REDD+ PROJECT FOR CARIBBEAN GUATEMALA: THE CONSERVATION COAST
MONITORING & IMPLEMENTATION REPORT

Karen Aguilar, Development Director

k.aguilar@FUNDAECO.org.gt

Document Prepared By

Paz Lozano, Manager of Development Services

plozano@ecopartnersllc.com

Kyle Holland, Managing Director

kholland@ecopartnersllc.com

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Project Proponent	Fundación para el Ecodesarrollo y la Conservación (FUNDAECO) Phone: (502) 23141900 Address: 25 calle 2-39 zona 1, Guatemala City, Guatemala Email: k.aguilar@fundaeco.org.gt Website: www.fundaeco.org.gt
Prepared By	Ecological Carbon Offsets Partners, LLC (ecoPartners) and Fundacion para el Ecodesarrollo y la Conservacion (FUNDAECO)
Contact	ecoPartners Phone: +1 (415) 634-4650 Address: 2930 Shattuck Ave, Suite 305, Berkeley, CA 94705 Email: plozano@ecopartnersllc.com Website: www.epcarbon.com
Verification Body	AENOR INTERNACIONAL S.A.U – Asociación Española de Normalización y Certificación Contacto: Jose Magro Dirección: Genova 6, 28004 Madrid, España Telefono: + 34 914 326 000 / +34 913 190 581 Email: jmagro@aenor.com
History of CCB Status	Validation Received 29 March 2017
CCB Benefits	• Estimated GHG reductions: 2,447,922 (tCO2e). • 540 community and local entrepreneurs (agroforestry, handicrafts, and

Summary	ecotourism) were supported for more sustainable livelihoods and improve their family incomes, through supplies provision, technical assistance and trainings. • 32,341 persons from 103 communities were benefitted with sexual and reproductive health services • 6,289 students from schools and universities participated in environmental education activities. • 14,443 ha of important watersources for local communities and towns were protected • 2,575 ha of highly threatened ecosystems were acquired to created nature reserves
Gold Level Criteria	Biodiversity Gold • Preserves 2,480 hectares of habitat for 6 critically endangered amphibian species and implements procedures to avoid fungal contamination in this area. Both habitat loss and disease have been identified as the greatest risks to trigger species found here.

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Acronyms

Acronym	Definition
AFOLU	Agriculture, Forestry and Other Land Use
ACF	Althelia Climate Fund
AGEXPORT	Asociación de Exportadores de Guatemala
AME	Asociación Movimiento por la Equidad
ASOREMA	Association of Nongovernmental Organizations Linked to Natural Resources and the Environment
AUDD	Avoided Unplanned Deforestation and Degradation
CODEDE	Consejo Departamental de Desarrollo
CONAP	Consejo Nacional de Áreas Protegidas
COPREDEH	The Local Representative of the Presidential Commission on Human Rights
CTA	Technical Administrative Council
DIPRONA	Nature Protection Department of the National Police
FONTIERRAS	Guatemalan Land Fund
FOA	Forest Owners Assembly
IGSS	Instituto Guatemalteco de Seguridad Social
INAB	Instituto Nacional de Bosques
INGUAT	Instituto Guatemalteco de Turismo
INTECAP	Instituto Tecnologico de Capacitacion
IUCN	International Union for Conservation of Nature
MARN	Ministerio de Ambiente y Recursos Naturales
MICAI	Mesa de diálogo Interinstitucional de Coordinación Agraria de Izabal
MSPAS	Ministerio de Salud Pública y Asistencia Social
OSAR	Observatorio de Salud Sexual y Reproductiva
PINFOR	National Forestry Institute and the Program for Forestry Incentives
PINPEP	Law for Forestry Incentives for Possessors of Small Extensions of Land for Forestry or Agroforestry Use
PNDRI	National Policy for Integral Rural Development
PROBOSQUE	Draft of the Law for Promoting the Establishment, Recovery, Restoration, Management, Production, and Protection of Forests in Guatemala
PRONACOM	Programa Nacional de Competitividad
QAQC	Quality Assurance and Quality Control
REDD+	Reducing Emissions from Deforestation and Forest Degradation plus foster conservation, sustainable management of forests and enhancement of forest carbon stocks
RPP	Readiness Preparation Proposal
SEGEPLAN	Secretaría de Planificación y Programación de la Presidencia
SIGAP	The National Commission for Protected Areas and the Guatemalan System for Protected Areas
SLF	Sustainable Livelihoods Framework
SOP	Standard Operating Procedure
TOC	Theory of Change
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development

1 GENERAL

1.1 Summary Description of the Implementation Status of the Project (G1)

This project is an Agriculture, Forestry and Other Land Use (AFOLU) project under the Reducing Emissions from Deforestation and Degradation (REDD) project category. Specifically, the project is of the "Avoided Unplanned Deforestation & Degradation" (AUDD) project category.

The project is estimated to generate approximately 24,445,681 tCO2e of GHG Emissions Reductions over 30 years. The project area is located in Department of Izabal in the Caribbean coast region of Guatemala in the Sarstun-Motagua reference region proposed by the national level REDD+ program. Belonging to the biologically diverse Mesoamerican Biological Corridor, forests in the project area are important nationally and internationally for the ecosystem services they provide. The project area forests, however, have experienced a continued reduction in biomass due largely to small-scale farmers and medium to large scale cattle ranchers that have sought to expand their activities or have been displaced from agro-industrial expansion. These forests have also historically been an important source of income for local families, who periodically harvest small amounts of timber when the economic needs arise.

In 2013 Guatemala passed the Framework for the Regulation of the Reduction of Vulnerability, the Mandatory Adaptation to the effects of Climate Change and the Mitigation of the effects of Greenhouse Gases (Decree 07-2013) which gave landowners the rights to emission reductions generated in either voluntary or compliance markets. This law allowed the REDD+ Project for Caribbean Guatemala to pursue a Grouped Project design where the project proponent, FUNDAECO, could represent small landowners and manage the development of a REDD+ project on their behalf through legal contracts that transfer Rights of Use to FUNDAECO.

The expansion of industrial agriculture and migration of subsistence farmers and cattle ranchers into protected areas is a historical trend observed in the project zone. Consequently, forests and land within protected areas are an important source of income within the project zone and is the major focus of the REDD+ project. The project aims to alleviate these pressures on the forests through the support of governance capacity (including individual property titling, land-use planning and conservation zone demarcation), the generation of alternative economic activities and income sources, and through capacity building in administration and management. These project activities, beyond protecting local forests and biodiversity, contribute to social and economic development in one of the poorest areas of Guatemala. The effectiveness of these activities is partially dependent on their long-term economic success and wide-spread adoption.

Since the project's inception, local communities have been actively participating in the project's formulation and implementation. The early involvement of participating communities has created awareness among community members and readiness for project implementation.

1.1.1 Project Objectives

FUNDAECO seeks to address the issue of deforestation in Guatemala on a local level. This initiative will have positive climate, community and biodiversity impacts in the project zone.

The project reduces CO2 emissions by preventing deforestation caused by the conversion of forests into cropland. The project prevents deforestation by addressing the drivers of deforestation in the project area

through effective law enforcement, land-use planning, education, economic opportunities, and sustainable agroforestry initiatives. FUNDAECO created the following climate, community, and biodiversity objectives through an analysis of the drivers of deforestation in the project area, the focal issues identified in consultation with communities and the participatory rural appraisal, and threats to biodiversity in the project zone. To achieve these objectives, the project proponent designed an array of project activities that fall under five program areas: resource protection and governance, sustainable enterprise, community empowerment & inclusiveness, education, and improved access to resources.

1.1.1.1 Climate Objectives

The REDD+ Project for Caribbean Guatemala's primary climate objectives are as follows:

- **Reduce CO2 emissions that result from the conversion of intact forest to agricultural and pastoral land.**
    - Widespread protection of forest in project zone.
    - Extensive areas under agroforestry production or reforestation in project zone.
    - Alternative revenue streams from forest production (e.g. agroforestry) and conservation uses
    - Reduced illegal logging

1.1.1.2 Community Objectives

The REDD+ Project for Caribbean Guatemala's primary community objectives are as follows:

- **Empower marginalized and vulnerable communities through the legalization of land, promotion of reproductive rights and participation in resource management.**
    - All marginalized and vulnerable communities with customary right have legalized land
    - Widespread awareness among women and families of reproductive rights and health
    - Full access to reproductive health information and care within the project zone
    - Ability and capacity of communities to implement sustainable resource management techniques
    - Inclusion of all marginalized and vulnerable communities with customary rights in resource management decisions that may impact them.
- **Improve quality of life in the project zone by creating access to new markets, promoting sustainable production and improving public health and education opportunities.**
    - Sufficient household income from provision of ecotourism services, sale of agroforestry products, and resource protection
    - Protection of ecosystem services important to livelihoods and health
    - Increased access to health information and care within the project zone
    - Widespread access to community capacity building and educational opportunities
- **Promote landowner and community self-sufficiency in the project zone through diversified economies and sustainable land uses.**
    - Sufficient household income from provision of ecotourism services, sale of agroforestry products, and resource protection
- **Preserve awareness and respect for traditional, cultural, spiritual and religious identities of communities within the project area.**
    - Recognition and assistance in protection of significant traditional, cultural, spiritual, and religious sites.

- Resource management with consideration of traditional, cultural, spiritual, and religious rights

1.1.1.3 Biodiversity Objectives

The REDD+ Project for Caribbean Guatemala's primary biodiversity objectives are as follows:

- **Maintain habitat for viable, abundant and diverse natural populations.**
  - Widespread protection of forest in project zone
  - Promote awareness of ecosystem and habitat importance for native species
- **Reduce threats to rare, threatened and endangered species.**
  - Prevention of critical habitat loss for rare, threatened, and endangered within the project zone
  - Maintenance or enhancement of critical habitat for rare, threatened, and endangered within the project zone
  - Awareness of rare, threatened, and endangered species and their importance
- **Maintain the function of the natural ecosystems.**
  - Widespread protection of forest in project zone.
  - Maintenance or enhancement of the integrity of important ecosystem services
- **Support local and global knowledge of biodiversity in the project zone.**
  - Increased awareness of the role of Guatemala's Caribbean coast in the support of diverse and globally important species populations
  - Promote awareness of ecosystem and habitat importance for native species
  - Awareness of rare, threatened, and endangered species and their importance

1.2 Project Location (G1 & G3)

The REDD+ Project for Caribbean Guatemala is located along the Caribbean coast of Guatemala, in the department of Izabal, and has the potential to conserve up to 128,448 hectares of tropical forest that make up part of the Mesoamerican Biological Corridor. The climate in the region is classified as Tropical Rainforest Climate (Af, according to the Koppen-Geiger classification) and has an average of roughly 3,000 mm of rainfall per year (climate-data.org). The northernmost boundary of the project area is the Sarstun river, which marks the border between Guatemala and Belize, and the southernmost boundary of the project area shares a border with Honduras. All areas that have the potential to be affected by the project are included in the figures below.

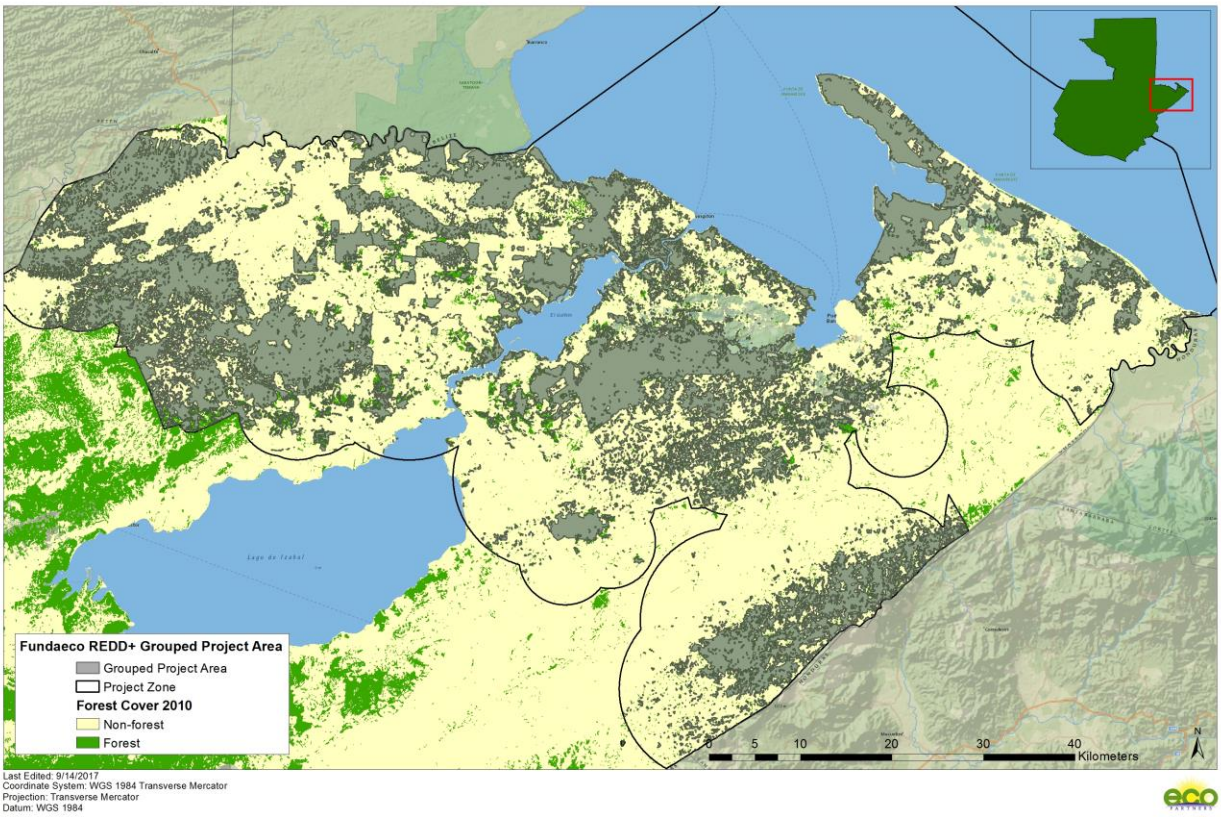

Figure 1: Grouped Project Area and Project Zone.

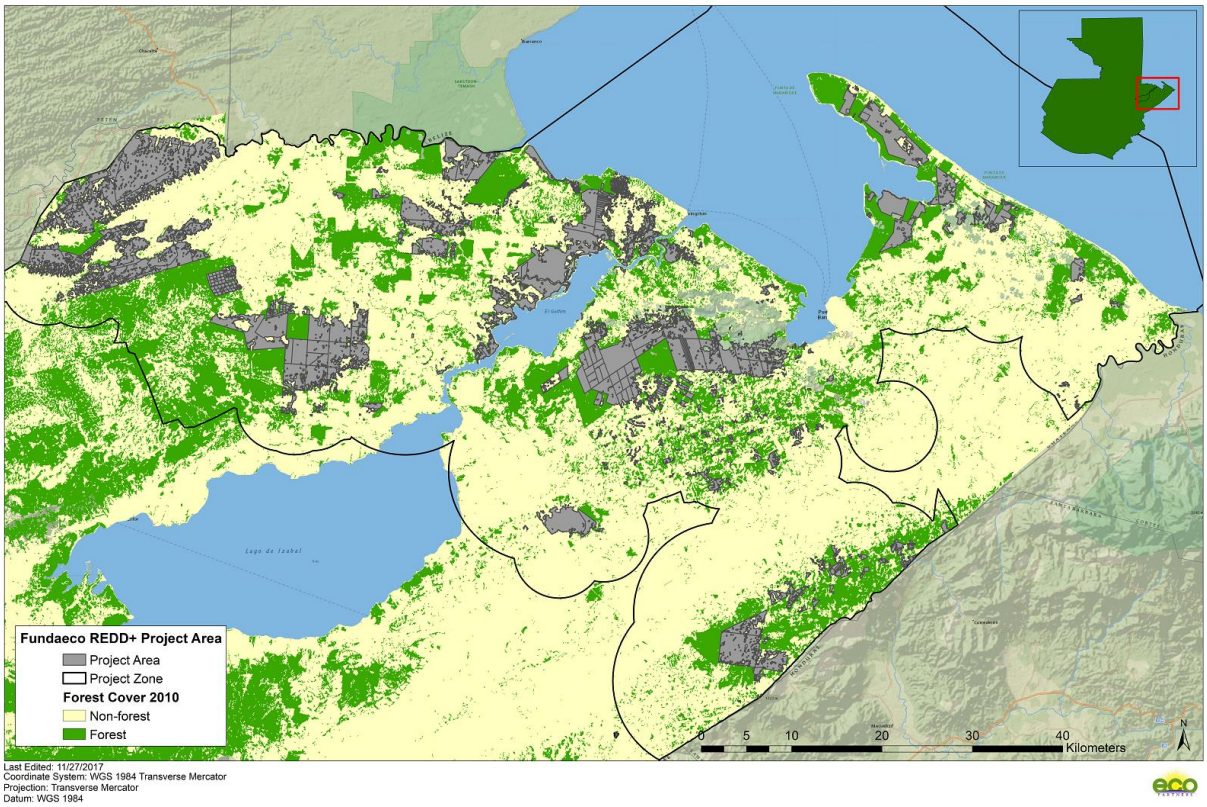

Figure 2. Project Area and Project Zone.

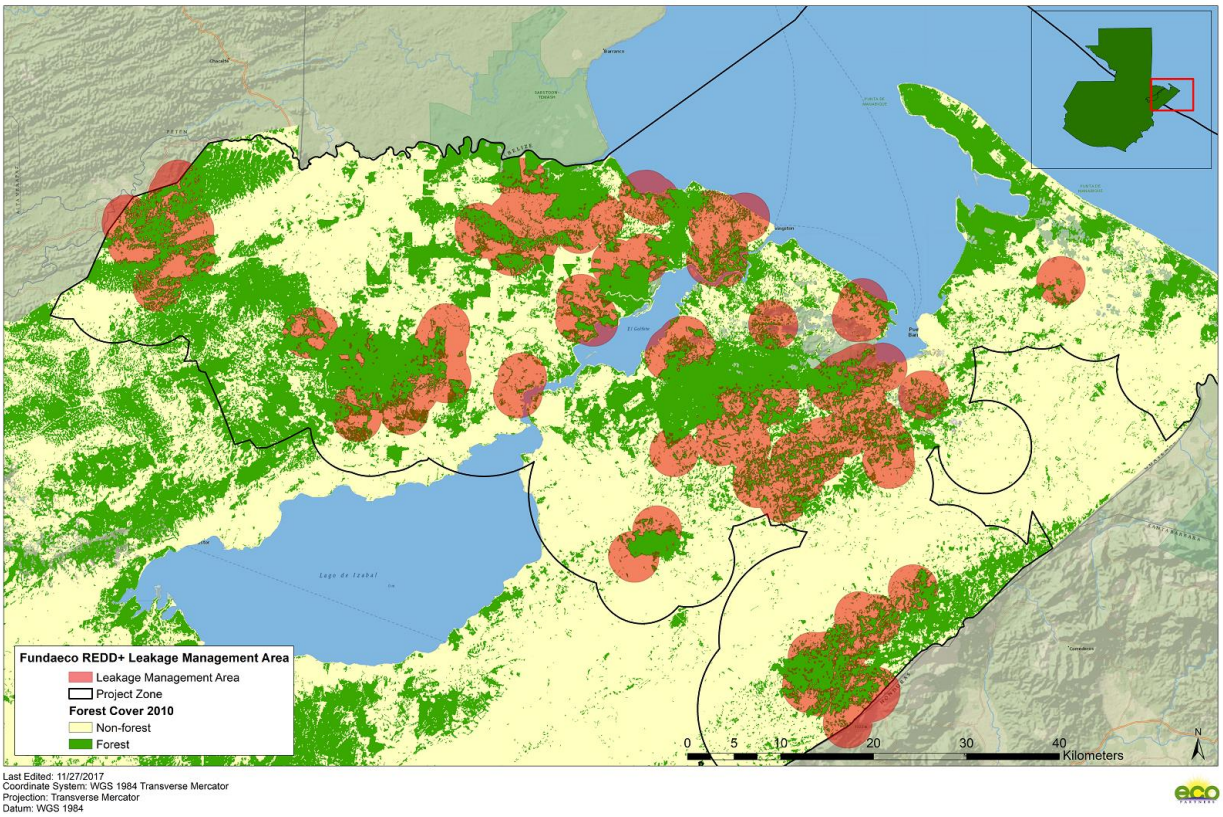

Figure 3: Leakage Management Zone and Project Zone

1.2.1 Soil

Soil taxonomy of the Grouped Project Area is based on the mostly used Soil Series, proposed by Simmons, who described a Soil Series as an area with similitude between all of its genetic horizons, that share parental material, and these horizons have the same color, structure, drainage and other characteristics (Simmons, Tarano T, & Pinto, 1959).

Soil Series are available in digital format (MAGA, 2001), and these layers were used to produce maps from which we can see (Figure 4). The main Soil Series in the area is Chacalté, Chacón and Inca. Each of the Soil Series extent and percentage of cover can be seen in Table 1.

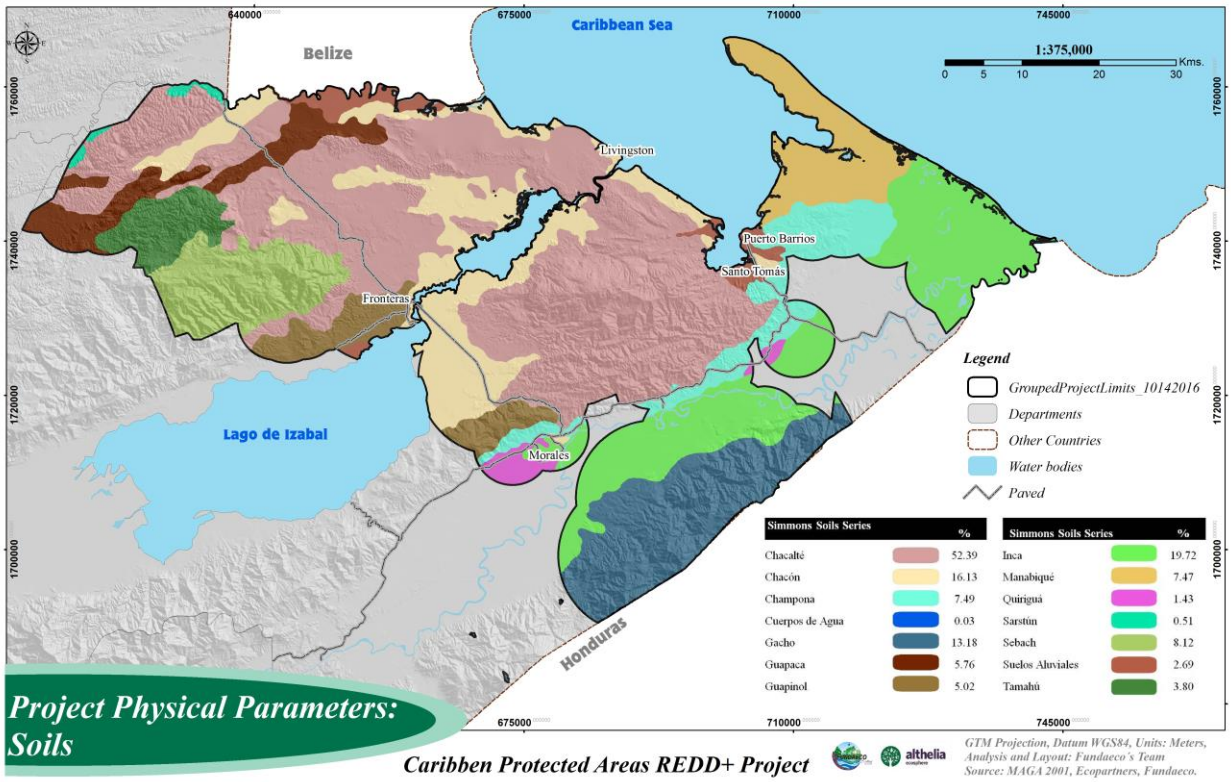

Figure 4. Soils in the Grouped Project Area.

Simmons Soil Series	Hectares	%
Water bodies	69.41	0.02
Chacalté	149,645.06	37.09
Chacón	45,855.87	11.37
Champona	21,357.30	5.29
Gacho	36,975.40	9.16
Guapaca	16,389.95	4.06
Guapinol	14,139.10	3.50
Inca	55,756.20	13.82
Manabique	21,189.30	5.25
Quiriguá	3,967.36	0.98
Sarstún	1,599.19	0.40

Sebach	18,209.70	4.51
Suelos Aluviales	7,606.99	1.89
Tamahú	10,697.80	2.65
Total	403,458.63	100.00

Table 1. Extent of each soil cover in hectares and its percentages

The most commonly found Soil Series is Chacalté at 37% or 150 thousand hectares. Chacalte soils can be originated from limestone, and may present a karstic relief. Its drainage is good, and its texture is mostly clay, with average depth of 50 cm. This series is found mostly in areas above 500 meters over sea level, and it covers most of Cerro San Gil, the higher parts of Cerro Sarstún, and North of Sierra Santa Cruz.

The next predominant series is Inca at 13.82% of the Surface of interest which is equivalent to 56 thousand hectares. The main origin of these soils is the sediments of the Motagua River. Thus, these are poorly drained soils, consistent mostly of very fine clays, and very deep, they can go in average to 75cm. These soils are found mostly along the Motagua Valley.

And third is the Chacón series, with 11.37% cover or 46 thousand hectares. These are soils whose origins are marine materials, with good drainage, median texture and very deep rounding 100 cm in depth. They are found in low areas, mostly along the shores of Lake Izabal and the Santo Tomás Bay.

1.2.2 Geology

The Guatemalan Caribbean is not as mountainous as the Highlands found west of Guatemala, but it is nevertheless a place with a more pronounced relief than the pacific coast. Izabal is mostly composed of areas at lower levels than 100 meters above sea level, but these plains are interrupted by the peaks of several Hills and Ranges.

In figure 5 , the topography of the area can be seen, where Cerro San Gil can reach up to 1200 meters above sea level in some parts, followed by Sierra Caral which stands in some parts above 1000 meters. Sierra Santa Cruz, is a range that averages 600 meters, going up to 900 at its highest, while the Cerro Sarstún is the lowest of the protected areas, where the most prominent place, is 500 meters.

