	• Project summary presented in informational meeting and distributed (print, digital) • Validation and Verification process and progress summary shared in informational meeting (relevant aspects) • Monitoring results shared in informational meetings (relevant aspects)
Cabuyaro Community Action Boards Guayabal,	• Project summary upon request: print, digital • Validation and Verification process and progress information shared in periodic informational meeting (relevant aspects).

Stakeholders (2.1.9)	Information Sharing, Document Dissemination (G3.1: 2.3.1, 2.3.2, 2.3.5)
Viso de Upía (2.1.9.1, 2, 9)	• Monitoring results shared in periodic informational meetings (relevant aspects)
Cabuyaro Cocoa Farmer (2.1.9.3, 6, 7)	• Project summary upon request: print, digital • Summary of monitoring results shared upon request (relevant aspects)

2.3.4 Dissemination of Summary Project Documents (VCS, 3.18, 3.19; CCB, G3.1)

The summary of the Project Document will be created and translated into Spanish and shared with employees and small farmers from the communities in the Project Instance Zone, using the established communication channels for all stakeholders. The document will be readily available in print (in a central and accessible location) or in digital format it will be publicly available on the public website www.verra.org, if and when interest is expressed in seeing them. All stakeholders will be asked to comment on the project document along with the summarized translated version.

Participants	Purpose	Date
Bacao Workers	Informational meeting, socialize PD summary and process for comments and feedback	September 21-22, 2022
Small Farmers	Informational meeting, socialize PD summary and process for comments and feedback	September 24, 2022
Local authorities	Official Statement	December, 2022

In the annexes, there are the supports of the socializations carried out regarding this PD, both for workers and small producers.

2.3.5 Informational Meetings with Stakeholders (VCS, 3.18, 3.19; CCB, G3.1)

The project will ensure that all stakeholders have access to necessary information conveyed in an appropriate and accessible manner. Along with access to project documentation, informational meetings with stakeholders will be a very important means of achieving this. Informational meetings will take three main forms: periodic, reoccurring meetings; topic-specific meetings; and meetings incorporated into existing programs (training, community development). Additionally, informational meetings may take the form of general meetings, in which all employees or community members take part, or meetings with employees, farmers, or community representatives, depending on the type of information to be shared.

The descriptions below provide more details regarding the type, frequency, and personnel responsible for leading the informational meetings with various stakeholders.

2.3.5.1 Employees

- Communication Plan: Those aspects of the Project that have implications for employees (social, labor, community aspects) will be proactively communicated with employees in general meetings (per year and every monitoring report) and/or in topic-specific meetings concerning

specific aspects of the project. Additionally, certain topics will be introduced or reinforced during operational, health, safety and environmental training programs. Documentation of meetings will include meeting minutes, attendance registrars, and copies of materials distributed.

- Monitoring and Reporting: Specific interventions undertaken as part of the Project will be monitored using disclosed progress and impact indicators. Employees will be informed of results in periodic or topic-specific meetings.
- Specific Information: In addition, the Project has jointly developed a program with a local community development organization (DyA) that will provide constant and on-going support to employees and their families. DyA will provide both formal and informal support for communication flows and the exchange of information with employees and their families.

2.3.5.2 Impulsa Bacao Farmers

- Communication Plan: The smallholder communication and engagement plan include periodic communication events (semimanual) with participating farmers. When aspects of the project apply to Impulsa Bacao farmers, those aspects will be presented openly to smallholders at periodic events, or in additional events held specifically for the relevant aspects.
- Any relevant aspects of the project that are communicated to smallholders, including monitoring results, will follow the standard smallholder communication and engagement procedure of: open discussion, response to questions, discussion of next steps (timeline, procedure), documentation of event, and distribution of follow-up to the smallholder representatives.

2.3.6 Risks from the Project and No Net Harm (VCS, 3.18, 3.19)

Bacao will develop a monitoring plan to register the progress on the social and environmental impacts over the long term of the project. Results and recommendations on activities to improve the implementation plan and monitoring reports will accommodate the stakeholders' needs. Impact indicators facilitate measuring the progress toward reaching the expected goals related to workers, the local communities and their ecosystem.

The social and biodiversity assessments helped to understand the needs of workers and communities and how they are affected by the project's activities. To identify these needs, a series of focus groups and interviews were conducted with workers and small farmers. Finally, inputs were included in the current objectives of the project and ToC. The following were risks and mitigation action identified:

Related to natural risk, fire has been identified as a potential risk from the project, so Bacao has established the following preventive measures and mitigation efforts:

- A protocol for fire prevention since 2019, which forbids burning any kind of vegetation or open fires for crop establishment, and
- Policy that refrains workers from smoking inside the plantation because cigarette butts can cause fires

Related to human risks, to maintain optimal working conditions for the staff, Bacao has developed and adopted a health and safety policy and has established processes to identify, report potential work relate risks and develop mitigation actions. Related to women and youth inclusion, Bacao is committed to provide a safe work environment, free of discrimination for all.

2.3.7 Community Costs, Risks, and Benefits (CCB, G3.2)

Several methods will be used to assess possible risks that the project could pose to the community, including employees and small farmers and their families. While no significant risks or costs associated with the project have been identified, safeguards, procedures, and a monitoring plan have been put in

place to ensure that any emerging risks are identified on time and addressed. In terms of benefits, the project is expected to provide a range of benefits for employees, smallholder farmers, and community members, which are described in detail below.

2.3.7.1 Employees

- The costs and risks posed to employees in this Project Activity Instance is largely addressed by operational and human resource management assessments and safeguards. These are conveyed to workers though their contracts, on-boarding, internal procedures, and on-going training sessions.
- Occupational Health and Safety Risk Assessment, Safeguards: In so far as the potential impact of the Project on employees can be considered in terms of Occupational Health and Safety, a detailed risk analysis was carried out by a qualified team according to IFC standards and national legislation, and appropriate measures to properly manage and reduce risks were determined and adopted. Workers receive regular training so that they are aware of the risks and the ways to prevent accidents, and if they happen, the reporting protocol has been established and socialized.
- Labour Rights Risks, Safeguards: In so far as the potential impact of the Project on employees can be considered in terms of labour rights, procedures are in place to uphold national and internal laws and standards, and workers are informed and trained on those topics.
- Benefits: Workers are guaranteed a minimum wage and all the legal benefits, plus an additional bonus structure and benefits. These benefits are communicated to workers at the time of employment and in on-going communications and training. Current benefits, which may be augmented and adapted over time, include:
    - Meals and beverages
    - Monthly food Bonus, economic incentive for excellent attendance
    - Life insurance contributions
    - Daily provisions (panela, coffee, etc.)
- In addition, a Living Wage Study was carried out to help identify and target in-kind benefits aimed at closing the gap between worker's actual salary and a living income at the household level. The study helped identify which benefits employees are aware of and which require additional socialization: a plan is underway to re-enforce Employment/Project benefits to workers. Likewise, interventions (benefits) designed to minimize the Living Wage Gap will be monitored and reported internally on an annual basis, including reporting and validation with employees.

2.3.7.2 Impulsa Bacao Farmers

- Risk Assessment, Mitigation: Proper screening of potential participants in smallholder programs will help to reduce the risk that could be incurred by farmers (e.g. time, effort, financial) that are not appropriate candidates for program.
- Communication: Communication is critical, and fully transparent, documented communication of the terms of the program and conditions of participation, including risks and benefits, are explicitly communicated to smallholders when they join and reiterated through on-going trainings.
- Benefits: In addition to the potential knowledge, skills and collaboration benefits, the explicit program benefits for participating smallholders include:

- No transportation cost or labor involved on processing cocoa, as crop is bought at farm gate in wet condition.
- Above market price paid by volume: 100 COP more per kilogram than the market price (which is reviewed, set).
- Market Information and Support: Clearly communicated quality specifications as well as guidelines and on-going support for achieving them, along with improved productivity.

2.3.8 Information to Stakeholders on Validation and Verification Process (VCS, 3.18.6, 3.19; CCB, G3.3)

Informational meetings will be held with workers and small farmers to inform them about the validation and verification process. Group discussions will be held to review the VCS/CCB Project Document; stakeholders will be informed that a VVB will be coming to visit some of the communities and Project Activity Instance at the validation time. At this time, stakeholders are free to communicate openly about their experience, thus they are welcome to communicate directly to the VVB. The following communication methods and measures are taken to inform each of the identified stakeholders of the process for VCS and CCB validation and verification.

2.3.8.1 Employees

Communication Measures: Employees are considered the stakeholders with the most direct involvement in the project's validation and verification process. Employees will be informed of their important role in validating the project through their participation in the assessment, design, and monitoring of the project's benefits to them. This will be summarized in appropriate terminology and communicated publicly and in written form.

As described in section 2.3.4 and 2.3.5, employees will be informed of the Project's CCB certification process, including aspects of validation and verification, through either meetings with employee representatives and/or general meetings. On-going updates on the process will be ensured through periodic general meetings or meetings with employee representatives. Employees will have access to summary documents regarding the CCB process and monitoring results in print or digitally.

Communication methods: The different approaches and methods that have been and will be used include:

- General informational meetings
- Worker representative meetings
- Operational/HR training and capacity building events
- Documentation of events and processes directly distributed, and/or made readily available at a disclosed, centralized location.

2.3.8.2 Impulsa Bacao Farmers

Communication Measures: Farmers participating in Impulsa Bacao will be informed of the CCB verification and validation process -and their important role in it- through specific and on-going communication strategies.

Information of the CCB process will be shared in informational meetings. Moreover, farmers will receive reinforcement training and be provided with opportunities to discuss the verification and validation process in their on-going training events.

Communication Methods: The different approaches and methods that have been and will be used include:

- Leadership/farmer representative meetings
- General informational meetings
- Training and capacity building events (e.g. farmers´ schools)
- Documentation of events and processes directly distributed, and/or made readily available at a disclosed, centralized location.

2.3.9 Site Visit Information and Opportunities to Communicate with Auditor (VCS, 3.18.6; CCB, G3.3)

All stakeholders, including employees, Impulsa Bacao farmers, and community stakeholders, will be informed and prepared in meetings six weeks prior to the auditor's visit, as well as a follow-up meeting two weeks prior to the visit. Communities will be informed that the VVB is a neutral party and that they should feel free to communicate openly about their experience with the project. They are informed that they are welcome to communicate directly to the VVB.

2.3.10 Stakeholder Consultations (VCS, 3.18; CCB, G3.4)

2.3.10.1 Employees and Communities

Date of stakeholder consultation	July2017
Stakeholder engagement process	All engagement opportunities will be announced using local channels verbal notifications in Spanish (local language).
Consultation outcome	• Program design: Employees and communities will participate actively in several studies and activities carried out in preparation of the project. Important findings from these studies will be validated with employee and community members in general and/or representative meetings prior to being included in the resultant plans and programs. The studies include: o Socio-economic baseline study conducted in communities around the PAI o Living Wage study conducted with employees o Participatory Rural Appraisals conducted with employees • Implementation phase: As activities are implemented and monitored, employees and community members will be consulted to provide feedback and offer insights for their continuous improvement and adjustment. Consultations will mostly be done through focus groups, representative meetings, and surveys.
Stakeholder input	The socio-economic baseline study provided relevant information about the communities' income sources and alternatives and their basic knowledge and skills related to cocoa production. This information was used to understand that the main benefit for workers will be financial security through a fixed job paid at minimum salary with benefits (access to health system, pension, and food assistance) and the opportunity to learn about the production system for cacao. The study also provided information about the limited job opportunities for youth and women in the project activity zone, and the opportunity for Bacao to fill this gap. Bacao will develop a well-

	structured HR structure with dedicated staff to work with employees and local communities to create a good and stable working environment.

2.3.10.2 Impulsa Bacao Farmers

Date of stakeholder consultation	20-November-2020
Stakeholder engagement process	Technical staff from Impulsa Bacao will visit farmers to conduct field assessments on the characterization of their farms including issues like cacao volumes, prices (income), management levels, density, and shade species. Additionally the farmers' experience, and age (generational effect) would be considered into the long term planning and management of the program.
Consultation outcome	• Business Model: In the small farmers case, the project must first initiate a discussion with the farmers' organizations leaders to determine interest. Only after discussion among the leaders and members will the organizations decide if they want to be part of the Impulsa Program. They are informed of the goals, objectives, outcomes, and activities and are able to provide feedback during the consultation process. Agreements are reached and all members are invited to participate in and voice concerns, questions, and feedback on how the project goals are impacting (negatively and positively) their lives. • Program Design: Prior to introducing new aspects of the program (e.g. training topics, marketing channels), farmers will be consulted to help co-design and then validate the activities. Farmers will participate in program evaluation to provide feedback for continuous improvement.
	These engagements provided information about the technical needs that farmers have. This would be used to design the training program and the kind of field assistance need to increase their production and volumes.

Demonstrate in the table below how due account of all and any comments received during the consultation and public comment period has been taken. Include details on any updates to the project design or demonstrate the insignificance or irrelevance of comments

Summary of comment received	When comment was received	Actions taken
Socioeconomic study- The study will provide information	09/Nov/2019	Bacao will develop a well-structured HR Department with

Summary of comment received	When comment was received	Actions taken
on the skills and knowledge of the work force in the communities surrounding the project area, their income streams, and the age of the population related to agricultural opportunities		dedicated staff to work with employees to create a good and stable working environment.
Household Surveys for workers- Learning the cost of living (food, housing, clothing, education, medical needs, others), income streams of workers.	22/May/2022	Consider the gap between minimum wage to living wage to guarantee a decent income for workers.
Field assessments for Impulsa farmers	20/Nov/2020	Design the training program and the most effective way to provide technical assistance to increase production and volumes for cacao. Define an effective collection and purchasing system for cacao

2.3.11 Continued Consultation and Adaptive Management (VCS, 3.18; CCB, G3.4)

Adaptive management is necessary in any project where activities need to consider a changing set of social dynamics and climate factors that can greatly impact the outcomes. Community needs will change over time as we are all affected by climate change. Communities and those on the ground are best situated to address these issues. Communities (small farmers participating in the Impulsa Program) will be asked during the Participatory Rural Appraisal (PRA) to identify new and effective activities overtime and also describe the risk of implementation of each activity. Risks are considered during implementation.

During the life of the Project communities will aid in the design through communication, direct employment, and the PRAs. The PRA process will continue throughout the Project and associated activities will be updated at every verification event. This process involves annual reviews of the implementation workplan with core stakeholder groups reviewed alongside the monitoring data.

Along with the PRAs, comprehensive consultations will be held regularly with workers and small farmers. These consultations will solicit meaningful contributions and input on the status of the project and the impact it is having on livelihoods, agricultural management, and other factors that affect the communities' well-being objectives related to the Project. TGC has experience on working with communities in a participatory manner to gather knowledge in a culturally appropriate manner. Terra Global uses participatory action research to inform the revisions to the Project as the lifetime of the Project continues. Participatory action research (PAR) emphasizes participation and action. TGC will seek to understand the Project as it relates to the communities to bring meaningful, real change, and is collaboratively followed by a reflection. PAR focuses on collective inquiry and various exercises to encourage participants to feel confident and comfortable to share how they feel the Project is impacting their lives.

Through continuous work, with the assistance of a local subcontractor, DyA, that has been hired a solid relationship between the workers and the company will be fostered. This relationship will allow the workers to share their opinion and provide feedback to continuously improve and ensure fluid

communication. This program uses different tools such as social mapping and participatory workshops where topics such as interpersonal relationships are covered, and the recognition of human capital as a fundamental pillar of growth.

2.3.12 Stakeholder Consultation Channels (CCB, G3.5)

The approaches and process developed for stakeholder communication and consultation in the project design phase are intended to serve as long term, on-going consultation channels. For that reason, the consultation channels put in place are presented to participating stakeholders in a transparent and comprehensive manner, including providing stakeholders with information regarding communication/consultation: frequency; personnel involved; documentation; monitoring and reporting; validation and verification.

The communication and consultation channels developed with the various stakeholders are tailored to their level of involvement in the project based on the identified risks and benefits that the project confers to them. The most consulted stakeholders include employees (120-400) and Impulsa Bacao farmers (40), for whom multiple channels of frequent consultation are developed. Although less directly involved and impacted, other stakeholders will be included in aspects of the project that are relevant to them through appropriate communication channels. All stakeholders -both identified and as of yet unidentified- will have access to important summary documents upon request or on publicly available websites and have access to direct communication with the company through established questions and grievance mechanisms.

2.3.13 Stakeholder Participation in Decision-Making and Implementation (VCS, 3.18, 3.19; CCB, G3.6)

To ensure the participation of stakeholders in the decision-making process, several spaces have been identified and meetings have been held as needed, as described below:

- Local authorities (Mayor, local community boards): written notifications (printed letter delivered to authorities' offices) are sent when communicating about project activities that affect HCVs areas and/or management of natural resources.
- Neighbours: Open communication channels (phone calls and WhatsApp chats) and meetings arranged based on the needs when changes in project activities affect their properties resources or boundaries.
- Bacao workers and Impulsa farmers: Meetings conducted every six months to review progress on the implementation of project activities, receive inputs and process feedback.

All meetings, verbal and written invites and communications are done in Spanish (local language), and women are always encouraged to participate.

2.3.14 Anti-Discrimination Assurance (VCS 3.19; CCB, G3.7)

The project established the Collaborators Policy (BCA-SC-OP-04), which states the company's commitment to the prevention of any type of discrimination and assumes the responsibility of treating all staff under the criteria of equality and equity in order to promote diversity and equal opportunities. All decisions concerning work performance are based on results and the potential shown by the workers.

Under this policy, there is a hiring procedure that starts with the creation of the position description, which focuses on the skills and experience required to perform the functions assigned to the position. The selection process is based on technical criteria obtained through psychotechnical tests developed by specialized experts and through an interview conducted by the supervisor.

The Human Resources area is responsible for complying with the selection and hiring process. The evaluation of the specific knowledge and skills of the position will be supervised by those responsible for the position. During the recruitment, selection and hiring process, the Human Resources' policies will be complied with, avoiding any type of discrimination related to ideology, race, sex, marital status, social class, religion, beliefs, sexual orientation, ancestry, philosophy, disability, membership in any type of association.

Women's participation as part of the staff will be a priority for the project, both for operational tasks, as well as in administrative functions such as accounting, medical services, and others.

The project through the implementation of the mentioned policy commits to the following:

- Comply with the constitutional and legal provisions in labor matters, individual and collective.
- Encourage employees to achieve the maximum potential of their talents, since the success of each employee depends on their skills and their contribution, while generating balance in their personal, family, and professional development.
- Guarantees the protection of life and personal integrity of its collaborators through contributions, policies and other types of guarantees that cover the main risks of its activity.
- Treat employees under criteria of equality and fairness.
- Promote equal opportunity diversity, where all talent decisions are based on the performance and potential demonstrated by the person at work.
- Provide feedback and continuously improve the performance of its employees.
- Ensure adequate paid rest.
- Promote career plans within the organization.
- Promote constant training and professional development through education.

Provide training sessions to promote awareness of the importance of each position/role and its contribution to the success of the project.

2.3.15 Feedback and Grievance Redress Procedure (VCS, 3.18.4; CCB, G3.8)

Development process	The grievance redress procedure was collaboratively developed by Bacao HR team with contributions from workers through informal meetings and peer-to-peer surveys. Bacao S.A.S will maintain an ongoing dialogue to enhance this process and continually integrating feedback
Grievance redress procedure	The policy differentiates between informal and formal grievance procedures, encouraging the direct resolution of minor disputes for swift and informal resolution. For more severe or unresolved cases, a formal grievance procedure has been defined. • The process of handling reports, receiving and solving requests for petitions, complaints, and claims will respect the principles of transparency, efficiency and speed contemplated in the constitution and the national laws. Complaints and claims can be submitted verbally or written (by email, mailbox) The Human Resources (HR) Coordinator, is responsible of receiving, registering and confidentially examining the cases. Then he/she assigns the case to the area in charge of

	generating the applicable response within a maximum time of (5) five business days. The HR Coordinator is also the one who consolidates the information through the BCA-SST-F-68 Report and Resolution PQRF. All stakeholders including workers (though Bacao HR), farmers from the Impulsa Program (through a local phone line (+57) 321 233 45 26), communities and neighbors are encouraged to use the procedure if needed. This approach helps ensure that grievances are addressed efficiently, maintaining an environment of trust and mutual respect among stakeholders. The project's grievance mechanism has the following stages: 1. Bacao will attempt to resolve all grievances and provide a written response in a manner that is culturally appropriate in total time of (20-30) twenty to thirty business days 2. Any grievances that are not resolved by amicable negotiations will be referred to mediation with a neutral third party, Minister of Labour local office. Harassment as defined in accordance with resolution 2646 of 2008 and Law 1010, can also be reported. Bacao has developed a separate procedure for the investigation of workplace harassment, which can be found in Annex Appendix 4: Commercially Sensitive Information. This policy establishes a mechanism for the prevention, reporting and overcoming of those behaviors that, in accordance with Law 1010 of 2006, may lead to acts of workplace harassment. Once the incident is registered and reported, it is processed by the \Labor Coexistence Committee who follows the steps below: 1. The complaint is submitted to the Workplace Coexistence Committee (convivencia@bacao.com.co) 2. The Committee is responsible for confidentially examining cases and selecting those that can be classified as workplace harassment. 3. If the parties do not reach an agreement before the Workplace Coexistence Committee, it must refer the case to the Disciplinary Control Office and management for the appropriate procedure.

2.3.16 Accessibility of the Feedback and Grievance Redress Procedure (VCS, 3.19; CCB, G3.8)

Workers are completely free to make a request, complaint, or claim (PQR) anonymously through the communication channel designated for this purpose. This is openly informed to them at the time they sign their contract or legal document that initiates the employment relationship.

Once the PQR is received through the established procedure, the person in charge, who is impartial, reports to the department in question for follow-up, monitoring and resolving the situation in question. The responsible of the department in questions will have 5 days to respond and notify the answer with copy to area that receive the concern. If no agreement is reached, a plan will be developed that includes responsibility, activities, times for follow up on the resolution of the conflict.

As for small farmers involved in Impulsa, they have been informed of the procedure by the local technician who provides training and technical assistance..

2.3.17 Worker Training (VCS, 3.19; CCB, G3.9)

The Training Program will be designed to ensure that all project's employees have the skills and technical knowledge to perform activities safely, with quality and efficiency, preventing any possible risk.

The following criteria will define the training needs for the project's employees:

- Description of positions and competencies defined in the Manual of Functions and Responsibilities.
- Identified activities to be executed.
- OSHMS policies and objectives.
- Results of hazard identification, risk assessment and control.
- Legislation and standards applicable to the organization in terms of Occupational Safety and Health.
- Technological changes, machinery, equipment, tools and others that have an impact on the safety and health of workers.

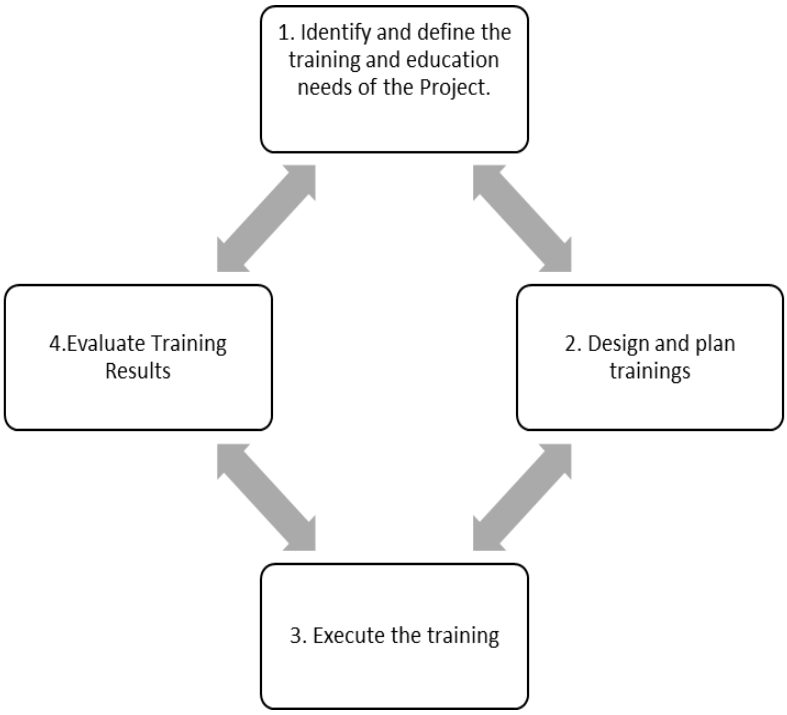
For the training design and planning the defined criteria mentioned above is considered and a training matrix will be established, in which each worker completes all the recommended training and progress is monitored.

If a worker obtains less than 70% in the evaluation for a training session, he/she must repeat the evaluation. If in the second evaluation the worker again obtains less than 70%, the worker must repeat the training session. There is an exception, when a worker does not know how to read or write, the evaluation will be done orally, and the instructor will record the answers.

Training contents and materials must be culturally appropriate and targeted to the different education levels of the participants and facilitated in Spanish (native language).

Figure *10* presents a graphical explanation of how the training is designed and implemented.

Figure 10. Graphical explanation of the design process for the training program.



The project will assign a budget that will allow the planning of the necessary resources for the ongoing implementation of training during the different phases of employment for all the staff.

Bacao's training program will be centered in 8 main topics, Safety, Occupational Health, Crop production, Environment, Soft skills, Administration, Brigades, and other technical topics according to the workers' specialty. The project will facilitate an average of 149 training sessions per year (as shown in Figure 11) to the projected 300 employees from which 25% will be women.

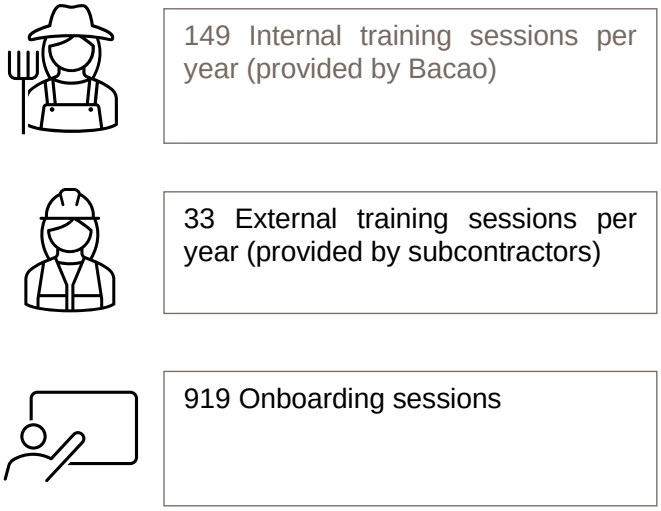


Figure 11.Training sessions (by type) provided to Bacao's employees.

To review additional details on the training program provided to project workers, see Appendix 3: Commercially Sensitive Information.

2.3.18 Community Employment Opportunities (VCS, 3.19.13; CCB, G3.10)

In order to guarantee a structured, equitable and egalitarian process, the recruitment, selection and hiring procedures to hire project staff will be established and will apply to all the recruitment and selection processes carried out to fill the open positions. This process will be conducted by the Human Resources Department (HR) and its scope ranges from developing the job descriptions to the signature of the contract. The process will follow the next steps:

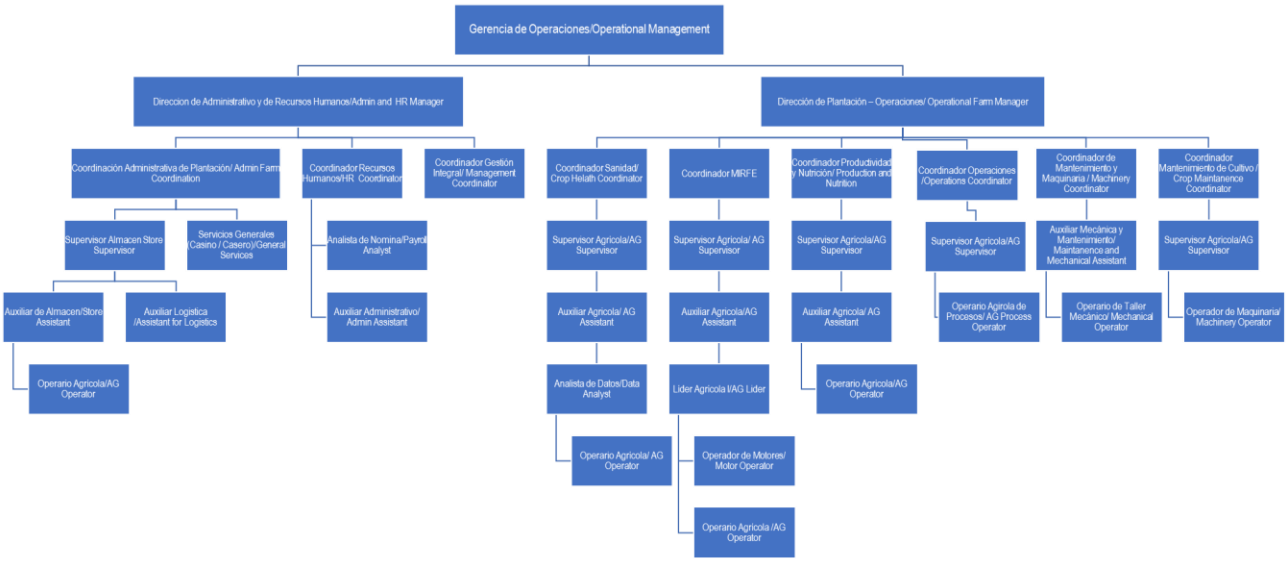
1. The job description will be shared with local government offices (The Department of Labour Competitiveness in the Municipal Mayor's Office, and the Regional Family Compensation Fund) to be announced through their websites, local billboards, and bulletins. Positions will also be advertised through local media such as loudspeaker, radio, and word of mouth.
2. The announcement will include the complete job description, emails, and hotlines for reception of resumes, and deadline to apply to the position.
3. Once the application process is closed, HR will review all candidates and conduct the verification of supports and related work experience, as well as the review of the candidates' profile in the national data base of risks and security.
4. Candidates that comply with the required qualifications and have passed the security filter, will be called for interview process and they will also have to pass psychotechnical tests.
5. Results from the interview and test process will be reviewed and selection will be made, to start the negotiation process for hiring.

The evaluation of the specific knowledge and skills of the position will be supervised by those responsible in the HR department. In the recruitment, selection and hiring process, the Human Resources policies will be complied with, avoiding any type of discrimination related to ideology, race, sex, marital status, social class, religion, beliefs, sexual orientation, ancestry, philosophy, disability, membership in any type of association.

The project will reinforce current national labor regulations and is governed by the rules on minimum working age established in the legislation and regulations applicable in Colombia and in international agreements, principles, and declarations.

At project start (2017), there is a total of 80 people hired of which 10 are full term employees and 70 are temporary workers. They will conduct initial activities to establish the agroforestry system like soil preparation and planting. Bacao is projecting to hire a total of 300 employees in the following years to complete the planting until the system is fully established and to conduct maintenance activities. Employees will have different roles and responsibilities from administrative, financial (12% from the total staff), field management (13%) and operations (75%). Bacao's proposed organization chart for farm management and operations is described in Figure 12.

Figure 12. Projected organization chart for Bacao's full operation.



2.3.19 Occupational Safety Assessment (VCS, 3.19; CCB, G3.12)

A procedure will be developed for the identification of hazards, evaluation and assessment of risks associated with all processes, routine, and non-routine activities, internal and external, machinery, equipment and tools, workplaces both administrative and operational for all workers conducting project activities related to planting, harvesting, and processing and other related activities.

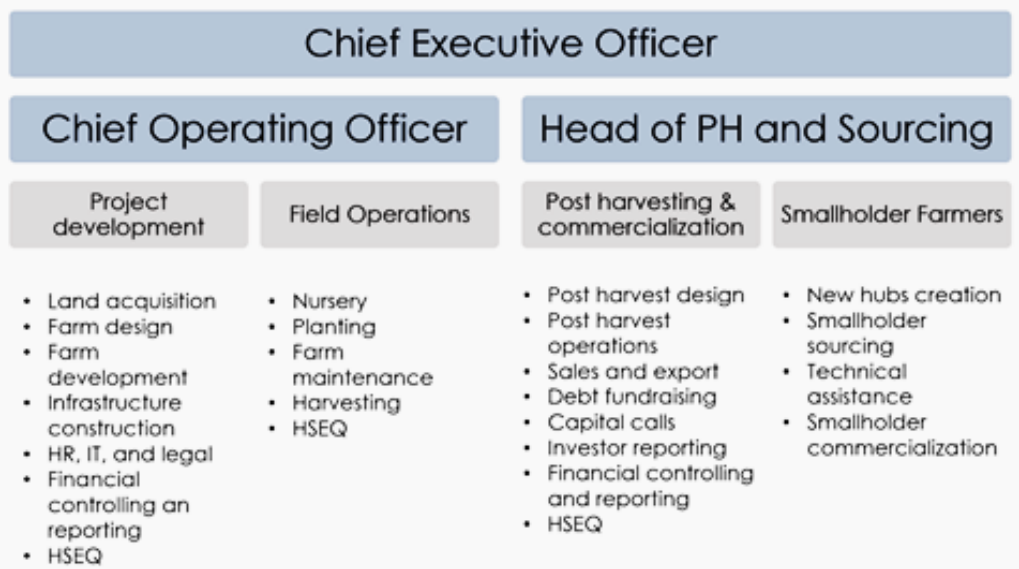
The hazard identification, evaluation, risk assessment and determination of controls will be made prior to workers' risk exposure. Risk control is based on prevention rather than reaction; thus risk prevention is considered on work areas' design, activities, processes, human factors, technological changes, and modification of infrastructure in general (facilities, equipment, processes, etc.). Details on this topic can be find in Appendix 3: Commercially Sensitive Information.

2.4 Management Capacity

2.4.1 Project Governance Structures (CCB, G4.1)

The project is implemented in Meta, Colombia by two registered companies. Bacao S.A.S., a subsidiary company, who is responsible for the establishment and management of the agroforestry plantation systems and Impulsa Bacao, who in charge of managing the post-harvest system and commercialization of cacao, as well as providing technical assistance and buying cacao from small farmers.

The following chart describes the organizational chart that specifies the roles of each line in which the project will operate, and the main task/responsibilities addressed by each of the teams.



2.4.2 Required Technical Skills (VCS, 3.19; CCB, G4.2)

Core Program Component	Bacao	Terra
Program authorization, design oversight and financing	√	
Program design and planning	√	√
Overall program implementation management and partner coordination	√	√
Community engagement and support for implementation of community program	√	
Field data collection (biodiversity, carbon accounting, community) and on-going monitoring	√	√
VCS/CCB program development and GHG quantification	√	√
Design and oversight of program's institutional arrangements (fiscal, legal and contractual)	√	√
Coordination with National GHG accounting and other government agencies		√
On-going funding of project management activities	√	√

2.4.3 Management Team Experience (VCS, 3.19; CCB, G4.2)

2.4.3.1 Andean Cacao, Bacao S.A.S., Impulsa Bacao

Bacao S.A.S. has a majority shareholding in Andean Cacao, a company which main goal is to promote the cocoa production in agroforestry system in the eastern plains of Colombia.

Xavier Sagnières- Co-founder and CEO of Andean Cacao

Professional in Finance with master's in general management and MBA, with more than 15 years of experience in leading and directing financial area in different companies, linked to the agricultural sector since 2013 participating in the proposal of the agroforestry model of sustainable cocoa, actively involved during the design and development of carbon certification proposal.

Federico Gómez- Legal representative and Chief Operating Party Bacao S.A.S

Professional in business administration with extensive experience in leading the development of agroforestry projects, with a proven track record of working in the agricultural sector and in leadership of work teams oriented to the achievement of objectives.

Martino Bonato- Head of Post-Harvest and Sourcing

Professional in philosophy and mathematics with an MBA and 13 years of experience in South America as a project manager to have a tangible impact and develop an international experience in a multicultural environment. He currently leads the post-harvest process as well as the marketing plan of cocoa with high quality standards, as well as the dimension of technical support and purchase of cocoa beans with small producers in the Bacao project zone.

Marianela Villamizar- Administrative and Financial Manager Bacao S.A.S

Professional with 15 years of work experience in Administration and Finance in companies in the logistics and project management sector. project management, Specialist in International Logistics and Financial Administration and master's in administration with double degree CESA-Carleton University. University. Experience in working with multicultural groups, implementation of technological projects for the improvement of processes, planning, organization of shared services areas.

Lina Guzmán- Director HSE Bacao S.A.S

Professional in Environmental and Sanitary Engineering, specialist in industrial safety and occupational risk prevention, currently in the process of a master's degree in Climate Change Mitigation and Adaptation, with seven years of experience in the hydrocarbon sector in drilling operations supporting the implementation of environmental management plans, designs and support in drilling fluids, industrial water treatment and drilling muds. Additionally, with six years of experience in the agricultural sector, focused on the development and implementation of Occupational Safety Management Systems (OSMS), emergency plans, ICA certification processes (BPA, Nurseries), application and monitoring of environmental permits with Autonomous Environmental Corporations, environmental impact assessment, environmental management plans.

Camilo Sanchez- Plantation Director Bacao S.A.S

Agro-industrial professional with MBA studies, experience in agro-industrial companies focused on the optimization of their production processes as a cost management and competitiveness strategy to improve the EVA of the organization. Skills and experience in high performance team building, continuous improvement, budgeting, operational planning, control and follow-up.

2.4.3.2 Terra Global Capital

Founded in 2006, Terra Global is a woman-run, women-owned for-profit social enterprise, and small business. Terra Global's mission is to facilitate financially, socially, and environmentally sustainable forestry and agricultural land management practices. Terra Global is the leader in sustainable forest and agriculture program development, land-use greenhouse gas quantification and finance, providing technical expertise and investment capital to their global client base in a collaborative and innovative manner. Having worked in more than 28 countries, Terra Global has deep global experience generating positive social and environmental outcomes from sustainable landscape management, working with its community and government partners. Terra Global has extensive experience in developing countries and in the U.S. as a leading developer of quantification and monitoring protocols of the environmental outcomes from a full range of agricultural and forest management practices.

Terra's approach employs transparency, accountability, and collaboration to deliver on our three key principles; delivering practical solutions that are responsive, pragmatic, and innovative; committed to bringing insight and innovation to catalyze the intersection between concessional and commercial approaches and bringing a "one team" culture when working with a diverse pool of talent across multiple geographies, cultures, and technical disciplines.

Leslie L. Durschinger - Founder, CEO, Conservation Finance, Sustainable Landscape Program Development

Leveraging 20 years of experience and a proven track record in the financial services industry, Ms. Durschinger founded Terra Global Capital in 2006 to promote results-based approaches to sustainable agriculture and forestry management. Ms. Durschinger is recognized as a pioneer and innovator in alignment of development values and financially viable approaches to sustainable landscape management. Terra is now the leader in emerging market climate smart agriculture and reduced deforestation program development, greenhouse gas quantification and business model development, providing technical expertise their global client base of governments, NGOs, and private companies in a collaborative and participatory manner. Under Durschinger's leadership Terra has structured risk mitigation instruments, trust funds and private equity funds to drive investment capital to sustainable agricultural production and forest management. Prior to Terra, Ms. Durschinger held senior management positions in the areas of derivatives trading, investment management, algorithmic trading, risk management, and securities lending. She is on the Board of ACDI-VOCA, Chair of the International Emission Trading Associations REDD+ Working Group and is a member of the Verra VCS Program Advisory Group, REDD+ Social & Environmental Standards Committee, VCS JNR Expert Working Group, and Coalition on Agricultural Greenhouse (C-AGG) Advisory Committee. Ms. Durschinger and her family make small production olive oil on their farm in Mendocino County. Among her previous employers are JP Morgan, Merrill Lynch, Barclays Global Investors and Charles Schwab.

Erica Meta Smith, M.F., RPF – Managing Director, Forestry, Field Training, GHG Quantification

Ms. Smith, M.F., RPF. Forest Carbon Field Development Specialist, Joined Terra Global Capital in 2009. Ms. Smith provides technical forestry knowledge, on-ground carbon quantification expertise, and specializes in forest mensuration programs. She has firsthand knowledge of a forestry-based income and the experience of depending on natural resources as a livelihood. Before working with Terra Global Ms. Smith worked in forest policy and on forestry technical operations. She received her undergraduate degree in Forestry and Master of Forestry from University of California-Berkeley in 2005 and 2007. Her master's work reviewed California Climate Action Registry's Forestry Protocols and implications of carbon markets in California. Ms. Smith is a Certified Ecologist through the Ecological Society of America and a Registered Professional Forester in the State of California. Ms. Smith has worked extensively in the REDD+ sector training communities and working with in-country experts for excellence in MRV across Africa and Asia.

Carolina Oleas, M.S., Director, Agronomy, Project Management, Rural Development

Carolina Oleas, M.S., Agronomist. Mrs. Oleas provides technical agricultural knowledge, community development expertise, and specializes in participatory project management. She has firsthand field

experience working with farmers in different countries of Latin America (Guatemala, Ecuador, Costa Rica, Bolivia, Haiti, El Salvador, others) building capacity with rural communities in sustainable development and climate-smart agricultural practices. Before joining Terra, Mrs. Oleas worked on designing, managing, monitoring, and evaluating projects and programs to promote sustainable production and the application of agricultural adaptation and mitigation practices at the field level with farmers' organizations. She received her undergraduate degree in agricultural engineering from EARTH University in Costa Rica, and later received a Master's in International Agricultural Development from Texas A&M University.

David Montoya González, Remote Sensing Analysis and GIS

Mr. Montoya has wide experience in remote sensing and GIS. He holds a bachelor's degree in Forest Engineer from the National University of Colombia (UNAL) and a master's degree in remote sensing from Federal University of Rio Grande do Sul (UFRGS) – Brazil. Mr. Montoya has worked with Colombian government entities, such as the national department of statistics (DANE), supporting the 3rd National Agricultural Census, and the National University of Colombia in research projects in the Andean Region, focused in geomorphometry, and in the Sibundoy Valley with the indigenous communities Inga and Kamentsá analyzing the land cover changes and natural resources sustainability. Also, he worked in the private sector developing GHG assessments and quantification.

2.4.4 Project Management Partnerships and Team Development (VCS, 3.19; CCB, G4.2)

The Project Proponents have very strong capacity for implementation for project activities. As the Program adds new Project Activity Instances (new farms), it will be determined whether other partners are needed. The Program will, however, use short-term technical experts as needed to supplement the core team and bring specialized expertise.

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

The project's implementing organizations are Bacao S.A.S. and Impulsa Bacao, both are successful companies with significant experience in managing sustainable agroforestry systems and commercialization cacao, respectively. The financial health of both implementing organizations is supported by Andean Cacao.

2.4.6 Avoidance of Corruption and Other Unethical Behavior (VCS, 3.19; CCB, G4.3)

The project implementor's employees engaged in the project will not be involved in, or complicit in, any form of corruption such as bribery, embezzlement, fraud, favoritism, cronyism, nepotism, extortion, and collusion.

Bacao has developed a disciplinary matrix, which states that workers cannot engage in any form of fraudulent, lack of honesty or abuse of power while conducting project activities.

2.4.7 Commercially Sensitive Information (VCS, 3.5.2 – 3.5.4; CCB Rules, 3.5.13 – 3.5.14)

The commercially sensitive information which has been prepared and provide to the VVB is listed in the Appendix 3: Commercially Sensitive Information

2.5 Legal Status and Property Rights

2.5.1 National and Local Laws (VCS, 3.1, 3.6. 3.7, 3.14, 3.18, 3.19; CCB, G5.6)

Some of the most relevant laws concerning the agricultural and forestry sectors are the following:

- Law 1753 of 2015, in its strategy of "transformation of the countryside" states as one of the objectives the "ordering of rural territory and access to land by settlers rural"
- Decree 1076 of 2015, through which the Sole Regulatory Decree of the Environment and Sustainable Development Sector is issued."
- Law 1776 of 2016 in article 4 establishes that "the Ministry of Agriculture and Rural Development will be responsible for leading and coordinating the formulation of the policy of rural development, based on criteria of productive and social ordering that allow to determine the priority areas of rural development". Also, it points out that "The Ministry of Agriculture and Rural Development will define the agricultural frontier taking into account the definitions of the environmental reserve zones and other restrictions on the use of land imposed by any governmental authority".
- Law 99 of 1993, Environmental Policy, in article 5 numeral 1, establishes that it corresponds to the Ministry of Environment and Sustainable Development, among other functions, that of "Formulating the policy in relation to the environment and renewable natural resources, and establish the rules and criteria of environmental ordinance for the use of the territory and the adjacent seas, to ensure the sustainable use of resources renewable natural resources and the environment.

In terms of the laws related to the Project the following apply:

The Project complies with all the labor laws related to payment of decent salaries, and all benefits required by the law (medical, social security, and retirement), occupational risk, and sexual harassment prevention, with a policy in place. Employees are informed of all their rights and duties, as well as the employer's responsibilities, when signing the contract and also during the introductory training session they receive. The fulfillment of all laws and policies related to the workplace is continually monitored. The following are labor laws the project complies with:

- Law 2663/1950, Labour Code. In order to demonstrate compliance with this law, Bacao hires a 3rd. party audit per year which verifies that the project fully complies with it. Audits have been conducted since 2017 (project start date) to this day.
- Law 1072/2015, Sole Regulatory Decree of Labour Sector. The project conducts external audits to demonstrate compliance with what is required under this law. On the last audit conducted, the auditor confirmed that the project effectively complies with a 90% satisfaction.
- Law 1010/2016 through which measures are adopted to prevent, correct, and punish workplace harassment and other harassment within the framework of labour relations. In order to comply with this law, the project has established tools to prevent and intervene in workplace harassment and create safe work environments which are part of the Safety and Health Policy.

The Project also fulfils the environmental regulations defined by the Ministry of Environment related to sustainable development (Decree 1076/2015). This law identifies the national environmental corporations as the regulatory entities, defines their roles and responsibilities, as well as the guidelines on forest conservation, management and fauna and flora preservation. The project receives a yearly monitoring visit from Cormacarena, the corporation for this area, who verifies that the project is following all regulations defined under the law. Yearly reports produced by Cormacarena are available for the VVB under request.

2.5.2 Relevant Laws and Regulations Related to Worker's Rights (VCS, 3.18.2; CCB, G3.11)

The project complies with the national labor laws related to wages, social benefits included in the general schemes for pensions, health, occupational risks, family allowance and complementary social services defined by law.

The most relevant legal regulations that apply for the project are the following:

- Law 2663/1950, Labour Code. In order to demonstrate compliance with this law, Bacao hires a 3rd. party audit per year which verifies that the project fully complies with it. Audits have been conducted since 2017 (project start date) to this day.
- Law 1072/2015, Sole Regulatory Decree of Labour Sector. The project conducts external audits to demonstrate compliance with what is required under this law. On the last audit conducted, the auditor confirmed that the project effectively complies with a 90% satisfaction.
- Law 1010/2016 through which measures are adopted to prevent, correct, and punish workplace harassment and other harassment within the framework of labour relations. In order to comply with this law, the project has established tools to prevent and intervene in workplace harassment and create safe work environments which are part of the Safety and Health Policy.

For the project it is important that all workers know their rights, duties, and responsibilities within the legal framework, for this reason it is stipulated that on the first day of work, there is a full induction to explain all issues related to compliance with salary payments, social security, legal and extra-legal benefits, as well as communication channels.

2.5.3 Human Rights (VCS, 3.19)

Project activities will be implemented on private land, no IPs, LCs or customary right holders' rights were involved in the transaction.

2.5.4 Indigenous Peoples and Cultural Heritage (VCS, 3.18, 3.19)

The project area is not in IP territory and no heritage will be affected by project activities.