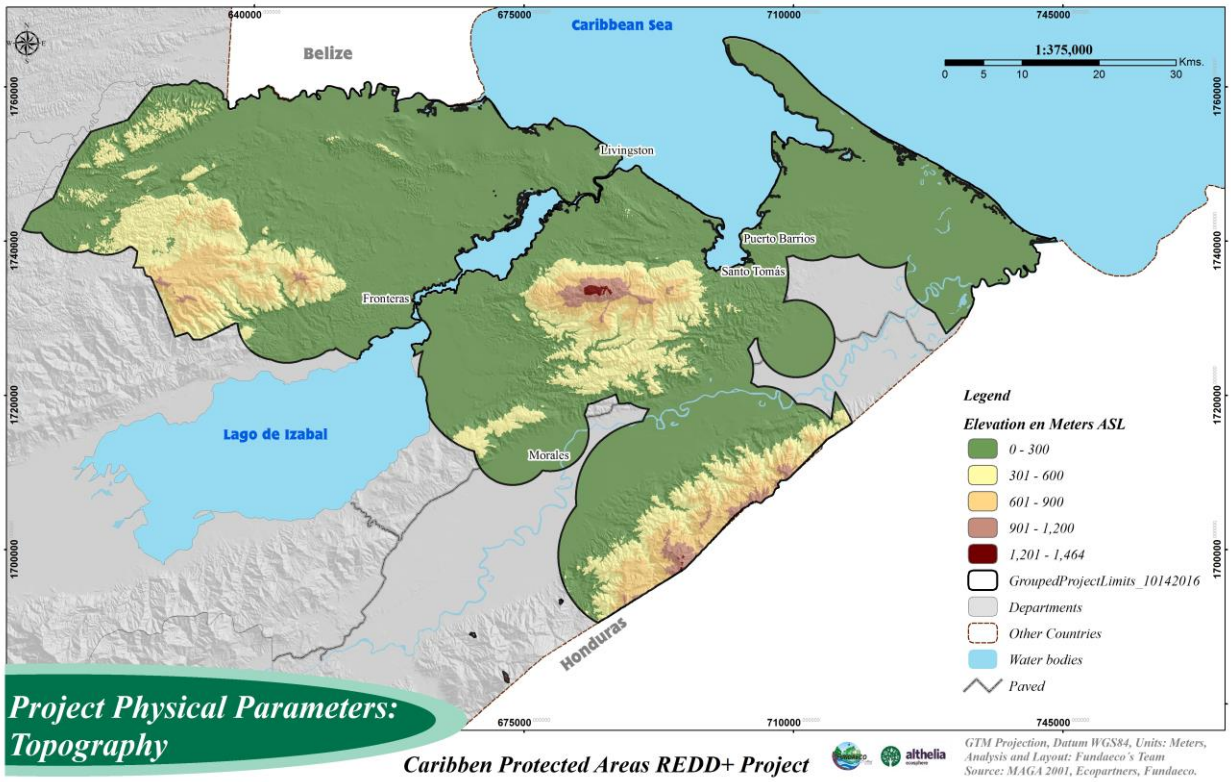

Figure 5. Topography of the Grouped Project Area.

1.2.3 Climate

Precipitation and temperature maps of the area were produced using information from the Very High Resolution Interpolated Climate Surface for Global Land Areas or WorldClim Project (Hijmans, Cameron, Parra, Jones, & Jarvis, 2005), which is global data but has been very useful in many national projects since it incorporates weather stations from continuant countries and thus represents weather in political borders in a more accurate way. Figures 6 and 7 below show precipitation and temperature.

This is a very rainy area, where precipitation starts at 2,000 millimeters of rain, near the Motagua Valley, and rises to the north, where it can reach more than 5,000 mm all along the Santo Tomás Bay.

There is a 10°C range of temperature, from the lowest areas where a yearly average temp is 29°C down to 20°C at the higher points such as the Cerro San Gil peak.

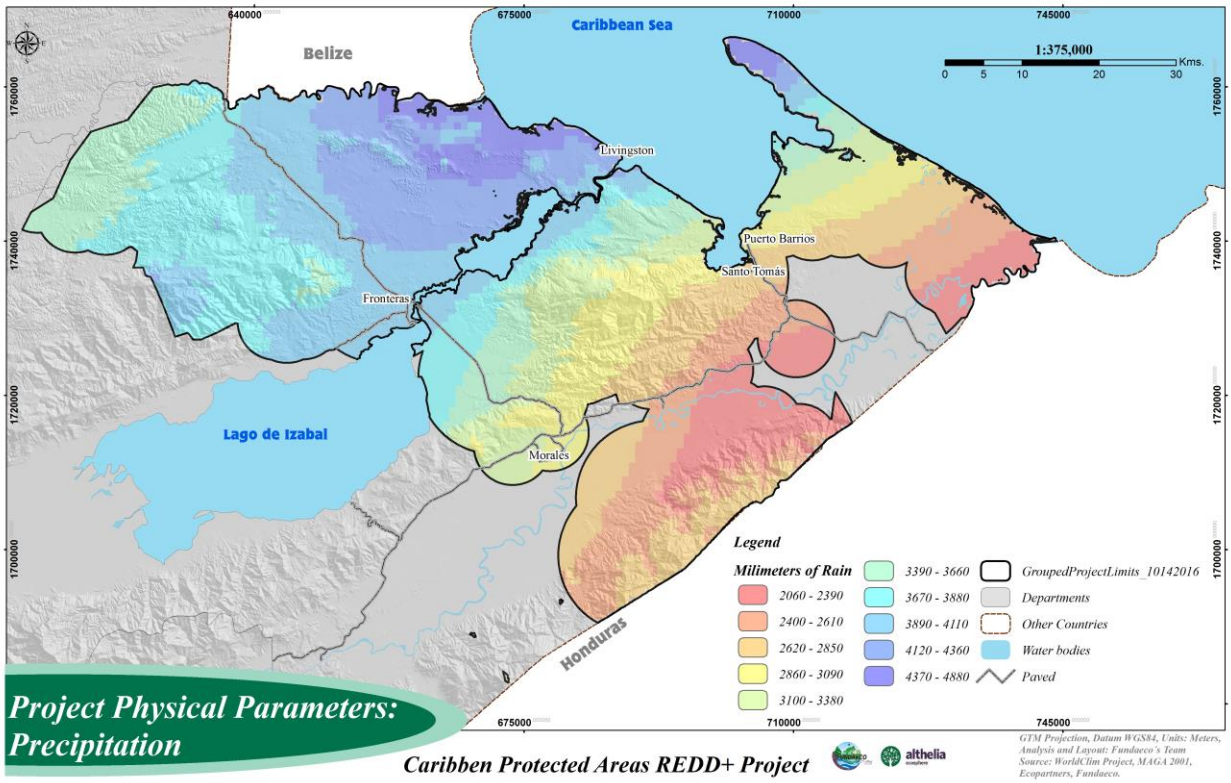

Figure 6. Precipitation in the Grouped Project Area.

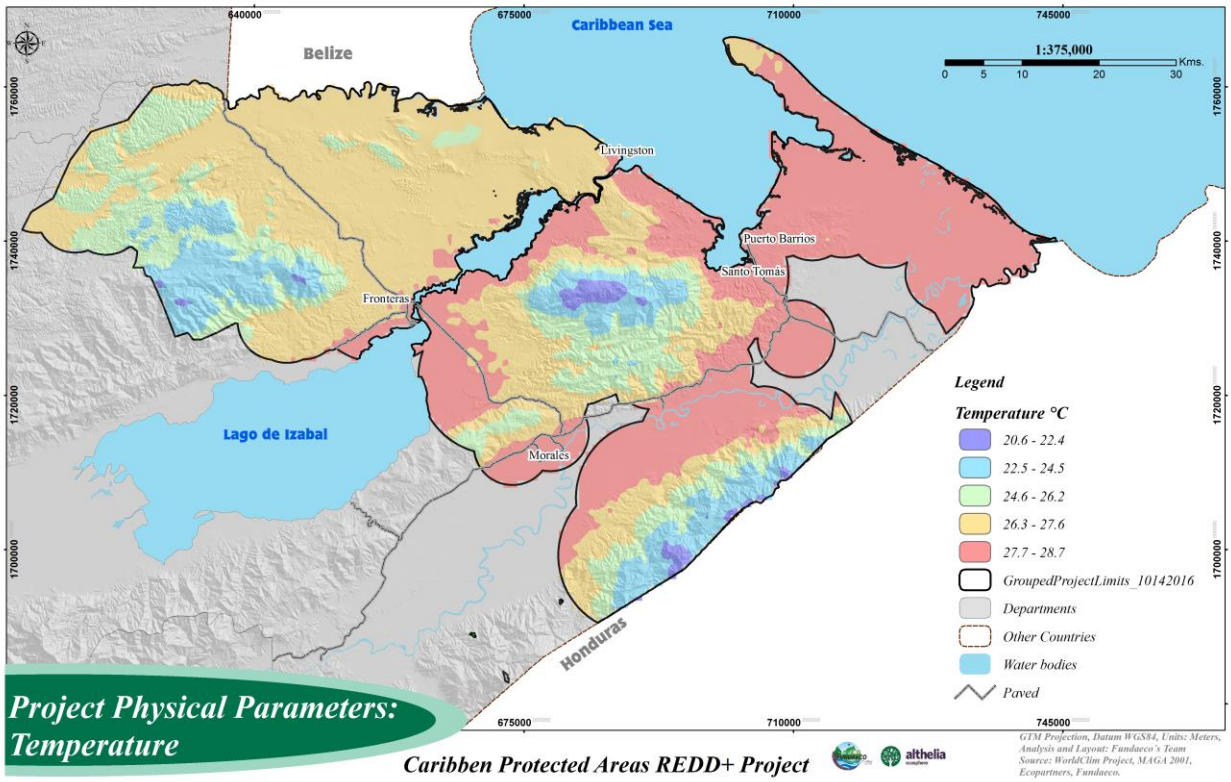

Figure 7. Temperature in the Grouped Project Area.

1.3 Project Proponent (G1, G4)

Fundacion para el Ecodesarrollo y la Conservacion (FUNDAECO) is a non-profit organization dedicated to conservation and community development based in Guatemala City, Guatemala with field offices in the Department of Izabal. FUNDAECO is the project proponent and is solely responsible for all aspects of project design, implementation, and management. FUNDAECO has full project ownership for all emissions reductions from the REDD+ Project for Caribbean Guatemala.

Organization name	Fundacion para el Ecodesarrollo y la Conservacion (FUNDAECO)
Contact person	Karen Aguilar
Title	Director of Development
Address	25 calle 2-39 zona 1
Telephone	50223141923/50223141900
Email	k.aguilar@FUNDAECO.org.gt
Website	http://www.FUNDAECO.org.gt/

Table 2. Project proponent details.

1.4 Other Entities Involved in the Project (G4)

Table 3 presents the main organizations and individuals currently providing services for the development of the REDD+ Project for Caribbean Guatemala.

Company	Brief Description of Roles	Key Contact
ecoPartners	Assistance in project design, PDD drafting, carbon accounting, spatial modelling – based in Berkeley, California, USA.	Kyle Holland
Universidad del Valle de Guatemala (UVG) Centro de Estudios Ambientales y de Biodiversidad (CEAB)	Establishment of LULC maps over the historical reference period, development of species specific allometric equations, and measurement of carbon stocks.	Edwin Josué Castellanos López
Althelia Ecosphere	Funding of project implementation and co-management of credit sales.	Adam Gibbon

Table 3. Other entities involved in the project.

Ecological Carbon Offset Partners, LLC (ecoPartners) is a consulting firm based out of Berkeley, California, USA. As a leader of carbon-financed conservation, ecoPartners works with project developers, forest owners and verification bodies to build successful carbon offset projects. They are experts in the technical aspects of project design, planning and development including biometrics, accounting methodologies and remote sensing. ecoPartners has extensive experience validating and verifying projects under the California Air Resources Board (ARB), Climate Action Reserve (CAR) Standard, Verified Carbon Standard (VCS), and Climate Community & Biodiversity (CCB) Standard. For the REDD+ Project for Caribbean Guatemala, ecoPartners has provided technical consulting services to FUNDAECO on project design, documentation, carbon accounting, validation, and remote sensing, as well as in drafting this Project Description.

Contact: Kyle Holland, Managing Director, Member
Address: 2930 Shattuck Ave, Suite 305, Berkeley, CA, 94795, USA
Telephone: +1 415-634-4650
Email: kholland@ecopartnersllc.com
Website: www.epcarbon.com

Universidad del Valle de Guatemala (UVG) Centro de Estudios Ambientales y de Biodiversidad (CEAB) aims to find solutions to environmental problems in Guatemala with a comprehensive and interdisciplinary approach. UVG CEAB has been contracted with to develop the baseline for the Sarstun-Motagua reference region as part of the national REDD+ program under development in Guatemala. Under this capacity UVG CEAB has held workshops in the Sarstun-Motagua region to understand agents and drivers of deforestation, has developed land-use/land-cover maps for the region, and will eventually implement baseline estimates for this region. A number of technical materials for the REDD+ Project for Caribbean Guatemala have aligned with the national REDD+ program and Sarstun-Motagua region. As a result, many of the technical materials created by UVG CEAB have been used in the development of this project.

Contact: Edwin Josué Castellanos López, Director del Centro de Estudios Ambientales.
Address: Ecosphere Capital Partners LLP (advisors), 7 Chalcot Road, Primrose Hill, London NW1 8LH
Telephone: 2364-0336 al 40 ext 596
Email: ecastell@uvg.edu.gt
Website: http://www.uvg.edu.gt/investigacion/ceab/index.html

Althelia Ecosphere is a fund dedicated to funding innovative models that lead to long term transitions to sustainable landuse and mitigate greenhouse gas emissions whilst providing sustainable livelihoods. Their model aims to address the drivers of deforestation and unsustainable land-use and release additional value from standing forests from payments for environmental services. Through a focus on blended value investments that deliver the highest calibre social, environmental and economic performance, they aim to demonstrate that financial performance can be fully aligned with sound environmental stewardship and social development. In the context of the REDD+ Project for Caribbean Guatemala, Althelia has provided financing for project development costs.

Contact: Adam Gibbon, Chief Technical Officer
Address: Ecosphere Capital Partners LLP (advisors), 7 Chalcot Road, Primrose Hill, London NW1 8LH
Email: adam.gibbon@althelia.com
Website:www.althelia.com

1.4.1 Technical Skills and Capacity

The FUNDAECO leadership team has extensive experience in community engagement, biodiversity assessment, and forest measurement in Guatemala. The organizational structure for the REDD+ Project for Caribbean Guatemala as well as the team's experience is detailed in the Implementation Plan (Plan de Implementación REDD V6 eP edits.docx).

1.4.2 Regulators

The Ministry of the Environment and Natural Resources (MARN) is the primary regulator of forest lands in the Guatemala. Compliance with VCS and CCB standards is regulated by a third party verification body. AENOR is an accredited verification body for VCS and CCB and serves as the initial validator and verifier for the project.

1.4.3 GHG Program Administrators

The VCS Association (VCSA) and the Climate, Community and Biodiversity Alliance (CCBA) are responsible for administering their respective programs. These responsibilities include maintaining documents relevant to project design, implementation, and monitoring. CCBA posts a version of this document for public comment during validation as well as the Monitoring and Implementation Report when the project seeks verification. VCSA maintains a registry of projects including descriptions, monitoring results, and emissions reductions issued.

1.5 Project Start Date (G1)

1.5.1 Program Start Date

The project start date is April 1, 2012. This is the date of the first Project Activity Instance (PAI) that occurred after additionality was established using expected carbon revenues (see Section 1.6.2) and funding strategies by FUNDAECO were based on debt-finance with anticipation of REDD+ carbon credit payments. FUNDAECO began a transition from grant and philanthropic funding to results based payments mechanisms found in REDD+ as early as 2010. The start of this transition was marked by a Memorandum of Understanding (MOU) signed in August 2010 between BNP Paribas/ Althelia Ecosphere and FUNDAECO to reduce emissions through a REDD+ project (see MOU BNP PARIBAS_Complete.pdf). In addition to increasing the focus on a finance strategy based on REDD+ the funding from grant and philanthropic sources was ramped down as early as 2011. In 2011 the contract between FUNDAECO and the Jade Project, supported by the Netherlands, the supported conservation activities in the network of protected area in Izabal was terminated with the last disbursement schedule in April 2011 (see Finalizacion CONTRATO JADE 2010-2011.pdf). This last payment covered operational costs for the remainder of the 2011 annum and FUNDAECO thereafter sough debt-financing to support a REDD+ project starting in 2012.

FUNDAECO demonstrated its intent to develop a REDD+ program in the Izabal region by following the five phases set out within the scope of the MOU including Project Identification, Commercial Structuring, Development, Implementation, and Monetization. Important milestones within the MOU were achieved including completion of a feasibility study September 14th, 2012, commercial structuring of a REDD+ program with Althelia with a contract reach in early 2015, and the contracting of ecoPartners in early 2015 to assist with the development and implantation implementation of REDD+ project activities.

This timeline demonstrates FUNDAECO's intentional transition between conservation finance strategies that, in terms of financial cash-flows, transitioned at the start of 2012. The project start date is reflected as the first PAI that resulted in emission reductions as a result of project activities funded through FUNDAECO's new financial strategy based on REDD+. The first PAI occurred on April 1, 2012 and created emission reductions from the project activities. See the Fundaeco VM0015 Accounting Model v1.99.xlsmfor a list of all PAI start dates on April 1, 2012 and the activities that correspond to those dates.

1.5.2 Project Activity Instance Start Dates

In addition to the Project Start Date for the REDD+ Project for Caribbean Guatemala start dates were collected for each Project Activity Instance (PAI). These start dates were based on a number of potential project activities implemented by FUNDAECO that lead to emission reductions (see Section 2.3.1). Examples of the types of project activities are summarized below in Table 4 along with the type of documentation provided to demonstrate each PAI start date. For a full list of PAI types and start dates, see the FUNDAECO REDD+ Database in the Fundaeco VM0015 Accounting Model v1.99.xlsm.

PAI Code	Project Activity Instance	PAI Start Date	Evidence Establishing PAI Start Date
LD	A parcel protected by legal designation	Date of protected area status	Documents showing FUNDAECO's instrumental role in the designation of a new protected area; Documents establishing date of protected

			area designation
EDU	A parcel protected after environmental training	Date of the training	Training report, participants list
CP	A parcel protected after BAP training	Date of the training	Training report, participants list
PP	A parcel protected by patrol	Date of first patrol after Althelia MOU	Documentation of first forest patrol post-Althelia MOU for parcel (reports, participants list, logbooks). This PAI includes: • PPI: forest owner allows FUNDAECO or CONAP to develop a patrol • PP2: forest owner participates or support the realization of patrols in his forest and surrounding forests • PP3: implementation of rounds and fence or boundaries maintenance for better forest protection • PP4: implementation of infrastructure to reduce illegal deforestation; fences, gates, security cabins • PP5: implementation of firebreaks
PINFOR/PINPEP	A parcel protected by PINFOR or PINPEP	Date of PINFOR/PINPEP approval or verification after Althelia MOU	PINFOR/PINPEP resolution or verification post-Althelia MOU showing date and forest area under protection/natural forest management.
PA	A parcel protected by acquisition	Date of purchase	Purchase agreements, title records
PM	A parcel protected by contractual agreement for protection or management	Date of agreement	Contracts or land management plans between landowners and FUNDAECO specifying FUNDAECO's involvement in land management and forest protection. Must be dated post-Althelia MOU and include evidence showing FUNDAECO's role in forest protection
PD	Parcel protected after alternative productive	Date of implementation	Logbook

	activities to reduce pressure over the forest		
ECO	Parcel protected after ecotourism project to reduce pressure over the forest	Date of implementation	Logbook
LL	Land Legalization	Date of legalization	FUNDAECO's role in legalization

Table 4. Examples of project activity instances for the establishment of project start dates for each parcel.

1.6 Project Crediting Period (G1)

The project crediting period is 30-years starting on April 1, 2012 and ending on March 31st, 2042. The results presented in this document occurred during the first monitoring and implementation period spanning from April 1, 2012 to December 31, 2016.

1.7 Sustainable Development

One of the three primary objectives of this project is to foster sustainable development of local communities in ways that support broader national goals for sustainable development. This has been achieved in various ways, including the following. First, local technicians committed to both sustainable community development and nature conservation within the project zone were included on the project team. They have been trained to remain open to listening to community grievances and to implement an adaptive management approach that remains flexible to making changes based on these grievances. This directly supports the Katun 2032 National Development Plan launched by Guatemala in 2014. Some fundamental goals of this plan are welfare for the people, wealth for all, natural resources for today and tomorrow, and states that citizen participation is a fundamental element of long-term development. This project activity has also supported various other policies adopted by Guatemala's government, including their Forestry and Agricultural policies, alongside the National Policy for Integrated Rural Development (see Table 14 of PDD).

Guatemala has also made various commitments to biodiversity in its Policy for Biological Diversity and the National Strategy and Action Plan for Biodiversity 2012-2022, which both emphasize conservation, protection, and improvement of the country's natural resources as critical for sustainable development. The project has made strong commitment to protecting biodiversity, especially the HCVs identified (section 2.5), and has implemented various activities to support this commitment. The primary activity protecting biodiversity has been through the reduction of deforestation and forest degradation and facilitating forest regeneration, since changes in forest cover are closely correlated to changes in biodiversity. This has primarily been achieved through the enforcement of protected area laws, improved land use management, and improving economic opportunities (see 2.3.2). FUNDAECO has also prohibited the use of invasive species and GMOs within the project area. In order to monitor changes in biodiversity due to project activities, a baseline scenario was developed during the project development stage and as the project moves forward, forest inventories will be conducted so that comparisons can be

made to this baseline. This will help serve as an indicator of biodiversity protection, alongside other indicators listed in Tables 44, 45, 46, and 47.

Regarding the Sustainable Development Goals, Guatemala has prioritized specific targets for each goal. FUNDAECO has identified that the project will contribute to several targets prioritized in the document Informe de la Estrategia de Articulación de los Objetivos de Desarrollo Sostenible al Plan y la Política Nacional de Desarrollo K´atun: Nuestra Guatemala al 2032. The next table shows the SDG targets that the Project is aiming to address, as well as the project activity related. Each activity will be monitored according to indicators and frequency proposed in sections 5.3.2 and 5.3.3.

SDG	Identified SDG indicator	Project Activity	Related Indicator
2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.	2.3.2 Average income of small-scale food producers, by sex and indigenous status	Creation of agroforestry plots (18)	# farmers participating in agroforestry projects *This indicator will be modified to monitor incomes in year 2021, when yields starts
3.7 By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes	3.7.1 Proportion of women of reproductive age (aged 15-49 years) who have their need for family planning satisfied with modern methods	Provision of health services (47)	# of workshops held
		Provision of health services (76)	# of patients treated # of women using contraceptive methods
13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions	Environmental education for schools (50)	# of schools participating
		Environmental education for interested communities (51)	# of communities participating in environmental education
14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information	14.5.1 Coverage of protected areas in relation to marine areas	Implementation of fishing restriction zones (8)	# of fishing restriction zones
15.1 By 2020, ensure the	15.1.2 Proportion of	Purchase of land	# of hectares

conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements	important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type	for protection (9)	purchased
		Creation of protected areas (11)	Records for creation of protected areas
		Protection and management of community water resources (12)	# hectares of watersheds protected
15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	15.2.1 Progress towards sustainable forest management	Manage protected areas (10)	# of hectareas managed
		Registered land into PINFOR or PINPEP, PROBOSQUE (3)	# hectares of land FUNDAECO helped to register within PINFOR or PINPEP, PROBOSQUE
15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species	15.5.1 Red List Index	Train parkguards to prevent transfer of amphibian fungus to amphibian conservation areas (66)	# of guards trained # of trainings held

Table 5. Sustainable development goals for the REDD+ Project for Caribbean Guatemala.

For sustainable funding, FUNDAECO has pursued and continues to pursue funding from sustainable development agencies and conservation funds in order to cover the various costs of the project. This will help ensure that the continuation of the project will not be solely dependent on receiving funds through voluntary carbon markets that are still uncertain.

2 IMPLEMENTATION OF DESIGN

2.1 Sectoral Scope and Project Type

This project is an Agriculture, Forestry and Other Land Use (AFOLU) project under the Reducing Emissions from Deforestation and Degradation (REDD) project category, sectoral scope 14. Specifically, the project is of the "Avoided Unplanned Deforestation & Degradation" (AUDD) project category. The project will not pursue IFM nor ANR activities in any of the project areas. Some of the project activities do occur on wetlands; however the specific carbon pools and GHG sources have not been accounted for as their exclusion leads to conservative estimates of the total GHG emission reductions. Specifically, peat soils have been removed from the project. The methodology VM0015 establishes that both below ground biomass and soil organic carbon are optional carbon pools and may be conservatively excluded.

2.2 Grouped Project

2.2.1 Project Zone

The delineation of the Project Zone was defined in section 1.2.4 of the PDD, and has not changed during this monitoring period. The Project Zone was defined as the service area of the project activities implemented and provided by the project proponent. Following CCB Standard Third Edition, the Project Zone was also defined as the area encompassing the Project Area in which project activities that directly affect land and associated resources, including activities such as those related to provision of alternative livelihoods and community development, are implemented. From the array of project activities implemented by FUNDAECO those that have spatial characteristics as well as provision alternative livelihoods, community development, and affect natural resources include:

1. Protected areas (Areas Protegidas)
2. Ecotourism sites
3. Health clinics (Clinicas)
4. Fisheries (Refugios)
5. Nurseries (Viverios)

Spatial datasets of these five areas were used to determine the service area of the FUNDAECO project activities and thus the Project Zone. Results from participatory rural appraisals that indicated how far individuals would travel to use resources such as nurseries, clinics, and fisheries were used to create a 10-km buffer around these. Following the requirements of the CCB Standard 3rd Edition, the project zone includes all the individual parcels and potential future parcels in the Project Area and Grouped Project Area according to the programmatic approach.

All communities that were encompassed within the Project Zone are shown in Figure 8, and are listed in Table 6 below. There were no new communities that were identified within the project zone, with the total number of communities remaining at 111 as was stated in the Project Description.

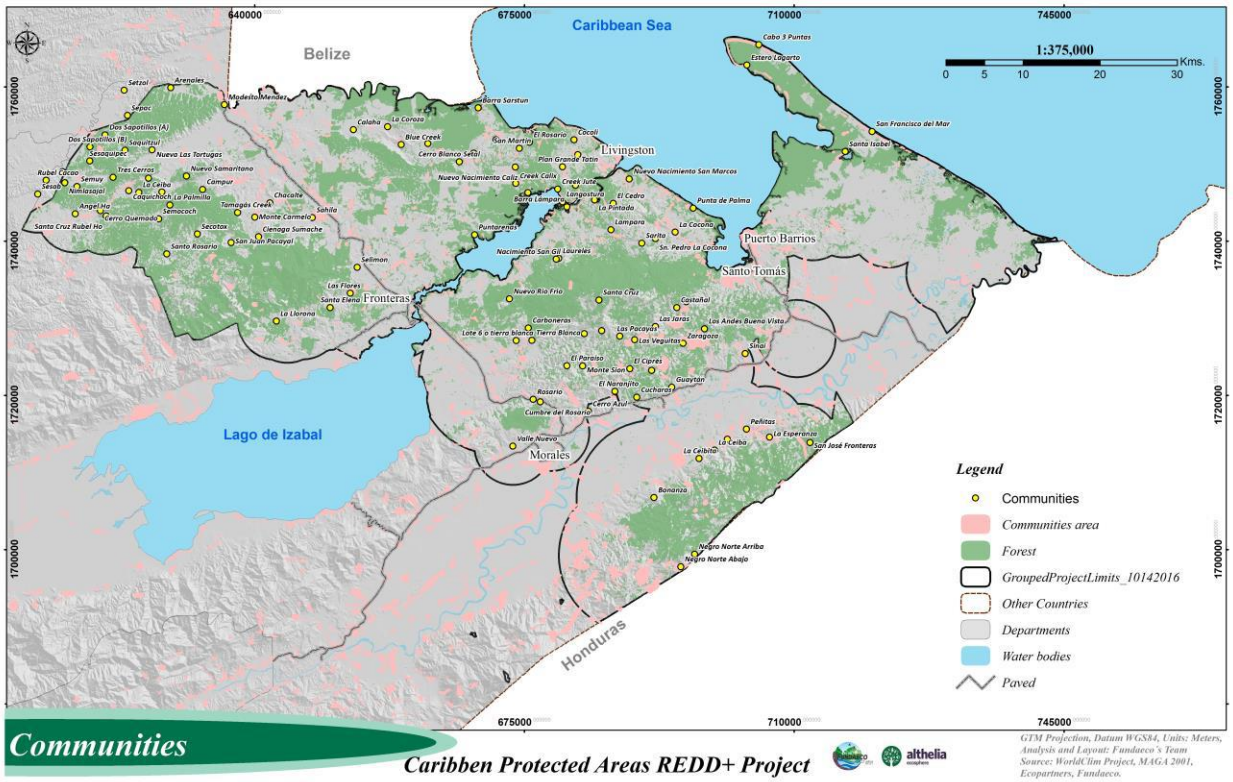

Figure 8: Map of communities identified inside project zone

Cumbre del Rosario	Cienaga Sumache	Calaha	Carboneras
Valle Nuevo	Santo Rosario	Blue Creek	Las Jaras
Rosario	Selimon	Barra Sarstun	Los Andes Buena Vista
Tierra Blanca	Nueva Generación Maya	El Rosario	Par. Agr. Sector "B"
Cucharas	San Francisco del Mar	Setal	Las Pacayas
Cerro Azul	Cabo 3 Puntas	Langostura	Las Veguitas
Creek Jute	Estero Lagarto	Lo de Enmedio Sars.Cre	Lote 6 o tierra blanca
Lagunita Salvador	Santa Isabel	Cerro Blanco	Zaragoza
Creek Calix	Plan Grande Quehueche	La Pintada	Santa Cruz
Puntarenas	Plan Grande Tatin	El Cedro	Cumbre Fria
Rancho San Carlos	Sarstun Creek	Punta de Palma	Nuevo Rio Frio
Guaytán	San Martin	Lampara	Sarita
El Ciprés	Nuevo Nacimiento Caliz	Sn. Pedro La Cocona	Monte Sion
Monte de los Olivos	Cocoli	Laureles	Nuevo Nacimiento San Marcos
Sinaí	La Coroza	Nacimiento San Gil	Barra Lámpara
La Cocona	ChinaMachacas	Nueva Jerusalem	El Paraíso
Las Flores	Cerro Blanco	Tamarindal	Negro Norte Abajo
El Naranjito		Castañal	Negro Norte Arriba

La Ceibita	Dos Sapotillos (B)	Semuy	Cerro Quemado
El Quinto	Sesaquipec	Angel Ha	Secotox
La Esperanza	Sesaquiquib	Santa Cruz Rubel Ho	San Juan Pacayal
Peñitas	Rubel Cacao	Nuevo Samaritano	Monte Carmelo
La Ceiba	Sesab	La Palmilla	Chacalte
Bonanza	Saquitzul	Semococh	Sahila
San José Fronteras	Nueva Las Tortugas	Modesto Mendez	La Llorona
Setzol	Tres Cerros	Campur	Santa Elena
Sepac	Creek Gallo	La Ceiba	Arenales
Dos Sapotillos (A)	Nimlasajal	Caquichoch	Tamagás Creek

Table 6: Communities inside the Project Zone

2.2.2 Grouped Project Area

This project is a grouped project and also uses the programmatic approach. The Grouped Project Area is shown in figure 9 below (see GroupedProjectArea_11032016.shp in the provided annexes). The grouped project area has been designed to display a single baseline scenario and demonstration of additionality. The Grouped Project Area is defined as forest area found at the project start date within the Project Zone (see Section 2.2.1) that has been forested for at least 10-years.