2.5.5 Statutory and Customary Property Rights (VCS, 3.18, 3.19; CCB, G5.1)

According to the information registered in the 2009 land census (86 million of the 114 million hectares of surface of the country), was distributed in 4 main categories, government land (20.5%), protected areas (3.7%), private land (44.7%), collective land (29%), and other minor types of ownerships such as black, and indigenous communities. The largest proportion of the area corresponds to private property, although the weight of collective property is significant. In Colombia there are three types of ownership of land public, private, and communal. Private property (Political Constitution, art. 58) is that it belongs to natural or legal persons, who can dispose and enjoy their property, as long as it is not against the law or against the rights of others ((UPRA), nd) In this case the Project Activity Instance is under private ownership by Bacao S.A.S. and the future Instances to be added will be private property as well.

2.5.6 Recognition of Property Rights (VCS, 3.7, 3.18, 3.19; CCB, G5.1)

The project is being carried out exclusively on private land. It has not and will not encroach on either government or community property. Land titles have been signed and secure to demonstrate the ownership of the project's land. All property rights are recognized, respected, and supported.

2.5.7 Free, Prior and Informed Consent (VCS, 3.18; CCB, G5.2)

Description of process for obtaining consent	Project activities will be implemented on private land, this land was purchased from a single owner, no Ips, LCs or customary right holder rights were involved, thus no FPIC consent process was conducted.
Outcome of FPIC process	The Project will not encroach uninvited on private property, community property, or any other government property. The Project is implemented on private land that was purchased by Bacao S.A.S who has all the legal permits and authorizations for use of land and water. The Project will follow the agreed guidelines for land use in all future Project Activity Instances and the Project Zone Instances without encroaching into any other properties. The Project Proponent has explicit and uncontested legal tenure and rights over the land, including the rights to benefit from income generating activities including carbon finance, and to oversee the benefits sharing available from the carbon finance.

2.5.8 Benefit Sharing Mechanisms (VCS, 3.18, 3.19;)

The final benefits procured from the sale of the GHG removal credits will be utilized for the long-term sustainability of the implemented project activities and for community benefits of the Bacao workers and enrolled farmers in the Impulsa Program. Impulsa farmers will continue to receive technical assistance and training workshops on topics such as improved agricultural practices, soil fertility and improved productivity, as well as Bacao workers will continue to improve their knowledge and skills on improved cacao production.

2.5.9 Property Rights Protection (VCS, 3.18, 3.19; CCB, G5.3)

The Project has not and will not involve the resettlement of any communities or households, since there are no communities living in the Project Activity Instance. Further, the Project goals involve maintaining and improving the livelihoods of communities that currently live within the Project Zone. Resettlement is not a component of the Project design, nor would it be acceptable under Colombian Law.

None of the Project Activities require relocation, either voluntary or involuntary.

2.5.10 Illegal Activity Identification (VCS, 3.19; CCB, G5.4)

The illegal activities that could impact the project results relate to illegal hunting and deforestation in the Project Activity Instance property. The project reduces this risk by implementing an environmental policy which includes the no hunting and non-trespassing item and a zero-deforestation item. These policies are reinforced through constant monitoring.

2.5.11 Ongoing Disputes (VCS, 3.18, 3.19; CCB, G5.5)

There are no unresolved conflicts or disputes; there have been no disputes in this aspect in the time in which the project has been developed.

2.5.12 Approvals (CCB, G5.7)

Bacao S.A.S has ownership of the land in the Project Area. The Project is operated on private land that was purchased by Bacao S.A.S who has all the legal permits and approvals for use of land and water. The Political Constitution of 1991 in its article 58, while guaranteeing private property and other rights acquired under civil law, also determines that it has an inherent social and ecological function that entails obligations.

2.5.13 Double Counting and Participation under Other GHG Programs (VCS, 3.23; CCB G5.9)

The current project excludes any validated areas an international or national standard, which ensures no double counting. Additionally, the project will be registered in the RENARE (*Registro Nacional de Reducción de Emisiones de Gases de Efecto Invernadero*).

In order to avoid double counting of mitigation results at the national level, particularly for credits sold as offsets sold in the voluntary market and those generated for commercialization in the Colombian domestic market, the project proponent will take the necessary actions to register and update the information of the initiative in the National Registry of GHG Emission Reduction (RENARE), in a period of less than three months counted from the time this registry is put into operation by MADS. All this is by virtue of the guidelines of Art. 54 of Resolution 1447 of 2018.

With the inscription of the project in RENARE, the generation of overlaps not compatible with future programs or projects in the same Project Activity Instance will be avoided and in this way the possibility of double counting will be eliminated.

2.5.13.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program, or any other form of community, social, or biodiversity unit or credit?

☐ Yes ☒ No

2.5.13.2 Registration in Other GHG Programs

Is the project registered or seeking registration under any other GHG programs?

☐ Yes ☒ No

2.5.13.3 Projects Rejected by Other GHG Programs

Has the project been rejected by any other GHG programs?

☐ Yes ☒ No

2.5.14 Double Claiming, Other Forms of Credit, and Scope 3 Emissions (VCS, 3.24)

2.5.14.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit? See the VCS Program Definitions for definitions of emissions trading program and binding emission limit.

☐ Yes ☒ No

2.5.14.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system? See the VCS Program Definitions for definition of GHG-related environmental credit system.

☐ Yes ☒ No

2.5.14.3 Supply Chain (Scope 3) Emissions

Do the project activities affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

2.6 Additional Information Relevant to the Project

2.6.1 Leakage Management (VCS, 3.11, 3.15)

There is no need for leakage management plan for this Project, since the animals that affected the baseline were transferred to another available degraded pasture outside of the Project Activity Instance as described in Section 3.2.3. Therefore, no leakage management plan was developed.

2.6.2 Further Information

No additional relevant legislative, technical, economic, sectoral, social, environmental, geographic, site-specific and/or temporal information will be included.

3 CLIMATE

3.1 Application of Methodology

3.1.1 Title and Reference of Methodology (VCS, 3.1)

Type (methodology, tool, module)	Reference ID (if applicable)	Title	Version
Methodology	CDM AR-ACM0003	*A/R Large-scale Consolidated Methodology: Afforestation and reforestation of lands except wetlands*	*2.0*
Tool	CDM AR TOOL-2	*Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities*	*1.0*
Tool	AR-TOOL03	Calculation of the number of sample plots for measurements within A/R CDM project activities	2.1.0
Tool	*CDM AR-TOOL14*	*Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities*	*4.2*

Type (methodology, tool, module)	Reference ID (if applicable)	Title	Version
Tool	*CDM AR-TOOL12*	*Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities*	*3.1*
Tool	*CDM AR-TOOL08*	*Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity*	*4.0*
Tool	*CDM AR-TOOL15*	*Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity*	*2.0*
Tool	*CDM AR-TOOL16*	*estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities*	*1.1*
Tool	CDM AR-TOOL17	Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities (270 KB)	1.0

3.1.1.1 LULC Classification

To define the area of the Project Activity Instance, the eligibility criteria defined in section A1.1 of the VSC standard v4.5 must be met: “The project area shall not be cleared of native ecosystems within the 10-year period prior to the project start date”. Then, it was required to make a LULC classification of the Primavera and Espejuelos properties in two points in time, at project start (2017) and 10 years prior to the project start (2007) to identify the areas that qualify as non-forest, pixels that were forest in one of the two images were excluded of the final area of the Project Activity Instance.

The reflectance imagery used to assess the land cover types in the Project Activity Instance were obtained from the sensors Landsat 7 ETM+ and Landsat 8 OLI/TIRS, Level 2 - Collection 2 - Tier 1 surface reflectance, and were accessed from the United States Geological Survey (USGS) using Google Earth Engine, which contain atmospherically corrected surface reflectance and land surface temperature derived from the data produced by the Landsat 7 ETM+ and Landsat 8 OLI/TIRS sensors. Table 12 and Table 13 describe the Landsat bands used in the classification process. The main features of the Landsat Level 2 - Collection 2 - Tier 1 product are:

- They have precision terrain processing and have been inter-calibrated across the Landsat sensors.
- They are radiometrically calibrated and orthorectified using ground control points (GCPs) and digital elevation model (DEM) data to correct for relief displacement.
- Landsat scenes with the highest available data quality are placed into Tier 1 and are considered suitable for time-series processing analysis.
- Tier 1 includes Level-1 Precision Terrain (L1TP) processed data that have well-characterized radiometry and are inter-calibrated across the different Landsat sensors.
- The geo-registration of Tier 1 scenes are consistent and within prescribed tolerances [<=12 m root mean square error (RMSE)].
- All Tier 1 Landsat data can be considered consistent and inter-calibrated (regardless of sensor) across the full collection.

All the images and the land cover classification images have the same common pixel resolution 30m by 30m, the same common origin and projection system.

For the two years (2007 and 2017), a composite of multiple images was created to remove clouds and reduce the banding error of the Landsat 7, and the average weighted date was calculated from the composite. The composite and the calculation of the average date were made in Google Earth Engine. A summary description of the images employed are described in Table 14, Table 15 and Table 16 provide a list of the Landsat scenes required for each composite.

For the classification process, reference points for the 2007 and 2017 images were randomly generated and visually interpreted and cross-referenced with high-resolution Google Maps imagery, which varies in resolution from 15 m to 15 cm depending on data availability. Approximately 400 training points were selected within the two classes (Forest and Non-Forest). The training points were divided into two datasets, 70% of the training points were used to train the model employing a Random Forest algorithm, and 30% were used to validate the classification through confusion matrices and accuracy metrics.

Post-classification merging and single-pixel filter analysis were performed to reduce the overall error rate of the classification. Merging combines the results of multiple classifications to mitigate the effects of random errors. Single-pixel filter analysis identifies pixels that are indicative of certain classes and uses these pixels to classify the rest of the data to reduce noise.

The classifications of the Project Activity Instance met the 90% accuracy as a common practice. The overall accuracy measures are presented in Table 17 and the confusion matrices in Table 18.

Table 12. Bands and resolution of the Landsat 7 ETM+ data, Level 2, Collection 2, Tier 1

Band nr.	Resolution (m)	Band name	Wavelength (µm)			
			ETM+			
			from	to	mid	FWHM
1	30	Blue	0.45	0.52	0.485	0.035
2	30	Green	0.53	0.61	0.57	0.04
3	30	Red	0.63	0.69	0.66	0.03
4	30	Near infrared	0.78	0.9	0.84	0.06
5	30	Short-wave infrared	1.55	1.75	1.65	0.1
7	30	Mid infrared	2.09	2.35	2.22	0.13

Table 13. Bands and resolution of the Landsat 8 OLI-TIRS data, Level 2, Collection 2, Tier 1

Band nr.	Resolution (m)	Band name	Wavelength (µm)			
			OLI-TIRS			
			from	to	mid	FWHM
2	30	Blue	0.450	0.515	0.4825	0.0325

Band nr.	Resolution (m)	Band name	Wavelength (µm)			
			OLI-TIRS			
			from	to	mid	FWHM
3	30	Green	0.525	0.600	0.5625	0.0375
4	30	Red	0.630	0.68	0.655	0.025
5	30	Near infrared	0.845	0.885	0.865	0.02
6	30	Short-wave infrared 1	1.560	1.660	1.610	0.05
7	30	Short-wave infrared 2	2.100	2.300	2.200	0.01

Table 14. Description of the remote sensing imagery used to classify the Project Activity Instance

Source	Average Weighted Date (YYYY/MM/DD)	No. Scenes	Sensors	Processing Level
USGS	2007/01/20	7	Landsat 7 ETM+	Level 2, Collection 2, Tier 1, surface reflectance
USGS	2017/01/04	4	Landsat 8 OLI/TIRS	Level 2, Collection 2, Tier 1, surface reflectance

Table 15. 2007 Landsat images used to classify the Project Activity Instance

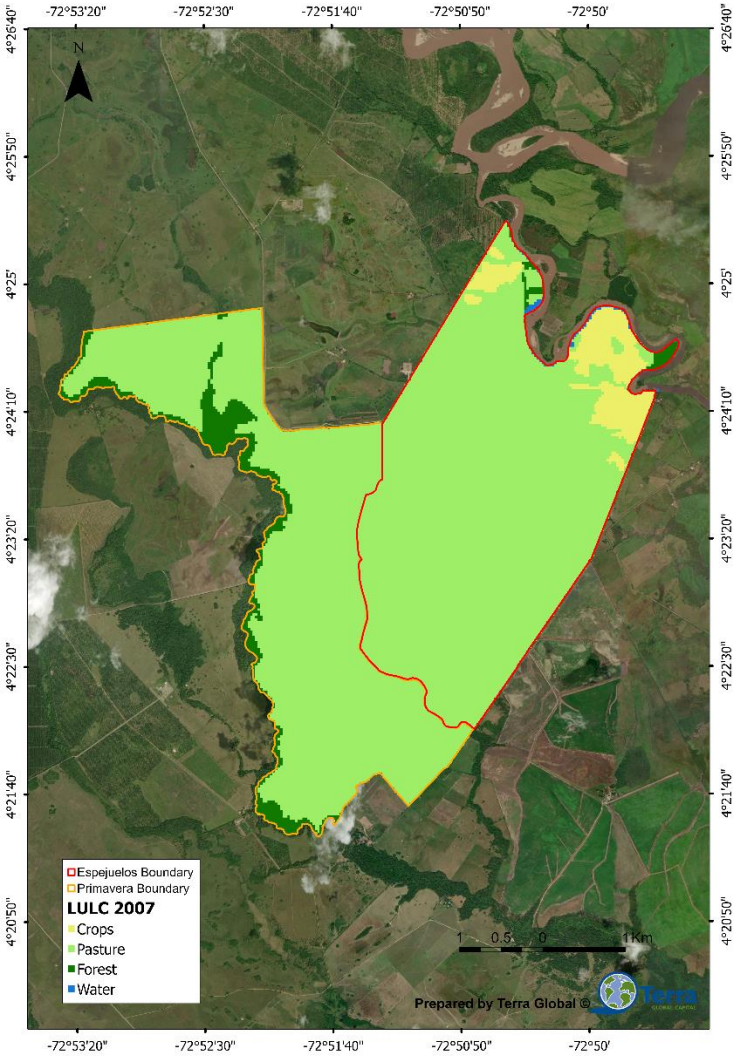
Date (YYYY/MM/DD)	Path	Row	Satellite
2007/01/15	7	57	Lansat 7
2007/01/31	7	57	Lansat 7
2007/02/16	7	57	Lansat 7
2007/03/04	7	57	Lansat 7
2007/05/23	7	57	Lansat 7
2007/06/08	7	57	Lansat 7

Date (YYYY/MM/DD)	Path	Row	Satellite
2007/06/24	7	57	Lansat 7

Table 16. 2017 Landsat images used to classify the Project Activity Instance

Date (YYYY/MM/DD)	Path	Row	Satellite
2017/01/02	7	57	Landsat 8
2017/01/18	7	57	Landsat 8
2017/02/03	7	57	Landsat 8
2017/02/19	7	57	Landsat 8

Map 7. Project Activity Instance in 2007 (10 years prior to project start), no forest areas



The landscape at project start is characterized by grassland and cropland as shown in Map 8. Areas defined as forests at the project start, thus not meeting this criterion, are excluded.

Map 8. Land use map of the Project Activity Instance at Project Start (2017).

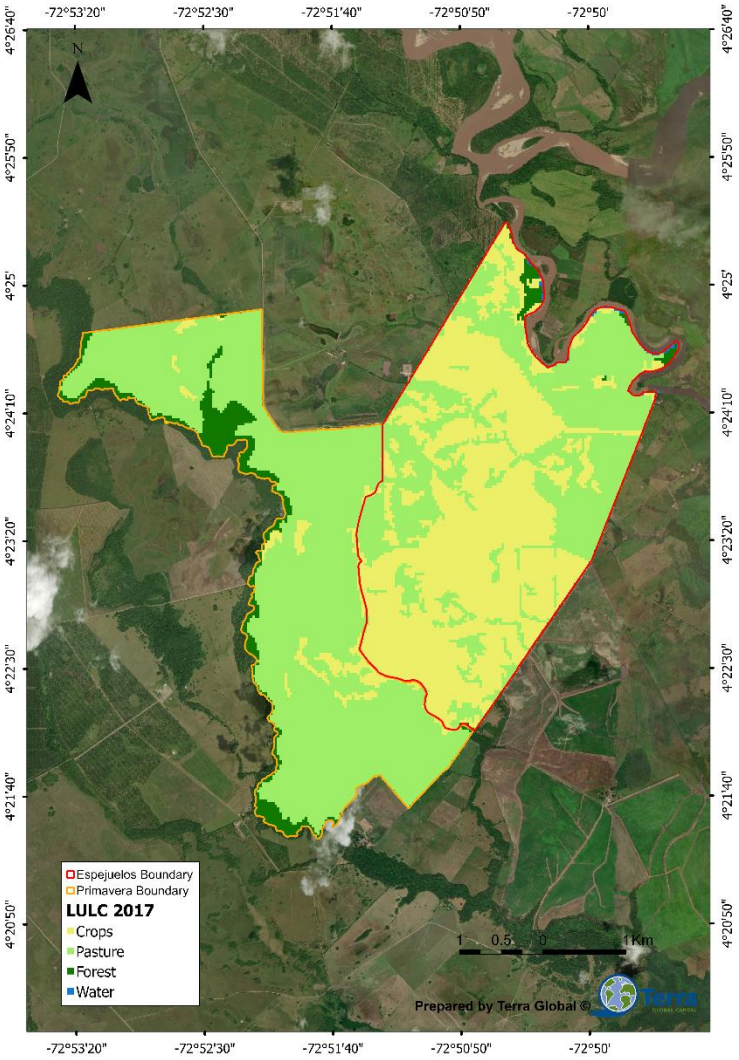


Table 17. Accuracy for the verification of the classified images

Image (YYYY/MM/DD)	Overall Accuracy
2007/01/20	95.31%
2017/01/04	94.03%

Table 18. Confusion matrices with omission and commission percentages

	2007/01/20	Predicted			
		Crop	Pasture	Forest	Water

Observed	Crop	41	2	0	0
	Pasture	0	83	3	1
	Forest	0	5	77	0
	Water	0	0	1	43
	Commission	0.00%	7.78%	4.94%	2.27%
	Omission	4.65%	4.60%	6.10%	2.27%
	2017/01/04	Predicted			
		Crop	Pasture	Forest	Water
Observed	Crop	179	13	0	0
	Pasture	2	139	0	0
	Forest	7	3	82	0
	Water	3	0	0	41
	Commission	6.28%	10.32%	0.00%	0.00%
	Omission	6.77%	1.42%	10.87%	6.82%

3.1.1.2 Applicability Criteria

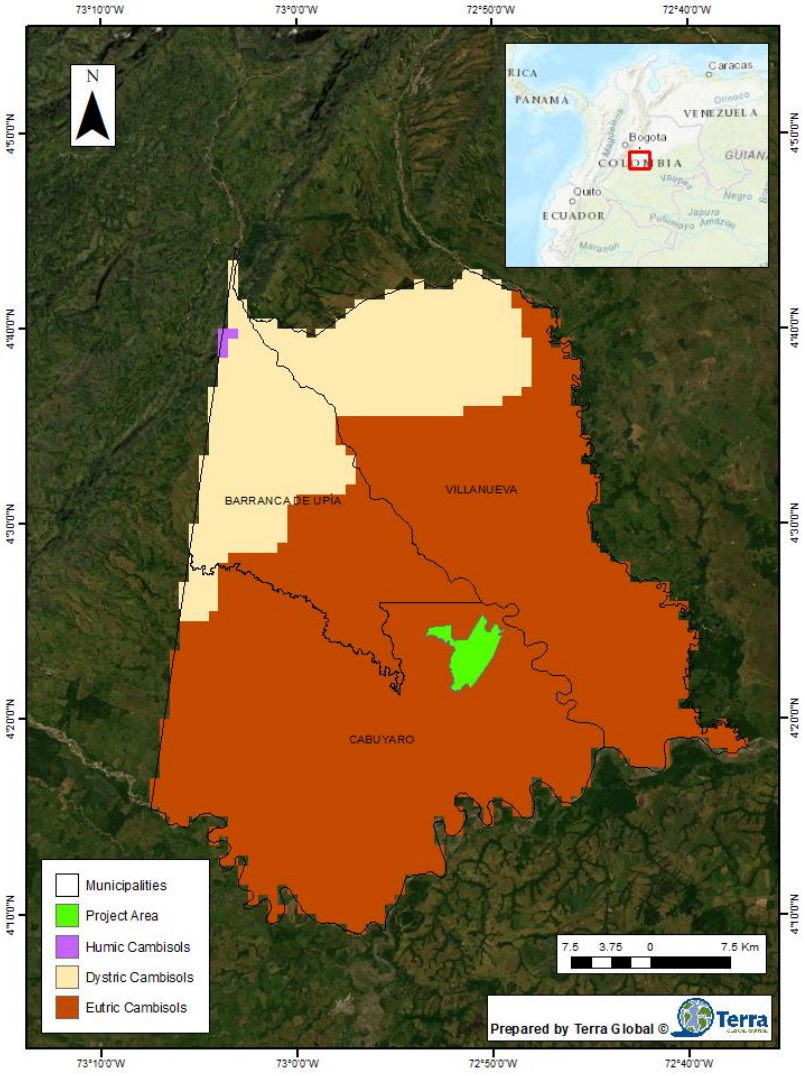
The methodology has two applicability conditions. Information to show that the project activities meet these conditions is provided under each of the applicability conditions:

(a) The land of the project does not fall into wetland 2 category;

The total Project Activity Instance is not occurring on wetlands follows the definition of wetlands according to the 2003 IPCC GPG LULUCF guidance – where a wetland category includes land that is covered or saturated by water for all or part of the year (e.g. peatland) and that does not fall into cropland, grassland, or settlements categories.

To map the major IPCC soil classes for the potential project area and determine whether or not it falls into wetland or organic soil class. Based on a study by (Batjes, 2010) which derived the IPCC default soil classes from the Harmonized World Soil Database (FAO, 2022), the soils in the entire Project Activity Instance belong to the IPCC soil classes of Low Activity Clay Soils (LAC). None of the Project Activity Instance belongs to the category of IPCC classes of organic soils (ORG) or wetlands (WET).

Map 9. Dominant soil using the Harmonized World Soil Database v 1.2 showing Project Area.



The methodology states that “Where the land in its baseline land-use has soil organic carbon (SOC) content that is expected to be higher than that under the land-use of “forestry” (i.e., when planted), the methodology restricts the extent of soil disturbance in the project to be no more than 10 percent. “This is not applicable to this project since the soil content in the baseline is zero to declining applicability criteria b) below.

(b) Soil disturbance[12] attributable to the A/R CDM project activity does not cover more than 10% of area in each of the following types of land, when these lands are included within the project boundary:

(i) Land containing organic soils as defined in Annex A: Glossary of the IPCC GPG LULUCF 2003;

Soil testing at project start showed that the Project Activity Instances contained less than 12 percent organic carbon when measured to a depth of 20 cm, not meeting the category of an organic soil.

(ii) Land which, in the baseline, is subjected to land-use and management practices and receives inputs listed in appendices 2 and 3 to this methodology.

Land in the baseline of the project is located in Tropical Wet region (according to the IPCC classification), land use is defined as grassland and cropland (rice) as shown in Figure 13 and Figure 14. Degraded pasture and Cropland (rice) at project start (2017), respectively. at project start. The management type grassland-no till and low on inputs, cropland-high till, and low inputs. According to a soil study done in June 2016 (Fino, 2016) in the PAI, it was determined that the soil had moderate erosion level due to water presence. Soils in the PAI were considered degraded to severely degraded, making the above criteria not applicable.

Figure 13 and Figure 14. Degraded pasture and Cropland (rice) at project start (2017), respectively.

In addition to the above applicability conditions, the conditions contained in the procedures, tools, guidelines, and guidance shall apply when these are used along with the methodology.