These areas further define where forest in additional parcels that meet the eligibility criteria (see Section 1.3.1 and Section 2.1.8 of the PDD) can be added in the future as Project Activity Instances to the Project Area (section 2.2.4 for a list of new Project Activity Instances). In order to define the Grouped Project Area, first, the parcels that met the eligibility criteria and were likely to be added to the project at some point in the future were collated into one shapefile. From this larger area, the areas that met the nationally recognized definition of forest for at least 10 years were extracted in order to create the final Grouped Project Area. See Figure 9 for a map of the Grouped Project Area.

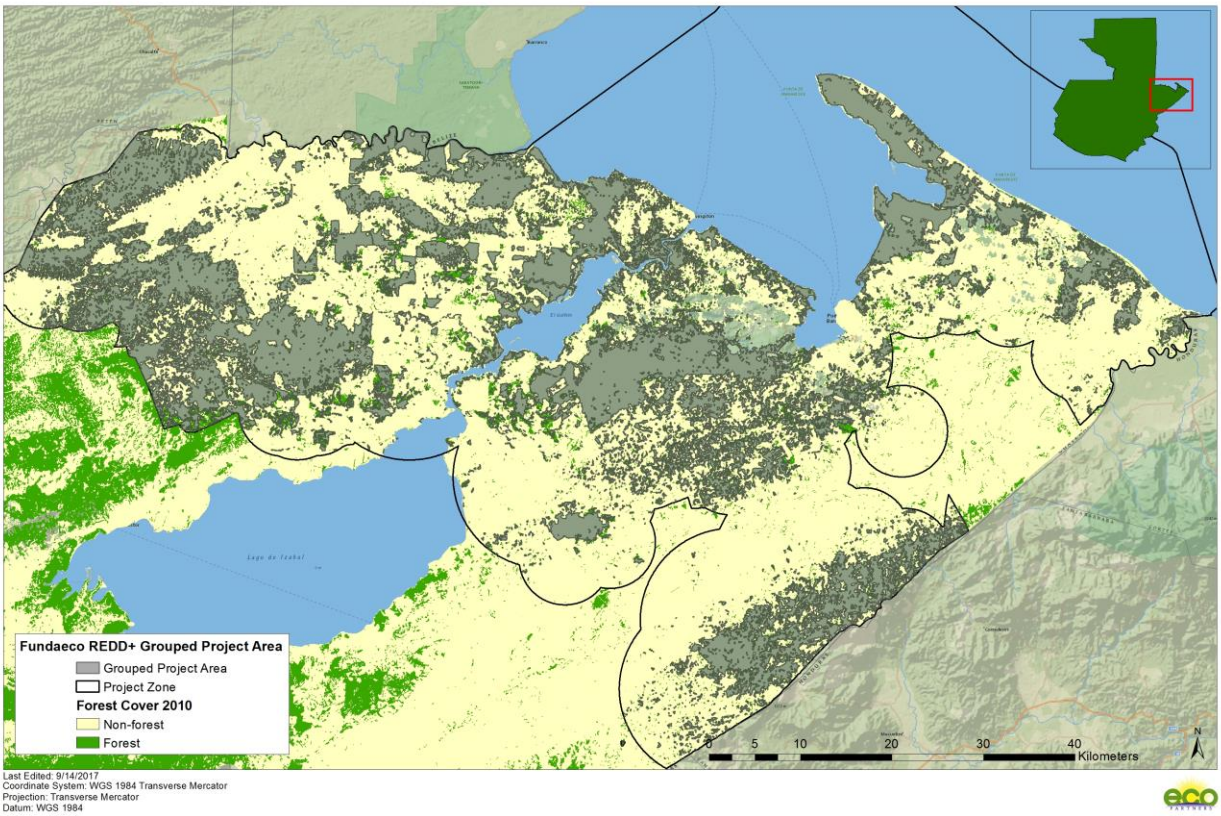

Figure 9. Grouped Project Area and Project Zone.

2.2.3 Project Area

The Project Area was defined as forested parcels within the Grouped Project Area where the project proponent has demonstrated clear project ownership at the time of verification. A FUNDAECO REDD+ Database has been provided (see Fundaeco VM0015 Accounting Model v1.99.xlsm) that describes the name, physical boundary, description of current land-tenure and ownership, and a list of project participants for each individual parcel. As of project verification, there are 666 different parcels that make up the 54,441 hectares of the Project Area, where project ownership has been transferred to FUNDAECO. Since project validation, 20 new parcels have been added to the Project Area. All new parcels meet the eligibility criteria outlined in section 2.1.8 of the Project Description. Section 2.2.4 below describes in detail how each new project activity instance meets the eligibility criteria for their inclusion in the project. The figure below provides a map of the Project Area that includes both previously validated project activity instances, and all new Project Activity Instances. The size of the Project Area is expected to increase over time as new Project Activity Instances are established.

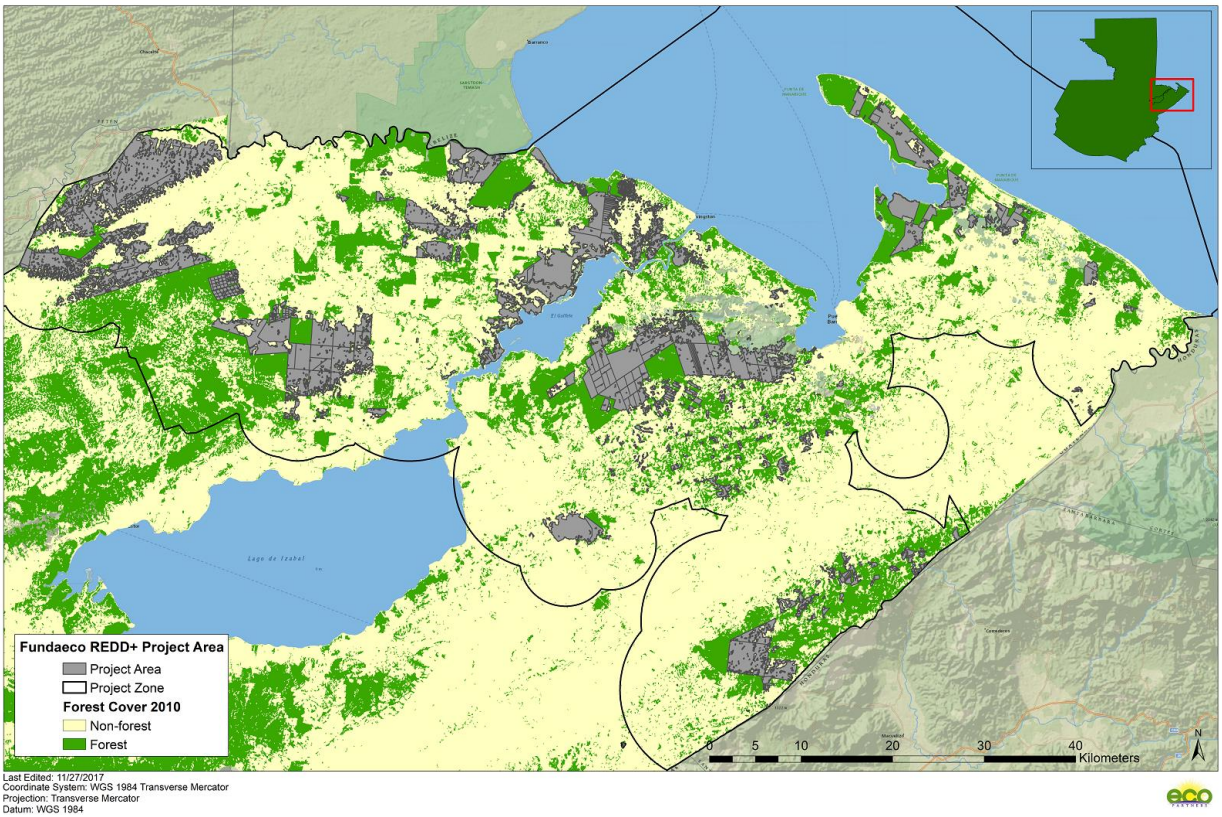

Figure 10. Project Area and Project Zone.

2.2.4 New Project Activity Instances

As a grouped project, 20 new project activity instances (PAIs) within the Project Area have been incorporated into the project for quantification of GHG emissions credits. Per VCS Standard v3.7, each new project activity instance must meet the 16 eligibility criteria outlined in this section as well as the VM0015 Methodology v1.1 applicability conditions (Part 1 Section 2). This section demonstrates the eligibility of the new PAIs, listed in Table 7 below.

Parcel Number	Socialization and Engagement			Rights and Project ownership	Project technology	PAI START DOCUMENT	PAI Start Date
270	Individual meeting (ficha)	clause 25 of the REDD+ contract		REDD contract 270	Parcel protected by forest patrols	reporte patrullaje	7/4/2012
424	Individual meeting (ficha)	clause 25 of the REDD+ contract		REDD contract 424	Parcel protected by forest patrols	ficha	3/20/2014
699	FPIC list 12/112015 and individual meeting (ficha)	clause 25 of the REDD+ contract	Asambleea general Cero San Gil	REDD contract 699	Parcel protected by forest patrols	reporte patrullaje	7/12/2012
715	Individual meeting (ficha)	clause 25 of the REDD+ contract	Asambleea general Cero San Gil	REDD contract 715	Parcel protected by forest patrols	ficha	8/23/2012
726	Individual meeting (ficha)	clause 25 of the REDD+ contract	Asambleea general Cero San Gil	REDD contract 726	Parcel protected by forest patrols	reporte patrullaje	7/19/2012
729	FPIC list 27/11/2015 and individual meeting (ficha)	clause 25 of the REDD+ contract	Asambleea general Cero San Gil	REDD contract 729a, 729b, 729c	Parcel protected by forest patrols	reporte patrullaje	12/7/2014
782	Individual meeting (ficha)	clause 25 of the REDD+ contract	Asambleea general Cero San Gil	REDD contract 782	Parcel protected by forest patrols	ficha	3/6/2014
855	Individual meeting (ficha)	clause 25 of the REDD+ contract	Asambleea general Cero San Gil	REDD contract 855	Parcel protected by forest patrols	reporte patrullaje	4/15/2014
856	Individual meeting (ficha)	clause 25 of the REDD+ contract	Asambleea general Cero San Gil	REDD contract 856	Parcel protected by forest patrols	reporte patrullaje	4/16/2014
858	Individual meeting (ficha)	clause 25 of the REDD+ contract	Asambleea general Cero San Gil	REDD contract 858	Parcel protected by forest patrols	reporte patrullaje	4/3/2016
863	Individual meeting (ficha)	clause 25 of the REDD+ contract	Asambleea general Cero San Gil	REDD contract 863	Parcel protected by forest patrols	reporte patrullaje	4/1/2014
864	Individual meeting (ficha)	clause 25 of the REDD+ contract	Asambleea general Cero San Gil	REDD contract 864	Parcel protected by forest patrols	reporte patrullaje	6/6/2012

865	Individual meeting (ficha)	clause 25 of the REDD+ contract	Asambleea general Cero San Gil	REDD contract 865	Parcel protected by forest patrols	reporte patrullaje	10/2/2016
866	Individual meeting (ficha)	clause 25 of the REDD+ contract	Asambleea general Cero San Gil	REDD contract 866	Parcel protected by forest patrols	reporte patrullaje	1/6/2013
870	Individual meeting (ficha)	clause 25 of the REDD+ contract	Asambleea general Cero San Gil	REDD contract 870	Parcel protected by forest patrols	reporte patrullaje	7/19/2012
872	Individual meeting (ficha)	clause 25 of the REDD+ contract	Asambleea general Cero San Gil	REDD contract 872	Parcel protected by PINFOR/ PINPEP	resolución PINFOR	1/9/2014
875	FPIC list 30/10/2015 (asistió familiar)	clause 25 of the REDD+ contract	Asambleea general Cero San Gil	REDD contract 875	Parcel protected by forest patrols	reporte patrullaje	11/4/2012
876	Individual meeting (ficha)	clause 25 of the REDD+ contract	Asambleea general Cero San Gil	REDD contract 876	Parcel protected by forest patrols	reporte patrullaje	1/4/2014
877	Individual meeting (ficha)	clause 25 of the REDD+ contract		REDD contract 877	Parcel protected by forest patrols	reporte patrullaje	1/4/2014
879	Individual meeting (ficha)	clause 25 of the REDD+ contract	Asambleea general Cero San Gil	REDD contract 879	Parcel protected by forest patrols	ficha	4/12/2014

Table 7: List of new project activity instances (PAI) and the supporting documentation to establish eligibility.

All parcels in Table 7 above meet the criteria specific to the VCS Standards v3.7. The following criteria establish eligibility:

1. All new project activity instances included must be located within the Grouped Project Area, which is one of the designated geographic areas specified in Section 2.2.2. Because the Grouped Project Area is delineated in such a way to meet the similarity criteria to the Reference Region described in Section 1.1.1 of the VM0015 Methodology v1.1 and Section 5.3.1 of the PD, the requirement that all new project activity instances be contained within the Grouped Project Area means that new PAIs will automatically meet the geographic criteria outlined in the PD and methodology.

Figure 11 below highlights the PAIs and their location within the Grouped Project Area. All the parcels for new PAIs are contained within the Grouped Project Area.

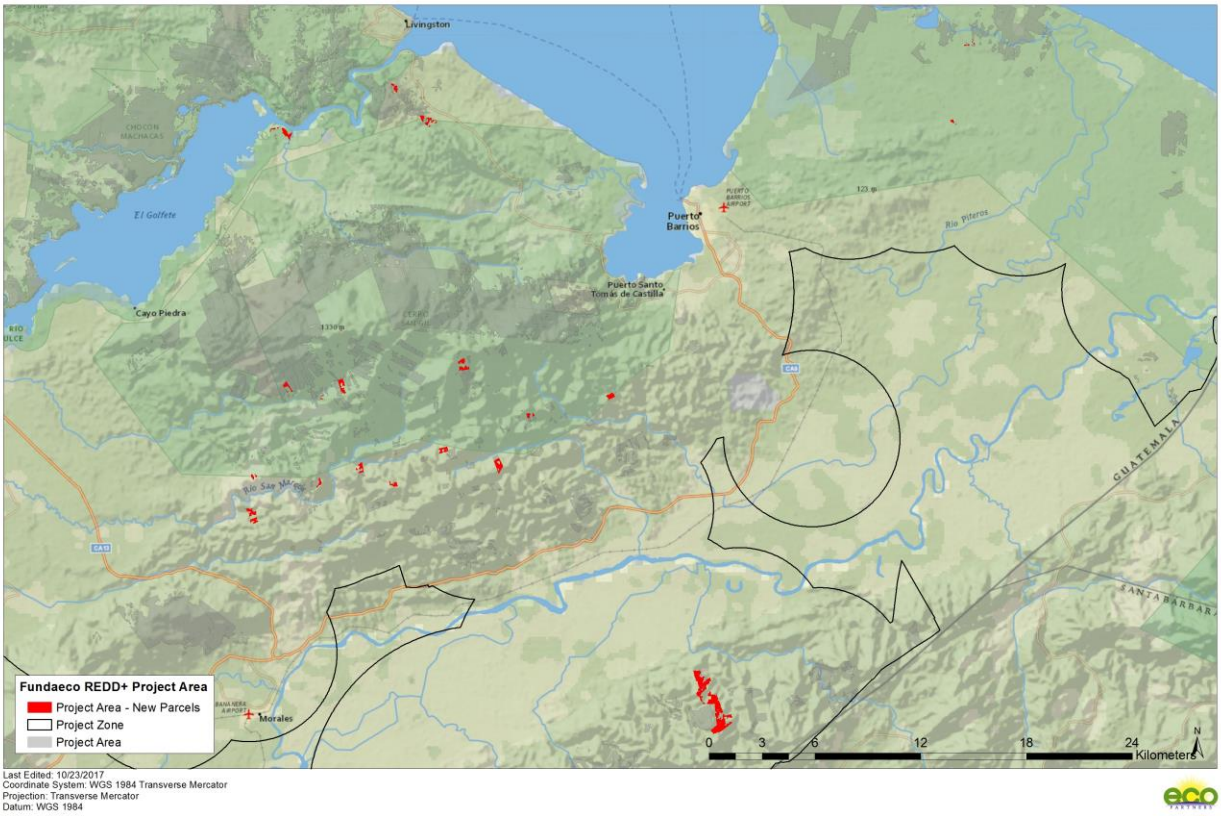

Figure 11: Map of new project activity instances superimposed over the group project area

2. All new parcels comply with the eligibility criteria delineated in section 4.2.4 of the PD.

Every new PAI meets all 16 eligibility requirements required by the VCS Standard and VM0015 methodology. This is demonstrated throughout this section and the supporting tables, figures, and documents.

3. All new project activity instances will be included in the monitoring report with sufficient necessary information to demonstrate compliance and enable sampling by the validation/verification body.

All new PAIs have been added to the Project Area shapefile in order to facilitate sampling, which has been made available to auditors (see Project_Area_YMD20171122.shp) and has been included in the Project Area KMZ file (see Project_Area_YMD20171122.kmz) uploaded to the projects database. All relevant information to demonstrate compliance with the eligibility criteria has been provided to auditors and the relevant documents are listed in Table 7 above.

4. All new project activity instances will be validated at the time of verification against the applicable eligibility criteria described in this section.

The eligibility of new PAI has been confirmed and documentation made available to auditors so that they are able to be validated at the time of verification against these criteria. They've been included in the baseline emissions calculations (see section 6.1 and 5.3 of the PD) and the relevant eligibility documentation has been provided to the auditors, including signed contracts with FUNDAECO, documents establishing project start date, and established project technologies supported by FUNDAECO.

5. All new PAIs will have evidence of project ownership for each project activity instance starting at least at the respective start date of each project activity instance provided.

The documentation listed in the Rights and Project Ownership column of Table 7 provides documentation for each parcel demonstrating the transfer of carbon rights for each parcel to FUNDAECO before the PAI start date. This documentation can be found in and has been provided to auditors.

6. All new project activity instances will be eligible for crediting only from the start date of that project activity instance through to the end of the project crediting period.

As established in the REDD+ Database in the accounting model (see Fundaeco VM0015 Accounting Model v1.99.xlsm), these newly added parcels have start dates occurring after April 1, 2012, which is the Project Start Date, and will only be credited through the 30 year crediting period from April 1, 2012 to March 31, 2042.

All new PAIs also meet the specific project criteria and applicability conditions specific to the VM0015 Methodology. The eligibility criteria for all parcels are established as follows:

7. Each new PAI must demonstrate that the project ownership has been transferred to the FUNDAECO through a legal contract.

Proof of transfer of this ownership from the landowner to FUNDAECO is found in the file listed in the Rights and Project Ownership column of Table 7. These documents have been provided to auditors.

8. Communities or private landowners of new PAIs have been engaged in the FPIC process according to section 3.7.1 of the PD.

The column Socialization and Engagement in Table 7 lists the type of meeting that was completed with each forest owner of every parcel. Every forest owner was met with individually to be informed of the project and signed documents that confirmed their engagement in the FPIC process and their voluntary participation in the project. These documents have been provided to auditors.

9. Baseline activities only include planned or unplanned logging for timber, fuel-wood collection, charcoal production, agricultural and grazing activities as is permitted in the most recent VCS AFOLU requirements.

All baseline activities for the new parcels are the same as for the Grouped Project Area. These baseline activities can be found in Section 4.2 of the PD, under the Condition (a) heading. As listed there:

The primary drivers of deforestation in the baseline are the conversion of forest land to annual agriculture, permanent agriculture, and pasture by small-scale farmers and large to medium scale cattle ranchers who are displace due to agro-industrial development in the reference region.

10. Project activities include at least one of the eligible categories defined in the VM0015 methodology.

Project activities include protection of forest without logging activities and thus meets eligible category A as defined by the scope of the VM0015 Methodology, v1.1. See Section 2.2.1 of the Project Description for all project technologies used in this project. The project activities for the new PAIs were forest patrols and the establishment of PINFOR/PINPEP programs (as is listed in the Project Technologies column of Table 7).

11. The project area can include different types of forest, such as, but not limited to, old-growth forest, degraded forest, secondary forests, planted forests and agro-forestry systems meeting the national definition of “forest”.

All new PAIs meet the definition of forest, as the previously validated Grouped Project Area was defined to include only areas meeting the definition of forest for a minimum of 10 years prior to the project start date. Thus, as all new PAIs were confined to the limits of the Grouped Project Area (see Figure 11), they meet the nationally established definition of forest.

12. Area only includes land qualifying as forest for at least the last 10 years.

Figure 12 below shows the new parcels compared to the map of 10 year forest cover proceeding the project start date. The entire Grouped Project Area was contained to only land qualifying as forest, with the new PAIs following these same guidelines.

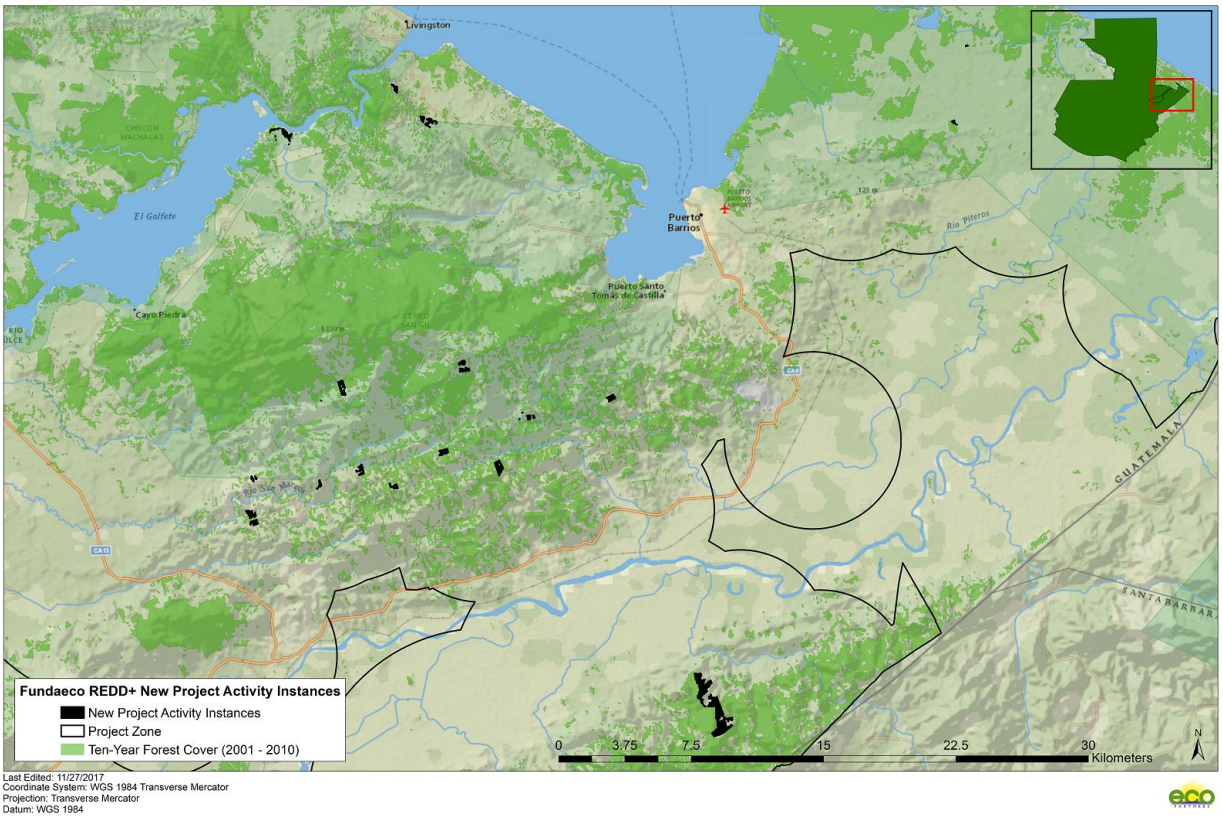

Figure 12: Map of new project activity instances superimposed over the 10-year forest area

13. Area doesn't include any forested area grown on peat soils as per VM0015 definitions.

For original validation, all mangrove forests on soil with organic matter exceeding 65% were removed from the Grouped Project Area and Reference Region (see Condition (e) of Section 2.4 of the PD). None of the parcels added to the project overlap with these areas that were excluded for original validation.

14. New project activity instances use technologies specified below and in section 2.2.1 of the Project Description, and applies these technologies in the same manner as is described in section 2.2.1 of the Project Description. Project technologies will be enabled by the financial or technical assistance of the project proponent.

The Project Technology column of Table 7 lists the technologies that have been provided by FUNDAECO to protect the forest within these parcels. For these new parcels, the technologies provided were increased forest patrols and the establishment of PINFOR/PINPEP programs, which are both pre-defined project technologies in section 2.2.1 of the Project Description.

15. All new project activity instances are subject to the single baseline that has been established for the Grouped Project Area (Section 4.5) and new project activity instances must also fall under a baseline scenario of unplanned deforestation by known agents and drivers of deforestation.

All new parcels are included within the validated Grouped Project Area boundaries (see Figure 11), thus meet the baseline scenario that has been established and validated for the project.

16. New project activity instances must have characteristics with respect to additionality that are consistent with those demonstrated in Section 4.6 for the specified project activity (AUD) within the Grouped Project Area. As a result, new PAIs must demonstrate that they received financial or technical support from the project proponent that resulted in emission reductions. Project activities can be those described in Section 2.2

Additionality has been demonstrated for the entire validated Grouped Project Area. As all new PAIs fall within the boundaries of the validated Grouped Project Area, these additional PAIs are automatically deemed additional. The landowners of the added parcels received support from FUNDAECO to implement forest patrols or PINFOR/PINPEP programs, as is shown in supporting documentation for each PAI (see Table 7).

2.3 Description of the Project Activity (G2)

2.3.1 Activities Leading to Net GHG Emissions Reductions

FUNDAECO's climate objective is to reduce CO2 emissions that result from conversion of intact forest to agricultural land. The REDD+ Project for Caribbean Guatemala's primary activities to achieve net GHG emissions reductions are to protect existing forested areas and to provide alternative sustainable livelihoods for deforestation and forest degradation agents. Without effective legal enforcement and protection of forested areas as well as a shift in community reliance on the forest as a source of income, the project area would have seen higher rates of deforestation in the time since the project's initiation.

In this monitoring period, FUNDAECO has maintained agreements with landowners throughout the project area to prevent the conversion of forest into agricultural land and grazing area, has provided protected area properties with consistent forest patrols, and has implemented agroforestry and livelihoods initiatives aimed at helping families to find stable sources of income that aren't derived from any deforestation activities. FUNDAECO has also implemented several other project activities aimed at curbing deforestation throughout the project area, which are detailed in the theory of change matrix (see TOC Activity Matrix v1.14.xlsm). Documentation of FUNDAECO's agreements with landowners within the project area is confidential, but will be provided to auditors (see Contrato VCUs entre FUNDAECO-PROPIETARIO 10915.doc). Additionally, records of forest patrol activities in addition to agroforestry and sustainable economic activities can be found in Monitoring indicator and results Matrix v1.2 2012-2016.xlsx. FUNDAECO has monitored the forest in this period using LANDSAT imagery of the project area for any deforestation event in the project area. Approximately 2,427 hectares were deforested within the project area during this monitoring and implementation period.

2.3.2 Activities Leading to Community and Biodiversity Benefits

FUNDAECO's community objectives are to:

- Empower marginalized and vulnerable communities through the legalization of land, promotion of reproductive rights and participation in resource management.
- Improve quality of life in the project zone by creating access to new markets, promoting sustainable production and improving public health and education opportunities.
- Promote landowner and community self-sufficiency in the project zone through diversified economies and sustainable land uses.

- Preserve awareness and respect for traditional, cultural, spiritual and religious identities of communities within the project area.

These objectives were obtained through community consultation and the identification of five focal issues affecting the communities in the project zone:

1. Lack of Economic and Employment Opportunities
2. Lack of Laws, Enforcement and Capacity
3. Land Tenure
4. Necessity
5. Shared Futures

Community benefits are derived from numerous project activities detailed in the Theory of Change Matrix (see TOC Activity Matrix v1.14.xlsm), and fall into the following program areas:

1. Resource Protection
2. Sustainable Enterprise
3. Empowerment and Inclusiveness
4. Education
5. Access to Resources

FUNDAECO's biodiversity objectives are to:

- Maintain habitat for viable, abundant, and diverse natural populations.
- Reduce threats to rare, threatened, and endangered species.
- Maintain the function of the natural ecosystem.
- Increase local and global understanding of biodiversity in Guatemala's Caribbean Coast.

Activities to achieve these objectives are numerous, and are grouped into four major program areas:

1) Resource Protection and Governance
2) Empowerment and Inclusiveness
3) Education
4) Access to Resources

The implementation plan for the phased project activities is provided as an annex to the Project Description (see Plan de Implementación REDD V6.docx). The budget and implementation schedule are also provided as annexes (see BP_budget_and_cashflow_20160630_Final_30_años_(ingresos solo FUNDAECO).xlsx). In this monitoring period, FUNDAECO has achieved its objectives by implementing project activities in every program area.

2.3.2.1 Community-Oriented Project Activities

The community oriented project activities implemented during the past monitoring period with the greatest impact on the quality of life for people within the project zone were those tied to generating alternative and sustainable sources of income, expanding health and reproductive care throughout the project zone, and improving the resource and land management capacity of communities. Together, these project activities have worked to address focal issues raised by communities throughout the project zone. See Section 7 for the community monitoring results and demonstration of net positive community impacts for this monitoring period.

2.3.2.2 Biodiversity-Oriented Project Activities

Project activities that are designed to bring about benefits to biodiversity also tend to overlap quite frequently with climate and community objectives as well. As such, many activities implemented by FUNDAECO serve to address multiple objectives across all CCB categories. The primary activities that FUNDAECO has implemented to target the biodiversity objectives of the project consist of measures targeted at reducing deforestation, including the enforcement of protected area laws, improved land use management, and improving economic opportunities. FUNDAECO has also taken measures to directly protect populations of vulnerable species through the establishment of fish restoration zones and amphibian protection protocols. In addition, FUNDAECO has worked to educate the public on the importance of biological diversity and environmental sustainability. FUNDAECO is also currently working to monitor and catalog bird species within the project zone in order to improve both the project's and the scientific community's understanding of species diversity within the region. See Section 8 for biodiversity monitoring results and an assessment of net positive biodiversity impacts for this monitoring period.

2.4 Management of Risks to Project Benefits (G1)

The project team has prepared separate risk ratings according for defined risk areas within the Project Area under the VCS AFOLU Non-Permanence Risk Assessment Tool (VCS Version 3.2) and following section 3.8.2 of the AFOLU Requirements. The project area, as defined in Section 2.2.3, has been divided into 2 separate risk areas distinguished based on differing land tenure and conservation commitments. The total risk rating for each risk area is summarized in Table 8 and individual non-permanence risk reports have been provided separately to validators (see Fundaeco REDD+ Non-Permanence Risk Report_Risk Area A v2.15.pdf and Fundaeco REDD+ Non-Permanence Risk Report_Risk Area B v2.15.pdf). The risk rating for the first monitoring period has remained at 14%. Descriptions of the different risk areas are also provided below.

Risk Area A
Risk Area A is defined by properties that are owned through clear title by FUNDAECO.

Risk Area B
Risk Area B is defined by properties that are owned through clear title by national entities, municipal entities, private owners, and poseedores.

Risk Category	Risk Area A Rating	Risk Area B Rating
a) Internal Risk	14	14
b) External Risk	0	0
c) Natural Risk	0	0
Overall Risk Rating (a + b + c)	**14***	**14***

*Table 8. Non-Permanence risk rating for each defined risk area within the Grouped Project Area. *Overall risk rating cannot be below 10.*

2.4.1 Climate Risks

Institutional weakness is one the risks that can affect both climate and biodiversity benefits, especially due to lack of resources and lack of continuity of public servants, which results in a slow and interrupted implementation of public policies and strategies. This can affect the project coordination with authorities in charge of law enforcement. To manage these risks FUNDAECO has included in the project an Environmental Litigation, Lobbying and Advocacy Program. At the National level, FUNDAECO is also part of ASOREMA. ASOREMA is the national association for environmental NGOs that holds a chair at INAB Board of Directors, CONAP Council, and the Climate Change Council. At the local level (Izabal Department) FUNDAECO is part of the CODEDE, the MICAI, and Izabal Competitiveness Work Group. From these mechanisms, FUNDAECO is constantly guaranteeing coordination and support to project strategies and activities. The project was presented and obtained endorsement form PRONACOM, Izabal Government, MARN and SEGEPLAN.

Lack of governance in areas surrounding project zone can indirectly affect the project. To reduce this risks the project team is integrated by local technicians and community promotors that keep a constant and close communication with communities and landowners to understand their situation and demands. FUNDAECO participates actively in the MICAI to identify and avoid potential conflicts.

The potential lack of carbon market to cover opportunity costs is also a risk that can affect benefits to climate, communities and biodiversity benefits. To manage this risk FUNDAECO has obtained the initial support of Althelia Climate Fund as carbon investors, ACF and FUNDAECO are creating a joint carbon marketing unit, and initial VCUs buyers' portfolio is prepared.

2.4.2 Community Risks

FUNDAECO considers that the political risks to the project are low, based on the fact that the country have integrated REDD+ as a national strategy to fight climate change and deforestation, and has included the REDD+ Project for Caribbean Guatemala as part of the National REDD+ Strategy, and the country NDCs presented 2015. Progress made towards land conflict resolution in the region (see section 2.8.3) and the signature of a letter of understanding -between FUNDAECO and Guatemala Public Prosecutor Office ("Ministerio Público") -, to fight environmental crimes in the framework of the REDD+ Project, gives the project an institutional backstop and reduce political risks.

In order to inform on the project and to reduce potential conflicts the FPIC activities were deployed within the project zone and not exclusively in the project area. All forest owners or their representatives included as project instances up to 2016, participated in the FPIC activities and gave their voluntary consent through the contract signed with FUNDAECO. However, FUNDAECO has identified some community risks and is already implementing actions to prevent or reduce these conflicts:

- Lack of access to markets is a risk for agroforestry, artisans, ecotourism and VCUs beneficiaries: FUNDAECO is closely working with AGEXPORT in order to increase market opportunities for vendors and producers supported by the project. AGEXPORT has been assessing FUNDAECO in market identification and contacts, value chains, and commercial image. FUNDAECO has registered the "Conservation Coast" as the trademark that will support project products image and marketing; based on a value differentiation.

  FUNDAECO is also training local producers and vendors to implement BPAs, improve productivity and in the case of artisans to improve and update handicrafts designs.

  The lack of carbon markets to cover opportunity costs is also a notable a risk. FUNDAECO is managing these risks in the carbon market unit, but also supporting communities and individual landowners to diversify their household economy, through supporting; resources for alternative

economic activities, access to markets, and technical support to forest incentives such as PROBOSQIES, PINPEP and PINFOR.

- Backing commitments under REDD+ project is a challenge since expectations may change over the years. FUNDAECO anticipated this challenge through a broad consultation process including the discussion of the carbon contract with each beneficiary. The project team is integrated by local technicians that are committed to sustainable development and nature conservation in the project zone, and that have a close communication with communities and individual landowners. The grievance and redress mechanism, and the adoption of an adaptive management approach will timely implement solutions. An annual social survey is carried on to know about beneficiaries' satisfaction level with FUNDAECO work.

2.4.3 Biodiversity Risks

The Project has used the theory of change to determine the most effective methods for bringing about benefits to biodiversity. However, there are still several natural and human induced risks to biodiversity benefits that underlie assumptions in the theory of change model. Some of these threats may be outside of the project's control, but others may have concrete mitigation measures that can be implemented by the project.

Specific risks to biodiversity that may be out of the project's control include the risk of continued habitat degradation outside of the project area, as well as the socio-political stability of Guatemala, which could impact economic drivers of deforestation as well as FUNDAECO's influence over the project area. There is also the risk that income generated from agroforestry systems and ecosystem services payments may not be enough to compete with income derived from activities such as the clearing of forest for agriculture or cattle grazing, resulting in less reductions in deforestation than anticipated. Additional human-induced risks include changes in local economic conditions, the lack of capacity and governance in local communities, the potential use of environmentally harmful practices as part of project activities, and the lack of a functional land tenure system. Natural risks to the project have been evaluated using the Non-Permanence Risk Tool (see Fundaeco REDD+ Non-Permanence Risk Report_Risk Area A v2.15.pdf and Fundaeco REDD+ Non-Permanence Risk Report_Risk Area B v2.15.pdf), and have been found to pose insignificant threats to the project area, and consequently pose little threat to the project's biodiversity benefits.

FUNDAECO has implemented several strategies for mitigating many of these risks to the project's biodiversity benefits. Targeted project activities as well as organization policy both will serve to strengthen biodiversity benefits and reduce any potential risks (see Section 8 for more details on project activities tied to biodiversity benefits). Although several risks are outside of the project's control, including local governance, changes in local economies, and land tenure systems, FUNDAECO is working to minimize these through project activities geared at empowering communities and providing land tenure access to vulnerable populations. Any biodiversity threats caused by the degradation or fragmentation of forest outside of the current project area also have the potential to be minimized through educational initiatives and the incorporation of these properties into the project area over time.

FUNDAECO's policy documents also outline the measures that the organization will take to ensure that project activities do not cause environmental harm. For example, in the FUNDAECO Policy documents (see Plan General de BPA 2016.docx), the use of GMOs and invasive species are prohibited, and environmentally friendly waste management measures are to be implemented as part of any project activity. All agroforestry and sustainable agricultural programs through FUNDAECO also abide by USAID guidelines for safe pesticide use (EG-PERSUAP-Final_Oct2012.docx), and an internal best agricultural

practices policy that outlines and justifies safe and appropriate pesticide and fertilizer use (Plan General de BPA 2016.docx). FUNDAECO agroforestry programs do use non-native and non-invasive species such as rubber in small-scale plantations within a larger mixed-use sustainable agriculture system. By using naturalized non-native and non-invasive species in sustainable and mixed-use agroforestry systems, FUNDAECO can enable farmers to access markets that provide them with better economic opportunities, thus preventing them from further clearing forest. For a detailed justification for the use of non-native species in small-scale agroforestry plantations see Consultoria Selvin Perez doc Final 10062014.docx. Overall with a combination of targeted project activities and organization policies, FUNDAECO is continuously taking steps to identify and mitigate threats to biodiversity within the project area and project zone.

2.5 Measures to Maintain High Conservation Values (B1, B2, CM1, CM2)

2.5.1 Community High Conservation Values (CM1, CM2)

According to Richards and Panfil, Social or Community HCVs are those that provide critical ecosystem services or are of cultural importance. In the project region both of them are founded.

A network of sacred sites where Queqchi and Garifuna communities practice religious rituals have been identified; each site is composed by several points, specially caves or small mountains called “cerros”:

- Tameja River and caves
- Rio Quehueche River and Caves
- Cerro Sarstun and Sartun River
- Rio Cocoli
- Siete altares
- Caves and cerros at the north of Sierra Santa cruz (Rubel Ho, Rubel Cacao, Sesaquipec and Sesaquisuib)

Ten watersheds were identified as HCVs that provide critical ecosystem services; Las Escobas, Tamejá, San Marcos, Juan Vicente, Sumaché, Cienega, Chahal, Bobos, Negro and Chiquito.

The project is dedicated to maintaining these community HCVs through several targeted project activities. HCV management areas have been identified (see Figure 6) in order to focus HCV conservation efforts within the project area. The primary measure taken to maintain HCVs is the reduction of deforestation within the sites identified as HCVs, through the voluntary integration of some of these forests to the project area and the implementation of protection activities. By reducing deforestation and degradation, the project has avoided threats within these areas, and their environmental services and cultural uses can be guarantee.

FUNDAECO has implemented forest protection measures through the deployment of forest patrols, the enrollment of landowners along watersheds in PROBOSQUE and PINPEP programs, conservation education initiatives, and support to preserve awareness and respect for traditional, cultural, spiritual and religious identities of communities within the project area.

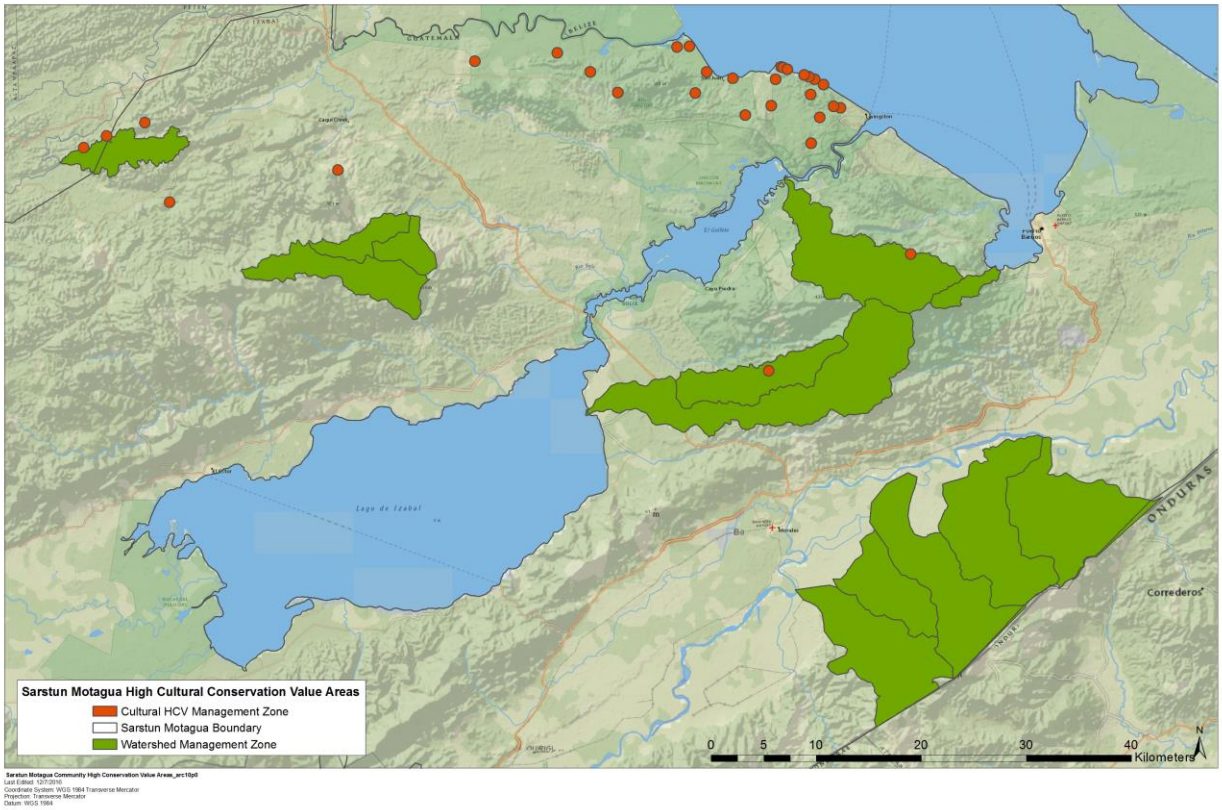

Figure 6. Map of community HCV management areas.

2.5.2 Biodiversity High Conservation Values (B1, B2)

Biodiversity High Conservation Values for the Project are:

HCV 1: Concentrations of biological diversity:

- Protected areas
- Threatened species: numerous IUCN Red List threatened species
- Endemic species: high endemism in the region
- Migratory corridors

HCV 2: Landscape level ecosystems and mosaics

- Intact and partially intact forest area sufficient to support naturally occurring species in natural patterns of distribution and abundance

HCV 3: Rare, threatened or endangered ecosystems

- Lowland forests
- Mangroves

The Project is dedicated to maintaining these biodiversity HCVs through numerous targeted project activities. Several HCV management areas have been identified (see Figure 7) in order to focus HCV conservation efforts within the project area. The primary measure taken to maintain biodiversity HCVs is through the reduction of deforestation within the project area. As is discussed in Section 8, biodiversity is highly correlated with forest cover (Richards and Panfil, 2011), and many of the identified biodiversity HCVs consist of forested areas within the project area and project zone, including protected areas, migratory corridors, landscape level ecosystems, and threatened ecosystems. By reducing deforestation and degradation threats within these areas, both the ecosystems and the threatened species within those ecosystems have been protected and maintained. FUNDAECO has implemented forest protection measures through the deployment of forest patrols, the enrollment of landowners in PINFOR and PINPEP programs, conservation education initiatives, and agroforestry systems. These project activities and their direct biodiversity benefits are described in more detail in Section 8.

Additionally, FUNDAECO has implemented specific measures to protect endangered amphibian species within the project area through the training of park guards in measures to prevent the spread of deadly amphibian fungal diseases. See Figure 7 for a map of amphibian protection zones.

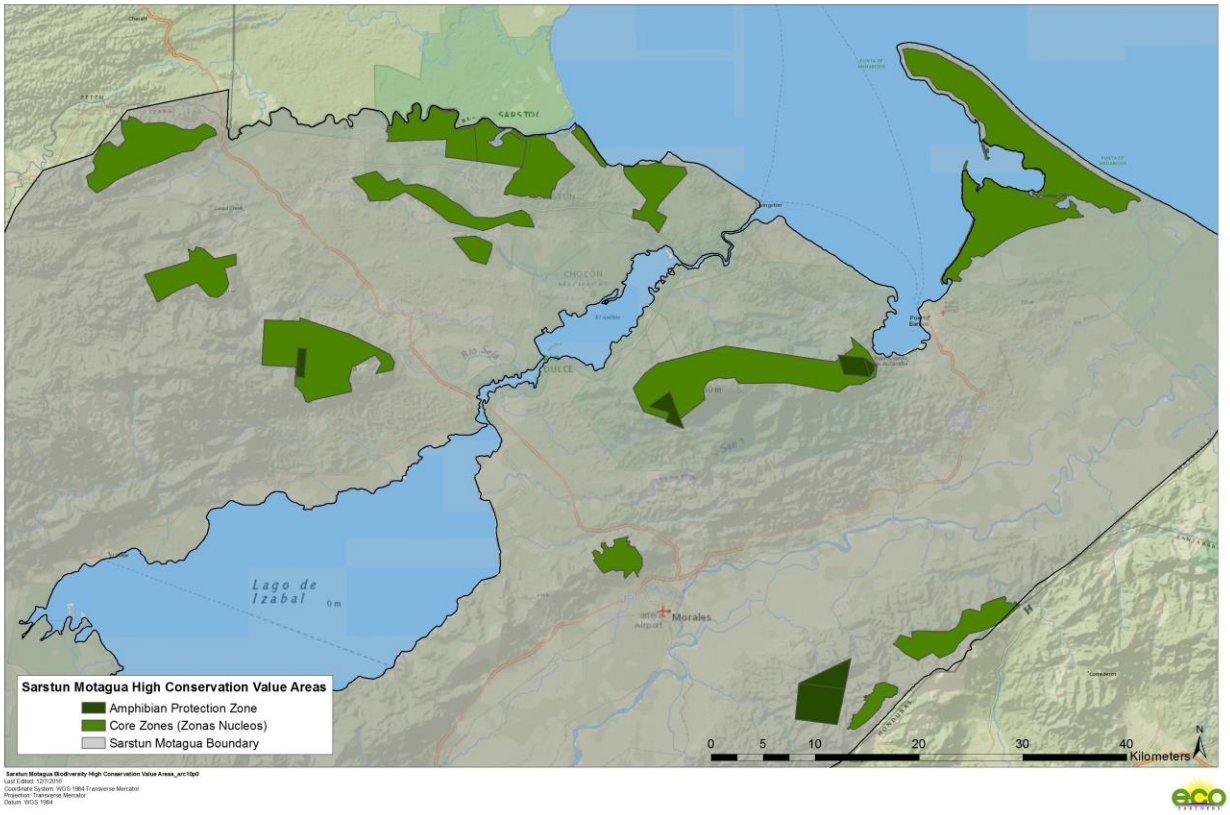

Figure 7. Map of biodiversity HCV management areas.

2.6 Project Financing (G3 & G4)

FUNDAECO is committed to covering project operation costs, initially through an investment from Althelia Climate Fund that covers development expenses. During the rest of the project lifetime FUNDAECO is committed to sell carbon credits with the support from ACF. Also, a VCU marketing unit will be established in Guatemala to reach local companies. However, when considering the carbon market uncertainty, and to guarantee project cash flow FUNDAECO will continue to seek funds from international cooperation. FUNDAECO will work with recognized sustainable development and conservation funds and agencies to cover costs from the different project components.

2.5.2 Employment Opportunities and Worker Safety (G4)

Since its foundation in 1990, FUNDAECO has complied with legal and administrative provisions on labor and social security and work rights; this practice is implemented throughout all of FUNDAECO Programs and Projects.

The rights and obligations of workers are contained in the Labor Code (Decree 1441 of the Guatemalan Congress). The state agency that enforces workers' rights respect is the Ministerio de Trabajo y Previsión Social, and the social security is in charge of the Instituto Guatemalteco de Seguridad Social – IGSS -. FUNDAECO is registered as an employer with both entities, and can receive evaluations as required by the law. In addition to social security coverage, the institution establishes an aggregate insurance policy with life insurance and medical expenses coverage.

FUNDAECO, in compliance with the content on civil, commercial and labor- enacts a Human Resources Policy, as part of Manual for Policies, Rules and Procedures, including, among others items: types of recruitment, recruitment processes, wages and salaries, interpersonal relations and performance evaluations.

2.5.2 Employment Training

In order to build local useful skills and knowledges to increase success in the project implementation and goals, a significant amount of training and capacity building its being implemented by FUNDAECO, and is provided in different level to field technicians and community beneficiaries.

Through workshops, filed technicians, and project beneficiaries were trained to implement several types of agro-ecological products (black pepper, cardamom, rambutan, forestry amount others) and ecotourism in an environmentally low-impact manner during the previous reporting period. Through these activities economic opportunities were improved in different areas. Please see the table below.

Training opportunities		
SAF	**ECOTOURISM**	**HANDCRAFTS**
Plant Production	Development of tourism product	Quality and added value
Grafting	Community Tourism Guides	New designs

Soil preparation and nutrition	Provision of food services	Material costing and small business management
System establishment	Management of groups and tourism culture	
Crop Management	Provision of lodging services	
Harvest		
Post harvest		
Processing		
Packing		
Biofertilizers		
BPAs		

Table 9. Community training opportunities.

Specific training for the project:
FUNDAECO trains all staff in the different aspects of the project components. For new employees, training period (induction process) will be provided in a 4 week term, immediately after beginning employment. The Induction process starts with identifying relevant topics to train the new employee. This process included field visits looking to integrate the technician in ongoing efforts with project stakeholders and communitarian leaders during the reporting period. Directors and Coordinators ensured that additional training is provided to staff, where needed, with efforts from FUNDAECO or from external support.

Communities:
FUNDAECO implements capacity-building activities with communities all over Caribbean Guatemala. When working with community members, the community itself will select the people participating in the proposed activities.

FUNDAECO divides 3 different levels of development in staff training systems:

- 1st level: FUNDAECO technical staff receives training in productivity, organization and legal subject; these technical teams are the ones that have the job to replicated -with knowledge transfer and generation of capabilities- across project organizations (Producers Organizations, Local Committees and COCODES)

- 2nd level: FUNDAECO technical staff, along with the accompanied of organizations leaders, provides technical assistance to producers at an individual plot level.

- 3rd level: For the different products will feature and deliver technical manuals containing the minimum "technology package" for the productive development of each of the production initiatives; all contents and tools provide by the technology package and deliver for capacity building activities, are designed to be culturally appropriate.

Although FUNDAECO and its partners possessed specific skills to accomplish these levels of training during the reporting period, additional specialized consultants might be retained in the future.

Efforts with external support:
Regarding agroforestry systems, specific training was provided by FUNDAECO to support project productive activities including agroforestry systems and ecotourism. Other trainings conducted during the reporting period included PINFOR, PINPEP, protected areas management, Law Enforcement, monitoring and conflict resolution; the Geographic or thematic coordinator is responsible on detecting training need and opportunities and the Regional Director for external support in this trainings.

Finally trainings on Human Rights, Sexual and Reproductive Health and Rights, and other issues covering community rights and empowerment, were organized by the Social and Gender Director during the reporting period. The project is constantly supporting midwives and health promotors and volunteers in related trainings.