Applicability criteria of tools to be used under AR-ACM0003 were reviewed as shown in Table 19, to confirm that all tools could be used.

Table 19. Applicability criteria of tools used under AR-ACM-0003.

Tools	Applicability Criteria
CDM AR-TOOL14: Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities", version 04.2	No internal applicability conditions
CDM Combined Tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities (Version 01)	No internal applicability conditions
AR-TOOL12: Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities	No internal applicability conditions
AR-TOOL 008: Estimation of non-CO2 greenhouse gas (GHG) emissions resulting from burning of biomass attributable to an A/R CDM project activity not used insignificant (see below)	The tool is applicable to all occurrence of fire within the project boundary.
AR-TOOL15: Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity v.02.0	This tool is not applicable if the displacement of agricultural activities is expected to cause, directly or indirectly, any drainage of wetlands or peat lands
A/R Methodological Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities (Version 01.1.0)	(a) The areas of land to which this tool is applied: (i) Do not fall into wetland category; ✓ or (ii) Do not contain organic soils as defined in Annex A: glossary of the IPCC GPG LULUCF 2003; (iii) Are not subject to any of the land management practices and application of inputs as listed in the Tables 1 and 2; (b) The A/R CDM project activity meets the following conditions:

Tools	Applicability Criteria
	(i) Litter remains on site and is not removed in the A/R CDM project activity; ✓ and (ii) Soil disturbance attributable to the A/R CDM project activity, if any, is: • In accordance with appropriate soil conservation practices, e.g. follows the land contours; • Limited to soil disturbance for site preparation before planting and such disturbance is not repeated in less than twenty years. ✓

3.1.2 Project Boundary (VCS, 3.12)

The carbon pools included in the project for accounting of carbon stock changes are shown in Table 20. These carbon pools will be significantly affected by project activities and are monitored over time. Emission sources and associated GHGs selected for accounting are shown in *Table 21*.

Table 20. Carbon pools selected for accounting of carbon stock changes in the Project Scenario

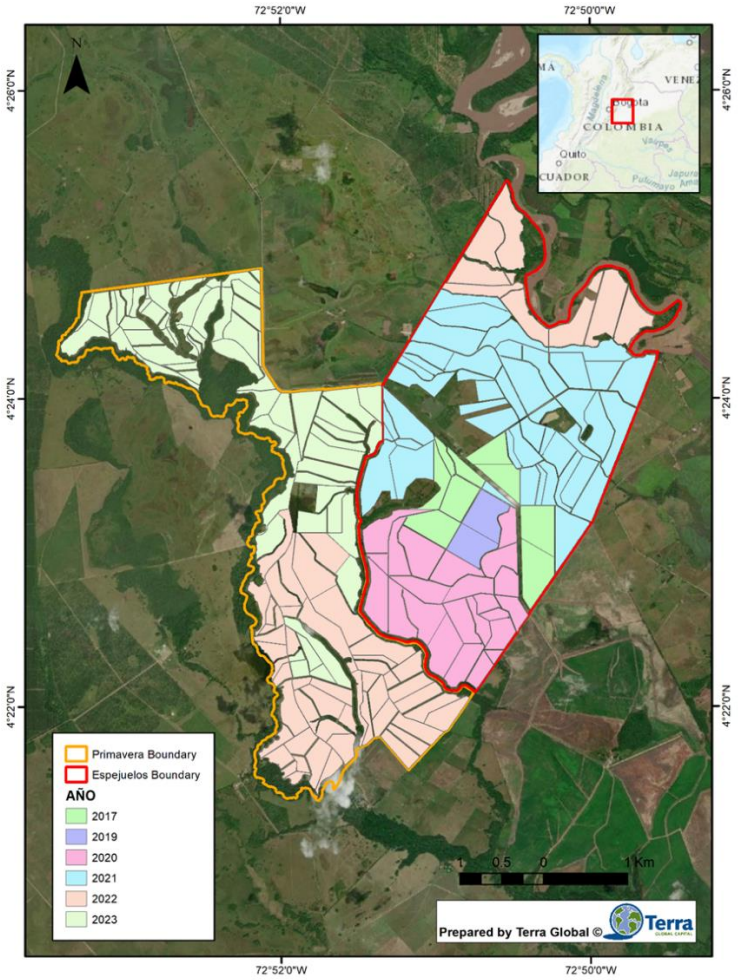
Carbon pools Project Scenario	Selected	Justification/Explanation
Above-ground biomass	Yes	This is the major carbon pool subjected to project activity
Below-ground biomass	Yes	Carbon stock in this pool is expected to increase due to the implementation of the project activity
Dead wood	Yes	Carbon stock in these pools will increase due to implementation of the project activity.
Litter	Yes	Carbon stock in these pools will increase due to implementation of the project activity
Soil organic carbon	Yes	Carbon stock in these pools will increase due to implementation of the project activity

Table 21. Emission sources and GHGs selected for accounting

Source	Gas	Included	Justification/explanation
Baseline	CO2	No	No burning of woody biomass occurs in the baseline scenario, but is not included in this project.

Source		Gas	Included	Justification/explanation
	Burning of woody biomass	CH4	No	No burning of woody biomass occurs in the baseline scenario, but is not included in this project..
		N2O	No	No burning of woody biomass occurs in the baseline scenario, but is not included in this project.
	Nitrogen Fertilizers	N2O	No	Not required by methodology
	Fossil fuels	CO2	No	Not required by methodology
Project	Burning of woody biomass	CO2	No	CO2 emissions due to burning of biomass are accounted as a change in carbon stock
		CH4	No	Burning of woody biomass for the purpose of site preparation are not part of the project forestry activities.
		N2O	No	Burning of woody biomass for the purpose of site preparation are not part of the project forestry activities.
	Nitrogen Fertilizers	N2O	No	Not required by methodology
	Fossil fuels	CO2	No	Not required by methodology

For the Project Activities Instances included in this PD, Map 10 provides the boundaries, showing the various planting areas for the Project Activity Instances. As the project expands, additional Project Activity Instances may be added.



Map 10. Farm Boundaries and planting years

Table 22. Areas (hectares) and years of planting of the agroforestry system in the first Project Activity Instance assumed at project start in Cabuyaro, Meta

Year Planted (date)	Status	Area (ha)
2017	Planted	120
2018	Planted	-
2019	Planted	36
2020	Planted	234
2021	Planted	475
2022	Planted	141
2023	Projected	432
2024	Projected	315
Total		**1,767**

3.1.3 Baseline Scenario (VCS, 3.13)

The baseline scenario of this large-scale A/R project activity is the continuation of the pre-project land use. If the Project Activity Instances parcels were not purchased by Bacao, the selling land holder would have continued to manage the land with the pre-project activities. The baseline scenario is degraded natural pastures and a small area of subsistence cropland. For a full description see section

Without-project Land Use Scenario and Additionality.

Details regarding pre-project land-use are described in Section Conditions Prior to Project Initiation and Land Use Scenarios without the Project (VCS, 3.13; CCB, G2.1).

The barrier analysis as specified under the methodology baseline requirements if conducted in Section 3.1.4.

3.1.3.1 Stratification

Baseline Stratification

Stratification of the biomass at project start was identified as one LC class – degraded grasslands which included rangeland as well as grasslands that are used seasonally to grow rice during the rainy season. At project start the major vegetation types within the Project Activity Instance included degraded rangeland, used for grazing cattle and rainfed rice production. See the classified image described in Map 8.

Project Stratification

Areas of forest and wetland that can be found on the farm were excluded from the Project Activity Instances and are left untouched. Bacao has established a no deforestation policy for cacao, so no forest cover can be lost due to project activities. In addition, scattered trees found across the landscape are incorporated into the cropping regime for cacao and are not removed.

As it relates to forest types, the agroforestry tree system established in the Project Activity Instances is standardized as it relates to composition and density of cacao, *Glyricidia* and species of windbreak trees. Thus, as it related to “forest types” for biomass are treated as one stratum.

For ex-post accounting, biomass plots are identified and analyzed based on the actual implementation of the project planting/management plan (i.e., number of hectares planted per year, density of trees per hectare, tree composition per hectare, etc.).

3.1.4 Additionality (VCS, 3.14)

3.1.4.1 Regulatory Surplus (VCS, 3.14)

Is the project located in an UNFCCC Annex 1 or Non-Annex 1 country?

☐ Annex 1 country ☒ Non-Annex 1 country

Are the project activities mandated by any law, statute, or other regulatory framework?

☐ Yes ☒ No

If the project is located inside a Non-Annex 1 country and the project activities are mandated by a law, statute, or other regulatory framework, are such laws, statutes, or regulatory frameworks systematically enforced?

☐ Yes ☒ No

No similar activities to the ones proposed for this project have been conducted in a similar geographic area. Because the additionality tool excludes these from the Common Practice Analysis, the VCS AFOLU project activity is not the baseline scenario and is additional.

3.1.4.2 Additionality Methods (VCS, 3.14)

According to the AR-ACM0003, project participants (PPs) shall demonstrate that the project activity is additional by selecting one of the following options:

(a) Using the "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities"; or

(b) Using an approved standardized baseline applicable to their project.

For this Grouped Project, PPs selected option (a) to demonstrate that the project activity would not have occurred in the absence of the proposed project activity. Following the "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities", the following steps were taken to determine additionality:

3.1.4.3 Step 0: Preliminary Screening Based on the Starting Date of the Proposed VCS AFOLU Project Activity

The project start date was 6 July 2017, which is after 31 December 1999.

The application of climate smart practices in the project activity instance have been the goal and incentive since project start. The implementation of these practices has driven the planned sale of VERRs.

3.1.4.4 Step 1: Identification of Alternative Land Use Scenarios to the Proposed VCS AFOLU Project Activity

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

The identification of alternative land use scenarios to the project activities was undertaken and four possible scenarios were identified:

a) Conversion to oil palm large scale plantation. While this practice is found in the region (see sections 2.1.15 and 2.2.1), it is also expensive, and it would require resources that the previous landowner did not have.

b) Remain in degraded pasture for the purpose of cattle production. This practice is common in the area (see sections 2.1.15 and 2.2.1), and as it was the land use activity prior to the start of the project, it is highly likely that it would have continued in the absence of the project. There was a small area of subsistence cropland on the project area prior to the start of the project; however, this has been excluded from this additionality analysis because it does not affect the Investment Analysis in Step 3, as the cropland was all for subsistence and was not sold on the market. Therefore, for the purpose of the additionality analysis, the pre-project land use is considered to be degraded pasture for the purpose of cattle production.

c) Conversion to agriculture with lowland rice farming. While this practice is found in the region (see sections 2.1.15 and 2.2.1), it is unlikely that it would have occurred at the project activity instance, as not all portions of the land are suitable for agriculture.

d) Forestation without being registered as an A/R VCS project activity.

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

a) Conversion to oil palm large scale plantation. The Colombian Constitution of 1991 guarantees the rights to private property, and specifically provides special protections for the production of food crops. Converting degraded pasture to oil palm production is consistent with this.

b) Remain in degraded pasture for the purpose of cattle production. This was the legal land-use scenario present in the Project Area prior to the start of the Project.

c) Conversion to agriculture with lowland rice farming. See description for alternative land-use scenario (a).

d) Forestation without being registered as an A/R VCS project activity. The Project Scenario is legal, and registering as an A/R VCS project activity does not affect its legality.

Therefore, all alternative land-use scenarios identified in sub-step 1a are consistent with enforced mandatory applicable laws and regulations.

3.1.4.5 Step 2: Barrier Analysis

Sub-Step 2a. Identification of Barriers that Would Prevent the Implementation of at Least One Alternative Land Use Scenarios

While performing the barrier analysis, a group of significant barriers that would prevent the implementation of the proposed project was identified. None of these barriers affect the continuation of the baseline scenario.

a) Investment Barriers

Debt funding is available in Colombia, but *it is difficult to access* for large scale agroforestry cacao systems. From the Project Participant's perspective, Bacao has numerous investment barriers. Bacao sells cacao besides GHG credits, associated with carbon sequestration, these two being the only sources of revenue. In order to invest in this large-scale agroforestry instance, Bacao has equity investment and has raised capital to cover the negative cash flows for the development of the Project Activity Instance. With the expectation of a carbon market and the expectation of the sale of GHG credits from the project activities, Bacao will recover and reinvest in the future expansion of PAIs.

This barrier eliminates conversion to oil palm large-scale plantation, as oil palm plantations have much higher costs relative to their revenues compared to cacao (*page 9*) (Nasution, Supriana, Pane, & Hanum, 2019), and it is unlikely that an oil palm investment would be attractive to investors. Therefore, alternative land use scenario (a) has been eliminated.

b) Barriers related to local tradition

The traditional/common type of cocoa farm throughout Colombia has a rudimentary management. Occasionally, plants are fertilized, some phytosanitary products are applied, and a few are pruned, but in general it is in response to the presence of diseases or pests. Farmers do not have (or have lost) the knowledge of other potential species with higher benefits and positive interactions with cacao, as they usually do not know which forest tree species could be combined well with cacao. These farms usually have 800 to 1,000 cocoa trees per hectare and annual yields between 300 and 500 kg/ha (ie yield per plant is 0.2 to 0.5 kg). Often on these farms, cocoa is not given exclusive management, but rather forms part of a diverse system from which the farmer harvests different products throughout the year. Cocoa from this type of farm usually is sold on the 'regular' cocoa market. The income generated by the cultivation of cocoa corresponds to an amount less than a minimum wage in a period of 10 years *(page 59)* (CIAT, nd).

Most farmers have little knowledge of agroforestry systems, planting techniques, and maintenance techniques for timber or fruit trees. This lack of knowledge discourages them from planting *these trees*

The project contributes to overcome this barrier by providing technical assistance and practical trainings on agroforestry practices such as planting scheme, sustainable maintenance, benefits of crop diversification, native species to be used for shade purpose. The training is provided to both plantation's workers and small farmers from the communities around.

c) Barriers due to local ecological conditions,

i) Degraded soil (e.g. water/wind erosion, salinization);

In the Altillanura of Colombia the extensive use of machinery, associated with the intense precipitation typical of the region, results in severe damage to the physical structure of the soil that leads to the sealing of the surface layer and the consequent drastic reduction in infiltration rates, air and water flow, affecting the availability of nutrients, which are already low in these soils. Under natural conditions, savannah soils in the Colombian tropics do not offer an appropriate environment for agricultural production. In this environment, continuous monoculture performs poorly, due to the rapid deterioration of its yields. The particularities of the soils of the Altillanura have been studied by a large group of researchers (among others, Spain 1993; Aristizábal et. al, 1999; Almanza and Argüelles, 1998; Rippstein, 1993; Amézquita, 1998, 1999, 2002; Phiri, et al, 2003) who generally classify them as not very fertile and very prone to erosion and structural degradation (*page 8*) (Rivas L., 2004).

The project contributes to overcome this barrier by establishing a sustainable multilayer agroforestry system that will rehabilitate and restore the soil fertility and productivity. Soil degradation will largely and relatively be corrected with proper land preparation work, drainage corrections, effective irrigation and good agronomic management that would allow the soil to recuperate to produce *above 2,000 kg* of cocoa per year (Fino, 2016).

This barrier does prevent the implementation of conversion to agriculture with lowland rice farming, as the soil is not suitable for the cultivation of rice. Therefore, alternative land-use scenario (c) has been eliminated.

d) Barriers due to social conditions,

i) Lack of skilled and/or properly trained labour force;

Cocoa production is a labor intense crop, which requires a large skilled workforce to properly conduct all the required management practices. Currently the population involved in cacao production are elders, who mainly work in their own farms. The young population don't have the necessary skills and they prefer to migrate to urban areas to get higher income. The lack of skilled labor is Colombia is a limiting factor for the cocoa expansion (page 82) (CIAT, nd).

The project contributes to overcome this barrier by providing continuous technical and practical training to workers and farmers, and by providing long term and steady salaries to their workers, to try to maintain the trained labor force engage in cocoa production.

Sub-Step 2b. Elimination of Land Use Scenarios that Are Prevented by the Identified Barriers

Conversion to oil palm large scale plantation has been eliminated by the Barrier Analysis in Sub-Step 2a. The following alternative land use scenarios remain after the barrier analysis:

1. Remain as degraded pasture for cattle production.
2. Forestation without being registered as a A/R VCS project activity.

Sub-Step 2c. Determination of the Baseline Scenario (if Allowed by the Barrier Analysis)

The following decision tree was applied for the determination of the Baseline Scenario.

- Is forestation without being registered as a A/R VCS project activity included in the list of land use scenarios that are not prevented by any barrier?
    - YES
        - Does the list contain only one land use scenario?
    - No, then continue with Step 3: Investment analysis.

3.1.4.6 Step 3: Investment Analysis

Sub-Step 3a. Determine appropriate analysis method

Simple cost analysis (Option I) was rejected because VCS-related income was not the only income source for the Project. Investment comparison analysis (Option II) was selected, as NPV was determined as the most suitable investment analysis metric for this Project.

Sub-Step 3b. – Option II. Apply investment comparison analysis

The most suitable financial indicator for the project type is NPV.

Sub-step 3c. Calculation and comparison of financial indicators (only applicable to options II and III)

According to an economic analysis of cattle grazing, the NPV of alternative land-use scenario 1 (remain as degraded pasture for cattle farming) is $1,161,365 (Wang, Teague, Park, & Bevers, 2018), which is higher than the NPV for the proposed project activity without the benefits from the VCS. Please see the confidential Cash Flow Analysis for the detail of how these NPVs were calculated.

Because the NPV of alternative land-use scenario 1 is higher than the NPV from the proposed project activity without the benefits from the VCS, remaining as degraded pasture for cattle farming was considered the baseline scenario. The following decision-tree was applied:

- Is forestation without being registered as an A/R VCS project activity included in the list of land use scenarios that are not prevented by any barrier?
    - Yes
- Has the proposed A/R VCS project activity a less favourable financial indicator than at least one land use scenario that is not prevented by any barrier?
    - Yes

This alternative land-use scenario was selected as the baseline scenario.

Sub-step 3d. Sensitivity analysis

Please see the confidential Cash Flow Analysis for the sensitivity analysis. The following decision tree was applied:

- Is forestation without being registered as an A/R VCS project activity included in the list of land use scenarios that are not prevented by any barrier?
    - Yes

- Is the sensitivity analysis conclusive?
    - Yes

The selection of the baseline scenario is valid.

3.1.4.7 Step 4: Common practice Analysis

No similar activities (i.e., activities of a similar scale and taking place in a comparable regulatory and geographic environment) to the ones proposed for this project have been conducted. At the start date of this Project, there were no cacao farms in the entire department of Meta at a similar scale to that of the Project. As of 2017, the annual production of cacao in the department of Meta was about 2,100 metric tons per year (Rodriguez-Medina, et al., 2019). As demonstrated in the confidential Cash Flow analysis, this Project estimated an annual production of over 3,500 metric tons, more than the entire department was producing at the time.

Because no similar activities can be observed, the VCS AFOLU project activity is not the baseline scenario and is additional.

3.1.5 Methodology Deviations (VCS, 3.20)

There are no methodology deviations at this time.

3.2 Quantification of Estimated GHG Emission Reductions and Removals

3.2.1 Baseline Emissions (VCS, 3.15)

The baseline conditions as well as project conditions in the Project Activities Instance includes insignificant amounts of trees, thus emissions are calculated to be zero over the crediting period. This means that trees that are found across the landscape are left to grow between the cacao and are not removed during site preparation. This follows the CDM AR TOOL14. According to section 5 of the tool conditions under which carbon stock and change in carbon stock may be estimated as zero. Carbon stock in trees in the baseline can be accounted as zero if all of the following conditions are met:

> (a) The pre-project trees are neither harvested, nor cleared, nor removed throughout the crediting period of the project activity.

To verify these conditions a biomass inventory carried out in April 2022 in the areas in Primavera and Espejuelos that are part of Project Activity Instances that had yet to be prepared or planted, measured aboveground tree biomass, litter, and deadwood. These inventories found that biomass was negligible (See biomass inventory for details).

The area in the Project Activity Instance was confirmed to be non-forest ten years before project start and is degrading rangeland and cropland (see section **Error! Reference source not found. Error! Reference source not found.**. In the baseline carbon is still continually lost from soil, but it is conservatively omitted.

3.2.2 Project Emissions (VCS, 3.15)

Trees found in the baseline before project start are not removed to plant cacao. The project activities require that there is no deforestation caused by the planting of a new agroforestry system. Bacao's No-Deforestation Policy is interpreted to mean that no trees are removed to plant cacao, and any existing trees are left on the landscape. This means that any existing trees grow in the baseline as well as the project and therefore are insignificant and measuring of Project Emissions are measuring trees planted through Project Activities.

The current net estimate of carbon removals was made for the entire eligible plantation area, following Section 5.5 of the methodology AR-ACM0003 A/R "Large scale Consolidated Methodology: Afforestation and reforestation of lands except wetlands version 2.0". The actual net GHG removals in carbon sinks are calculated using the equation 2 of the AR-ACM0003 A/R Methodology:

$$\Delta C_{ACTUAL,t} = \Delta C_{P,t} - GHG_{E,t}$$

Where:

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

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

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

The emissions generated by the activities of the project attributed to the removal of herbaceous vegetation, the use of fossil fuels, the application of fertilizers, the use of wood, the decomposition of leaf litter and fine roots, the construction of access roads within the project area, and transport are considered insignificant ($\boldsymbol{GHG_{E,t}} = 0$). In addition, the actual project net GHG removals occurring in the selected carbon pools in year *t* are calculated as follows:

$$\Delta C_{P,t} = \Delta C_{TREE\_PROJ,t} + \Delta C_{SHRUB\_PROJ,t} + \Delta C_{DW\_PROJ,t} + \Delta C_{LI\_PROJ,t} + \Delta SOC_{AL,t}$$

Where:

$\boldsymbol{\Delta C_{P,t}}$: Change in the carbon stocks in project, occurring in the selected carbon pools, in year *t*; tCO_2e.

$\boldsymbol{\Delta C_{TREE\_PROJ,t}}$: Change in carbon stock in tree biomass in project in year *t*; tCO_2e.

$\boldsymbol{\Delta C_{SHRUB_{PROJ},t}}$: Change in carbon stock in shrub biomass in project in year *t*; tCO_2e.

$\boldsymbol{\Delta C_{DW\_PROJ,t}}$: Change in carbon stock in dead wood (DW) in project in year *t*; tCO_2e.

$\boldsymbol{\Delta C_{LI\_PROJ,t}}$: Change in carbon stock in litter (LI) in project in year *t*; tCO_2e.

$\boldsymbol{\Delta SOC_{AL,t}}$: Change in carbon stock in soil organic carbon (SOC) in project, in year *t*; tCO_2e.

3.2.2.1 Carbon stock in trees

The estimation of carbon stocks in trees was made based on Section 8.2 of the tool, "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities (Version 04.2)" of the AR-ACM0003 methodology, as follows:

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

$$B_{TREE} = A * b_{TREE}$$

$$b_{TREE} = AGB_{TREE} + BGB_{TREE}$$

$$BGB_{TREE} = AGB_{TREE} * (R_{TREE})$$

Where:

C_{TREE}	Carbon stock in tree biomass; tCO_2e.
CF_{TREE}	Carbon fraction of tree biomass; tC/t d.m.
B_{TREE}	Tree biomass; t d.m.
A	Sum of areas of the strata; ha.
b_{TREE}	Tree biomass strata per hectare; t d.m. ha^{-1}
R_{TREE}	Root-to-shoot ratio for trees; dimensionless.
AGB_{TREE}	Tree above ground biomass per hectare; t d.m. ha^{-1}
BGB_{TREE}	Tree bellow ground biomass per hectare; t d.m. ha^{-1}

The estimates of ex-ante emission reductions and removals under the project scenario are derived from peer reviewed literature for aboveground tree carbon. The unique growing and management system deployed by the project with coppiced cacao, nitrogen fixing *Glyricidia* managed for soil fertility and thinned to 10% over time for shade, as well as the windbreaks makes finding data on carbon content from trees of various ages and similar systems over time difficult. Most studies of "shade cacao" are based on systems that have a highly diverse set of non-carbon tree species and in some cases the trees remain from a past forest cover and are mature at the time of establishing the cacao plantation. The study that must represented the project growing system, provided the carbon content of for a multiple of age groups was Mohammed, from agroforestry cocoa ecosystems in Ghana (Askia M. Mohammed, 2016). Other studies that were reviewed for cacao systems in Latin America, did not provide granular enough data to extract a growth curve over time.