The next table shows partner institutions and organizations that are previously identified to support the implementation of the training programs; other institutions can be included along the project life:

External organizations supporting training programs	
INTECAP	“Instituto Tecnologico de Capacitacion” supports Agroforestry Systems and Ecotourism
AGEXPORT	“Asociación de Exportadores de Guatemala” supports Agroforestry Systems and Ecotourism
AGREQUIMA	Agrequima it’s an technical company that’s specializes in Best Practice implementation
INAB	"Instituto Nacional de Bosques”with support in agroforestry and forestry
INGUAT	“Instituto Guatemalteco de Turismo” supports Ecotourism
MSPAS	“Ministerio de Salud Pública y Asistencia Social” Health and Sexual and Reproductive Health
OSAR	“Observatorio de Salud Sexual y Reproductiva”Sexual and Reproductive Health and Rights
AME Guatemala	“Asociación Movimiento por la Equidad” Fundamental Human Rights, Sexual and Reproductive Health and Rights, Gender

Table 10. External organizations supporting training programs.

2.6 Project Financing

As a grouped project, the budget and financial cashflow was designed to scale up in surface and activities, therefore resources are planned to cover new project instances. FUNDAECO is committed to cover project operation costs, initially through an investment from the Althelia Climate Fund that covers development expenses, and project activities and scaling-up until 2021. Currently, and for the remaining

lifetime of the project, FUNDAECO is also committed to selling carbon credits with support from the ACF. Also, a VCUs marketing unit will be stablished in Guatemala to reach local companies. However, because of uncertainty in voluntary carbon markets, FUNDAECO continues to seek funds from international agencies to guarantee project cashflow. FUNDAECO is working with recognized sustainable development agencies and conservation funds to cover costs for the different project components.

2.7 Employment Opportunities and Worker Safety (G3)

FUNDAECO requires specialist services in natural resources management, agriculture, forestry, social work, laws and politics, communications, nurses, biology, accounting, administration and finance, educators, rangers, farmers and field workers.

Maintenance of work stability:
FUNDAECO maintains a low staff turnover rate; this policy values the interest towards nature and communities, experience, and dedication of the staff. During the reporting period, FUNDAECO retained existing staff in order to harness already acquired experience in: REDD + topic; the knowledge of the project area, and its social and natural conditions and dynamics; and the contacts with local communities and stakeholders. FUNDAECO also hired additional staff members with important experience local experience to implement activities during the reporting period.

New hires and promotion:
FUNDAECO procedures are established in section one of the institutional Manual for Policies, Rules and Procedures. According to this manual when a new position or task is required, first opportunity is given to existing staff. During the reporting period, the Technical Administrative Council or CTA “Consejo Tecnico Administrativo” report internally in the institution for new opportunities or vacancies by inner communication channels. Employees submitted their aspirations to be reclassified or promoted, once the profiles required have been published and their skills are commensurate with the position available.

Induction process:
All new and promoted employees, prior to assuming the fulfillment of their responsibilities, must receive from the Administrative Director or administrative assistants an induction on institutional manuals, FUNDAECO mission and vision, policies and other administrative documentation. Procedures aspects, information on monthly salary, delivery of relevant documents and signing of pertinent documentation. The reporting period, the immediate superior gave induction on the position tasks.

2.7.1 Worker’s Rights

The rights and obligations of workers were observed and enforced in accordance with Labor Code of Guatemala. These provisions were developed in FUNDAECOs manual of Internal Working Regulation and Procedure which was presented to the Ministry of Labor and Social Security for review and approval by a representative of the employer and two representatives of the workers, having been approved by the Ministry through the 179-2002 resolution, regulating the conditions of working hours, salary payments, holidays, requests and claims, obligations of the employer and employees, safety and health.

In compliance with the established regulations, this manual was made available to workers at each office in printed form and in digital form. Besides these regulations when hired, the employee receives the institutional Code of Ethics and Values, which contained general and mission related values to be observed by our staff. More recently FUNDAECO has developed its Policy on Gender, No Discrimination and Violations against Fundamental Human Rights (see Gender, No Discrimination, and Human Rights PolicyV2.docx). All manual and regulations were implemented under the concepts and criteria stated

along this Policy. Since this Policy is new, at this point the document is provided to each new employee during the induction meeting. At the end of 2017, workshops are planned to present and explain the Policy principles and implementation. Each year a refreshment workshop will be done for the Policy on Gender, No Discrimination and Violations against Fundamental Human Rights, the Code of Ethics and Values, and other documents regarding internal procedures and vision in support of the REDD+ project. The commitment to the accomplishment of these policies will be renewed by each employee every year.

On Non-Discrimination:
Every employee has the right not to be discriminated directly or indirectly for employment, or once employed, for reasons of gender, marital status, age within the law limits, racial or ethnic origin, social status, religion or belief, political ideas, sexual orientation, membership or not to a labor union.

Employment benefits to personal during the reporting period:

- All employees were entitled to benefits prescribed by Guatemalans labor laws.
- FUNDAECO recognized as institutional policy the payment of a universal indemnity after 4 years of working with the institution when the employee has accumulated a favorable record of conduct and performance; the termination is on friendly terms and under no circumstances for reasons of serious faults against the rules of the institution or the existing labor law in Guatemala. If any employee resigns before the four years, it will be the Technical Administrative Council (CTA), who will assess whether or not the universal compensation takes place.
- Health Suspension by the Guatemalan institute of Social Security: Any worker can be temporally suspended from his job duties because of illness or accident, remuneration shall be in accordance with the provisions of the organic law of IGSS. A copy of the suspension certificate is sent to the employee's personnel file and payroll manager.
- Life and health insurance.
- FUNDAECO recognized the concept of a "performance bonus", up to a maximum of 25% of the base salary. For the worker to enjoy this benefit, it must be stated in the employment contract.
- Field expenses: allocation of funds will be made for personnel who need to travel outside their workplace as part of their job functions.

2.7.2 Worker Safety

FUNDAECO in fulfillment of Guatemalan law is registered with a patronal number and complied with the established benefits covering registered employees with the following social security programs:

- Common disease
- Accidents
- Maternity
- Age Disability

In addition to the benefits of the Guatemalan Social Security Institute, FUNDAECO in a common agreement with employees hires a collective life and medical expenses insurance coverage prior to the reporting period and maintained throughout the reporting period. During the reporting period, the medical expense coverage was extended at the request of employees to their families.

Within the regulations of the Guatemalan Social Security Institute conducted in coordination with the Ministry of Labor, FUNDAECO applied the following regulations during the reporting period:

- The Regulation on Health and Safety at Work, contained in the Government Agreement No. 229-2014 and its amendments contained in No.33-2016, which contains regulations

regarding work environment, vehicle driving, handling and operation of machinery, infrastructure and facilities, hazardous substances, infectious diseases and first aid kits.

- Regulation on Accident Protection, published by the Guatemalan Social Security Institute board (Agreement no. 1002) that regulates issues relating to accident prevention and first aid measures.

Specific procedures related to FUNDAECO field work were included in the institutional Policy and Plan for Health and Safety. FUNDAECO has also adopted the Security and Risk Manual at the Herpetarium, from the Guadalajara Zoo Herpetarium in order to manage its local Herpetarium at Cerro San Gil. This herpetarium is registered at CONAP, and personnel have been trained by the Director of the National History Museum Herpetarium.

The body responsible for ensuring compliance with all laws and regulations is the Technical Administrative Council or CTA, and at the same time operates as the Health and Safety Committee supplying security protocols and issued several tools for each employee, among some of this tools we can mention the instructive for Safety on Emergency Situations, instructional use of water and land vehicles; Chapter XIII of the Internal Work Regulations containing the Hygiene and Safety at Work guidelines.

2.8 Stakeholders (G3)

2.8.1 Stakeholder Engagement Structure

FUNDAECO has worked in the project region for over twenty years, and during this period, it has designed, promoted and supported different mechanisms and structures that ensure the active participation of all stakeholders – particularly communities- in consultation, decision making, and implementation of field activities across the project region. These formal structures – established both under the Development Councils Legislation and the Protected Areas Legislation- will ensure the active engagement and participation of all stakeholders throughout the project implementation period. Communities in particular, participated not only as Forest owners and Carbon right holders, but also as members of protected area management bodies, as project beneficiaries and as direct participants in the implementation of project activities.

From the local to the regional level, the following structures have been involved in project consultation and planning prior to and during the reporting period, ensuring project implementation, follow-up and oversight:

- **COCODEs (Comités Comunitarios de Desarrollo)**, or Community Development Councils, are the basic unit for consultation, planning and implementation; The General Assembly of each COCODE – in which all community members (both men and women) participate- elects a Board of Directors and a President, who in turn represents his/her community in regional bodies.
- **Local Regional Indigenous and Community Associations and Protected Area Community Assemblies (Asambleas o Consejos Intercomunitarios de Áreas Protegidas)**: Local Associations representing a group of communities, usually associated with the management of land and natural resources in a particular region or protected area, are also an important mechanism for community stakeholders engagement. The Associations Aj Rihonel Re li Ch´och in Río Sarstún, Aj Ilol Quiché in Chocón Nacional, San Antonio Aj Awinel in Jalauté, Asociación Cerro 1019 in Sierra Santa Cruz, have been key partners in all FPIC processes, and will also participate in the protection and community development activities throughout project implementation.

These Associations also represent the communities within a particular protected area, and are consulted and engaged in all field activities and key management decisions, including the consultation and implementation of the REDD+ project. These participatory bodies will be strengthened in each protected area during project implementation.

- **Protected Area Executive Councils or Boards of Directors ("Consejos Ejecutivos Locales de Áreas Protegidas")** will also be a key participatory body for the active engagement of all stakeholders in project implementation. These Councils, which preside over the management of specific protected area, integrate key stakeholders at the local level, including the National Council of Protected Areas, Municipalities, Private Landowners and/or Private Sector representatives, Governor, relevant government agencies, and Local Community Representatives.
- **COMUDEs (Comités Municipales de Desarrollo)** or Municipal Development Councils, are participatory bodies at the Municipal level; Presided by local Mayors, they also incorporate private landowners, community representatives, local representatives of Government Agencies, and NGOs. The REDD+ Project has been extensively socialized with COMUDEs, as a key administrative body that ensures wide engagement of all stakeholders in a particular Municipality.
- **Consejo Departamental de Desarrollo (CODEDE)**, the Development Council for the Department of Izabal, presided by the local Governor, is the regional body that ensures the engagement of stakeholders at the regional level. The REDD+ project has been submitted for its review during the FPIC process, and the CODEDE will ensure regional level support to project implementation.

Additionally, a wide array of local producer associations, women's associations, and other local organized groups were consulted during the FPIC process prior to and during the reporting period, and were actively involved in project implementation (Please refer to Campaña Carbono 2015 992015.docx and Section 7.2 of this document for a full list of partner community associations).

These different participatory governance structures have been engaged during project preparation and consultation, and have been actively engaged in project implementation by FUNDAECO´s local field teams, deployed across the region in five field offices and three Field Stations. In each office, a Technical Coordinator and a team of environmental educators, social workers, agronomists, naturalists, and field workers have ensured a close, intensive and active engagement of communities, forest owners, agroforestry producers, women and youth in the implementation of all project activities. All project implementation activities have been closely coordinated in each level with the appropriate participatory bodies, and a Regional Project Coordinator has ensured regional coordination with the Governor of Izabal, and the Regional Coordinator of the National Council of Protected Areas. FUNDAECO, as project proponent, has ensured administrative support, operational planning, oversight, coordination with all relevant partners and stakeholders for project activities implementation, and Auditing and MRV requirements for the project. For more details on stakeholder engagement, please see section 2.7 of the PD.

2.8.2 Public Comment Period

This document was posted to the CCBA website along with the PD and held open for public comment. The project proponent also posted a summary of this document in accordance with the Rules for the Use of the CCB Standards (December, 2013). Summaries of the PD have been translated into Spanish, the language most prevalently spoken in the project zone, and posted on the CCBA website. The project Implementation Plan was also made publically available in Spanish. FUNDAECO has organized socialization activities with associations and community groups, in order to ensure understanding and obtain comments. FUNDAECO has also used other media to publicize the PD and Implementation Plan and to gather comments, such as newspapers and social media. When needed, a Q'eqchi' translator has

participated to guarantee comprehension of the PDD to Q'eqchi' communities. All comments have been centralized by FUNDAECO and will be presented to project validators.

2.8.3 Stakeholder Conflict and Grievances

Based on its past experience in the Project Region, FUNDAECO has strengthened and expanded its existing procedures to ensure access to information, response to complaints and grievances, and conflict prevention and resolution -from the community to the regional level. This work began prior to the first reporting period and is on-going.

A system for the reception, registration, response, resolution and/or referral of grievances has been implemented at different geographical and organizational levels, according to their gravity and urgency, ranging from requests of access to information, operational and administrative complaints, grievances and disputes over rights of access, collective conflicts, and potential violations of Legislation and Fundamental Rights. Different and specific channels of communication and complaint have been used, based on current practices, in order to ensure that all stakeholders, particularly vulnerable populations – such as indigenous women- have rapid access to complaints and grievance redress. FUNDAECO will not prejudice the outcome of a conflict that is directly related to the project's implementation.

In order to improve the Project´s performance as related to proper and effective response to complaints and grievances, the following mechanisms have been implemented:

- Quarterly Monitoring of requests for information, complaints and grievances, in order to identify areas if improvement and correction of procedures and/or operational methodologies
- Annual stakeholder satisfaction surveys, to be carried out by the Gender and Social Participation Direction of FUNDAECO,
- Annual Risk Assessment and identification of Potential Conflicts, and development of a Project Contingency Plan, in order to address issues that might develop into collective conflicts or grievances.

For a more detailed description of the grievances process and policy, see Grievance Mechanisms.docx and section 2.7.5 of the PDD.

According to MICAI aide-memoire dated on September 20 of 2016, the Conflict Map for Izabal Department showed 75 cases in process, form these 69 were located in El Estor, which is located outside the Project Zone

The next table present a summary of the cases addressed by MICAI inside the Project Zone, between 2012 and 2016, from which 12 were solved and 6 were still in process at the end of 2016.

No.	Case	Status
1	Comunidad Creek Monte Verde/Familia Milian	Solved
2	Creek Agua Caliente/ Tamejas	Solved
3	Vista Hermosa (San Carlos EL Porvenir)/Alejandra	Solved
4	Creek Maya/Alejandra	Solved
5	El Cedro/La Pintada	Solved

6	Gilberto Reyes/Creek Blanco	Solved
7	Punta de Palma/San Andres	Solved
8	San Miguelito/Finca 1842	Solved
9	El Rosario y San Martin/Finca Tapon Creek	Solved
10	Barra Lampara/ La Angostura	Solved
11	La Pintada/Barra Lampara	Solved
12	Creeke Gallo II/Nuevo Nacimiento La Arca	Solved
13	Playa Sarstun Creek/fincas varias	In process
14	Peñitas	In process
15	Sarita/Finca Laboratorios Piersen	In process
16	Comunidad Puerto Modesto Mendez/Finca Chocon	In process
17	Comunidad Baltimore/Yojoa	In process
18	Quebradas	In process

Table 11. Conflicts addressed in the Project zone during the monitoring period.

2.9 Deviations

2.9.1 Methodology Deviations

First Deviation	
Source:	VM0015 v1.1 Section 6.1.1 and Appendix III – Estimate of carbon stocks in the harvest wood products carbon pool
Criteria and Procedures:	The criteria and procedures described in Appendix III for the *Estimation of carbon stocks in the harvest of wood products* under *Method 2: Commercial inventory estimation.*
Relation to Monitoring or Measurement:	This procedure is related to measurement. To estimate the wood products at the time of deforestation an estimate of extracted biomass using an indirect measure of commercial volume, medium-term wood products, and long-term wood products are required following VM0015 v1.1.
Requested Deviation:	A modified version of the VM0003 Methodology for Improved

	Forest Management Through Extension Rotation Age (IFM ERA), v1.2 was applied for the estimation of wood products only if it provides a conservative and/or more accurate estimate of wood products.
Justification:	The modified version of the VM0003 Methodology for Improved Forest Management Through Extension Rotation Age (IFM ERA), v1.2 is provided in section 5.3.6.1 of the Project Description. The estimate for extracted biomass carbon in VM0003 (EXC_{WP}) is more accurate than the estimate in VM0015 (CXB_{icl}). This latter estimate of extracted biomass carbon uses an indirect measurement of commercial volume relying on multiple estimators including above-ground biomass and commercial volume regressions. Whereas the estimate of EXC_{WP} relies only upon volume regressions for commercial species to estimate extracted biomass carbon reducing the uncertainty. Additionally, the modified version of the VM0003 v1.2 omits medium-term wood products. This leads to a more conservative estimate of wood products in the baseline as the release of emissions to the atmosphere as a result of wood products decay over the specified 20-year decay period are not accounted for.
Quantification Impact:	This methodology deviation meets the VCS Standard v3 principles of accuracy and conservativeness. Because the medium-term wood products are omitted from the overall wood products estimate resulting in a lower estimate of the forest carbon stocks, the impact on GHG emissions reductions and removals is conservative.

Second Deviation	
Source:	VM0015 v1.1 Section 6.1.1(e)
Criteria and Procedures:	Calculate the long-term (20 years) average carbon stocks of post deforestation classes.
Relation to Monitoring or Measurement:	This procedure is related to measurement and conflicts with the measurement methods for the decay of below-ground and

	deadwood biomass in Section 6.1.2.
Requested Deviation:	The project proponent has randomly sampled initial and final LULC classes to arrive unbiased estimates of carbon stocks. The project proponent applies the unbiased estimates of carbon stocks in accounting and uses a linear decay model per the requirement of Section 6.1.2 rather than a 20-year average.
Justification:	The carbon stocks estimates for each selected carbon pool are unbiased because the carbon stock samples for each LULC classes were randomly selected. The project proponent conservatively accounts for the uncertainty in the carbon stock estimates according to the requirements of Section 6.1.1(f). Because the deviation is unbiased, it is more accurate than using (potentially) bias models to predict the flux within each carbon pools over a twenty-year prediction period. Relative to the VCS AFLOU Requirements for the decay of carbon over time, it is more accurate to account for the decay of biomass in below-ground and deadwood using a linear 10-year decay model rather than a 20-year average. By taking an average over time, the methodology allows for non-conservative "forward crediting" in the baseline scenario where emissions reductions for decay are accounted for before they otherwise would have occurred. This deviation is more accurate and conservative than the prescribed methodology methods.
Quantification Impact:	This methodology deviation meets the VCS Standard v3 principles of accuracy and conservativeness. Because the deviation avoids instances of forward crediting, emissions in the baseline are conservatively estimated and meet the AFOLU Requirements.

2.9.2 Project Description Deviations

First Deviation	
Source:	Project Description Section 4.4.1 and 8.1.2.1

Criteria and Procedures:	The inclusion of the litter pool as part of the project boundary of the proposed AUD project activity
Relation to Monitoring or Measurement:	This procedure is related to monitoring. The inclusion of the litter carbon pool in the project boundary is recommended only when significant, and is to be decided (TBD) by the project proponent (VM0015 Section 4.4.1).
Requested Deviation:	Originally the litter carbon pool was included as part of the carbon pools included in the project boundary as part of the Project Description. The requested Project Description deviation would be the exclusion of the litter pool as part of the project boundary.
Justification:	The project proponent determined that the litter carbon pool was not a significant pool, and that the exclusion of this pool would be conservative in the estimate of baseline emissions, as the carbon stocks in the baseline scenario are lower than those in the project scenario. The average carbon stocks in the forest classes were determined to be 2.86 tC/ha as compared to 0.81 tC/ha in the non-forest classes. The litter carbon pool is not a required pool under VM0015, and the exclusion of this pool would be conservative. The exclusion of the litter carbon pool does not impact the applicability of the methodology, additionality, or the appropriateness of the baseline scenario. The baseline scenario for the project is the conversion of primary forest to subsistence agriculture and pastureland. The inclusion of the litter carbon pool is not required by the methodology, and it is lower in the baseline scenario than the project scenario, so its exclusion is conservative.
Quantification Impact:	This Project Description deviation meets the VCS Standard v3 principle of conservativeness. Because the carbon stocks in the litter pool are expected to decrease in the baseline case, the impact of dropping the litter carbon pool on GHG emissions reductions and removals is conservative.

Second Deviation	
Source:	Project Description Section 5.3.6
Criteria and Procedures:	Adding new plots to improve the precision of carbon stock estimates.
Relation to Monitoring or Measurement:	This procedure is related to measurement and monitoring. Increasing the precision of carbon stock estimates is analogous to improving the measurement of carbon stocks. Additional plots relates to monitoring of carbon stocks during the reporting period.
Requested Deviation:	The requested Project Description deviation would be to add 35 plots allocated in non-forest classes and 6 plots allocated in the Humid forest class in order to reduce measurement uncertainty. Improved estimates of carbon stocks would be used symmetrically in the baseline and project scenarios.
Justification:	The addition of plots reduces uncertainty and therefore should be allowed.
Quantification Impact:	The carbon stock estimate for above-ground non-tree in Humid forest decreases from 128.7 to 126.26 tC/ha while in Non forest classes zero.

Third Deviation	
Source:	Project Description Section 7.3
Criteria and Procedures:	Updating the Project Description to qualify the project as providing Exceptional Biodiversity Benefits.
Relation to Monitoring or Measurement:	This procedure is related to biodiversity monitoring. Indicators were established for the monitoring of biodiversity, which have been added to the Project Description. These indicators were monitored during this monitoring period and results can be found in Section 8.3**Error! Reference source not found.**
Requested Deviation:	Originally this project was not validated for providing Exceptional Biodiversity Benefits. However, since many endangered species are present within the project area, project

	activities were implemented to provide these biodiversity benefits within the project area. Therefore, this project is seeking verification for providing Exceptional Community Benefits under CCB Standards V3.1.
Justification:	The project area qualifies as a 'Key Biodiversity Area' according to the CCB Standards v3.1, under the vulnerability criteria, which requires the occurrence of at least a single individual critically endangered or endangered species. Part of the project area is a known habitat for 6 such species, mostly amphibians. Since the project has implemented activities such as the establishment of an amphibian preserve and educational programs to protect these species from disease, this is an acceptable deviation under Section 3.5.7, Rule 3 of CCB Program Rules v3.1, since this is a substantial change in the positive biodiversity impacts. Section 7.3 of the Project Description and relevant supporting sections and tables have been updated to account for these changes, as required by these rules.
Quantification Impact:	This deviation has no impact on carbon quantification since it relates to biodiversity monitoring, not forest and carbon monitoring.

3 LEGAL STATUS

3.1 Compliance with Laws, Statutes, Property Rights and Other Regulatory Frameworks (G3 & G5)

FUNDAECO is compliant with all relevant local and national laws, including those listed in table 12 below.

Law	Summary and Relevance to Project
Decree 07-2013. Framework for the Regulation of the Reduction of Vulnerability, the Mandatory Adaptation to the effects of Climate Change and the Mitigation of the effects of Greenhouse Gases.	This law establishes right of use for landowners.
Law for Forestry Incentives for Possessors of Small Extensions of Land for Forestry or Agroforestry Use	This law creates economic incentives for possessors of small parcels to participate in agroforestry or forest conservation activities.

(PINPEP). Decree 51-2010	
Draft of the Law for Promoting the Establishment, Recovery, Restoration, Management, Production, and Protection of Forests in Guatemala (PROBOSQUE)	This bill proposes to continue the forestry incentive program in Guatemala from 2017 for another 30 years. PROBOSQUE also extends the scope of the original PINFOR to be more socially inclusive.
Protected Areas Act	The National Commission for Protected Areas and the Guatemalan System for Protected Areas (SIGAP) were created to ensure the optimal functioning of essential ecological processes and of vital natural ecosystems for the benefit of all Guatemalans. This act designates specific areas of Guatemala as protected areas with specific land use restrictions.
Forestry Law	The law deems reforestation and forest conservation as matters of national urgency and of social importance. It also promotes the idea of sustainable management for forest development and is the law that first established the National Forestry Institute and the Program for Forestry Incentives (PINFOR).
Law on Land Registry	Established the registry for cadastral data on the national level. The law also defines different types of property and land ownership such as community lands, and possessors.
Law for the Public Access to Information	The objective of this law is to guarantee that all interested parties, free from discrimination, have the right to request and access public information in the possession of the central authorities and local government. This is a key tool for the dissemination process of both the project and the national ER program.
Forestry Policy	The objective of this policy is to increase the socioeconomic benefits derived from the goods and services produced in forest ecosystems and to contribute to land management in rural areas through productive management and the conservation of natural resources.
Agricultural Policy	The agricultural policy aims to transform the agrarian situation of Guatemala by promoting legal possession and land tenure, as well as the resolution of land conflicts so that together with the use of other productive assets, conditions are improved of the population lives in rural areas and integrated rural development is fostered, in a multicultural society
National Policy for Integral Rural Development (PNDRI)	This policy's objective is to achieve improvements in the quality of life for people in rural areas through equitable access and sustainable use of productive resources, means

	of production, and natural and environmental goods and services.
Policy for Biological Diversity	It aims to promote effective management of biodiversity in Guatemala by emphasizing conservation and sustainable resource use as a crucial factor in sustainable development.
National Policy for Climate Change	The Climate Change policy's objective is to have Guatemala adopt risk prevention measures on a national and municipal level in order to reduce vulnerability and improve adaptation to climate change. It also aims to reduce GHG emissions in order to improve the quality of life of Guatemala's citizens and to strengthen Guatemala's influence in international climate change discussions.
National Strategy and Action Plan for Biodiversity 2012-2022	This is a tool developed to implement the national Policy for Biological Diversity and to complement article 64 of the Constitution, which declares that conservation, protection and improvement of the country's natural resources are topics of national concern.
National Development Plan Katun 2032	A national development plan with goals for sustainable development throughout Guatemala by 2023.
Plan of Action for the Prevention and Reduction of Illegal Logging in Guatemala	This plan aims to strengthen institutional actions to prevent and reduce illegal logging, while fostering responsible participation of related stakeholders to design and implement a long term strategy
Forestry Concessions	Established zones for forestry use and management for both communities and industry. Management units are defined by CONAP and are approved for a specific type of use or management of the area's natural resources, which can involve sustainable management, protection, conservation, and improvement. Concessions are granted for long periods of time and require the development of management plans, environmental impact assessments, and land use plans, which are approved by CONAP to ensure compliance with regulations. CONAP has granted a total of fourteen different concessions, twelve of which are community-managed and two of which are for industrial use.
National Strategy for the Sustainable Production and Efficient Use of Firewood	The strategy aims to develop tools and skills that guarantee availability of fuel wood by sustainable production, and adoption of efficient technologies. Allowing the prevention of health problems related to smoke and forest conservation.

Table 12. Laws, their relevance and project compliance.

3.2 Evidence of Project Ownership (G5)

Based on the VCS Standard Section 3.11.1, the project demonstrates that the proponents have project ownership over the emission reductions under subsection 4:

"Project ownership arising by virtue of a statutory, property or contractual right in the land, vegetation or conservational or management process that generates GHG emission reductions and/or removals (where such right includes the right of use of such reductions or removals and the project proponent has not been divested of such project ownership)"

As a grouped project the REDD+ Project for Caribbean Guatemala has a number of landholders with different land tenure arrangements where project activities are implemented and emission reductions can be claimed. Different tenure arrangements include private property, private property holders without formal title termed possessors, community lands, State lands administered by CONAP, State lands given in concession to communities and industries and other users. With the exception of possessors, all of the tenure arrangements present in the grouped project area arise from either formal titles or formal management agreements with the State. These formal agreements are catalogued by the Cadastral Information Registry (RIC) following the Cadastral Information Registry Act of 2005 (Decree 41-2005).

In the case of possessors, land titles are recognized by the State through municipal certificates. A possessor is defined as a land holder who without being land owner exercises some or all of the usual property rights over a piece of land (Article 23 of Decree 41-2005). PINPEP furthers the definition of a possessor in the context of forests and delineates clear statutes of property rights and required documentation. PINPEP rules hold that to be recognized as a land holder without title (i.e. possessor) a certificate provided by the mayor of the relevant municipality is required declaring that the person concerned is known as the local occupier of the land in a way that is peaceful, public, permanent and in good faith and that no competing claim on the land is known.