From the study the aboveground carbon estimates for shade and unshaded systems are provided in *Figure 15*.

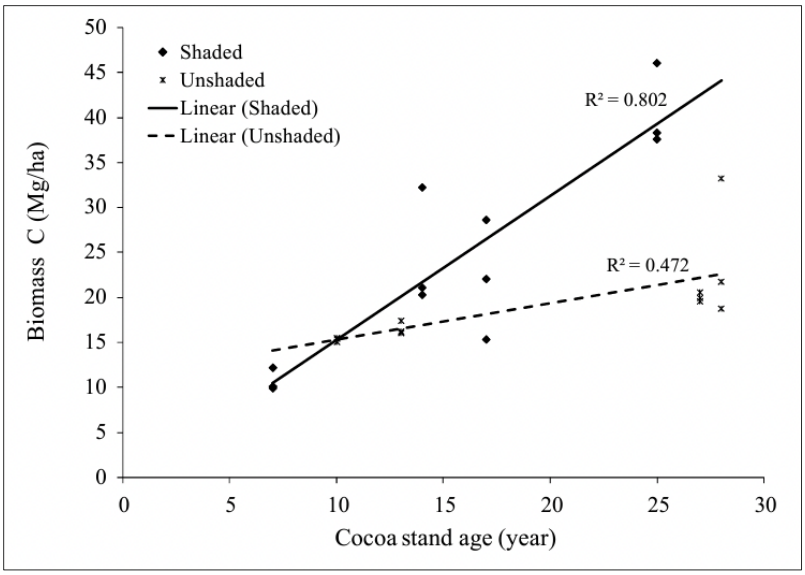


Figure 15. C mg/ha Shaded Cocao Systems (Mohammed A., 2016)

Only the data points in for the shade systems were used to fit an exponential curve over the 30-year rotation.

Table 23. tC Mg ha^{-1} Above ground biomass shade cacao by year (Mohammed A., 2016)

	Above Ground
Year	tC Mg/ha
1	5.00
7	9.00
7	12.00
14	20.00
14	21.00
14	32.00
17	15.00
17	22.50
17	29.00
25	37.00
25	37.50
25	46.00

An exponential curve was fitted to *Table 23*, to estimate a function for annual carbon stocks as presented in Figure 16. The annual carbon stocks were then split into 2 categories of cacao trees and non-cacao trees based on the proportions presented in Table 2 of Mohammed A. (2016) which correspond to 45.73% for cacao trees, 45.39% for non-cacao trees, and 8.87% for litter. The non-cacao trees were further segmented into the categories of shade trees or windbreak trees. The growth of the woody biomass stocks of the three different categories of trees were then modelled out for two full rotation cycles (60 years) based on the management practices outlined in section 2.1.17, and based on the assumption of a 30-year rotation.

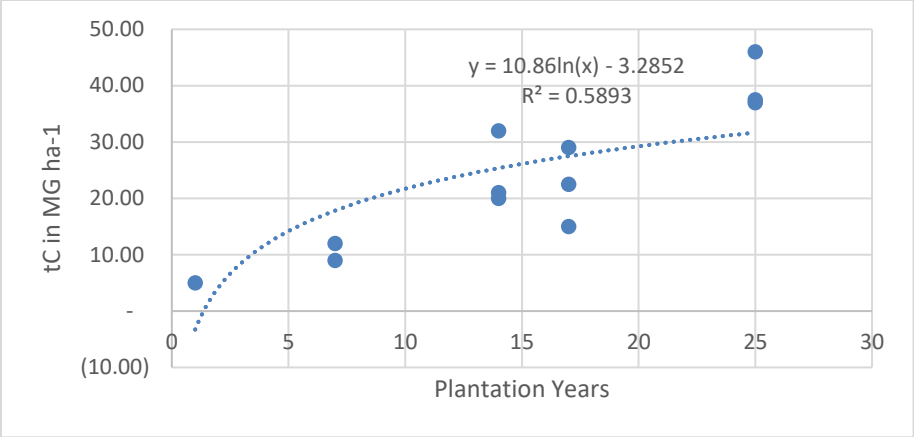


Figure 16. Exponential curve tC ha-1 aboveground biomass

Finally, the aboveground biomass is calculated as follows:

$$AGB_{Cacao\ Trees} = (10.86 * Ln(x) - 3.2852) * 0.4573 * 1{,}000 * (1/0.47)$$

$$AGB_{Non-cacao\ Trees} = (10.86 * Ln(x) - 3.2852) * 0.4539 * 1{,}000 * (1/0.47)$$

Where:

$AGB_{Cacao\ Trees}$	Above-ground biomass of cacao trees; kg DM/ha
$AGB_{Non-cacao\ Trees}$	Above-ground biomass of non-cacao trees (shade trees, and windbreaks trees); kg DM/ha
$10.86;\ -3.2852$	Fitting parameters; dimensionless
$1{,}000 * (\frac{1}{0.47})$	Change tC to kg DM
0.4573	Biomass proportion of cacao trees; percentage
0.4539	Biomass proportion of non-cacao trees; percentage

The root to shoot ratio was applied aboveground biomass was 23% (Borden K., 2019) which resulted in a per year tCO2 per hectare in *Table 24*.

Table 24. tCO2 / ha per year aboveground and belowground biomass

Year	tC/ha	tCO2/ha
1	3.68	13.50
2	10.60	38.90
3	13.86	50.85
4	15.94	58.47
5	18.05	66.20
6	19.77	72.51
7	21.22	77.85
8	22.48	82.48
9	23.59	86.55
10	24.59	90.20
11	25.49	93.50
12	26.31	96.51
13	27.06	99.29
14	27.76	101.85
15	28.41	104.24
16	29.02	106.48
17	29.60	108.57
18	30.13	110.55
19	30.65	112.43
20	31.13	114.20
21	31.59	115.89
22	32.03	117.50
23	32.45	119.04
24	32.85	120.51
25	33.24	121.93
26	33.61	123.29
27	33.96	124.59
28	34.30	125.85
29	34.64	127.07
30	11.44	41.97
31	14.30	52.47
32	19.22	70.52
33	21.34	78.30
34	22.64	83.06
35	24.16	88.63
36	25.41	93.23
37	26.48	97.16

Year	tC/ha	tCO2/ha
38	27.42	100.59
39	28.25	103.65
40	29.00	106.41

3.2.2.2 Carbon stocks in deadwood and litter

Deadwood biomass in standing dead trees of species *i* is calculated using the conservative default-factor based method as follows (see Equation 9 of AR-AM-Tool12):

$$C_{DW,i,t} = C_{TREE,i,t} * DF_{DW}$$

Were:

$C_{DW,i,t}$ = Carbon stock in dead wood in stratum *i* at a given point of time in year *t;* t CO_2-e

$C_{TREE,i,t}$ = Carbon stock in trees biomass in stratum *i* at a point of time in year *t*, as calculated in tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO_2-e

DF_{DW} = Conservative default factor expressing carbon stock in dead wood as a percentage of carbon stock in tree biomass; percent

i = 1, 2, 3, ... biomass estimation strata within the project boundary

t = 1, 2, 3, ... years elapsed since the start of the A/R CDM project activity

The litter carbon stock is calculated using the conservative default-factor based method as follows (see Equation 15 of AR-AM-Tool12):

$$C_{LI,i,t} = C_{TREE,i,t} * DF_{LI}$$

Where:

$C_{LI,i,t}$ = Carbon stock in litter in stratum *i* at a given point of time in year *t;* t CO_2-e

$C_{TREE,i,t}$ = Carbon stock in trees biomass in stratum *i* at a point of time in year *t*, as calculated in tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO_2-e

DF_{LI}	=	Conservative default factor expressing carbon stock in litter as a percentage of carbon stock in tree biomass; percent
i	=	1, 2, 3, ... biomass estimation strata within the project boundary
t	=	1, 2, 3, ... years elapsed since the start of the A/R CDM project activity

The ex-ante estimates for both litter and dead wood were calculated by using the conservative default-factor based method for estimation of carbon stock in litter and dead wood from the A/R Methodological Tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities", as is recommended by the methodology. The value of 1% was applied for DF_{LI} and DF_{DW} to best match the biome, elevation, and precipitation found at the project site and in order to remain conservative in our assumptions. This means that it is assumed that the carbon found in litter is 1% of the carbon stock in tree biomass and that the carbon found in dead wood is also 1% of the carbon stock in tree biomass.

3.2.2.3 Carbon stocks in soil (SOC)

The initial SOC stock at start of the project is estimated as follows (see Equation 1 of AR-AM-Tool16):

$$SOC_{INITIAL,i} = SOC_{REF,i} * f_{LU,i} * f_{MG,i} * f_{IN,i}$$

Where:

$SOC_{INITIAL,i}$	=	SOC stock at the beginning of the A/R CDM project activity in stratum *i* of the areas of land; t C ha-1.
$SOC_{REF,i}$	=	Reference SOC stock corresponding to the reference condition in native lands (i.e. non-degraded, unimproved lands under native vegetation. normally forest) by climate region and soil type applicable to stratum *i* of the areas of land; t C ha-1.
$f_{LU,i}$	=	Relative stock change factor for baseline land-use in stratum i of the areas of land; dimensionless.
$f_{MG,i}$	=	Relative stock change factor for baseline management regime in stratum *i* of the areas of land; dimensionless.

$f_{IN,i}$ = Relative stock change factor for baseline input regime (e.g. crop residue returns, manure) in stratum *i* of the areas of land; dimensionless.

i = *1, 2, 3,* . strata of areas of land; dimensionless

The ex-ante soil carbon estimates are calculated by following the guidelines laid out in A/R Methodological Tool "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities", as is recommended by the methodology. The default reference soil organic carbon stocks selected was 44 tC/ha, which corresponded with HAV soils in a tropical, wet environment. The initial soil carbon stock was calculated by using an F_{LU} of 1, F_{MG} of 0.7, and F_{IN} of 1, as is recommended by Table 6 from the Tool to best match our baseline conditions. This led to an increase in soil carbon of 0.66 tC.ha (tCO2e/ha) over 20 years.

3.2.2.4 Non-CO2 GHG Emissions

The tool "Estimation of non-CO_2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity" considers that:

- Non-CO_2 GHG emissions resulting from any occurrence of fire within the project boundary shall be accounted for each incidence of fire which affects an area greater than the minimum threshold area reported by the host party for the purpose of defining forest, provided that the accumulated area affected by such fires in a given year is ≥5% of the project area.
- Aboveground biomass of living trees shall be considered not to result in significant non-CO_2 GHG emission in case of fire, when:
  - A forest fire burns through the understory but does not climb into the tree canopy; or
  - A forest fire singes trees but does not cause mortality such that leaf regeneration can be observed within six months.

Burns for stubble removal are not part of the project forestry activities. In the case that a fire event occurs in the project area, the impact of the disturbance will be estimated and reported in order to make the relevant discounts. Considering the above, the emissions due to non-CO_2 GHG emissions are zero.

3.2.3 Leakage Emissions (VCS 2.5, 3.2, 3.6, 3.15, 4.3)

For the quantification of leakage, the methodology AR-ACM0003 version 2.0 was followed and the AR-TOOL15 A/R Methodological tool Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity was applied. Displacement of an agricultural activity by itself does not result in leakage emission. Leakage emission occurs when the displacement leads to an increase in GHG emissions relative to the GHG emissions attributable to the activity as it exists within the project boundary. The pre-project agricultural activities identified in the baseline were cattle grazing and rice crops cultivation.

To identify if there was a displacement of activities AR-TOOL15 A/R was used, and the following criteria were met:

a) Animals are displaced to existing grazing land and the total number of animals in the receiving grazing land (displaced and existing) does not exceed the carrying capacity of the grazing land;

Therefore, following AR-TOOL15 A/R the leakage emission attributable to the displacement of grazing activities is considered insignificant and hence accounted as zero as justified in Table 25.

Table 25. Leakage emission due to the displacement of grazing activities.

a) Animals are displaced to existing grazing land and the total number of animals in the receiving grazing land (displaced and existing) does not exceed the carrying capacity of the grazing land	The estimated stock rates for the livestock in the project areas prior to the start of the project were less than 1 hectare. According to ANeIA (Agrobusiness, Food Supply Chain, and Nature Tourism, 2019), in the Meta Department, cattle occupancy is 0.6 animals per hectare, whereas the optimal capacity is 2 animals per hectare (ANeIA, 2019). The national average ranges from 1.5 to 1.8, indicating that the Meta Department is below both its optimal capacity and the national average (Contexto Ganadero, 2022). It is unlikely that the previous owners would move their livestock to an area over capacity. Farms around the project area commonly have grazing areas under carrying capacity, with fences installed prior to the project implementation. For that reason, the displacement of grazing activities is considered insignificant and accounted as zero.

Fuelwood collection activities were not present at the Project Activity Instance Area prior to the project start. The previous owner of the property reported that no fuelwood collection activities were carried out in the actual project area. Therefor there was no leakage due to the displacement of fuelwood collection.

Before project start, low-productivity rice crops were grown rotationally in a few hectares within in the Project Activity Instances. Farmers typically default to rice cultivation of unproductive areas in periodic or annual systems. Land deforested before 2017 was primarily used for cattle grazing, followed by some rainfed rice (manual production systems), or left as a fallow because of soil degradation. Manual rice crop cultivation is a way for farmers to use as much low-productive and over-grazed land as possible and is for self-consumption often for the farmer's subsistence.

These areas that were used for rice production are non-commercial and are inefficient, specifically in areas that are grazed when dry and only used for rice production when the area is flooded and cannot be used for any other production. This rainfed rice has very low productivity as well as it is grown on a very-low production area. In Colombia these manual production systems have a yield of 1.8 tons per ha, as compared to mechanized systems that have between 3.2 and 6.5 tones per ha (PMCR, 2018). Any displacement of manual production systems carried out by local farmers, would be displaced by mechanized systems (i.e. if the farmer had to buy rice because they would no longer grow rice on the same land, they would purchase it in the market from a mechanized system which is much more productive). Therefore, it is not likely that project activity would displace rice cultivation (or harm productivity), and any predicted displacement would likely be in other degraded grassland areas. Displacement of agriculture activities is considered insignificant, and leakage is considered nil as identified using AR-TOOL15 A/R.

According to AR-TOOL15 A/R the following equation must be used:

$$LK_{AGRIC,t} = \frac{44}{12} \times \left(\Delta C_{BIOMASS,t} + \Delta SOC_{LUC,t}\right)$$

Where

$LK_{AGRIC,t}$ = Leakage emission resulting from displacement of agricultural activities in year *t*; tCO_2e

$\Delta C_{BIOMASS,t}$ = Decrease in carbon stock in the carbon pools of the land receiving the activity displaced in year *t*; t d.m.

$\Delta SOC_{LUC,t}$ = Change in soil organic carbon (SOC) stock due to land-use change in the land receiving the displaced activity in year *t*; tC ha.

As described above, both $\Delta C_{BIOMASS,t}$ and $\Delta SOC_{LUC,t}$ are less than 0, (i.e any displacement would happen a more efficient system), and therefore the $LK_{AGRIC,t}$ is also 0, and there is no leakage.

$$LK_{AGRIC,t} = \frac{44}{12} \times (0 + 0)$$

$$LK_{AGRIC,t} = \frac{44}{12} \times (0)$$

$$LK_{AGRIC,t} = 0$$

When new instances of the project activity are included in the project, leakage will be reassessed in the case where a crop other than manual rice production systems are displaced due to project activities.

3.2.4 Estimated GHG Emission Reductions and Carbon Dioxide Removals (VCS, 3.15, 4.1)

State the non-permanence risk rating (%)	*26%*
Has the non-permanence risk report been attached as either an appendix or a separate document?	☒ Yes ☐ No
For ARR and IFM projects with harvesting, state, in tCO2e, the Long-term Average (LTA).	200,936 (value before buffer discount)
Has the LTA been updated based on monitored data, if applicable?	☐ Yes ☒ No Since this is the first monitoring report, it is not necessary update the LTA
State, in tCO2e, the expected total GHG benefit to date.	200,936 (value before buffer discount and until reaching LTA)
Is the number of GHG credits issued below the LTA?	☒ Yes ☐ No

The net anthropogenic GHG removals by sinks is calculated as follows (see Equation 5 of AR-ACM0003 CDM Methodology):

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

Where:

$\Delta C_{AR-CDM,t}$	=	Net anthropogenic GHG removals by sinks, in year *t*; t CO_2-e
$\Delta C_{ACTUAL.t}$	=	Actual net GHG removals by sinks, in year *t*; t CO_2-e
$\Delta C_{BSL,t}$	=	Baseline net GHG removals by sinks, in year *t*; t CO_2-e
LK_t	=	GHG emissions due to leakage, in year *t*; t CO_2-e

Processes and procedures to calculate net GHG removals by sinks are described in Section 3.2.2 Project Emissions (VCS, 3.15). The carbon listed in the Estimated net baseline emissions or removals represent the starting carbon that exists in the soil at baseline. This must be included since the starting carbon in the project scenario is included and is canceled out by taking the difference between the baseline and the project scenario. Baseline net GHG removals by sinks in addition to soil carbon were found to be zero as described in Section 3.2.1 Baseline Emissions (VCS, 3.15). GHG emissions due to leakage were also found to be zero and are described in Section 0 The tool "Estimation of non-CO_2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity" considers that:

- Non-CO_2 GHG emissions resulting from any occurrence of fire within the project boundary shall be accounted for each incidence of fire which affects an area greater than the minimum threshold area reported by the host party for the purpose of defining forest, provided that the accumulated area affected by such fires in a given year is ≥5% of the project area.
- Aboveground biomass of living trees shall be considered not to result in significant non-CO_2 GHG emission in case of fire, when:
  - A forest fire burns through the understory but does not climb into the tree canopy; or
  - A forest fire singes trees but does not cause mortality such that leaf regeneration can be observed within six months.

Burns for stubble removal are not part of the project forestry activities. In the case that a fire event occurs in the project area, the impact of the disturbance will be estimated and reported in order to make the relevant discounts. Considering the above, the emissions due to non-CO_2 GHG emissions are zero.

Leakage Emissions (VCS 2.5, 3.2, 3.6, 3.15, 4.3). The Net anthropogenic GHG removals by sinks described in the table below include the associated risk to credits as described in the risk buffer.

Table 26 includes deductions for risk. Final VCUs are for ex-anti estimates, while ex-post carbon measurements will follow procedures listed in Section 3.3 Monitoring and will be measured at each verification.

Ex-ante carbon calculations are described over the 40-year life of the project and do not include other activities during the crediting period such as cacao stand replacement. Stand replacement will be a significant carbon loss and will be monitored throughout the life of the project showing carbon loss in years of stand replacement. To account for this, Long-term Average benefit of the project was modelled out to 60 years, including cacao stand and shade tree replacements every 30 years. As there are 9 years of planting, and to ensure that all harvesting events are included, the project in total was modelled out to 68 years. This led to a net removal of 200,936 tCO2e and an annual removal rate of 5,023 tCO2e over 40 years, before buffer discount and until reaching the LTA.

Table 26 provides the ex-ante emission removals that include future stand replacement and VCUs assuming a risk buffer of 26%.

Table 26. Net GHG Emission Reductions and Removals

Vintage period	Estimated baseline emissions (tCO2e)	Estimated project emissions (tCO2e)	Estimated leakage emissions (tCO2e)	Estimated reductions (tCO2e)	Estimated removals until LTA* (tCO2e)	Estimated buffer pool allocation (tCO2e)	Estimated total VCU issuance (tCO2e)
06-Jul-2017 to 05-Jul-2018	31	0	0	0	291	(76)	215
06-Jul-2018 to 05-Jul-2019	31	0	0	0	2,142	(557)	1,585
06-Jul-2019 to 05-Jul-2020	31	0	0	0	2,049	(533)	1,516
06-Jul-2020 to 05-Jul-2021	31	0	0	0	2,592	(674)	1,918
06-Jul-2021 to 05-Jul-2022	31	0	0	0	7,403	(1,925)	5,478
06-Jul-2022 to 05-Jul-2023	31	0	0	0	14,348	(3,730)	10,617
06-Jul-2023 to 05-Jul-2024	31	0	0	0	15,436	(4,013)	11,423
06-Jul-2024 to 05-Jul-2025	31	0	0	0	19,857	(5,163)	14,694
06-Jul-2025 to 05-Jul-2026	31	0	0	0	22,430	(5,832)	16,598
06-Jul-2026 to 05-Jul-2027	31	0	0	0	18,627	(4,843)	13,784
06-Jul-2027 to 05-Jul-2028	31	0	0	0	15,696	(4,081)	11,615
06-Jul-2028 to 05-Jul-2029	31	0	0	0	14,094	(3,664)	10,429
06-Jul-2029 to 05-Jul-2030	31	0	0	0	12,691	(3,300)	9,391
06-Jul-2030 to 05-Jul-2031	31	0	0	0	11,649	(3,029)	8,620
06-Jul-2031 to 05-Jul-2032	31	0	0	0	10,844	(2,819)	8,024
06-Jul-2032 to 05-Jul-2033	31	0	0	0	10,201	(2,652)	7,549
06-Jul-2033 to 05-Jul-2034	31	0	0	0	9,675	(2,516)	7,160
06-Jul-2034 to 05-Jul-2035	31	0	0	0	9,237	(2,402)	6,835
06-Jul-2035 to 05-Jul-2036	31	0	0	0	1,676	(436)	1,240
06-Jul-2036 to 05-Jul-2037	31	0	0	0	-	-	-

Vintage period	Estimated baseline emissions (tCO2e)	Estimated project emissions (tCO2e)	Estimated leakage emissions (tCO2e)	Estimated reductions (tCO2e)	Estimated removals until LTA* (tCO2e)	Estimated buffer pool allocation (tCO2e)	Estimated total VCU issuance (tCO2e)
06-Jul-2037 to 05-Jul-2038	0	0	0	0	-	-	-
06-Jul-2039 to 05-Jul-2040	0	0	0	0	-	-	-
06-Jul-2040 to 05-Jul-2041	0	0	0	0	-	-	-
06-Jul-2042 to 05-Jul-2043	0	0	0	0	-	-	-
06-Jul-2043 to 05-Jul-2044	0	0	0	0	-	-	-
06-Jul-2044 to 05-Jul-2045	0	0	0	0	-	-	-
06-Jul-2045 to 05-Jul-2046	0	0	0	0	-	-	-
06-Jul-2046 to 05-Jul-2047	0	0	0	0	-	-	-
06-Jul-2047 to 05-Jul-2048	0	0	0	0	-	-	-
06-Jul-2048 to 05-Jul-2049	0	0	0	0	-	-	-
06-Jul-2049 to 05-Jul-2050	0	0	0	0	-	-	-
06-Jul-2050 to 05-Jul-2051	0	0	0	0	-	-	-
06-Jul-2051 to 05-Jul-2052	0	0	0	0	-	-	-
06-Jul-2052 to 05-Jul-2053	0	0	0	0	-	-	-
06-Jul-2053 to 05-Jul-2054	0	0	0	0	-	-	-
06-Jul-2054 to 05-Jul-2055	0	0	0	0	-	-	-
06-Jul-2055 to 05-Jul-2056	0	0	0	0	-	-	-
06-Jul-2056 to 05-Jul-2057	0	0	0	0	-	-	-
06-Jul-2057 to 05-Jul-2058	0	0	0	0	-	-	-
06-Jul-2058 to 05-Jul-2059	0	0	0	0	-	-	-
Total	**620**	**0**	**0**	**0**	**200,936**	**(52,243)**	**148,693**

* Averaged over 68 years to include cacao stand replacements (2 production cycles).