With established rights to property Article 22 of the Framework for the Regulation of the Reduction of Vulnerability, the Mandatory Adaptation to the effects of Climate Change and the Mitigation of the effects of Greenhouse Gases (Decree 07-2013) further the Rights of Use of legal owners or possessors of lands to emission reductions generated in either voluntary or compliance markets. For the REDD+ Project for Caribbean Guatemala, all participating properties have transferred their emissions reductions Rights of Use to FUNDAECO. Contracts with each land owner are confidential, but will be provided to auditors as part of the Project Description annexes. Each contract transferred project ownership for a minimum of 30 years. Where project activities have been implemented since the project start date carbon rights are transferred retroactively and land owners have declared to not participate in any other emissions trading programs.

3.3 Emissions Trading Programs and Other Binding Limits (G5)

Guatemala submitted an Intended Nationally Determined Contribution (INDC) to the UN Framework Convention on Climate Change's (UNFCCC) Paris Agreement in 2015. The Paris Agreement will not take effect until 2020 and as such no emissions trading programs currently exist within Guatemala. Currently a national REDD+ program is under development but is not yet operational.

3.4 Participation under Other GHG Programs (G5)

The project has not been registered, nor is it seeking registration under any other GHG program.

3.5 Other Forms of Environmental Credit (G5)

Carbon credits are currently the only environmental credit being generated from this project. In addition, the appropriate legal agreements are in place between project participants to ensure credits are not sold more than once.

3.6 Projects Rejected by Other GHG Programs (G5)

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

3.7 Respect for Rights and No Involuntary Relocation (G5)

The Free Prior and Informed Consent process was implemented by FUNDAECO with the identified stakeholders mentioned in Section 7.2. The project team and field technicians developed more than a 100 meetings, workshops and assemblies to present the project to the communities and institutions involved in the project, and to discuss their support or consent.

The information presented and discussed during the FPIC process explained: the fundamental knowledge about Climate Change and the environmental services of the forest; the deforestation rates of the Caribbean Guatemala; the concepts and elements related to REDD+, and the objectives, strategies and benefits of the REDD+ Project.

With the purpose of performing a FPIC process that meets the criteria of the international conventions, the project was launched by the Department Governor, through a meeting request with the main institutions and coordination groups, including interinstitutional coordination groups, development Councils, and regional associations. The launching call and invited institutions and groups are presented in the Informe de Proceso FPIC.

The strategy followed during the implementation of the FPIC process (detailed in document “Informe de Proceso FPIC”) looked to cover all the coordination and organization levels within the project region starting with: the Governor presentation; then meetings with governmental institutions, interinstitutional coordination groups, and development Councils; meetings with key community groups and leaders and finalized with workshops with private forest owners and other stakeholders.

More than 100 consultation and socialization events where held from during the reporting period (meetings, workshops, assemblies, etc.) in which more than 2400 people participated (between community groups, governmental institutions, community leaders, private stakeholders, women rights groups, etc.).

The free and previous consultation process developed with the communities involved in the REDD+ project was made in order to obtain the community participation and validation of the proposed project, it also helped –in an indirect way- to obtain the communities’ main concerns regarding the implementation of the project and the activities that FUNDAECO should develop to support the REDD+ project (see Informe de Proceso de Consulta Previa _ GPV4.docx).

The project does not require or involve the involuntary relocation of people or of activities important for their livelihoods or culture. The project is designed respecting and supporting people rights, in this sense the project includes land legalization actions that allow interested communities, with historical rights but without land titles, to include their forest in the grouped project area.

3.8 Illegal Activities and Project Benefits (G5)

Illegal activities that have historically occurred within the project area include deforestation for land use change purposes, and illegal logging. The project does not benefit from deforestation for subsistence agriculture or cattle grazing purposes or the removal of timber through illegal logging. These activities result in negative impacts to project benefits, and as a result the project has several ways of minimizing illegal activities with in the area, as shown in table 13 below.

Illegal activity	Action	Benefit
Illegal logging	Support to law enforcement	Support to Guatemalan institutions in charge of law enforcement, especially CONAP, INAB and MP.
		Support to communities or individual forest owners in legal following in case of illegal activities committed by a third part.
		Support in forest patrols especially to communities or individual forest owners that do not have the resources to deploy this action.
	Forestry plantations	Access to resources
Deforestation	Law enforcement	Support to Guatemalan institutions in charge of law enforcement, especially CONAP, INAB and MP.
	Forest patrols	Support to communities or individual forest owners in legal following in case of illegal activities committed by a third part.
	Support for access to forestry incentives program PINFOR and PINPEP, and incomes from VCUs	Access to resources as they will not have to pay for a professional to prepare files to be presented to incentives Programs PINFOR and PINPEP, alternative incomes from incentives and VCUs
	Support for agroforestry plantations and access to markets	Access to resources (plantations supplies, technical assistance, marketing support) and alternative incomes

Table 13. Illegal activities which may negatively affect the Project.

4 APPLICATION OF METHODOLOGY

4.1 Title and Reference of Methodology

The project used the VCS-approved methodology VM0015, v1.1, "Methodology for Avoided Unplanned Deforestation" for quantification of GHG emission reductions and removals generated from avoided unplanned mosaic deforestation.

In combination with the methodology, the latest version of the following approved tools and modules were used by the project:

- CDM A/R Methodological Tool Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities.
- CDM A/R Methodological Tool 03 Calculation of the number of sample plots for measurements within A/R CDM project activities.
- CDM A/R Methodological Tool 06 Procedure to determine when accounting of the soil organic carbon pool may be conservatively neglected.
- CDM A/R Methodological Tool 09 Estimation of GHG emissions related to displacement of grazing activities in A/R CDM project activity.
- CDM Tool for testing significance of GHG emissions in A/R CDM project activities.
- VM0003 Methodology for Improved Forest Management Through Extension Rotation Age (IFM ERA), v1.2
- VCS Tool VT0001 Tool for the demonstration and assessment of additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) project activities.
- VCS Tool for calculating deforestation rates using incomplete remote sensing images.
- VCS Module VMD0033 Estimation of emissions from market leakage.

Finally, the project meets all of the requirements for models and default factors set forth in the VCS Standard v3.7, issued October 19th, 2016, and the VCS AFOLU Requirements v3.5, issued October 19th, 2016.

4.2 Project Boundary (G1)

Carbon Pools:

Carbon Pool	Included?	Justification/ Explanation of Choice
Aboveground tree biomass	Yes	Major carbon pool affected by project activities.
Aboveground non-tree biomass	No	May be conservatively excluded as it expected to decrease under the baseline scenario.
Belowground biomass	Yes	Major carbon pool affected by project activities.
Dead wood	No	May be conservatively excluded as it expected to

		decrease under the baseline scenario.
Litter	No	May be conservatively excluded as it expected to decrease under the baseline scenario.
Soil organic carbon	No	May be conservatively excluded as it expected to decrease under the baseline scenario.
Wood products	Yes	Major carbon pool affected by project activities

Table 14. Carbon pools inside the Project

Sources of GHG Emissions:

	Gas	Included?	Justification/Explanation
Biomass burning	CO_2	No	Accounted for as changes in carbon stocks
	CH_4	No	Not a significant source (<5%) according to the revised LULUCF IPCC GL 1996 document.
	N_2O	No	Considered insignificant according to VCS Program Update of May 24th, 2010
Livestock Emissions	CO_2	No	Not a significant source
	CH_4	No	Not an included activity
	N_2O	No	Not an included activity

Table 15. Sources of emissions inside the Project.

4.3 Baseline Scenario (G2)

Per VM0015, the most plausible baseline scenario for the project is continued unplanned deforestation for agriculture and grazing activities resulting in removal of old growth/primary forest. The project area would be deforested in the absence of the REDD project activity. The deforested areas are mosaic in nature.

<u>Deforestation of old-growth/ primary forest without logging (A)</u>

This option applies because under mosaic deforestation, the historical changes in land-use are representative of the most likely future changes in land-use.

4.3.1 Without-Project Scenario for Communities (CM1)

FUNDAECO made a scenario exercise based on methods proposed by Richards and Panfil (2011).

Focal questions were related to access to land and natural resources in both the baseline and project scenarios. The focal issues within the community were tied directly to the agents and drivers analysis, as is described in the PD.

Six main focal issues for communities were identified:

- Access to land
- Maize production/crop lands
- Access to livelihoods other than maize
- Rains and water
- Education
- Sexual and Reproductive education and health

a. Access to land: access to land is one of the main focal issues, and it means access to croplands, pasture land, and other natural resources including wood, fuelwood, and water sources. At the community level, access to land also means access to sacred sites.

   In absence of the project, it is expected that communities will continue the fight for the establishment of agricultural and pastoral land in forested areas due to factors such as the expansion of industrial agriculture in previously cultivated low-land areas and increasing population. However they are aware of the need they have for external support such as provided by FUNDAECO and the project, due that the process for land titling requires the preparation of technical and social files, as well as administrative procedures and lobbying with FONTIERRAS headquarters in Guatemala. They are aware that without land, there is no food security, but they also preview other situations such as migration and social conflict.

b. Maize production: Maize crop is considered focal issue since it means food security to families that cultivate it for consumption. During the exercise, the issue was analyzed from the production perspective; sufficient yield and a not sufficient yield, to feeding family needs. Production is related to quality of grain, agricultural practices, and quality of soil. When adding other driver forces such as quality soil and land, and population growth the scenario shows that this is a multi-variable force, that then need to be addressed considering all other identified forces.

   In the present, quality lands are scarce and peasants lack of best agricultural practices; so to get enough yield peasant needs to use more land, in shorter fallow cycles.

   Without the project, communities will stay in present conditions, meaning they will need to expand croplands eliminating forests, but also getting into others lands when their land is not producing enough. When added population growth factor, situation turns into social conflicts. Other envisaged situations are related to lack of rains (“the forest produces rains”), erosion and disasters.

c. Access to livelihoods other than maize: Livelihoods other than maize can include other crops, but also activities such as ecotourism, or work opportunities. However, this driver force relies on some other forces such as access to markets, best organization and entrepreneurial capacities.

Without the project, there will be less access to project activities and then less support to diversified and alternative livelihoods. It is recognized that the government have some programs, but lack of capacities to identify priorities, reach communities and make a good follow-up of their program beneficiaries. In this scenario, communities will need to turn to unsustainable wood extraction, unsustainable maize expansion and migration to uncertain conditions; poverty will increase.

d. Rains and water: Considered as contributing forces since crops and domestic consumption rely on them, rain and water are an uncertain driver force since there are no specific models for the region. However local have started to feel difference between previous patterns and present rain patterns, in the last years yields were affected by longer dry seasons, at the same time that disasters have occurred with heavy unusual rains over deforested lands, and river flows are reduced compared to before volumes.

When analyzing this driver force it is clear that there is a local knowledge on the influence on forest in the rivers flows and rains. Without project, there will be no law enforcement or access to incentives that guaranteed watersheds protection, that will be deforested leading to reduced river flows and competition for its use.

e. Education this is a driver force related with livelihoods but also to general community welfare. In the present communities, do not have access to high school, or to technical education levels. This reduces their work opportunities. In addition, the situation is worst for women that in many cases do not finish even elementary school. Without the project education opportunities for women area reduced.

f. Sexual and reproductive education and health: In the present women need to walk long distances to the nearest public health services, and they can die during pregnancy or birth from causes that can be prevented; rural and isolated communities in the project region have high mortality rates, compared just to the ones from Africa. There is also no access to family planning methods which impacts in the health of women and children, but also in the family economy, and resources such as croplands.

Without the project, mortality rates for pregnant women will remain the same, but also their health conditions in general. Moreover, population growth will affect scarce resources, especially land and cropland.

4.3.2 Without-Project Biodiversity Scenario (B1)

Biodiversity conditions in the baseline scenario were analyzed based on the observed and predicted land use changes taking place in the project region. As discussed in Richards and Panfil (2011), changes in biodiversity are strongly correlated with changes in forest cover, making it possible to measure and analyze biodiversity health by using proxy indicators within the environment. The fact that biodiversity abundance is directly correlated with habitat (i.e. forest cover), and ecosystem health is possible to determine impacts on biodiversity from broader-scale assessments on an ecosystem or regional level. This method of analysis was used for the FUNDAECO Project to inform the development of the theory of change model for biodiversity, including project objectives and activities geared towards bringing about biodiversity benefits (see Section 8 and TOC Activity Matrix v1.14.xlsm).

Through an understanding of the biodiversity that has historically been supported within the project region and an analysis of trends in forest loss in this area, the trajectory of ecosystem health can be accurately predicted. The project region consists of a network of threatened forest areas that provide invaluable

habitat for an abundance of endemic species, as well as numerous migratory species. These forests also provide large-scale ecosystem services such as nutrient enrichment, erosion control, and hydrological function that benefit both communities and biodiversity within the region.

The ecological integrity of these forests, however, has been severely impacted by anthropogenic land use change over the past several decades. An analysis of deforestation within the Sarstun Motagua reference region from the period of 2001-2010 showed an annual rate of deforestation of 3.41% (see fundaeco_deforestation_rate_v1.4.xlsx for details). This translates to a staggering loss of roughly 20,503 hectares of forest per year.

The problem flow analysis for biodiversity in Table 16 shows how the drivers of deforestation create a causal chain of events that result in the loss of forest area and have negative effects on biodiversity throughout the region. Not only have these drivers already contributed to huge losses in forest area throughout the reference area in the past decade, but there were no direct actions being taken in the absence of the project to address any of these threats. Without the project's intervention, there are no indications that measures would be taken to protect and maintain biodiversity within the Sarstun-Motagua region, which would result in the further fragmentation and loss of forest habitat as well as the decline in health and abundance of forest and marine species.

Project Intervention Areas	**Contributing Factors**	**Contributing Factors**	**Direct Threat**	**Conservation Target, Focal Issues**
Governance and resource protection (strengthening enforcement of the law, legal framework, land title, land-use planning & implementation)	Limited local resources, legal framework, governance and capacity for land-use planning	Little to no enforcement of laws against forest clearing Lack of clarity & definition of individual / family land rights. Ineffective land-use planning	Conversion to crop land Conversion to pasture for cattle ranching Illegal settlement of land Logging, fuelwood collection, and fishing for local enterprise, domestic use Commercial sale of fuel wood, charcoal, and fish	In-tact forest area (diminished forest area, fragmentation, degradation of forest composition, structure, function and habitat) Marine life Biodiversity HCVs
Providing access to resources, alternative livelihoods	Limited local resources , and limited alternatives to land clearing, timber extraction, and fishing	Unmet economic, sustenance needs for families. High demand and price for timber and seafood.		
Education and community empowerment		Limited local capacity for environmental leadership project implementation		

Table 16. Biodiversity problem flow analysis.

The model of the baseline scenario also corroborates the biodiversity problem flow analysis in that large-scale deforestation is predicted to affect biodiversity throughout the reference region and project area were the project not in place. The baseline model shows a decline in forest area of 11% over the next 30 years in the Grouped Project Area, resulting in a loss of roughly 108,800 total hectares of forest (see Figure 13 and Fundaeco VM0015 Accounting Model v1.99.xlsm) A loss of forest of this magnitude would result in dramatic negative effects on biodiversity through the loss, and degradation of habitat and ecosystem functions. These predicted outcomes highlight the necessity of effective conservation measures throughout the region.

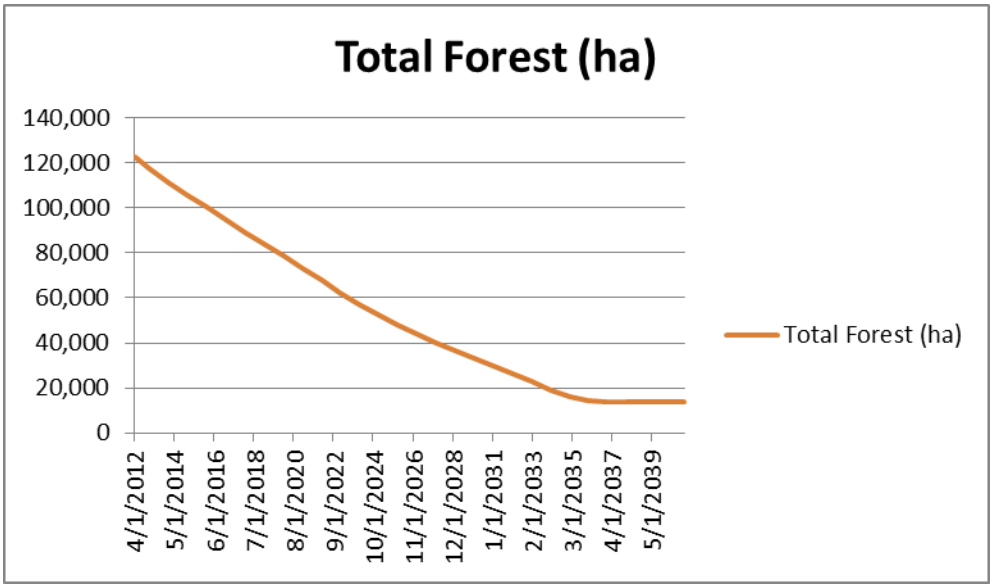

Figure 13. Grouped Project Area forested area (ha) over time in baseline scenario.

4.4 Additionality (G2)

4.4.1 VCS Tool for the Demonstration of Additionality

The project has used the VCS Tool for the Demonstration of Additionality in VCS AFOLU Project Activities (VT0001) version 3.0 to assess the additionality of the project and select the baseline scenario. The assessment remains unchanged since the time of validation.

Step 1: Identification of alternative land use scenarios to the proposed VCS AFOLU project activity

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

i. Continuation of pre-project land use. The following land uses occurred in the project area prior to project initiation:

1. Unplanned expansion of small-scale commercial agriculture, subsistence agriculture, and cattle grazing – As stated above, the *Ladino* and *Q'etchi* communities are

relocating from fluvial valleys to protected areas due to heavy investment for large-scale commercial production of timber species, palm oil, and cattle-grazing. The remaining forested areas and protected areas of the region are located in the region's mountains that are generally above 300m in altitude with steep slopes and are unattractive for agro-industrial cultivation. As a result, agents of deforestation are typically small-scale farmers growing annual or permanent crops and farming livestock. This land use results in deforestation (unplanned).

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

2. It is possible, though highly unlikely, that FUNDAECO could prevent deforestation from small-scale farming and cattle-grazing that result in the project area without registering the activity as a VCS project and by financing alternative livelihood and other project activities through aid agencies, philanthropy, or grants.
3. It is possible, though highly unlikely, that national or international development or non-governmental organizations could implement similar alternative livelihood, governance, and capacity building activities to reduce deforestation.

iii. Activities similar to proposed project activity on at least part of the land within the project boundary resulting from legal requirements or observed similar activities

4. PINFOR and PINPEP, described above in Section 3.1, are established forest protection programs by INAB that include payments for conservation or protection of forest resources on private lands. It is possible, although highly unlikely, that landowners could pursue these payments individually in the project area to protect or conserve forested areas and prevent unplanned deforestation.

Sub-step 1a(b): Credibility of identified land use scenarios

Scenario 1 was present in the project area prior to project initiation and is thus credible. The drivers of deforestation study carried out by the CNCG working group (see CNCG SM drivers of deforestation_final_1.pdf) confirm that these land uses were present in the project area prior to the project start dates and are likely to continue unabated in absence of the project. Scenario 2 above is considered credible since FUNDAECO has been operating in the Izabal region for over 20 years through various financing strategies including donors. Scenario 3 is considered credible because while aid and non-governmental organizations have implemented sustainable development projects in the region before, they have been markedly different in scale. Scenario 4 is considered credible as there are existing regulations for PINFOR and PINPEP (see Section 3.1) that are managed by INAB and these activities are present in the project area prior to project initiation.

Sub-step 1a(c): List of credible alternative land use scenarios

1. Unplanned expansion of small-scale commercial agriculture, subsistence agriculture, and cattle grazing, see number 1 above.

2. Implementation of alternative livelihood and other activities to reduce of deforestation due to small-scale agriculture and cattle-grazing by FUNDAECO through financial resources other than carbon credits, see number 2 above

3. Implementation of alternative livelihood, governance, and capacity building activities to reduce deforestation by an international or national non-profit, see number 3 above.

4. Application for conservation payments through the PINFOR or PINPEP programs by individual landowners resulting in reduced deforestation.

Sub-step 1b(a): Consistency of credible land use scenarios with enforced mandatory applicable laws and regulations

i. Scenario 1 is legal within the project area except for within the *Zona Nulceos* of protected areas that according to the *Planes Maestros* does not allow for the use of natural resources or any production system including agriculture, livestock, or forestry (see Plan Maestro Cerro San Gil.pdf, plan maestro Parque Nacional Rio Dulce.pdf, Plan Maestro Parque Regional Municipal Montana Chiclera.pdf, Plan Maestro Punta de Manabique.pdf, Plan Maestro Río Sarstún 200709.pdf, and Decreto 16-2014_Sierra Caral.pdf). Around the *Zona Nucleos* within protected areas are *Zona de Uso Multiplo*, *Zona de Amortiguamientos*, and *Zona Recreativas* where natural resources use or productions systems including agriculture, livestock, and forestry are permitted. Outside of the protected areas Scenario 1 meets applicable laws. Land use scenarios 2 & 3 involve the action of local or international NGOs and it is assumed that their activities would be in compliance with regulatory requirements. Land use scenario 4 is based on the regulatory framework of the PINFOR and PINPEP laws, described above in Section 3.1, and is this in compliance with all regulatory requirements.

ii. In the case of Scenario 1, an analysis of current practice with *Zona Nucleos* is presented demonstrating that the mandatory laws with these areas are not enforced and non-compliance within these areas is widespread. As discussed in Section 4.5.3 of the Joint VCS and CCB Project Description, an exploratory factor analysis of 501 questionnaires concerning the regional population's views on the cause of deforestation found that a "Lack of Laws, Enforcement and Capacity" is the second factor in explaining the quantity of deforestation in the region. This suggests that the regional population recognizes that mandatory laws within the region are not enforced and non-compliance often passes with no oversight from the legal authority of CONAP.

In addition to this evidence, the rate of deforestation was analyzed during the historical reference period based on LULC maps for 2001, 2006, 2010 (see Section 5.3 of the Joint VCS and CCB Project Description). Over that time period the *Zonas Nucleos* had a deforestation rate of 1.16% while within the Reference Region the deforestation rate was 3.41% (see fundaeco_deforestation_rate_v1.4.xlsx and Fundaeco Deforestation Rate - Zona Nucleos v1.1.xlsx). Although the deforestation rate appears low to that of the reference region, this remains a relatively high deforestation rate that results in 2,260-ha of forest loss per year in areas where deforestation is illegal. Moreover, an analysis of the spatial drivers of deforestation (see Section 4.5.3 of the Joint VCS and CCB Project Description) demonstrated that elevation, slope, distance to forest edge, distance to secondary roads, and distance to navigable hydrology were the variables that explained the greatest variance in locations of forest loss, where lower values explained greater deforestation. The average of each of these variables over forested areas for 2010 is presented in Table 17 across two areas: 1) the Grouped Project Area with *Zona Nucleos* removed and 2) the *Zona Nucleos*.

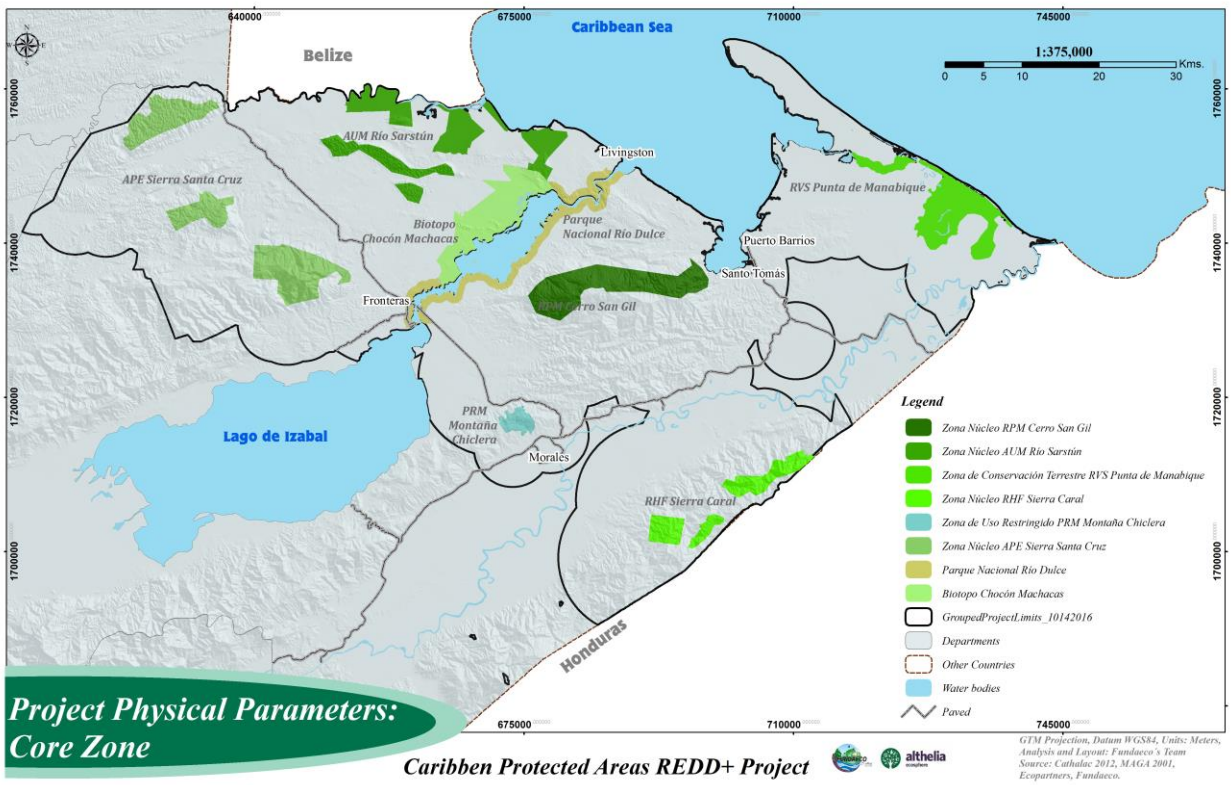

Figure 14: Map of the Core Zone (Zonas Nucleos).

Spatial Variable	Grouped Project Area	Zonas Nucleos	Grouped Project Area sans Zonas Nucleos
Elevation (meters above sea level)	301.012	340.22	247.69
Slope (Percent rise)	27.531	24.90	28.08
Distance to Forest Edge (meters)	0.229	0.0967	0.3699
Distance to Hydrology (meters)	4268.83	5818.19	5138.75
Distance to Navigable Hydrology (meters)	7131.2	6347.0	7862.66
Pop Density (people per square meter)	106.984	105.673	116.63
Distance to Secondary Roads (meters)	4268.83	5818.19	3153.18

Distance to Tertiary Roads (meters)	1701.42	2363.07	1227.0
Distance to Primary Roads (meters)	11780.8	12729.4	10987.6
Farm coverage (coverage metric, higher = more coverage in region)	2844.35	1958.7	3575.26
Pasture coverage analysis (coverage metric, higher = more coverage in region)	34115.5	30543.1	36200.69

Table 17. Average values of explanatory spatial variables of deforestation with the Grouped Project Area, the Grouped Project Area sans Zonas Nucleos, and the forest area in the Zona Nucleos.

Table 17 demonstrates that the identified spatial variables in the *Zonas Nucleos* are greater than that of the average of the Grouped Project Area and provide explanation for outside governance and oversight by CONAP for a lower deforestation rate. As *Zonas Nucleos* are often contained within the upper reach of mountain ranges in Izabal and within the interior of protected areas, this result is expected.

Lastly, the seven protected areas within the Project Zone are co-managed between FUNDAECO and CONAP. This is demonstrated in the Plan Maestros where FUNDAECO is listed as a management partner. This points to the fact that if FUNDAECO were not to receive additional funds through the REDD+ Project for Caribbean Guatemala, the capacity of an important management partner would be compromised proving that despite the illegality of deforestation in *Zonas Nucleos*, Scenario 1 remains additional.

Together, this evidence demonstrates that the local population recognizes the lack of enforcement within protected areas which is demonstrated by the 2,260-ha of forest loss per year in *Zonas Nucleos.* Although this deforestation rate is low compared to that of the reference region, this can be explained by location rather than governance or legal authority.

iii. Based on above, no land use scenarios have been removed.

Sub-step 1b(b): Outcome of Sub-step 1b

1. Unplanned expansion of small-scale commercial agriculture, subsistence agriculture, and cattle grazing, see number 1 above.

2. Implementation of alternative livelihood and other activities to reduce of deforestation due to small-scale agriculture and cattle-grazing by FUNDAECO through financial resources other than carbon credits, see number 2 above

3. Implementation of alternative livelihood, governance, and capacity building activities to reduce deforestation by an international or national non-profit, see number 3 above.

4. Application for conservation payments through the PINFOR or PINPEP programs by individual landowners resulting in reduced deforestation.

Sub-step 1c: Selection of baseline scenario

Due to the continued displacement of *Ladino* and *q'eqchi'* into protected areas and the lack of adequate governance and resources to limit land conversion for agriculture and cattle-grazing within the project area as demonstrated in Section 4.5.3 of the Joint VCS and CCB Project Description, the most plausible baseline scenario is the continuation of previous and current land use scenario (scenario 1 above). This scenario has been ongoing in the project area and reference area over the last decade and is unlikely to cease without effective intervention.

The project activities described in this document require substantial financial resources and long-term presence in the project area to manage the activities. Without significant financial returns to ensure project longevity, aid and non-governmental projects cannot operate at the scale described above. Because of these limitations on potential regional, national, and NGO activities, scenarios 2 and 3 were not selected.

PINFOR and PINPEP offer an alternative revenue source for forest protection and conservation that has existed in the project area prior to project initiation. Application to PINFOR and PINPEP, however, involves several technical steps including mapping of property and forest boundaries, forest inventory, and completion of technical forms. In Izabal this technical expertise has been primarily provided by FUNDAECO to private landowners and is not carried out by individual landowners. In addition, PINFOR and PINPEP payments are only provided to landowners for several years, after which they receive no additional benefits and cannot re-enroll in the program. This makes PINFOR and PINPEP unviable as long-term economic opportunities for landowners. For this reason scenario 4 was not selected.

Step 2: Investment Analysis

The VCS Additionality Tool requires that either step 2 (investment analysis) or step 3 (barrier analysis) be undertaken (or both). The barrier analysis was selected and is completed below.

Step 3: Barrier analysis

This section shows how project activities would not take place without the revenues arising from the sale of GHG credits.

Step 3a: Identify barriers that would prevent the implementation of the type of proposed project activity

Investment barriers. Similar activities to the Resource Protection, Governance, and Monitoring, Sustainable Enterprise, Education, Community Empowerment & Inclusiveness, and Increased Access to Resources activities identified in the Theory of Change document (see TOC Activity Matrix v1.14.xlsm) have only taken place with the aid of grants from international cooperation, the national government, or international donors. Previously FUNDAECO received international aid to finance project activities that ended in April 2011 (Finalizacion CONTRATO JADE 2010-

2011.pdf). With a slowdown in international aid FUNDAECO deliberately pursued a new financing strategy through REDD+ and forest carbon credits demonstrated by entering a Memorandum of Understanding with the Althelia Fund on August 8th, 2010 (MOU BNP PARIBAS_Complete.pdf). To overcome the lack of international aid and investment barriers FUNDAECO pursued a new financing strategy under REDD+.

Other forms of finance such as debt funding are not available for these types of project activities, unless under a REDD+ project that is conditional on the returns in the form of VCUs. As a non-profit organization that directs income towards management costs and project activities, seeking credit is inherently risky without producing a scalable commodity such as carbon credits. The REDD+ project enables the carbon streams to be used as guarantee.

Institutional barriers. There are risks related to changes in government policies, as the Guatemalan National Emissions Reduction Program is being developed, and there are on-going discussions about the adoption of a jurisdictional framework. Early REDD+ initiatives are being promoted by the Government, and will help bring down the barrier. The main institutional barrier, though, is the lack of enforcement within protected areas by national entities due to following shortcomings identified in Guatemala's Readiness Preparation Proposal(RPP) a)the existence of significant regulatory loopholes; b) cross competencies among different institutions, which often means that none of the institutions take responsibility; c) regulations that lack sufficient coercion; d) few formal areas for public participation in the design and control of institutions and policies; and e) a lack of inter-institutional coordination (Guatemala Final RPP_March 2012.pdf).

Barriers related to local tradition. Traditional use of resources and agriculture is very basic, not linked with broader markets, and relies on the harvest potential of a combination of subsistence crops.

Barriers due to prevailing practice. The REDD+ project promoted by FUNDAECO is the first of its kind in the Izabal Department of Guatemala. There are three other REDD initiatives in the Tierras Baja del Norte region of Guatemala in the Maya Biosphere Reserve, Sierra del Lacandon National Park, and in the eco-region of Lachua. However, none of these projects have achieved validation or verification under VCS or CCBA.

Barriers due to social conditions and land-use practices. Important drivers of deforestation in the area include increasing population and investment in agro-industrial activities in Izabal creating demographic pressure on land.

Barriers related to Land tenure and property rights. The prevailing communal land ownership limits the incentives for conservation, as property rights on the timberlands are not clearly defined. The internal informal tenure systems present a risk of land fragmentation.

Barriers related to markets, transport and storage. There are infrastructure barriers, including lack of transportation, energy and waterways to generate stock piling or processing of agricultural goods in the territories. It is difficult to transport products included in project activities to market as infrastructure is scarce or nonexistent.

Unregulated and informal markets. The markets for products related to the project activities do not allow the transmission of effective information to the communities proposing the project.

Remoteness of AFOLU activities. The project occurs in an area with underdeveloped road and infrastructure resulting in high transportation costs, eroding competitiveness and profitability of non-timber forest products

Lack of infrastructure. There are no facilities to convert, store, or add value to production from proposed project activities. This lack of infrastructure limits the possibilities for communities to profit from the goods produced through the proposed project activities.

Step 3b: Show that the identified barriers would not prevent the implementation of at least one the alternative land use scenarios (except the proposed project activity):

All barriers identified above will not prevent the land use scenarios identified in Step 1.

Step 4: Common practice analysis

Due to the lack of governmental and community resources, there are no operational projects or initiatives to reduce deforestation and forest degradation on this scale in the region. Several REDD+ projects do exist within other regions of Guatemala. These include:

- A project in the Forest Concessions of the Maya Biosphere Reserve, run by *Concesionarios Forestales de Petén* and the Rainforest Alliance. It covers an area of nearly 500,000 ha and aims to strengthen existing activities in sustainable forestry management in the face of future deforestation pressures. It has achieved VCS and CCBA validation and is currently seeking vertification.
- A project in the *Sierra del Lacandón* National Park, run by the *Fundación Defensores de la Naturaleza*. It covers an area of 202865 ha and aims, amongst other objectives, to reduce the advancement of agricultural land into the park, illegal logging, and forest fires. The project is estimated to reduce CO2 emissions by the equivalent of 1,238 million tons over 20 years. It has achieved VCS and CCBA validation and verification.
- A project in the eco-region of Lachuá, run by the *Fundación Lachuá* and the IUCN. The ecoregion of Lachuá consists of 33000 ha of native forests, 14000 ha of which are located within the Lachuá national park. This project has not experienced any recent deforestation, but it is expecting a strong increase in deforestation in the future due to the tarmacking of the road known as the *Franja Transversal del Norte*, a road that crosses Guatemala from east to west. The results of the subnational reference scenario appear to confirm the feasibility of developing a REDD project in this region. It is seeking a VCS and CCBA certification.

While FUNDAECO has supported similar project activities in the region previously, the traditional source of FUNDAECO's financing, international donors, ended in April 2011 (Finalizacion CONTRATO JADE 2010-2011.pdf). In response to this FUNDAECO pursued a new financing strategy through REDD+ forest carbon credits and entered an MOU with the Althelia Fund to initiate the due diligence of this financing strategy (MOU BNP PARIBAS_Complete.pdf). FUNDAECO has been the principle group who has implemented the outlined project activities above (see Section 2.3) in Izabal at a regional scale.

The region is predominately comprised of private landowner, community landowners, and non-titled right holders, who do not have the financial capacity to implement activities similar in scope to those presented

here. Therefore, efforts to reduce deforestation and forest degradation through Resource Protection, Governance, and Monitoring, Sustainable Enterprise, Education, Community Empowerment & Inclusiveness, and Increased Access to Resources, are not common practice in the region. As a result of this analysis, the project activities are determined to be additional.

4.4.2 Community and Biodiversity Benefits

4.4.2.1 Community Benefits

During the reporting period, the project benefited community members according to their location and implemented activities related to the Theory of change, this means that not all communities are getting all the project benefits, as shown below:

- Supported agroforestry initiatives: the provision of agroforestry supplies such as seeds, plants and basic agrochemicals in the initial phases of the agroforestry system. FUNDAECO is providing these supplies just for prioritized agroforestry systems. This benefit covered only communities located in areas deforested before 2001, and where deforestation threats continue.

- Technical assistance for agroforestry: FUNDAECO technicians visited supported producers during the reporting period but also other producers that were willing to improve their production and are organized in productive groups or associations. The technical assistance visits pretended to detect any problem with their crops and give advice to the producer.

- Revenues from agroforestry production: supported producers were able to sell their products and generate revenues. FUNDAECO had a positive role to make this benefit possible, by developing a regional marketing strategy for these products, through the brand "The Conservation Coast ™", that promote the values for these products during the reporting period. FUNDAECO also established an alliance with AGEXPORT to obtain advice and support to access markets to the benefit of producers in the Project Zone.

- Land legalization: FUNDAECO supported historically seated communities in land legalization, by preparing technical and legal files required by FONTIERRAS, and by lobbying institutions involved in land legalization. Land legalization allowed communities to access forestry incentives, and to participate in the project as carbon holders.

- Support to access forestry incentives: PINFOR, PINPEP, PROBOSQUE: FUNDAECO supported communities in the preparation of technical and legal files required by INAB to access the different forestry incentives; this includes forest inventory, forest management plan, legal file and the designation of FUNDAECO professional as forestry regent. This support was provided to communities that are participating as carbon holders. Supported communities received forestry incentives directly from INAB during the reporting period.

- Services in control and surveillance of their properties and litigation: The project has regional control and surveillance team that organizes and implement patrols within all the Project Area.

- Sexual and Reproductive Health and Education: this is a regional benefit provided by FUNDAECO to cover communities within the Project Zone. Many community members, with special focus on women, were provided access to services in the Community Women Clinics and medical days organized by FUNDAECO. As part of the Sexual and Reproductive Health Strategy FUNDAECO also organized talks, courses, and awareness activities, trains young women in

peer to peer education, support midwifes and health promotors in updating their skills during the reporting period.

- Education and training: FUNDAECO provided training focused on young women, in order to support them in finishing elementary and high school. Women were selected according to their willingness and commitment to finish this education phases.

4.4.2.2 Biodiversity Benefits

Main project activities produced positive biodiversity impacts during the reporting period. These have been categorized into four different program areas, through the theory of change approach, that focus on resource protection, empowerment and inclusiveness, education, and access to resources. Many of these project activities effectively maintained and supported biodiversity in the Project Zone to bring about climate and community benefits as well. The realized biodiversity impacts of each program area and its corresponding project activities are described below.

Program Areas	Activities	Medium-term Impacts	Long-term Impacts
Resource Protection and Governance	Implementation of fish restoration zones	Greater clarity and commitment re land-use and sustainable strategies.	Increased awareness of the role of Guatemala's Caribbean coast in the support of diverse and globally important species populations. Maintenance or enhancement of the integrity of important ecosystem services. Widespread protection of forest in project zone
	Enforced protection and management of protected area forests and community water sources	Prevention of habitat loss and maintenance of natural ecosystems. Greater awareness and respect for land title and land-use designations.	
	Increased land tenure and land legalization efforts	Increased area of newly legally registered land that can be brought into forest protection, agroforestry, or reforestation.	
	Environmental litigation, and participation in local government and protected area councils	Continuation of important forestry, land use planning, and climate change laws Increased governance capacity and a positive influence on land management decisions within protected areas	

Empowerment and Inclusiveness	Engagement of community in biological monitoring process including the engagement of local fisherman in reef monitoring initiatives	Increased awareness and knowledge of biodiversity, ecosystems, and threatened or endangered species within the project area and Caribbean coast	Increased awareness of the role of Guatemala's Caribbean coast in the support of diverse and globally important species populations Awareness of rare, threatened, and endangered species and their importance
Education	Ecotourism site establishment	Increased awareness and knowledge of biodiversity, ecosystems, and threatened or endangered species within the project area, Caribbean coast, and world	Increased awareness of the role of Guatemala's Caribbean coast in the support of diverse and globally important species populations Maintenance or enhancement of critical habitat and populations of rare, threatened, and endangered species within the project zone
	Workshops and education initiatives for schools and communities on biodiversity and ecosystem conservation		
	Support for biodiversity research throughout the project zone		
	Training and education for park guards on amphibian fungus and preventing its spread to vulnerable populations	Maintenance and protection of habitat integrity and populations of endangered species	
Access to Resources	Land use planning and legal services in project zone	Increased implementation of forest protection through land use management and land legalization	Widespread protection of forest in project zone Reduced reliance on unsustainable timber extraction
	Establishment of agroforestry plantations and related services to diversify incomes	Decreased illegal timber extraction Local production and employment alternatives	
	Technical assistance for crops, agroforestry plantations, and sustainable fishing.		

	Improved access to ecosystem services payment programs such as PINFOR and PINPEP	Dividends to the community	

Table 18. Theory of change overview for biodiversity related project activities.

5 MONITORING DATA AND PARAMETERS

5.1 Description of the Monitoring Plan (CL4, CM4 & B4)

In the context of FUNDAECO's VCS/CCBA REDD+ project in Guatemala, the purpose of the monitoring plan is to measure and record data and indicators used to measure the climate, community, and biodiversity effect of the project compared to the baseline, without project, scenario. In accordance with project verification standards, FUNDAECO has set up the necessary follow-up mechanisms in order to ensure monitoring of all relevant variables and indicators, including: forest cover; forest degradation; socio-economic data; average family income evolution; reproductive health indicators; employment creation; average agricultural yields; biodiversity monitoring (indicator species); etc. For annual summaries of FUNDAECO's community, and biodiversity impacts see the Monitoring indicator and results Matrix v1.2 2012-2016.xlsx, Memoria de Labores 2012 Fundaeco.pdf, and Memoria de Labores 2013 Fundaeco.pdf). Methodologies used to estimate and model values correspond to those proscribed by VM0015 v1.1, and are detailed in sections 4, 5, 6, and 7 of the Joint VCS-CCB Project Description. Periodicity of monitoring is enumerated for each parameter in Sections 5.2 and 5.3. Roles and responsibilities for monitoring as well as GHG information management systems are in Section 5.1.1.

The climate impact on the project and other areas was monitored using remote sensing, permanent plots measuring the carbon content of the forest, and a suite of monitoring strategies to climate-related activities within the leakage belt and the project area itself. While models of carbon savings will be created to predict the impacts, empirical evidence from the project area and similar control areas outside of the project will be used at verification to confirm the carbon savings generated.

FUNDAECO monitored activities related to community impacts by keeping records of community indicators outlined in the Theory of Change document (see TOC Activity Matrix v1.14.xlsm). By keeping detailed records of the people participating in and affected by community related project activities, FUNDAECO has been able to measure improvements in the quality of life within communities throughout the project zone. See Sections 7, 5.1.2.2 and Procedimiento para el Monitoreo Socioeconomico y Comunitario.docx for a more detailed description of community monitoring procedures and results.

Biodiversity impacts of the project were measured primarily through analyzing the change in intact forest, which was used as a proxy for both floral and faunal diversity. Additionally, FUNDAECO implemented an extensive bird monitoring program in order to catalog avian diversity throughout the project region for use both in the project's biodiversity monitoring goals as well as for use within the scientific community.

5.1.1 Organization and Management

FUNDAECO's organizational structure for project management and implementation consists of four levels: First level is National Directive Level where Board of directors, and Project Directive Committee are involved, this level also includes legal assessment and communications assessment. The Directive level also includes a REDD+ Manager in charge of standards implementation, planning and monitoring.

In order to guarantee that monitoring procedures are effective for the size of the project a Monitoring Coordinator will be working with the REDD+ Manager. The second level includes thematic coordination with units that respond to each of project components. The third level is the Regional coordination Level where the Regional Project Director coordinate directly with field level or the fourth level; the Geographic Coordination or Protected Area Coordination. Each Geographic Coordination has a Coordinator as well as staff who manage teams that implement project activities under the climate, community, or biodiversity categories. See Figure 15 for a detailed organizational structure.

Figure 15. FUNDAECO's organizational structure.

5.1.2 Monitoring Methods

All project activities within the Project Area and Project Zone monitored during this reporting period were consistent with the project activities discussed in the Project Description Document. If any project activities are to be phased out or incorporated at a later date due to adaptive management, the monitoring and implementation plans for the REDD+ Project for Caribbean Guatemala will be updated accordingly.

Each parameter measured will have an associated measurement SOP for each monitoring period, created by the Director for each sector. If an SOP is adapted from one monitoring period to the next, the documents shall be versioned and archived and the monitoring report reference the version and title of the SOP used for that monitoring period. All updates to SOPs shall be approved by the sector director in the national office. The sector directors are responsible for ensuring that all relevant SOPs are adhered to by the regional directors and staff.

5.1.2.1 Climate Monitoring

FUNDAECO quantified the net climate benefit of the REDD+ Project for Caribbean Guatemala through monitoring according to the methodology prescribed by VM0015 v1.1, including monitoring the required areas using remote sensing techniques and permanent forest plots installed and maintained in the project area.

Selected pools included and excluded in the project scenario and a justification for that decision are as follows:

Carbon Pool	Included?	Justification/ Explanation of Choice
Aboveground tree biomass	Yes	Major carbon pool affected by project activities.
Aboveground non-tree biomass	No	May be conservatively excluded as it expected to decrease under the baseline scenario.
Belowground biomass	Yes	Major carbon pool affected by project activities.
Dead wood	No	May be conservatively excluded as it expected to decrease under the baseline scenario.
Litter	No	May be conservatively excluded as it expected to decrease under the baseline scenario.
Soil organic carbon	No	May be conservatively excluded as it expected to decrease under the baseline scenario.
Wood products	Yes	Major carbon pool affected by project activities

Table 19. Selected carbon pools in the project scenario.

5.1.2.1.1 Project Implementation

All climate-related project activities have associated indicators that are monitored at specified frequencies. Project activities implemented in this monitoring period are consistent with the project

activities outlined in the TOC Matrix (see TOC Activity Matrix v1.14.xlsm) and the Project Description. For a list of all monitored climate indicators, see TOC Activity Matrix v1.14.xlsm.

5.1.2.1.2 Stocks and Emissions

The project and leakage areas were monitored for LULC changes using remote sensing techniques approved per the requirements of VM0015 v1.1 as described in Section 5 of the Joint VCS-CCB Project Description and in Fundaeco LULC Classification and Accuracy Assessment Report v1.4.pdf. Data used to analyze deforestation in the project area was all Landsat 8 satellite imagery and followed Chapter 3A.2.4 of the IPCC 2006 GL AFOLU document. A single cloud-free image was used in the final product: the image tile can be seen in Figure 16 and is listed in Table 20 below.

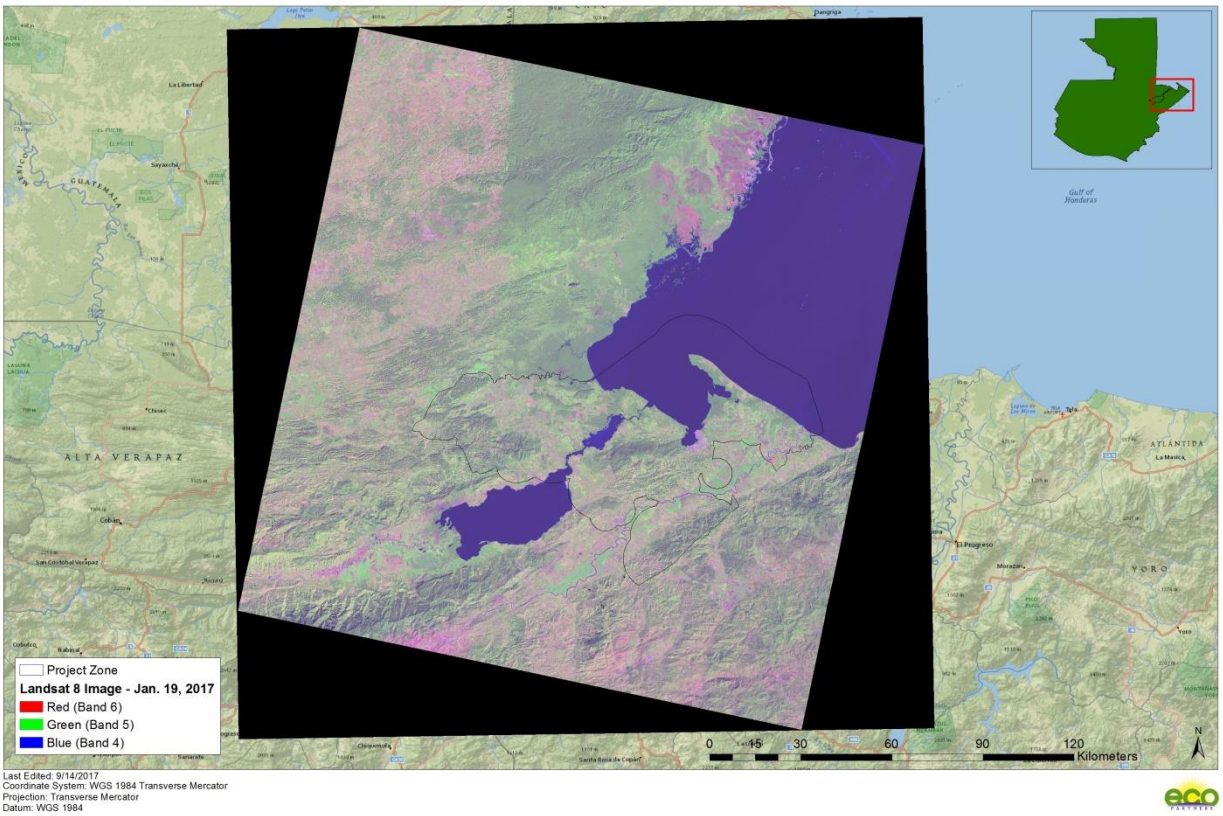

Figure 16: 2017 Landsat image used for LULC classification in false color.

Vector	Sensor	Resolution		Coverage	Acquisition Date	Scene or point identifier	
		Spatial	Spectral	(km2)	(DD/MM/YY)	Path/ Latitude	Row/ Longitude
Satellite	Landsat 8 OLI	30	11	37,368	22/01/2017	19	49

Table 20. Data used for historical LULC analysis

A 2017 LULC map was generated using the procedures described in Fundaeco LULC Classification and Accuracy Assessment Report v1.4.pdf. These map products were derived from the imagery sources listed in Table 20 above, and included pre-processing steps such as orthorectification, and radiometric correction. The imagery was then classified, and an accuracy assessment conducted (see Fundaeco LULC Classification and Accuracy Assessment Report v1.4.pdf).

Pre-processed imagery was used in the classification process. The LULC classes consist of forest land (very humid and humid forest), annual agriculture, permanent agriculture, pasture, shrubs, wetlands, urban, other non-forest, and water, which were also considered in the LULC analysis of the 2001-2010 images. Areas classified as no data were masked out for subsequent processing of map products. For a more detailed description of LULC classification methods and post-processing steps, see Actividad 2.2.2.2 Informe CNCG Q3 FY2014_v2.docx. The accounting of GHG benefits in the project area only included cloud-free imagery. The final LULC image classification for 2017 is shown in Figure 17 below.

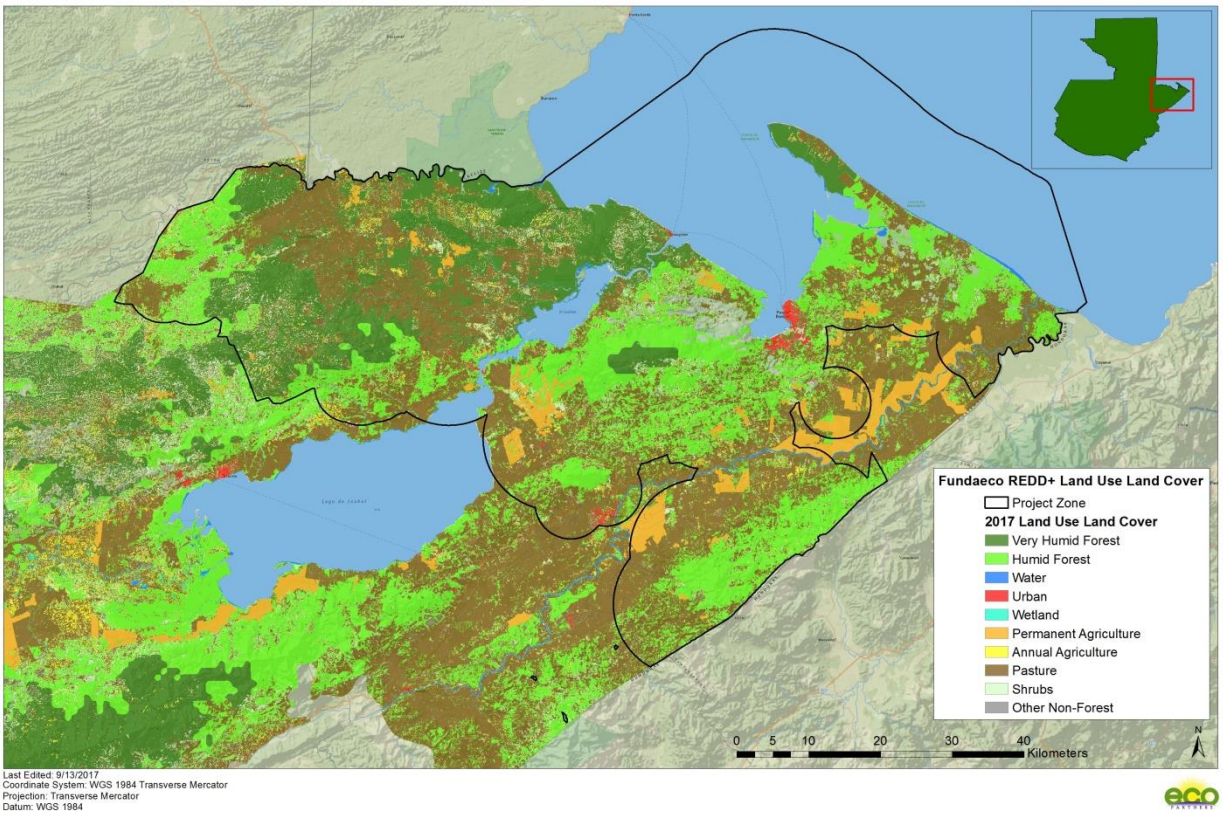

Figure 17: Final 2017 land use land cover classification.

The accuracy assessment was conducted on the 2017 LULC map produced by ecoPartners through the allocation of verification points across the reference region. A minimum of 50 of points were allocated to each class in a fixed grid in order to reach 80% accuracy per class, as required by the VM0015 methodology. The appropriate sampling density was determined from Gongalton & Green (2009), and the sampling points are shown in Figure 18. The results of the map accuracy assessment are shown in Table 21, and described in more detail in the Evaluación de la precisión 06jul2016 MV .docx.