3.3 Monitoring

3.3.1 Data and Parameters Available at Validation (VCS, 3.16)

Data / Parameter	A_i
Data unit	Ha
Description	Area of strata i
Source of data	Field measurement
Value applied	The total area for validation is 1,767 hectares

Planting year	Area (ha)
2017	120

		2019	36	
		2020	248	
		2021	475	
		2022	140	
		2023	432	
		2024	314	
		Total	1,767	
Justification of choice of data or description of measurement methods and procedures applied	N/A			
Purpose of data	The parameter is used to calculate actual net GHG removals.			
Comments	-			

Data / Parameter	Carbon fraction of tree biomass
Data unit	t C (t d.m.)-1
Description	Total carbon in weight per ton of tree fresh matter
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied	0.47
Justification of choice of data or description of measurement methods and procedures applied	Reference value
Purpose of data	Determination of baseline scenario and project removals
Comments	

Data / Parameter	CO_2 fraction
Data unit	t CO2 (t C)-1
Description	Total CO_2 in weight per ton of C
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied	44/12
Justification of choice of data or description of measurement methods and procedures applied	Reference value
Purpose of data	Determination of baseline scenario and project removals
Comments	

Data / Parameter	Root to shoot ratio
Data unit	Ton dry matter / ton dry matter
Description	Ratio between belowground and aboveground biomass
Source of data	"Root biomass variation of cocoa and implications for carbon stocks in agroforestry systems" by Borden et al. (2017), https://doi.org/10.1007/s10457-017-0122-5
Value applied	For the entire agroforestry system: 0.23
Justification of choice of data or description of measurement methods and procedures applied	Brief description of methodology behind the root-to-shoot ratio from Borden et al. (2019): The authors "bridge conventional methods of quantifying coarse root biomass with non-destructive application of ground penetrating radar to estimate cocoa belowground biomass (BGB) and C stocks in an agroforestry system in Ghana. BGB was measured for cocoa grown with shade trees (*Entandrophragma angolense* or *Terminalia ivorensis*) and in monoculture. BGB estimates showed good accuracy, with a relative root mean square error of 7% from excavated plants."
Purpose of data	Determination of baseline scenario and project removals
Comments	

Data / Parameter	$SOC_{REF,i}$
Data unit	t C ha-1
Description	Reference SOC stock corresponding to the reference condition in native lands (i.e. non-degraded, unimproved lands under native vegetation. normally forest) by climate region and soil type applicable to stratum i of the areas of land
Source of data	AR-AM-tool-16-V1.1.0 Table 3: Default reference SOC stocks for mineral soils
Value applied	HAC soils in Tropical, wet Climate region: 44
Justification of choice of data or description of measurement methods and procedures applied	Reference value
Purpose of data	Calculation of project removals
Comments	

Data / Parameter	$f_{LU,i}$
Data unit	Dimensionless.
Description	Relative stock change factor for baseline land-use in stratum i of the areas of land.
Source of data	AR-AM-tool-16-V1.1.0 Table 6: Relative stock change factors for different management activities on grasslands (net effect over a period of 20 years)

Value applied	All permanent grasslands: 1.0
Justification of choice of data or description of measurement methods and procedures applied	Reference value
Purpose of data	Calculation of project removals
Comments	

Data / Parameter	$f_{MG,i}$
Data unit	Dimensionless
Description	Relative stock change factor for baseline management regime in stratum i of the areas of land
Source of data	AR-AM-tool-16-V1.1.0 Table 6: Relative stock change factors for different management activities on grasslands (net effect over a period of 20 years)
Value applied	Severely degraded grasslands: 0.7
Justification of choice of data or description of measurement methods and procedures applied	Reference value
Purpose of data	Calculation of project removals
Comments	
Data / Parameter	$f_{IN,i}$
Data unit	Dimensionless
Description	Relative stock change factor for baseline input regime (e.g. crop residue returns, manure) in stratum i of the areas of land.
Source of data	AR-AM-tool-16-V1.1.0 Table 6: Relative stock change factors for different management activities on grasslands (net effect over a period of 20 years)
Value applied	Grassland without input of fertilizers: 1.0
Justification of choice of data or description of measurement methods and procedures applied	Reference value
Purpose of data	Calculation of project removals
Comments	
Data / Parameter	$SOC_{INITIAL,i}$
Data unit	t C ha-1.
Description	SOC stock at the beginning of the A/R CDM project activity in stratum i of the areas of land
Source of data	AR-AM-tool-16-V1.1.0 Table 3 and Table 6.
Value applied	$SOC_{INITIAL,i} = SOC_{REF,i} * f_{LU,i} * f_{MG,i} * f_{IN,i}$

	$SOC_{INITIAL,i} =$ 44 * 1.0 * 0.7*1.0 $SOC_{INITIAL,i} =$ 30.8
Justification of choice of data or description of measurement methods and procedures applied	Reference value
Purpose of data	Calculation of project removals
Comments	

3.3.2 Data and Parameters Monitored (VCS, 3.16)

Data / Parameter	**Ai**
Data unit	Hectares
Description	Area planted under each model, in each plantation cycle
Source of data	Field measurement (GPS)
Description of measurement methods and procedures to be applied	Area planted is measured by project team's technicians after planting for true area.
Frequency of monitoring/recording	At each verification
Value monitored	For the first verification the verification area is 880 ha **Year** / **Number of hectares planted** 2017 / 120 2019 / 36 2020 / 248 2021 / 475 Total / 880
Monitoring equipment	GPS, Field form and registry
QA/QC procedures to be applied	Data is cross-checked in the field by Terra Global Capital during each visit and by other Entities' technical teams.
Purpose of data	Calculation of baseline emissions and project emissions.
Calculation method	N/A
Comments	Stored electronically. 100% of project area to be recorded.

Data / Parameter	**Root to shoot ratio**
Data unit	Ton dry matter / ton dry matter
Description	Ratio between belowground and aboveground biomass
Source of data	For *Theobroma cacao*: "Root biomass variation of cocoa and implications for carbon stocks in agroforestry systems" by Borden et al. (2017), https://doi.org/10.1007/s10457-017-0122-5 For *Glyricidia sepium*: "Allometric equations for biomass and carbon stock estimation of small diameter woody species from tropical dry deciduous forests: Support to REDD+" by Pati et al. (2022), https://doi.org/10.1016/j.tfp.2022.100289
Value applied	For *Theobroma cacao*: 0.23

	For *Glyricidia sepium*: 0.39
Justification of choice of data or description of measurement methods and procedures applied	Brief description of methodology behind the root-to-shoot ratio for *Theobroma cacao* from Borden et al. (2019): The authors "bridge conventional methods of quantifying coarse root biomass with non-destructive application of ground penetrating radar to estimate cocoa belowground biomass (BGB) and C stocks in an agroforestry system in Ghana. BGB was measured for cocoa grown with shade trees (*Entandrophragma angolense* or *Terminalia ivorensis*) and in monoculture. BGB estimates showed good accuracy, with a relative root mean square error of 7% from excavated plants." Brief description of methodology behind the root-to-shoot ratio for *Glyricidia sepium* from Pati et al. (2022): "We have harvested 589 individuals belonging to 23 woody species at the seedling and sapling stage from a tropical dry deciduous forest and developed species specific allometric equation and general allometric equation for aboveground biomass estimation. Further, the belowground biomass equation of 9 species were also developed using above ground biomass and root to shoot ratio as predictor variable."
Purpose of data	Determination of baseline scenario and project removals
Comments	NA

Data / Parameter	$\Delta C_{ACTUAL,t}$
Data unit	t CO_2-e
Description	Actual net GHG removals by sinks, in year *t*
Source of data	Biomass plot samples
Description of measurement methods and procedures to be applied	The sum of the verifiable changes in carbon stocks in the carbon pools within the project boundary, minus the increase in non-CO2 GHG emissions measured in CO2 equivalents by sources that are increased as a result of the implementation of an A/R CDM project activity.
Frequency of monitoring/recordingc	At each monitoring event
Value applied	Result of Biomass plot samples
Monitoring equipment	Field form and registry
QA/QC procedures to be applied	Data is cross-checked in the field by Terra Global Capital during each visit and by other Entities' technical teams.
Purpose of data	Calculation of change in carbon stock.
Calculation methods	Calculated as the average of sample measurements.
Comments	NA

Data / Parameter	$\Delta C_{P,t}$

Data unit	t CO_2-e
Description	Change in the carbon stocks in project, occurring in the selected carbon pools, in year *t*
Source of data	Biomass plot samples
Description of measurement methods and procedures to be applied	Carbon stocks in project area.
Frequency of monitoring/recording	At each monitoring event
Value applied	Result of Biomass plot samples
Monitoring equipment	Field form and registry
QA/QC procedures to be applied	Data is cross-checked in the field by Terra Global Capital during each visit and by other Entities' technical teams.
Purpose of data	Calculation of change in carbon stock.
Calculation methods	Calculated as the average of sample measurements.
Comments	NA

Data / Parameter	$GHG_{E,t}$
Data unit	t CO_2-e
Description	Increase in non-CO_2 GHG emissions within the project boundary as a result of the implementation of the A/R CDM project activity, in year *t*
Source of data	Field measurements
Description of measurement methods and procedures to be applied	Estimation of non-CO_2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity"; t CO_2-e
Frequency of monitoring/recording	At each monitoring event
Value applied	Field measurements
Monitoring equipment	Field form and registry
QA/QC procedures to be applied	Data is cross-checked in the field by Terra Global Capital during each visit and by other Entities' technical teams.
Purpose of data	Actual net GHG removals by sinks
Calculation methods	Calculated as the non-CO2 GHG emissions linked to the project area where biomass burning occurs.
Comments	NA

Data / Parameter	ΔC_{TREE}

Data unit	t CO_2-e
Description	Change in carbon stock in trees during the period between two points of time *t1* and *t2*
Source of data	Biomass plots
Description of measurement methods and procedures to be applied	Carbon stock in trees during the period between two points of time
Frequency of monitoring/recording	At each monitoring event
Value applied	Result of biomass plots
Monitoring equipment	Field form and registry
QA/QC procedures to be applied	Data is cross-checked in the field by Terra Global Capital during each visit and by other Entities' technical teams.
Purpose of data	Carbon stock in trees during the period between two points of time
Calculation methods	Calculated as the average of sample measurements.
Comments	NA

Data / Parameter	$u_{\Delta C}$
Data unit	%
Description	Uncertainty in ΔC_{TREE}
Source of data	Biomass plot samples
Description of measurement methods and procedures to be applied	Appendix 2. AR-AM-TOOL-14-v4.2
Frequency of monitoring/recording	At each monitoring event
Value applied	Result of Biomass plot samples
Monitoring equipment	Field form and registry
QA/QC procedures to be applied	Data is cross-checked in the field by Terra Global Capital during each visit and by other Entities' technical teams.
Purpose of data	Calculation of change in carbon stock.
Calculation methods	Calculated as the uncertainty of the mean value of above-ground biomass
Comments	NA

Data / Parameter	DBH

Data unit	Centimeters
Description	Diameter at breast height. Diameter of trees planted measured at 1.3m height
Source of data	Field measurements in sample plots
Description of measurement methods and procedures to be applied	Diameter is measured at 1.30m height by technicians from the project team, for all trees planted in designated sample plots.
Frequency of monitoring/recording	At each inventory (<5 years)
Value applied	N/A (diameter not used for ex-ante estimate)
Monitoring equipment	Caliper or diameter tape
QA/QC procedures to be applied	Cross-checked verification on a sample basis
Purpose of data	Ex-post calculation of carbon removals
Calculation method	Direct measurement. N/A
Comments	NA

Data / Parameter	**Tree height**
Data unit	Meters
Description	Height of the trees planted
Source of data	Field measurements in sample plots
Description of measurement methods and procedures to be applied	Tree height is measured by technicians from the project team, for all trees in designated sample plots.
Frequency of monitoring/recording	Yearly
Value applied	N/A
Monitoring equipment	Clinometer
QA/QC procedures to be applied	Cross-checked verification on a sample basis
Purpose of data	Ex-post calculation of carbon removals
Calculation method	N/A
Comments	Direct measurement. N/A

Data / Parameter	$A_{DISP,t}$

Data unit	Ha
Description	Crop displaced that is not rice.
Source of data	Field measurements if found to be significant.
Description of measurement methods and procedures to be applied	Standard operating procedures (SOPs) prescribed under national forest inventory are applied. In the absence of these, SOPs from published handbooks, or from the IPCC 2006, are applied
Frequency of monitoring/recording	At every verification
Value applied	0
Monitoring equipment	N/A
QA/QC procedures to be applied	Quality control/quality assurance (QA/QC) procedures prescribed under national forest inventory are applied. In the absence of these, QA/QC procedures from published handbooks, or from the IPCC 2006, are applied
Purpose of data	Ex-post calculation of carbon removals
Calculation method	
Comments	Only to be assessed if for crop displacement that is not rice.

3.3.3 Monitoring Plan (VCS, 3.16, 3.20)

The monitoring plan for the project has been designed, the main field studies were conducted by a third party for verification (as shown in *Figure 17***Error! Reference source not found.**) to gather biomass data that contribute to the impact indicators of the project.

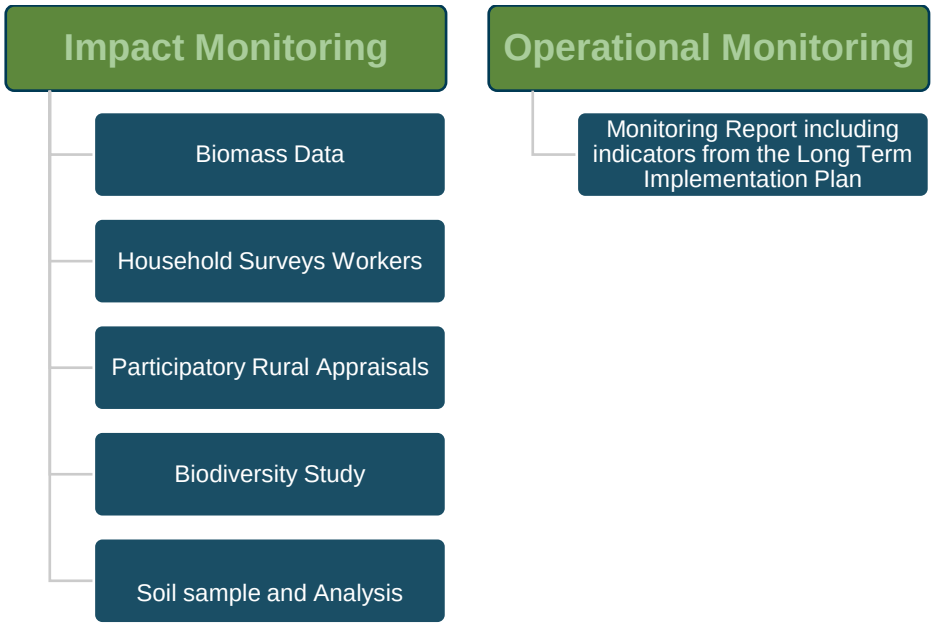


Figure 17. Operational and Impact monitoring reports required as part of the project's monitoring plan.

Climate Monitoring is assessed through biomass inventories and paired with remote sensing and spatial data. Biomass inventories follow a standard operation procedure (SOP) that keeps measurement consistency between field crews and throughout the years of the project. The full SOP is available to the VVB. Carbon Pools included in the sampling include:

- Tree biomass greater than 1 cm DBH
- Standing Deadwood greater than 5 cm DBH
- Lying deadwood with a diameter greater than 5 cm at center
- Litter
- Soil Organic Carbon

To estimate carbon accumulating in live tree biomass, the diameter at breast height (DBH) measurements from all *live* trees >1cm in diameter were taken, all *standing dead* trees >5 cm in diameter, and every downed Deadwood > 5 cm in diameter along two 10m transects. DBH is represented by the diameter of a tree trunk consistently measured at 1.3 meters above the ground, in accordance with myriad peer-reviewed methodologies. Windbreaks were stratified by planting date and measured along transects. Destructive sampling was used to measure litter. Soil samples were continuously monitored from 2016. Baseline conditions had low organic carbon content throughout surface levels throughout the project boundary. Samples were taken every year throughout the last five years, with results included in the emission reductions calculations.

A clear and standard operating procedure was followed for recording, storing, and aggregating data for analysis. Field crew leaders ensured datasheets were properly filled out in the field, as well as numerous QA/QC procedures were followed. All raw data was compiled into one binder for data entry and stored at the Bacao Office. Scans of field datasheets and geotagged photos are stored digitally and will be for the life of the project.

3.3.4 Dissemination of Monitoring Plan and Results (VCS, 3.18; CCB, CL4.2)

The summary of the Climate Monitoring Plan will be created and translated into Spanish and shared with the project stakeholders. The monitoring plan will be disseminated with the Project Document summary with the support of on-the-ground project partners. Local stakeholders will be asked to comment on the monitoring plan along with the summarized translated PD.

Information will be shared to the project's stakeholders through the following ways:

Stakeholders	Method of dissemination
Workers	Informational meeting
Smallholder Farmers	Informational meeting
Local authorities	Writing communication

3.4 Optional Criterion: Climate Change Adaptation Benefits

Gold Level exceptional climate benefits is applicable to this project.

3.4.1 Regional Climate Change Scenarios (CCB, GL1.1)

Climate change is impacting local land use scenarios in numerous ways:

Flooding: The municipality of Cabuyaro has several conditions that make it susceptible to flooding, such as flat-concave microrelief, alluvial clays, and proximity to the Meta River and Upia River. In 2017, seven municipalities in the Meta Department were declared a public calamity due to the intensity of the rains, causing landslides, infrastructure, and economic losses. These losses due to climatic variability and changes in the climate are high, which affects both economic and social development and highlight the need to incorporate CC into national planning and risk management instruments (Rodriguez A. , 2018).

Fire: Most of the fires in the savannas of Los Llanos Orientales of Colombia area caused by humans, mainly farmers that use fire for slash-and-burn practices. Usually, people burn during the dry season (December to March) as a way of obtaining fresh grass for their cattle and to clear fields for cultivation later in the year. In addition, in these ecosystems, fires are a natural process, where the species have developed adaptations to respond positively to fire and to facilitate its spread, configuring regimes that vary in frequency, intensity and impact. In Colombia, the savannahs of the Orinoquia are recognized as a fire-dependent ecosystem, mainly made up of grassland and grassland-type covers (Armenteras, et al., 2011). Extensive droughts during the dry season have potentialized the possibilities of fire in the area.

In the absence of the project, these impacts could have significant impact on the land-use scenario of the Project Activity Instance. Fire and flooding could potentially render agricultural land less productive. The PAI will implement strategies and practices to mitigate these risks, such as designing and adopting a fire prevention plan that includes the implementation of preventive activities during soil preparation, planting and crop maintenance.

3.4.2 Climate Change Impacts (CCB, GL1.2)

Threats described in are already having an impact on both community well-being and biodiversity conservation status. Extreme changes in weather such as floodings and intensive droughts impact, agricultural systems, HCVs and many of the flora and fauna in the area. Changes in the pattern of the weather are affecting the growth rate of plants and trees in the agroforestry system, thus it is recommended to analyze the new patterns in order to recommend areas and varieties that can support the climate variability (CIAT, nd). Also drastic changes in the climate are affecting the dynamics and life cycle of pest and diseases in cocoa production, thus the need to develop proper integrated pest management systems that respond to the new climate patterns and effectively control them.

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

The project design helps to mitigate the impacts of climate change in several ways:

- CO_2 reduction: Removal of 200,936 tCO_2e from the atmosphere in the first 40 years of the project.
- Conservation Farming: The Project Activity Instance will be applying conservation practices such as cover cropping, improve soil fertility through organic matter, integrated pest management (protocols will be developed), and diversify agroforestry system.
- Increase tree cover: Trees retain moisture and create microclimates; they provide shade and contribute organic matter to restore soil health. Trees also prevent erosion and can serve as windbreaks when planted near structures.

4 COMMUNITY

4.1 Without-Project Community Scenario

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

There are no communities living inside of the Project Activity Instances, but there are two communities nearby. The communities around the Project Activity Instance included in this PD are listed in *Table 27*.

Table 27. Communities around Project Activity Instances

Community	Number of Inhabitants
Barranca de Upía	5,835
Cabuyaro	5,076
TOTAL	**10,911**

Source: (DANE, 2018)

4.1.1.1 Well being

The department of Meta has been one of the most affected in the country by the armed conflict and the presence of illegal armed groups. However, the municipality of Cabuyaro, although it has had a presence of FARC guerrillas and self-defense groups, has not been a municipality where the consequences of the armed conflict have been felt by the civilian population.

However, Cabuyaro has been characterized as a recipient of the displaced population. Being one of the most important producers of oil in the country, it is a quiet area in terms of public order. Currently, there is no active presence of any illegal armed groups in the municipality.

Between 2002 and 2013, there was a turnaround in the region's economy, related to greater investment in agro-industry and the oil industry, and to a gradual shift from the traditional agricultural vocation to the mining and energy sector (hydrocarbons). The extraction industry is today the main economic component of the area (85%), along with agro-industrial activities (7%), among which is the palm industry as a main line. Due to the recent crisis in the oil industry, the municipality of Cabuyaro has experienced strong economic and social problems such as unemployment. The agricultural sector offers limited income opportunities, although less dependent on the oscillations of the hydrocarbon sector.

The Cabuyaro area, where the farm is located, is considered safe and thus receives many victims of the conflict ("desplazados"). This immigrant population suffers a number of social issues i) limited access to land, ii) lack of housing, iii) family fragility, iv) lack of education and lacks common cultural identity. Income opportunities are limited *to* only a few part-time jobs available in oil companies. This leads to income uncertainty causing a short-term outlook mentality with reliance on state assistance.

The agricultural sector offers limited income opportunities. According to a social assessment conducted by , there were only 450 formal jobs (public services, fishery, oil and palm industries). In the Meta department, 7.5% of the population was in extreme poverty rate in 2017. As for the average family income in Cabuyaro, 50% of their income comes from the production and commercialization of crops (banana, cassava, papaya, passion fruit, corn, rice, soy, cocoa), while the other 50% comes from daily jobs on farms (primarily palm oil), ranches, and oil wells in the area (Guaycaramo, 2016).

In terms of health, the municipality of Cabuyaro is not certified in health, as it does not meet the legal standards necessary to demonstrate adequate levels of effectiveness and efficiency in the provision

of medical services. There are health posts, but they are not in full operation due to lack of medical staff or due to the deterioration of the facilities.

As far as education is concerned, the municipality is also not certified by the Ministry of Education. Of the 10 educational centers, only one offers education up to eleventh grade. The remaining schools, located in rural areas, offer up to fifth grade, and in some cases up to ninth grade.

The water and basic sanitation of Cabuyaro reports access to water and sewage coverage to an average of 53% (2012), with 95% in urban areas and 20% in rural areas. Many people still have to buy water in plastic bottles because they think the water has too much chlorine (Kinome, 2020).

Some of the social issues are high % of teenage pregnancy and domestic violence (associated with alcohol abuse). Also women discrimination related to access to job opportunities, thus women have no or limited income and are mainly engaged in household work.

As for land tenure, the inequitable land distribution is evident. The concentration of large areas in the hands of a few individuals leads to the underutilization of large areas of land and inefficient land management such as extensive cattle ranching or permanent production of bio combustibles. The consequence is reduced access to fertile lands, which leads to high prices for land.

4.1.1.2 Community Characteristics

Communities around the Project Activity Instance vary in size and jurisdiction. There are neighborhoods (“barrio”), which in the municipality there are six (Centro, Juan Pablo II, Los Pescadores, San Nicolas, Villa Diana y Nuevo Amanecer). There are also police inspections, which is a judicial instance in an area (urban or rural) that exercises jurisdiction over that territory. In Cabuyaro there are three inspections located in Guayabal, Viso Upía and Mangos, the two first inspections are in close proximity to the Project Activity Instance. And there is also a classification called “vereda”, which are settlements located in the rural areas with basic infrastructure. In Cabuyaro, there are eight veredas San Pedro, San Miguel de Guarupay, Yarico, Naguayas, San Isidro, Remansón, Maracaray, Las Delicias and Palomas.

The local authority for each community is called the Community Action board (“Junta de Acción Comuna”), which is elected every 4 years by community members. The boards are the communities’ representation entity to the Municipality of Cabuyaro (Cabuyaro A. , 2021).

According to the 2005 census, the housing quantitative deficit in Cabuyaro was 17.61%. Since then, successive government administrations have invested in housing support programs for the poorest families. However, many people remain in precarious situations, such as families illegally occupying land and building temporary housing made out of metal like the invasion in "El Viso" invasion). Among the plantation’s workers, more than 84% rent the house where they live (Kinome, 2020).

4.1.1.3 Diversity

Sexism is culturally accepted in Colombia, and especially in rural areas such as Cabuyaro. Women in general do not have the same access to job opportunities as men do. Women are expected to care for the house and children, limiting their economic independence. In order to change this, there needs to be education, and to create awareness of the importance of women’s contribution to society. As well as providing equal access to education and job opportunities for women.

Minorities in this area are the “desplazados”, who are a floating population that have been displaced from other areas due to the armed conflict and are now settling in Cabuyaro and around. These population were victims of the armed conflict and live away from their home and families.

4.1.2 Interactions between Communities and Community Groups (VCS, 3.19; CCB, CM1.1)

The project will conduct various participatory exercises with members of the Guayabal and Viso de Upía communities, as well as interviews with the presidents of the Community Action Boards of these two communities. Through these, it will be possible to carry out a brief characterization of the living conditions of the inhabitants and to identify the problems that affect these communities. The results will allow the project to identify the main challenges related to access to public services, health, roads, housing, use of natural resources, infrastructure, and education.

In the Guayabal and Viso de Upía area there are several farmer organizations that congregate cocoa farmers. The registered associations are ASOCAUPIA, AGROVIS, Cacaoteros de la Asociación de Agricultores, and ASOCABUYARO. These organizations have provided basic technical assistance, as well as training and grafted cocoa varieties to incentivize the production in the region. Not all cocoa farmers belong to a formal organization, in their case they grow and commercialize the cocoa individually. From a survey conducted as part of the study "*Diagnóstico Socio-Económico del Area de Influencia del Proyecto Los Espejuelos*" by Bacao S.A.S in 2016, farmers requested more technical training, increase the production area and support in the commercialization process of cocoa.

4.1.3 High Conservation Values (CCB, CM1.2)

High Conservation Value	Churches
Qualifying Attribute	Churches have religious significance to Christian and Catholic Communities living in the Project Zone.
Focal Area	There are various churches located in the project zone. Local communities living in and around Cabuyaro need to be able to access these areas of worship.

High Conservation Value	Rivers (Cabuyarito, Meta)
Qualifying Attribute	Riverbanks are used for recreational areas by communities in the project zone, the rivers are also used for transportation and communities also use it for income generating activities.
Focal Area	Use of river water for agricultural purposes is regulated and should be monitored to assure the flow, volume, and quality of the water. The project will closely monitor the flow and quality and will report to the local environmental authority, Cormacarena.

High Conservation Value	Morichales and gallery forest areas
Qualifying Attribute	Guayabal and El Viso de Upía communities have access to patches of forest areas, which have high social significance as community members will use these areas for income generating activities such as hunting.
Focal Area	The project will reinforce the non-hunting and no-deforestation policies in the Project Activity Instance and will provide

	education to workers and small farmers (Impulsa) on the importance to conserve the forest areas and the plant and animal species in them.

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

Historically, community members in the area are fishermen, ranchers, farmers, artisans, and individuals that work for companies such as oil production. Individuals have moved between these activities depending on various reasons such as capital available for investment, market prices of their goods, and policies in place. In the case of fishermen, which in the past used to be the most popular economic activity due to the various rivers in the area, numbers were reduced due to a national policy put in place in 2015 to reduce fishing to the most artisanal practices to protect the fish population in the rivers.

In the case of ranching, jobs have decreased as some of these pastures have been sold to be transformed into intensive large production of African palm and other crops such as rice, sugar cane, and other crops. In the case of palm production, a portion of the labor force that used to work on the ranches has switched to palm production. Some others have switched to other activities claiming the palm production is more labor intensive and the production pollutes the rivers around due to the vast use of toxic agrochemicals.

The agricultural expansion in the area has promoted community members to work on different types of farms in the area, but also incentivizing them to establish their own production. Some of the crops being planted in the area are cacao, banana, papaya, mango, beans (gandul) and trees such as cedar and yopo for shade and/or windbreaks. The average size of land for small farmers in the Guayabal and Viso areas is 2 hectares. Farmer have started planting cocoa incentive by seeing other farmers harvesting the product and selling it dry in local market in Villavicencio, but prices are very variable. The majority have planted local varieties with low productivity, and few have planted grafted varieties.

In the absence of this project, the communities will continue doing subsistence agriculture and receive sporadic income from temporary jobs for unskilled labor. Through the project, community members specifically employees will have long term steady income, improved work conditions and will have access to education on sustainable cacao production. As for small farmers that will be part of the Impulsa program they will have access to a direct market with no intermediaries that will improve their income and access to education on improved agricultural practices.

4.2 Net Positive Community Impacts

4.2.1 Expected Community Impacts (CCB, CM2.1)

Community groups	Employees of the Project
Impact(s)	Increased knowledge, income, and livelihoods for workers (including women) • Increase job opportunities in the Project Instance Zones • Increased income for employees offering a living wage • Increase workers' knowledge and skills on agroforestry systems • Increase well-being of workers and their families
Type of benefit/cost/risk	This is a predicted, actual benefit
Change in Well-being	In a baseline scenario, people in the Project Instance Zone are raising cattle, growing rice, or working in other farms or in the oil industry to obtain revenue. Revenues are unstable in time and employment is often short term. The project by providing

	long-term employment will secure steady revenue for workers and their families.

Stakeholder	Small Cocoa Farmers in the Project Instance Zone
Impact(s)	Improved livelihoods of small farmers (including women) through income diversification and increase knowledge • Access to improved cacao varieties • Increase and diversified farmers' income • Increase knowledge about sustainable agroforestry practices
Type of benefit/cost/risk	This is a predicted, direct benefit
Change in Well-being	Through Impulsa small farmers are increasing their revenues and will have the opportunity to diversify their income.

4.2.2 Negative Community Impact Mitigation (VCS, 3.19; CCB, CM2.2)

A participatory study will be conducted to identify high conservation value areas related to community well being and base on the results the project will define if measures are needed to be put in place to mitigate any potential negative week being impacts on community groups.
In general, the project is not expected to have any negative impact on the community. In terms of workers' safety, the project will provide training and develop a policy called "Safety and Health Policy at the workplace" to prevent work related injuries and to foster a safe working environment .

4.2.3 Net Positive Community Well-Being (VCS, 3.19; CCB, CM2.3, GL1.4)

The project will offer employment opportunities (full time and part time) providing economic stability to its employees, who will also receive legal and additional benefits such as food vouchers, life insurance, transportation, continuous training, affiliation to the health and safety system, among others.

Additionally, the project will implement a social and technical program, Impulsa, which will support small farmers from the surrounding communities (Guayabal, and Viso de Upía). The support will consist of supplying grafted cocoa plants, providing technical assistance to establish agroforestry systems (average 3.6 hectares of extension), and establishing a commercialization system for direct purchase of cocoa from these farmers, for the cacao to be processed locally to be sold in international markets. This program will diversify farmers' income as they normally grow one traditional crop, rice, or raise cattle.

4.2.4 High Conservation Values Protected (CCB, CM2.4)

It is anticipated that the social and cultural HCVs in the Project Instance Zone will not be negatively affected by the Project; there will be maintenance of access of social and cultural HCV areas.

4.3 Other Stakeholder Impacts

4.3.1 Impacts on Other Stakeholders (VCS, 3.18, 3.19; CCB, CM3.1)

Identify any potential positive and negative impacts that the project activities are likely to

The Guayabal and Viso de Upia Community, Cabuyaro municipality, will be positively impacted by the project implementation since many could work in the organization as either administrative

personnel or field workers. The Council and Mayor's Office of Cabuyaro will positively be impacted with the implementation of the project since it will follow the rules and regulations of the region. Additionally, the Cabuyaro Cocoa Farmers will be impacted positively with the implementation of the project due to the possible commercial alliance between them and the project, which will improve the cocoa value chain. CORMACARENA, being the highest environmental authority in the area, will also be positively impacted with the Project' implementation, since the Project will follow the environmental law, licenses and authorizations required by the jurisdiction.

The Cabuyaro Community Action Boards will be positively impacted since they are fundamental for fostering community relationships. The Impulsa Bacao Farmers are one of the main stakeholders and will be positively impacted with the implementation of the project along with the employees, since the project has an important social and environmental aspect to it.

Lastly, the neighbors around the Project area will not be negatively impacted by the implementation of project activities, since the Project respects property limits and use of natural resources, and if issue arises, there is open communication between the parties.

4.3.2 Mitigation of Negative Impacts on Other Stakeholders (VCS, 3.18, 3.19; CCB, CM3.2)

No negative impact has been identified on the well-being of the other stakeholders.

4.3.3 Net Impacts on Other Stakeholders (VCS, 3.18, 3.19; CCB, CM3.3)

The implementation of project activities is not anticipated to impact negatively any of the stakeholders, it will, in fact, improve the employment opportunities for the communities in the area, increase the visibility of sustainable cocoa production, and it will follow the regulations of CORMACARENA.

4.4 Community Impact Monitoring

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

The social impacts of the Project will be monitored over the crediting period. A detailed social monitoring plan has been developed to quantify the social impacts and meet the requirements of the Climate, Community and Biodiversity Standard.

The monitoring plan is based on variables directly linked to the project's objectives for the identified community groups (workers and small farmers) and to predicted outputs, outcomes, and impacts identified in the project's causal model related to the well-being of communities. The outcomes of the project relate to income improvement and diversification for workers and small farmers, increase their knowledge on sustainable agroforestry systems and increase access to market for cacao.

The expected differentiated impact is to improve livelihood for workers and small workers

The project completed an assessment to identify HCVs related to community wellbeing. The project will continue monitoring the HCVs identified and will evaluate effectiveness of any measures taken to maintain or enhance identified HCVs related to community well-being in the future.

The complete monitoring plan that has been developed for the project is included in Appendix 4: ADDITIONAL INFORMATION.

4.4.2 Monitoring Plan Dissemination (CCB, CM4.3)

The summary of the Community portion of the CCB Monitoring Plan has been created and translated into Spanish and shared with stakeholders in the Project Activity Instance Zone.

The dissemination of the Monitoring Plan with the Project Document was conducted by the on-the-ground project partners (Bacao and Impulsa). Local stakeholders were asked to comment on the monitoring plan along with the summarized translated PD.

The following community meetings were held to disseminate the PD and the Monitoring Plan:

Participants	Purpose	Date
Workers	Informational meeting, socialize PD summary and process for comments and feedback	September 22, 2022
Small Farmers	Informational meeting, socialize PD summary and process for comments and feedback	September 23, 2022
Local authorities	Written communication	February, 2023

Stakeholders' questions will be answered during the meetings.

The Monitoring Report summary will be made publicly available on the public website www.verra.org. All stakeholders will be asked to comment on the project description along with the summarized translated version, and if needed to send comments to CCBStandards@vcs.org.

During each Monitoring Period the results of the project will be reported to communities. This will be the responsibility of Bacao SAS and be conducted every 4 years.

4.5 Optional Criterion: Exceptional Community Benefits

Gold Level exceptional community benefits are not applicable to this project.

5 BIODIVERSITY

5.1 Without-Project Biodiversity Scenario

5.1.1 Existing Conditions (VCS, 3.19; CCB, B1.1)

The Colombian Orinoco basin occupies about 35% of the national territory with about 345,350 km2 (Lasso et al. , 2010) Throughout this region there is a great variety of landscapes and ecosystems, including different types of savannas (e.g. high plains, floodplains), as well as forest habitats along the Andean foothills, the Amazon-influenced forests on the border with the Guaviare River and transition areas towards the Guyanese shield (Rangel Ch., 2014) The Orinoquia region is also recognized for its high diversity of fauna species with about 685 species of fish, 71 species of amphibians, 122 species of reptiles, 761 species of birds and 196 species of mammals (Ferrer Perez et al., 2009) (Acevedo-Charry, Pinto Gomez & Rangel, 2014) Despite this high biodiversity, the basin also faces processes of loss and fragmentation of ecosystems such as savannahs and forests due to the expansion of urban centers, agriculture, palm crops and pastures for livestock (Romero Ruiz et al., 2012) (Sanchez Cuervo et al., 2012).

The Colombian altillanura, known as the savannah region between the Meta River to the east and south until the transition with the jungles of the Guaviare River, is recognized for house different landscape units and ecosystems (Jaramillo & Rangel, 2014) among which stand out different types of

savannas, morichales and gallery forests (Jaramillo & Rangel, 2014). The region has been transformed in 35% of its natural ecosystems to pastures for livestock and crops during the period from 1,987 to 2,007 (Romero Ruiz et al., 2012) Although recent decades have seen an increase in the number of studies aimed at characterizing the local and regional diversity in various groups of vertebrates and invertebrates, most have been carried out in natural environments or barely disturbed (Ocampo-Penuela & Etter, 2013) In contrast, despite the impact of agroforestry and livestock activities in the region are few studies aimed at knowing the patterns of diversity and turnover of species in associated communities in agricultural landscapes (Tamariz Turizo et al, 2017) (Cely Gomez et al., 2021). These types of studies are necessary to know the true impact that these types of industries have in the wealth, composition, and movement patterns of the species, while allowing the identification of species or groups resilient to changes in the scenery.

To identify the existing ecosystems in the Project Activity Instance, a field study was conducted by *Soluciones Integrales Efectivas* S.A.S. (SIE) to determine the existing categories according to the national Vegetation Covers and Land Uses Map (defined by the methodology based on Corine Land Cover), more detail on the study included in Appendix 3: Commercially Sensitive Information.

The study identified that, at the baseline, the Project Activity Instance has riparian forest coverage, non-floodable gallery forest, floodable gallery forest, clean pastures, weedy pastures, and grasslands or stubble. The gallery and riparian forests are located on the banks of permanent or temporary watercourses, while the non-flooded gallery forest is found on the banks of the channels that have deepened the terrain.

As for the floodplain forest of the altillanura occupies wide depressions, in the Project Activity Instance they are found in the fringe of the water sources Caño Mocho, Caño Galápago, River Upía, Morichales and other natural drainages found on the property. It stands out for the abundance of moriche palm, mixed with timber trees such as Tablon and Sangre de Toro, among other species that are also tolerant to high water levels almost all year round; in its lower part there are tall weeds (platanillo) and melastomataceae.

As for the clean pastures, it covers most of the Project Activity Instance, approximately 70%. The most common in the altillanura is the flat and hilly savanna with smooth saeta grass associated with other grasses. The grassland has numerous plant species, most of them a few centimeters tall, which only live during the rainy season and die after dispersing their seeds. Due to poor or lack management practices, pastures present mostly weeds associated with secondary vegetation.

Lastly, within the Project Activity Instance there is a cover made up of herbaceous species developed naturally in different densities and substrates. These grasslands are also called forest of the bush, to refer to groups of trees that form small islands of forest surrounded by sabas. To determine the fauna associated within these different covers, a study was conducted to characterize the richness, composition, and replacement of species in four groups of vertebrates (amphibians, reptiles, birds, and mammals) associated with pastures and remnants of gallery forest in the Project Activity Instance (full study included in Appendix 3: Commercially Sensitive Information). A summary of the species seen is included in

Table 28.

Table 28. Herpetofauna, birds and mammals seen in the pasture and forest areas through the baseline biodiversity study conducted in the project area

Baseline	Number of individuals-Pastures	Number of individuals-Gallery Forest
Herpetofauna		
Bufonidae	4	1
Alligatoridae	1	1
Boidade	0	1
Colubridae	2	0
Hylidae	0	15
Iguanidae	0	0
Iguanidae: Dactyloinae	0	0
Leptodactylidae	7	11
Leptotyphlopidae	0	1
Phyllomedusidae	0	2
Podocnemididae	0	0
Scincidae	0	0
Teiidae	0	2
Testudinidae	0	0
Total Herpetofauna	**14**	**34**
Birds		
Accipitridae	2	1
Alcedinidae	0	0
Apodidae	1	0
Ardeidae	3	0
Bucconidae	0	0
Burhinidae	0	0
Caprimulgidae	1	0
Cathartidae	2	1
Charadriidae	1	0
Columbidae	5	4
Corvidae	0	1
Cracidae	0	2
Cuculidae	3	3
Donacobiidae	0	0
Falconidae	3	3
Fringillidae	1	1
Furnariidae	1	1
Galbulidae	0	1
Hirundinidae	1	0
Icteridae	4	2
Mimidae	1	0

Baseline	Number of individuals- Pastures	Number of individuals- Gallery Forest
Momotidae	0	1
Motacillidae	1	0
Nyctibiidae	0	0
Odontophoridae	0	0
Parulidae	0	2
Passerellidae	1	0
Picidae	1	2
Pipridae	0	2
Psittacidae	5	2
Rallidae	0	1
Ramphastidae	2	1
Strigidae	0	0
Thamnophilidae	1	4
Thraupidae	5	4
Threskiornithidae	3	1
Tinamidae	1	2
Tityridae	0	1
Trochilidae	0	3
Troglodytidae	1	1
Trogonidae	0	1
Turdidae	1	0
Tyrannidae	9	11
Vireonidae	0	0
Total Birds	**60**	**59**
Mammals		
Atelidae	2	3
Canidae	0	1
Caviidae	9	4
Cebidae	1	3
Cervidae	0	4
Cuniculidae	0	1
Dasypodidae	0	3
Dasyproctidae	0	2
Didelphidae	1	26
Echymidae	1	0
Erethizontidae	0	1
Felidae	0	2
Myrmecophagidae	3	1
Others	0	26
Total Mammals	**17**	**77**

Source: Study conducted by Bacao and Terra Global Capital

Ramphastos tucanus (Vulnerable), ***Myrmecophaga tridactyla*** (Vulnerable). ***Mitu tomentosum, Setophaga striata, Dasypus sabanicola*** and ***Panthera onca*** on Gallery Forests	The project will not negatively impact the habitats for those vulnerable and near threatened species. There will be activities to preserve those Gallery Forests that are in the HCV areas. Additionally, the agroforestry will potentially benefit since the area was mostly degraded pastures.

5.1.2 High Conservation Values (CCB, B1.2)

Based on the coverage study developed by SIE and the biodiversity study conducted by Unillanos, the conclusion is reached that there are areas that must be conserved within the project area due to their importance at the ecosystem level.

High Conservation Value	HCV1 – Diversity of Species
Qualifying Attribute	The Project Activity Instance contains one threatened species of bird, *Ramphastos tucanus* (Vulnerable), and one threatened species of mammal, *Myrmecophaga tridactyla* (Vulnerable). In addition, the project contains two species of birds and two species of mammals that are Near Threatened: the birds *Mitu tomentosum* and *Setophaga striata*, and the mammals *Dasypus sabanicola* and *Panthera onca*.
Focal Area	The conversion of degraded pasture to multi-species cacao plantation is not expected to have any negative impacts on the Project Activity Instance. The existing land use of pasture is already in a degraded state.

High Conservation Value	HCV3 - Ecosystems and habitats (Non flooded and flooded gallery forest-morichales, and riparian forest)
Qualifying Attribute	The ecosystems present in the area represent a high value for the region because they provide habitat for a variety of species and, if not protected, their conservation status could be altered and with it their ecological functions. Thus, it is considered that the areas classified as forests in *Map 8* constitutes an HCV.
Focal Area	The conversion of degraded pasture to multi-species cacao agroforestry system will not affect the forest at the Project Activity Instance's edge. The forest constituting the HCV area will be preserved.

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

Continued grazing on this pasture would likely lead to further degradation of the soil and plant communities in the Project Activity Instance in what is already an area of low biodiversity. This would reduce habitat quality over time and could negatively impact existing biodiversity.

5.2 Net Positive Biodiversity Impacts

5.2.1 Expected Biodiversity Changes (VCS, 3.19; CCB, B2.1)

Biodiversity Element	Tree cover
Estimated Change	The project is expected to increase the amount of tree cover in the area by planting shade trees and windbreaks as well as the cacao trees themselves. These trees will be planted in areas that are currently degraded pasture with little tree cover, so planting the trees will increase tree cover in the Project Activity Instance.
Justification of Change	The purpose of this project is to convert degraded pasture into a multi-strata agroforestry system. Implementing this core part of the project will result in tree cover increase in areas that are currently grassland.
Biodiversity Element	Habitat connectivity
Estimated Change	As the trees planting is part of this project's activities, the Project Activity Instance has the potential to create greater habitat connectivity between the forest at the edges of the area by creating continuous tree cover.
Justification of Change	The purpose of this project is to convert existing degraded pastures into a multi-strata agroforestry system. Implementing this core part of the project will result in tree cover in areas that are currently grassland, creating continuous tree cover across an area that is currently broken up by the degraded pasture. Continuous tree cover may facilitate movement between habitat patches of wildlife that rely on wooded areas.
Biodiversity Element	GHG emissions and climate change
Estimated Change	This project is expected to sequester carbon from the atmosphere, reducing global warming.
Justification of Change	Establishing a multi-strata cacao agroforestry system on what is currently degraded pasture will increase carbon storage in aboveground biomass (living and dead trees), belowground biomass (roots), and soil organic carbon.
Biodiversity Element	Gallery Forest
Monitored Change	This project allowed the preservation of certain plant species such as *Mauritia flexuosa.* This plant as a group (called Morichales) represent an important ecosystem value, since they regulate the flow of water, store it, and are the habitat of countless living beings, among others. The gallery forest within the project area has been consistently maintained throughout the duration of the project, achieving a 100% maintenance rate. However, Morichales ecosystems may experience a natural decline due to various environmental factors, including

	hydrological shifts, reduced water availability caused by climate change, soil degradation, and natural succession, where other vegetation may outcompete the palms.
Justification of Change	These plants help to preserve and enhance the biodiversity of the project area.

5.2.2 Mitigation Measures (VCS, 3.19; CCB, B2.3)

We anticipate that the project will not adversely affect biodiversity, or the High Conservation Values (HCVs) identified within or around the Project Zone. However, should potential impacts arise, certain activities can mitigate these negative effects on the HCVs, particularly regarding diversity of species (HCV1) and the ecosystems and habitats (Non flooded and flooded gallery forest-morichales, and riparian forest) (HCV3). The non-flooded and flooded gallery forest-morichales, and riparian forest, could be impacted by various project activities. These forests, along with the plantation, support a diverse array of species (HCV1).

These are some of the project activities to be implemented that will mitigate negative impacts on the areas of HCV (morichales and species diversity). In order to mitigate the negative impacts identified in the project, the following measures are proposed:

- *Maintenance* of conservation areas (morichales)
- Promote and monitoring the Zero deforestation policy (in plantations and small farmers)
- Provide training to workers on existing biodiversity and conservation
- *Install* camara traps for continuous monitoring of biodiversity in project areas

Moreover, considering the conclusions and recommendations from the biodiversity study, it has been determined that optimal management procedures should continue, including (detailed in Appendix 3: Commercially Sensitive Information):

- Management plan and procedure of agricultural inputs that will be used and applied in the plantation
- Procedure for the Establishment of New Crops (Appendix 3: Commercially Sensitive Information)
- Procedure for Crop Maintenance (Appendix 3: Commercially Sensitive Information)
- Within the policies established by the project implementor to prevent impacts on biodiversity are the following:
- It is forbidden burning any kind of vegetation or open fires for the establishment of crops
- All plastic waste from agricultural activities, must be reported and returned to the supervisor in charge (environmental area) to provide proper final disposal.
- It is prohibited to cut down trees that are on the banks of the Project Activity Instance, rivers, pipes, swamps, without prior authorization.
- Hunting, cutting of trees, fishing and/or capture of animal species is prohibited within the Project Activity Instance.
- If any species of fauna is found in the Project Activity Instance, it should not be mistreated or killed, with the exception of dangerous species, that represents a potential risk to the staff.
- Refrain from smoking inside the plantation since a cigarette butt can cause a fire and the toxic smoke pollutes the environment.

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

The without-project impacts in the project zone are expected to be a continued state of degraded pasture that provides limited habitat for existing species. Project activities will not affect the existing forest and over time, as plantation trees grow, the plantation may beneficially link existing forest patches by providing tree cover in an area where forest is separated by degraded pasture.

To meet the Gold Level for climate change adaptation benefits, as outlined in section 3.4.3, the project will implement several key strategies: a) contribute to CO2 reduction, b) engage in conservation farming through agroecological practices, and c) increase tree cover. These activities align with the Long Term Implementation Plan and their respective indicators.

One of the primary outcomes contributing to CO2 reduction, conservation farming, and increased tree cover is land rehabilitation and soil restoration through agroecological practices. The main activities for this outcome include:

a. Agroforestry and Soil Health Improvement: Monitored by the number of hectares under the agroforestry system. A diversified agroforestry system will provide additional food sources to the fauna in the project area
b. Soil and Water Condition Assessment: Monitored by the improvement in soil quality. Better water and soil quality will enhance the habitat for species in the project area.
c. Biomass Increase through Agroforestry: Monitored by the percentage increase in aboveground and belowground biomass in the project area. Increase biomass will provide shelter to the flora and fauna in the area.

These activities will ensure that the project not only meets the Gold Level criteria for climate change adaptation benefits but also promotes sustainable agricultural practices and enhances environmental resilience.

5.2.4 High Conservation Values Protected (CCB, B2.4)

Of the two Vulnerable species in the Project Activity Instance, *Ramphastus tucanus* prefers forested areas ((Ebird, n.d.)), and *Myrmecophaga tridactyla* occupies both forested areas and grasslands (Smitsonian Institute , n.d.), and also two species of birds and two species of mammals that are Near Threatened: the birds *Mitu tomentosum* and *Setophaga striata*, and the mammals *Dasypus sabanicola* and *Panthera onca*. As such, the conversion of grassland pasture to multi-species agroforestry system is not anticipated to have a negative impact on the habitat of these two threatened species.

5.2.5 Species Used (VCS, 3.19; CCB, B2.5, B2.6)

Species introduced	Classification	Justification for use	Adverse effects and mitigation
Cacao (*Theobroma cacao* (Varieties CCN-51, FTA-2, FEAR-5, FSA-13, FSV-41))	Non-native	Main crop	No known adverse effects. The crop will be controlled and maintained according to the management plan and using sustainable agricultural practices.
Abarco (*Cariniana pyriformis*)	Native	Planted to prevent wind damage and reduce erosion	No known adverse effects. Crop will be maintained according to the farm's agricultural practices.

Species introduced	Classification	Justification for use	Adverse effects and mitigation
Matarratón (*Gliricidia sepium*)	Native	Planted to provide shade for the cacao plants (main crop)	No known adverse effects. Crop will be maintained according to the farm's agricultural practices.
Kudzu (*Pueraria phaseoloides*), Sweetheart (*Desmodium adscendens*), Velvet bean (*Mucuna pruriens*)	Non-native	Cover crops	No known adverse effects. Cover crops will be maintained according to the farm's agricultural practices.
Plátano Harton (*Musa paradisiaca*)	Non-native	Planted to provide temporary shade Non-invasive herbaceous plant used across Colombia as a food crop. No additional water is used to irrigate this crop.	No known adverse effects. Crop will be maintained according to the farm's agricultural practices.
Achiote (*Bixa orellana*)	Native	Planted to provide shade. Contribute to soil health by adding organic matter through leaf litter. This improves soil fertility and structure, enhancing the productivity of the agroforestry system	No known adverse effects. Crop will be maintained according to the farm's agricultural practice.
Water buffalo (*Bubalus bubalis*)	Non-native	14 water buffalos used as animal labor Safe alternative to use of fossil fuel and mechanical equipment.	No known adverse effects. As work animals, they are unlikely to leave human use.

5.2.6 Invasive Species (VCS, 3.19; CCB, B2.5)

No known invasive species exist in the project area.

5.2.7 GMO Exclusion (CCB, B2.7)

The project implementor operates their own nurseries where they reproduce and grow the tree species used in the project. Project nurseries have been certified and registered under ICA. No Genetically Modified Organisms (GMO) are used in the propagation of the plants used in this project. A full list of plant species to be used is included in Section 5.2.5Species Used (VCS, 3.19; CCB, B2.5, B2.6).

5.2.8 Inputs Justification (VCS, 3.19; CCB, B2.8)

There are few fertilizers and agrochemicals that are applied to the crops grown in the Project Activity Instance. Proper use instructions, timed application and safety procedures are followed when applying

these inputs. The staff carefully monitors use so that the least can be applied as these are costly to the project. All fertilizers and agrochemicals are applied according to the crops' age and needs and will follow international and national laws on application.

The majority of the fertilizers are applied through the irrigation system. This system ensures that water and nutrients are delivered directly to the plant roots in a controlled manner, reducing the possibility of groundwater contamination and minimizing nutrient runoff into close water bodies. By integrating fertilizers into the irrigation water, plants receive precise amounts of nutrients, promoting efficient absorption and reducing the environmental impact (Please see Irrigation Technical Manual in Appendix 5:Additional Information).

Name	Boric acid
Justification of Use	Fertilizer
Adverse Effect	Serious health hazard. Instructions and procedures for safe application need to be followed

Name	Granulated agrimins
Justification of Use	Fertilizer
Adverse Effect	Do not present a public health concern

Name	Basacote 6M
Justification of Use	Fertilizer
Adverse Effect	Do not present a public health concern

Name	Borax crystals
Justification of Use	Fertilizer
Adverse Effect	Serious health hazard. Instructions and procedures for safe application are followed based on label and internal protocol

Name	Granulated borax
Justification of Use	Fertilizer
Adverse Effect	Serious health hazard. Instructions and procedures for safe application are followed based on internal protocol

Name	Calmag precisagro
Justification of Use	Fertilizer

Adverse Effect	Unlikely to present acute hazard in normal use

Name	White Potassium Chloride
Justification of Use	Fertilizer
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Potassium Chloride Crystals
Justification of Use	Fertilizer
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Granular Potassium Chloride
Justification of Use	Fertilizer
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Monoammonium Phosphate (MAP)
Justification of Use	Fertilizer
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Monopotassium Phosphate (MKP)
Justification of Use	Fertilizer
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Fungifert Mycorrhiza
Justification of Use	Fertilizer-Biologic
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Hydrocomplex
Justification of Use	Fertilizer
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Kalma G
Justification of Use	Fertilizer
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Kieserite
Justification of Use	Fertilizer
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Composted organic matter
Justification of Use	Fertilizer-Organic
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Cane Molasses
Justification of Use	Fertilizer-Organic
Adverse Effect	Unlikely to present acute hazard in normal use

Name	MF Active Magnesium
Justification of Use	Fertilizer
Adverse Effect	Unlikely to present acute hazard in normal use

Name	MF Active Manganese
Justification of Use	Fertilizer
Adverse Effect	Unlikely to present acute hazard in normal use

Name	MF Active Zinc
Justification of Use	Fertilizer
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Calcium nitrate

Justification of Use	Fertilizer
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Potassium nitrate
Justification of Use	Fertilizer
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Agricultural thermal silicate
Justification of Use	Fertilizer
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Ammonium sulfate (crystals)
Justification of Use	Fertilizer
Adverse Effect	Serious health hazard. Instructions and procedures for safe application are followed based on internal protocol

Name	Ammonium sulfate (granular)
Justification of Use	Fertilizer
Adverse Effect	Serious health hazard. Instructions and procedures for safe application are followed based on internal protocol

Name	Copper sulfate pentahydrate
Justification of Use	Fertilizer
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Magnesium sulfate heptahydrate
Justification of Use	Fertilizer
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Zinc sulfate

Justification of Use	Fertilizer
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Zinc sulfate heptahydrate
Justification of Use	Fertilizer
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Sulfex zinc
Justification of Use	Fertilizer
	Unlikely to present acute hazard in normal use

Name	Turba Orange peat
Justification of Use	Fertilizer-Organic
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Urea phosphate
Justification of Use	Fertilizer
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Granular urea
Justification of Use	Fertilizer
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Zeoter -A
Justification of Use	Fertilizer
Adverse Effect	Unlikely to present acute hazard in normal use at 0.07 mg/kg rate
Name	Dinamic
Justification of Use	Herbicide
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Becano
Justification of Use	Herbicide
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Escorpion/Scorpion
Justification of Use	Herbicide
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Glifosol 480 SL
Justification of Use	Herbicide
Adverse Effect	Serious health hazard. Instructions and procedures for safe application are followed based on internal protocol

Name	METSULFURON
Justification of Use	Herbicide
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Rongo 150 SL
Justification of Use	Herbicide
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Linap
Justification of Use	Herbicide
Adverse Effect	Unlikely to present acute hazard in normal use

Name	OXYFLUORFEN 240
Justification of Use	Herbicide
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Rifit
Justification of Use	Herbicide

Adverse Effect	Serious health hazard. Instructions and procedures for safe application are followed based on internal protocol

Name	Verdict 1400
Justification of Use	Herbicide
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Cipermectina
Justification of Use	Insecticide
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Dimetox
Justification of Use	Insecticide
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Imaprid
Justification of Use	Insecticide
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Lorsban powder
Justification of Use	Insecticide
Adverse Effect	Unlikely to present acute hazard in normal use

Name	TIAMETOXAM
Justification of Use	Insecticide
Adverse Effect	Unlikely to present acute hazard in normal use

Name	GALEON 247 SC

Justification of Use	Insecticide
Adverse Effect	Serious health hazard. Instructions and procedures for safe application are followed based on internal protocol

Name	NUVAN 50
Justification of Use	Insecticide
Adverse Effect	Serious health hazard. Instructions and procedures for safe application are followed based on internal protocol

Name	PABLANCO
Justification of Use	Insecticide
Adverse Effect	Unlikely to present acute hazard in normal use

Name	PROTEUS OD170
Justification of Use	Insecticide
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Amistar Top SC
Justification of Use	Fungicide
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Adalto 720 SC
Justification of Use	Fungicide
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Agrodyne SL
Justification of Use	Fungicide
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Predostar
Justification of Use	Fungicide

Adverse Effect	Unlikely to present acute hazard in normal use

Name	Silvacur Combi EC 300
Justification of Use	Fungicide
Adverse Effect	Serious health hazard. Instructions and procedures for safe application are followed based on internal protocol

Name	Fosetyl 80 WP
Justification of Use	Fungicide
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Copper oxychloride
Justification of Use	Fungicide
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Ridomil Gold MZ 68 WP
Justification of Use	Fungicide
Adverse Effect	Unlikely to present acute hazard in normal use

Name	Vitavax 400
Justification of Use	Fungicide
Adverse Effect	Unlikely to present acute hazard in normal use

5.2.9 Waste Products (VCS, 3.19; CCB, B2.9)

The Project Activity Instance will generate a Waste Management Plan which defines policies for identifying and managing all waste products related to fresh water, wastewater, solid waste, fuels and oils, and chemicals. As part of this plan, the project will establish alliances and contracts with specialized companies that provide specialized treatment to dispose the project's waste, complying with the national regulatory guidelines of the local environmental authority, Cormacarena. Operating personnel will also be trained in proper classification and waste disposal.

One of the project's main waste products are cacao husks. Cacao husks will be decomposed by being collected after processing, piled, and mix with lime to facilitate the breakdown of the organic material. This processed material is brought back to the field to continue decomposing in the soil and increase the organic matter of the soil.

5.3 Offsite Biodiversity Impacts

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

A biodiversity study was carried out to determine possible negative effects and define mitigation measures. In addition, no complaints have been reported by neighbors and/or outsiders, however, within the Fertilizer and Pesticide Application Procedure, a series of instructions have been established to mitigate any possible negative effects from the use agrochemicals in the project activities. In the event that an unforeseen event happens that could generate a negative impact, the instructions is to report it immediately to HSE to prevent possible environmental damage or consequences.

Table 29. List of possible negative biodiversity impacts and the mitigation measures defined

Negative Offsite Impact	Mitigation Measure(s)
Livestock grazing shifts from Project Activity Instance to other sites	• Project owner will give previous owner of livestock a grace period to find a new site before establishing the cacao agroforestry system in the Project Activity Instance. • As animal stocking is quite low across the surrounding area, carrying capacity is not yet met. If cattle is increased in the landscape, and carrying capacity is met, rotational grazing can be implemented.
Hazardous waste pollution	• All used empty sacks/bags must be returned, avoiding leaving the empty bags in the field as it could generate accumulation of waste and contamination. • Used oil is properly disposed by specialized subcontractor. • According to the company's policy, it is forbidden to throw plastic material or any other type of non-biodegradable inorganic solid waste from food and drinks into the crop and drains. • Within the farm all generated waste must be separated and disposed of in the bins for this purpose.
Agricultural Inputs Use and Disposal	• When there is any fertilizer left that will not be used, it must be returned. It cannot be dumped in the lot, in water bodies or irrigation channels. As these inputs are costly, they are well kept track of. • At all agrochemical mixing points, workers must have absorbent material like sand or sawdust in case of spills, as well as a shovel, broom and plastic bags – this is a company policy.
Water pollution	• Proper use of water is required to avoid negative impacts on water resources. • Water bodies such as pipes and channels, as well as open land must be free of solid waste (plastic material, Styrofoam, containers, or food

Negative Offsite Impact	Mitigation Measure(s)
	wrappers) and hazardous waste (containers and material contaminated with chemical substances).
Air pollution	• Within the farm no open burning is allowed, as it can cause a fire and pollutes the air with toxic smoke. • Smoking inside the plantation is not allowed since a cigarette butt can cause a fire and the toxic smoke pollutes the environment. Workers that must smoke are allowed to do so in designated areas. • On the farm workers and visitors must avoid exceeding the speed limit, in order to mitigate the emission of particulate matter (dust) that affect human health and the environment.
Visual pollution	• Within the farm, work areas are kept clean to contribute to the improvement of the landscape.

5.3.2 Net Offsite Biodiversity Benefits (VCS, 3.19; CCB, B3.3)

Without the intervention provided by the project, areas outside the Project Activity Instance would continue to degrade under intensive livestock and crop production. The lack of tree cover and sustainable management would result in habitat loss, soil erosion and degradation, and water quality issues. The project's initiatives in both the Project Activity Instance and the surrounding areas contribute to habitat restoration, improved water quality, and sustainable land management. These efforts collectively enhance biodiversity and ecosystem health, demonstrating that the net effect of the project on biodiversity is positive and significant.

In addition to benefits within the Project Activity Instance, this project will also provide technical assistance to at least 120 small farmers outside of the Project Activity Instance to support them in establishing cacao agroforestry systems. The establishment of trees outside the Project Activity Instance by small farmers will increase tree cover in these areas, potentially providing additional habitat and habitat connectivity for local species.. Overall, the net offsite biodiversity benefits are expected to be positive, no negative impacts have been identified.

5.4 Biodiversity Impact Monitoring

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

The Project developed a detailed monitoring plan (Appendix 4: ADDITIONAL INFORMATION) which details the variables to be measured to determine the progress to achieve the outputs, outcomes and impacts related to biodiversity.

One of the primary outcomes contributing to CO2 reduction, conservation farming, and increased tree cover is land rehabilitation and soil restoration through agroecological practices. The main activities for this outcome include:

a. Agroforestry and Soil Health Improvement: Monitored by the number of hectares under the agroforestry system. A diversified agroforestry system will provide additional food sources to the fauna in the project area

b. Soil and Water Condition Assessment: Monitored by the improvement in soil quality. Better water and soil quality will enhance the habitat for species in the project area.

c. Biomass Increase through Agroforestry: Monitored by the percentage increase in aboveground and belowground biomass in the project area. Increase biomass will provide shelter to the flora and fauna in the area.

The indicators that the Monitoring Plan will track are related to biodiversity are described :

5.4.1.1 Presence of wildlife in the Project Activity Instance

- Identification (visual, camaras) of animal species in the agroforestry system (amphibians, reptiles, birds, and mammals)-Project Activity Instance

5.4.1.2 Effectiveness of the anti-hunting policy in the Project Activity Instance

- No-hunting policy in place in the Project Activity Instance
- # communicational materials designed on local biodiversity (mammals, birds, reptiles, and amphibians) and the importance of conservation to be delivered to Bacao employees

5.4.1.3 Reduction of fire risk in the Project Area

- # fire-prevention training sessions for Bacao employees in the Project Activity Instance
- Fire prevention policy in place, # fires detected since 2019

The in-field species diversity monitoring will be conducted every verification period. The assessment will be done during the rainy season, to maintain consistency over time. The methodology used will be surveyed by visual encounter (Crump & Scott 1994). Surveys will be carried out between 8:00 am and 12:00 pm for diurnal species and 6:00 pm and 10:00 pm for nocturnal species for four days.

The monitoring plan includes the process to assess the effectiveness of measures taken to maintain or enhance all identified HCVs related to significant biodiversity present in the project zone.

On the other hand, to meet the Gold Level for climate change adaptation benefits, the project will implement key strategies aligned with the Long Term Implementation Plan (as stated in section 3.4.3):

- CO2 Reduction: Achieved through land rehabilitation, agroforestry, and increasing tree cover.
- Conservation Farming: Engaged through agroecological practices to improve soil health and productivity.
- Increase in Tree Cover: Monitored by the number of hectares under the agroforestry system.

The presence of wildlife in the Project Activity Instance Area will be assessed by:

- Identification of Animal Species: Visual and camera-based identification of amphibians, reptiles, birds, and mammals within the agroforestry system. This includes regular monitoring to track changes in species presence and abundance, providing data on biodiversity adaptation benefits.

- Adaptation Benefits for Biodiversity: The consistent tracking of species presence will help assess how biodiversity is adapting to the improved habitat conditions created by the project's agroecological practices. This will include monitoring changes in species diversity and population stability as indicators of successful climate change adaptation.
- Indicators for Exceptional Biodiversity Benefits: Monitoring population trends of trigger species (such as key indicator species specific to the project area) and identifying threats to these species (e.g., habitat loss, poaching). This will involve detailed population surveys and threat assessments to ensure these species are thriving and to address any emerging threats proactively.

5.4.2 Biodiversity Monitoring Plan Dissemination (CCB, B4.3)

The summary of the Biodiversity Monitoring Plan will be created and translated into Spanish and shared with communities in the Project Zone. This monitoring plan will be disseminated with the Project Document with the support of on-the-ground project partners. Local stakeholders will be asked to comment on the monitoring plan along with the summarized translated PD. The Monitoring Plan will be made publicly available on the public website www.verra.org.

5.5 Optional Criterion: Exceptional Biodiversity Benefits

Gold Level exceptional biodiversity benefits are not applicable to this project.

APPENDIX 1: STAKEHOLDER DESCRIPTION TABLE

Stakeholder	Rights, Interest and Overall Relevance to the Project
Guayabal and Viso de Upia Community	These communities are identified as main stakeholder due to its close proximity to the Project A members could be part of the project's employees, and/or farmers could be potential partici program that will support small producers in their crop and income diversification.
Cabuyaro	Cabuyaro has been identified as a main stakeholder as most of the project's staff will come including administrative personnel and field workers.
Cabuyaro Mayor's office	For the project, the mayor's office will be a key interest player because it regulates part of the through them specific procedures regarding permits and development of activities are carried c
Cabuyaro Council	For the project, it is a key actor since, as well as the mayor's office, they regulate part of the lo the Project Activity Instance
Cabuyaro Cocoa Farmers' Association	The cocoa producers of Cabuyaro will be a strategic interest group for the project by creating c improving their technical and organizational capacity to contribute to the value chain's st development of the area.
CORMACARENA	It is the highest environmental authority in the area of jurisdiction in accordance with the guidel Ministry of the Environment. Cormacarena grants the environmental concessions, permits licenses required by law for the project to use renewable natural resources (water) or for the dev that affect or may affect the environment.

Stakeholder	Rights, Interest and Overall Relevance to the Project
Cabuyaro Community Action Board	Community Action Board is a civic corporation made up of community members, who join forces and resources to seek the solution of the most felt needs of the community. For the project, the Junta will be a relevant when approaching the community to establish relationships and collaborate
Neighbors around the project area	The neighbors around the Project Activity Instance will be part of the strategic allies, making sure property limits are respected and the use of shared natural resources such as water is respected. The project will establish an open communication and fluid relationship that will allow the activities to take place in a safe environment
Bacao Employees	The project's employees will represent an important stakeholder as they will be hired to implement activities according to the strategic and operational plan.
Impulsa Bacao Farmers	The farmers participating in Impulsa Bacao are important stakeholders, as the company will be designed and operated as a social business in partnership with the farmers. Because the company´s business model aims to address the major challenges faced by farmers in the region, their involvement in strategic planning, operations, and monitoring will be critical for ensuring the success of the Project.

APPENDIX 2: PROJECT ACTIVITIES AND THEORY OF CHANGE TABLE

Strategy description	Expected climate, community, and/or biodiversity			
	Outputs (short term)	Outcomes (medium term)	Impacts (long term)	Relevance to project's objectives
Agroforestry system establishment and maintenance	Improved soil health and fertility	Land rehabilitation & soil restoration through agro-ecological practices	Sustainable Agricultural Management of the project area to restore degraded land	High relevant as it contributes to the GHG emissions reduction
Agroforestry system establishment and maintenance	Plant and maintain three layers of agroforestry system	Increased biomass (aboveground and below ground)	Sustainable Agricultural Management of the project area to restore degraded land	High relevant as it contributes to the GHG emissions reduction
Agroforestry system establishment and maintenance	Innovation, use of agricultural technology and good agricultural practices		Sustainable Agricultural Management of the project area to restore degraded land	High relevant as it contributes to the GHG emissions reduction
Forest restoration	Maintenance of conservation areas. Promote zero deforestation policy in project area	Restoration of ecosystem services	Sustainable Agricultural Management of the project area	High relevant as it contributes to biodiversity
Community Livelihoods	Improve working conditions for project's workers through long term employment opportunities and capacity building	Support an inclusive model among communities around the project activity instance	Sustainable community livelihoods are improved	High relevant as it contributes to communities
Cacao direct commercialization system Bacao-Farmer	Crop and income diversification, direct sales of cacao, facilitate training	Reduce the level of vulnerability of smallholder farmers through improve cocoa farm management and a direct commercialization system	Sustainable community livelihoods are improved	High relevant as it contributes to communities
Monitoring	Information/ data about climate, biodiversity and	Project objectives are assessed based on the	Project design is adapted based on the	High relevant as it contributes to climate, biodiversity

APPENDIX 3: COMMERCIALLY SENSITIVE INFORMATION

Use the table below to describe the commercially sensitive information included in the project description to be excluded in the public version.

Section	Information	Justification
A	Summary of Project Cash Flows	Project Financial information
B	Long-term Project Implementation Plan	Project Defined Activities
C	Biodiversity Study conducted in the project area	Results related to biodiversity from project activities
F	Bacao Training Program	Project Operational program
H	Vegetation Cover Report Espejuelos Estate, Cabuyaro, Meta 2016	Report on soil conditions relevant for project activities
I	Bacao Procedure to establish new crops	Project Internal process
J	Bacao Procedure to maintain crops	Project Internal process
K	Bacao Irrigation Technical Manual	Project internal process

APPENDIX 4: ADDITIONAL INFORMATION

The following data and information are made available

Annex/ Section	Description
	Project Calculation of the non-permanence risk score
	Bacao Monitoring Plan

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