Emissions from the project were quantified using the LULC transitions in the project and leakage areas from the 2017 mosaic relative to the 2010 benchmark map. See Section 6 for the results of the LULC analysis from 2010-2017.

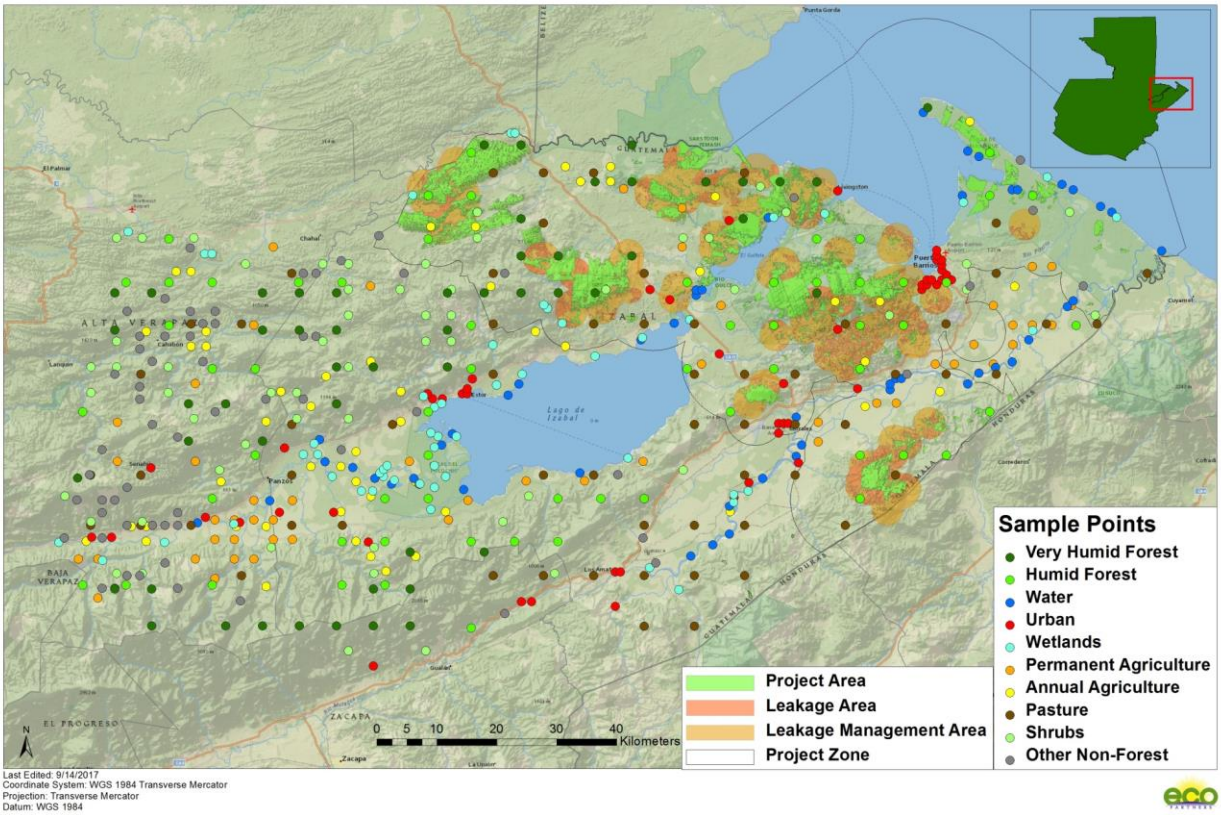

Figure 18: Accuracy assessment point allocation.

	Observed											
	Very Humid Forest	Humid Forest	Water	Urban	Wetlands	Permanent Agriculture	Annual Agriculture	Pasture	Shrubs	Other Non-Forest	Total Classified Points	Classified Correctly
Very Humid Forest	50						2		2		54	92.59%
Humid Forest		50			3	1	2	2	3	1	62	80.65%
Water			48	2	4						54	88.89%
Wetlands				42	1						43	97.67%
Urban			3	1	44	2	3	0	1		54	81.48%
Permanent Agriculture						43	3	4			50	86.00%
Annual Agriculture	1	2		2		1	42	3	1		52	80.77%
Pasture		4		3		2		50	2		61	81.97%
Shrubs	2	5			1	2		2	48		60	80.00%
Other Non-Forest				2	1					61	64	95.31%
Total Reference Points	53	61	51	52	54	51	52	61	57	62	478 / 554	Total Accuracy (%)
Classified Correctly (%)	94.34 %	81.97 %	94.12 %	80.77 %	81.48 %	84.31 %	80.77 %	81.97 %	84.21 %	98.39 %	Total Accuracy (%)	86.28%

Table 21: Accuracy assessment result

5.1.2.1.3 Forest Inventory Methods

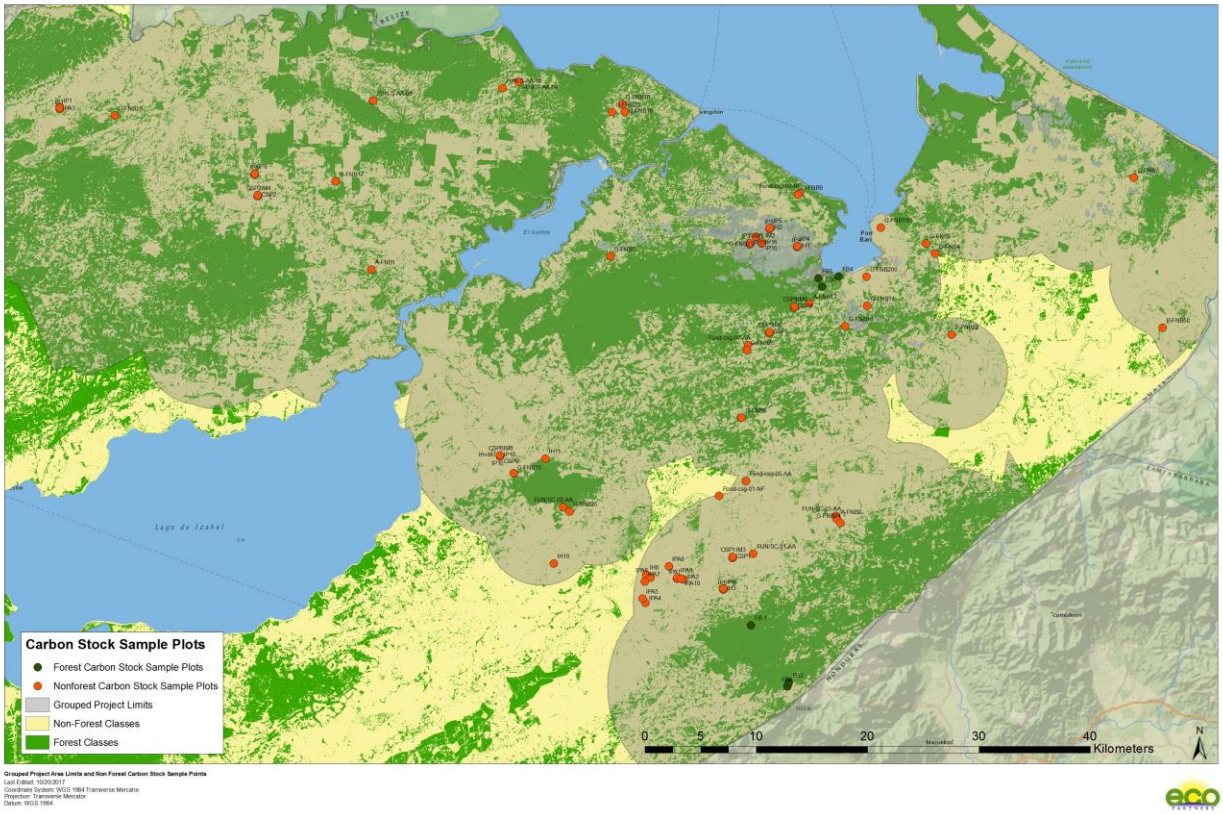

Figure 19: Forest and non-forest carbon stock plots map

Updates to the carbon stock inventory were made during the first monitoring period for the Humid Forest, Shrubs, Pasture, Annual Agriculture, Urban, and Other Non-Forest classes in order to reduce or calculate the measurement uncertainty within each class. An additional 11 shrubs, 11 pasture, 8 annual agriculture, 2 urban, 3 other non-forest, and 6 humid forest plots were allocated and measured. The addition of these plots reduced the uncertainty in the humid forest class from 10.2% to 9.2%, and reduced the uncertainty for all the other non-forest classes, despite their uncertainty remaining above the 10% threshold.

The changes in carbon stock uncertainty within the humid forest class resulted in slightly higher ex-ante baseline carbon stock estimates over the course of the project lifetime. Changes to the baseline emissions estimates were only a result of the change in emissions factors due to the updated carbon stock values. The carbon stocks used for accounting can be found in the Fundaeco VM0015 Accounting Model v1.99.xlsmas well as the carbon stock data in Forest Carbon Stock Model_Quilo_v1.7.xlsm and nonforest Carbon - All LULC Categories v1.16.xlsx. All non-tree pools as well as the litter pool were conservatively excluded as they were shown to be lower in the baseline end land use than the project scenario. Forest inventory methods to be used in future carbon stock updates are described in section 5 of the Joint VCS and CCB Project Description and the UVG Field Methodologies (see Metodología en Estimación de Carbono-Inglé_CEAB-UVG_2010.pdf).

Carbon Pool	Very Humid Forest Carbon Stocks (tC/ha)	Humid Forests Carbon Stocks (tC/ha)
AGT (tC/ha)	116.2	126.3
AGNT (tC/ha)	N.D.	N.D.
BG (tC/ha)	27.9	33.7
DW (tC/ha)	N.D.	N.D.
Litter (tC/ha)	N.D.	N.D.
Wood Products (tC/ha)	7.5	2.9

Table 22: Updated forest carbon stocks

5.1.2.1.4 Leakage

Leakage was monitored according to the VM0015 methodology requirements. Leakage emissions were calculated based off of the deforestation transitions that happened within the defined leakage belt between 2010 and 2017. To see how the leakage belt was defined in the ex-post monitoring, see section 6.3.2. Any leakage sources identified as significant in the ex-ante calculations (see Section 5.5 of the Joint VCS and CCB Project Description), were monitored during this monitoring period. To see all monitoring results for leakage, please refer to section 6.3 of this report.

5.1.2.2 Community Monitoring

Community impacts were monitored according to the SOPs presented in the document Procedimiento para el Monitoreo Socioeconomico y Comunitario.docx. Identified indicators were part of the Project Theory of Change. A report was prepared presenting all impact indicators and monitoring results.

Monitoring was conducted with the input from beneficiaries for the different Project components; forest owner beneficiaries, productive projects beneficiaries, education beneficiaries, health beneficiaries, and community participation beneficiaries.

For each beneficiary a permanent tracing was kept. This allowed the quantification of impacts at the end of the monitoring period, for each component and at the community level. Benefit tracing was done in three steps: data generation and gathering (using data verifiers); database preparation for each component; and integrated databases, and database preparation for specific analysis. These steps allowed the program to track economic and behavioral changes within communities towards more sustainable and forest-friendly livelihoods.

Results of the community monitoring are publically available, published on the internet and disseminated to the Forest Owners Assembly and communities inside the project area.

5.1.2.3 Biodiversity Monitoring

Biodiversity impacts were monitored both within the project area and zone. The design of the data and parameters monitored is such that the project will be able to quantify its impact on biodiversity on a regional and local level. Both floral and faunal diversity were assessed using the proxy of intact canopy cover, monitored as part of climate monitoring. While the focus of biodiversity monitoring is on forest cover and habitat integrity, there are other monitoring activities focusing on avian and amphibian species as well.

Avian studies were used to provide FUNDAECO with indicators of wider environmental health or ecosystem integrity, particularly when such assessments used summarized data from a wide range of species (Stotz et al. 1996, Bibby 1999, Canterbury et al. 2000, Carignan and Villard 2002, Sutherland et al. 2004). Ornithological evaluations provide a measure to evaluate, in a quick and precise way, the ecological characteristics and the conservation status of most terrestrial communities. The periodicity of avian surveys was on an annual basis, during the months that covers the stop-over of migratory birds in the region –October to March-. See FUNDAECO_BIRD_MONITORING PROGRAM.pdf.

The trigger species *Duellmanohyla soralia* along with other threatened or endangered amphibians were used as a reporter group to changes habitat or the loss thereof. Because amphibians are so dependent on the ambient humidity, their geographic ranges, ecological, behavior, and life history it is strongly influenced by the distribution and abundance of water, usually in the form of rain. In fact, the abrupt and frequent synchronized playback of some frogs and toads with the first rains is a well-known natural phenomenon, especially in areas where rainfall is highly seasonal. Amphibians were monitored in a biannual basis trying to cover the start and the stop of the rainy season. As threatened amphibian species were considered both a biodiversity HCV and a marker for biodiversity gold criteria, they were monitored in order to determine ecosystem health and positive biodiversity benefits beyond the general criteria.

The procedures for monitoring land cover within the project area are detailed in section 5 of the Joint VCS and CCB Project Description, and the bird monitoring procedures are detailed in FUNDAECO_BIRD_MONITORING PROGRAM.pdf. The data and parameters monitored are in section 5.3.

Results of the surveys were used in an adaptive framework to evaluate the effectiveness of the project activities in providing a net biodiversity benefit, and the metrics and project activities modified as needed by the sector director.

Results of the biodiversity monitoring were made publically available, published on the internet and disseminated to the Forest Owners Assembly and communities inside the project area, as well as other stakeholders such as MARN and CONAP.

5.1.3 Data Management

Data produced by FUNDAECO for all project related activities are stored in paper and digital formats within the regional and national offices. Copies of the data collected at the regional level are stored in digital format at the national office for safekeeping.

5.1.4 Reporting Methods

Data were collected and analyzed on a regional level, and then is aggregated and reported for the project as a whole. The regional analyses are helpful in informing the specific region's implementation teams on

the progress of project activities being implemented in their region. This information was aggregated with information from all other regional offices to update this monitoring report and provide a project-specific overview of progress.

FUNDAECO tracked both the rate of deforestation and changes in LULC every monitoring period. Rates of deforestation in the project area and leakage belt were measured at the end of the first monitoring period. The project baseline deforestation rate will be reassessed and submitted every ten years for third party verification. FUNDAECO will conduct an annual internal review of deforestation rates to produce data-driven models of deforestation in relation to project activities. The models will allow FUNDAECO to better understand which project activities and locations have been effective at reducing deforestation rates. Additionally, these reviews will help FUNDAECO better understand which areas need greater focus and resources to further reduce deforestation.

This monitoring report was prepared for the 2012-2016 monitoring period, and is intended to summarize evidence of the net project benefit for the selected VCS/CBBA auditor. Results of monitoring were communicated in an appropriate language and format to the communities and stakeholders in the project zone.

5.1.5 Quality Assurance and Control

The directors for community, biodiversity and climate conducted an internal audit of approximately 10% of the measurements for data and parameters monitored, using a risk-based assessment for selection. If there was a deviation of more than 5% in the measurement and re-measurement of the parameter, the deviation was investigated and resolved. When updating data stored electronically, the files were versioned.

The sector directors are responsible for creation and adaption of QA/QC protocols as required, and for any technical direction of the regional directors or teams.

The FUNDAECO field teams minimized error by working as teams to check the identification of tree species and diameter measurements, and to review community and biodiversity data collected. These teams verified each other's readings. Managers for each team verified a subset of the data recorded using risk-based assessment. The regional directors also sampled a subset of data recorded on a periodic basis, using a risk-based assessment.

To reduce and eliminate transcriptional error, a subset of spreadsheets was proofed by re-reading the field notebooks and comparing it to the data that has been entered.

All data were reported to project proponents and local stakeholders and any discrepancies or disagreements were rectified by explanation or joint visitation of activities in question. All publically available satellite data used in monitoring, validation, verification and certification is archived and available to auditors.

5.2 Data and Parameters Available at Validation (CL4)

Data Unit / Parameter:	%LKB
Data unit:	%
Description:	Percentage of the overlapping leakage belts area to be assigned to project, A, B…..N
Source of data:	calculated

Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	A
Data unit:	ha
Description:	Area of error due to observed change predicted as persistence
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	a
Data unit:	ha yr-1
Description:	Estimated intercept of the regression line
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	a1 and a2
Data unit:	ha
Description:	sample plot areas
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Aaveragei
Data unit:	ha
Description:	Area of "average" forest land suitable for conversion to non-forest land within stratum
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ABSLLK
Data unit:	ha
Description:	Cumulative area of baseline deforestation within the leakage belt at year t
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ABSLLKct,t
Data unit:	ha
Description:	Area of category ct deforested at time t within the leakage belt in the baseline case
Source of data:	
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ABSLLKfcl,t
Data unit:	ha
Description:	Area of final (post-deforestation) forest class fcl deforested at time t within the leakage belt in the baseline case
Source of data:	
Value applied:	N/A

Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ABSLLKi,t
Data unit:	ha
Description:	Annual area of baseline deforestation in stratum i within the leakage belt at year t;
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ABSLLKicl,t
Data unit:	ha
Description:	Area of initial (pre-deforestation) forest class icl deforested at time t within the leakage belt in the baseline case
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ABSLLKt
Data unit:	ha
Description:	Annual area of baseline deforestation within the leakage belt at year t;
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ABSLPA
Data unit:	ha
Description:	Cumulative area of baseline deforestation in the project area at year t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template, Table M
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ABSLPAct,t
Data unit:	ha
Description:	Area of category ct deforested at time t within the project area in the baseline case
Source of data:	measured or estimated from literature
Value applied:	See Accounting Model, PD Template, Table AE
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ABSLPAct,t
Data unit:	ha
Description:	Area of category ct deforested at time t within the project area in the baseline case
Source of data:	calculated
Value applied:	See Accounting Model, PD Template, Table AE
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ABSLPAi,t
Data unit:	ha
Description:	Annual area of baseline deforestation in stratum i within the project area at year t;
Source of data:	calculated

Value applied:	See Accounting Model, PD Template, Table I
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ABSLPAicl,t
Data unit:	ha
Description:	Area of initial (pre-deforestation) forest class icl deforested at time t within the project area in the baseline case
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ABSLPAt
Data unit:	ha
Description:	Annual area of baseline deforestation in the project area at year t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template, Table I
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ABSLPAz,t
Data unit:	ha
Description:	Area of the zone z “deforested” at time t within the project area in the baseline case; ha
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ABSLRR
Data unit:	ha
Description:	cumulative area of baseline deforestation in the reference region at year t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template, Table L
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ABSLRRct,t
Data unit:	ha
Description:	Area of category ct deforested at time t within the reference region in the baseline case
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ABSLRRi,t
Data unit:	ha
Description:	Annual area of baseline deforestation in stratum i within the reference region at year t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template, Table H
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ABSLRRt
Data unit:	ha
Description:	Annual area of baseline deforestation in the reference region at year t
Source of data:	calculated

Value applied:	See Accounting Model, PD Template, Table L
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ABSLRRtaverage,i
Data unit:	ha
Description:	Annual area of baseline deforestation in stratum i within the Reference region at a year taveragei
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Aforaget
Data unit:	ha
Description:	Area under forage above the baseline in leakage management areas
Source of data:	calculated ex ante, measured ex post
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Aoptimali
Data unit:	ha
Description:	Area of “optimal” forest land suitable for conversion to non-forest land within stratum i
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	AP
Data unit:	m2
Description:	Plot area
Source of data:	measured or estimated from literature
Value applied:	See section 5.3.5.1 of the Project Description
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	Varies depending on carbon pool measured and LULC type

Data Unit / Parameter:	APDPAicl,t
Data unit:	ha
Description:	Areas of planned deforestation in forest class icl at year t in the project area
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	APFPA icl,t
Data unit:	ha
Description:	Annual area of planned fuel-wood and charcoal activities in forest class icl at year t in the project area
Source of data:	calculated ex ante, measured ex post
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	APLPAicl,t
Data unit:	ha
Description:	Areas of planned logging activities in forest class icl at year t in the project area

Source of data:	calculated ex ante, measured ex post
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	APNiPAicl,t
Data unit:	ha
Description:	Annual area of forest class icl with increasing carbon stock without harvest at year t in the project area
Source of data:	calculated ex ante, measured ex post
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	APSLKfcl,t
Data unit:	ha
Description:	Annual area of class fcl with decreasing carbon stock in leakage management areas in the project case at year t
Source of data:	measured ex post
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ARRi
Data unit:	ha
Description:	Total forest area in stratum i within the reference region at the project start date
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A

Comments:	N/A

Data Unit / Parameter:	ARRi,t-1
Data unit:	ha
Description:	Area with forest cover in stratum i within the reference region a year t-1
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	AUFPAicl,t
Data unit:	ha
Description:	Areas affected by forest fires in class icl in which carbon stock recovery occurs at year t
Source of data:	measured ex post
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	B
Data unit:	ha
Description:	Area correct due to observed change predicted as change
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	b
Data unit:	dimensionless

Description:	Estimated coefficient of the time variable (or slope of the linear regression)
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	BCEF
Data unit:	dimensionless
Description:	Biomass conversion and expansion factor for conversion of merchantable volume to total aboveground tree biomass
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	BEFpl
Data unit:	dimensionless
Description:	Biomass expansion factor for converting volumes of extracted round wood to total above-ground biomass (including bark), applicable to tree tr, in plot pl
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	BLDA, BLDB, … BLDN
Data unit:	ha
Description:	Total area of projected baseline deforestation during the fixed baseline period of Project A
Source of data:	PD of project A; PD of project B, … PD of Project N;

Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	C
Data unit:	ha
Description:	Area of error due to observed persistence predicted as change
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Cabcl
Data unit:	t CO2e ha-1
Description:	Average carbon stock per hectare in the above-ground biomass carbon pool of LU/LC class cl
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Cabfcl
Data unit:	t CO2e ha-1
Description:	Average carbon stock per hectare in the above-ground biomass carbon pool of final post-deforestation class fcl
Source of data:	measured or estimated from literature
Value applied:	See Accounting Model, PD Template, Tables X, Y, Z, AA, AB, AC, AD
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of project emissions
Comments:	

Data Unit / Parameter:	Cabicl
Data unit:	t CO2e ha-1
Description:	Average carbon stock per hectare in the above-ground biomass carbon pool of initial forest class icl
Source of data:	measured or estimated from literature
Value applied:	See Accounting Model, PD Template, Table V
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of project emissions
Comments:	

Data Unit / Parameter:	Cabntcl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the above-ground non-tree biomass carbon pool of LU/LC class cl
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Cabtcl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the above-ground tree biomass carbon pool of LU/LC class cl
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Cabz

Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the above-ground biomass carbon pool per zone z
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Cacl
Data unit:	tCO2-eha-1
Description:	Average carbon stock per hectare in above-ground biomass in LU/LC class cl
Source of data:	
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Cbbcl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare below-ground biomass carbon pool of LU/LC class cl
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Cbbfcl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare below-ground biomass carbon pool of final post-deforestation class fcl
Source of data:	measured or estimated from literature
Value applied:	See Accounting Model, PD Template, Tables X, Y, Z, AA, AB, AC, AD

Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of project emissions
Comments:	

Data Unit / Parameter:	Cbbicl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare below-ground biomass carbon pool of initial forest class icl
Source of data:	measured or estimated from literature
Value applied:	See Accounting Model, PD Template, Table V
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of project emissions
Comments:	

Data Unit / Parameter:	Cbbntcl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare below-ground non-tree biomass carbon pool of LU/LC class cl
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Cbbtcl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare below-ground tree biomass carbon pool of LU/LC class cl
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Cbbz
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare below-ground tree biomass carbon pool per zone z
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Cdwcl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the in the dead wood biomass carbon pool of LU/LC class cl
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Cdwfcl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the in the dead wood biomass carbon pool of final post-deforestation class fcl
Source of data:	measured or estimated from literature
Value applied:	See Accounting Model, PD Template, Tables X, Y, Z, AA, AB, AC, AD
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of project emissions
Comments:	

Data Unit / Parameter:	Cdwicl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the in the dead wood biomass carbon pool of initial forest class icl
Source of data:	measured or estimated from literature

Value applied:	See Accounting Model, PD Template, Table V
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of project emissions
Comments:	

Data Unit / Parameter:	Cdwz
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the in the dead wood biomass carbon pool per zone z
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	CEp,icl
Data unit:	dimensionless
Description:	Average combustion efficiency of the carbon pool p in the forest class
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	CFdc
Data unit:	tonnes C (tonne d. m.)-1
Description:	Carbon fraction of the density class dc
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	CFj
Data unit:	tonnes C (tonne d. m.) -1
Description:	Carbon fraction for tree tr, of species, group of species or forest type j
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	CFpl
Data unit:	tonnes C (tonne d. m.) -1
Description:	Carbon fraction of sample pl
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Ci
Data unit:	
Description:	Cost to select and measure a plot of the LU/LC class cl
Source of data:	estimated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	cl
Data unit:	dimensionless
Description:	1, 2, 3 … Cl LU/LC classes
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A

Comments:	N/A

Data Unit / Parameter:	Clcl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the litter carbon pool of LU/LC class cl
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Cldwcl
Data unit:	t CO2-e
Description:	Average carbon stock per hectare in the lying dead wood carbon pool of the LU/LC class cl
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Cldwfcl
Data unit:	t CO2-e
Description:	Average carbon stock per hectare in the lying dead wood carbon pool of final post-deforestation class fcl
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Cldwicl

Data unit:	t CO2-e
Description:	Average carbon stock per hectare in the lying dead wood carbon pool of initial forest class icl
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Clfcl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the litter carbon pool of LU/LC class fcl
Source of data:	measured or estimated from literature
Value applied:	See Accounting Model, PD Template, Tables X, Y, Z, AA, AB, AC, AD
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	Clicl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the litter carbon pool of LU/LC class icl
Source of data:	measured or estimated from literature
Value applied:	See Accounting Model, PD Template, Table V
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	Clz
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the litter carbon pool per zone z
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of	

measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Cp
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the carbon pool p
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Cp,icl,t
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the carbon pool p burnt at year t in the forest class icl;
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Csdwcl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the standing dead wood carbon pool of the LU/LC class cl
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Csoccl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the soil organic carbon pool of LU/LC class cl
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Csocfcl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the soil organic carbon pool of final post-deforestation class fcl
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Csocicl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the soil organic carbon pool of initial forest class icl
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Csocpl
Data unit:	t CO2-e ha-1
Description:	Carbon stock per hectare in the soil organic carbon pool estimated for the plot pl;
Source of data:	measured or estimated from literature
Value applied:	N/A

Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Csocz
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the soil organic carbon pool per zone z
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ct
Data unit:	dimensionless
Description:	1, 2, 3 … Ct categories of LU/LC change (from initial forest classes icl to final post-deforestation classes fcl)
Source of data:	each renewal of fixed baseline period
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Ctotcl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in all accounted carbon pools of LU/LC class cl
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Ctotfcl,t
Data unit:	CO2-e ha-1
Description:	Average carbon stock of all accounted carbon pools in non-forest class fcl at time t;
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Ctoticl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock of all accounted carbon pools in forest class icl
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Ctoticl,t
Data unit:	t CO2-e ha-1
Description:	Average carbon stock of all accounted carbon pools in forest class icl at time t
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Ctotz
Data unit:	t CO2-e ha-1
Description:	Average carbon stock of all accounted carbon pools per zone z
Source of data:	calculated

Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ctz
Data unit:	dimensionless
Description:	1, 2, 3 … Ctz categories of LU/LC change (from initial forest classes icl to post deforestation zones z)
Source of data:	each renewal of fixed baseline period
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	CV%
Data unit:	%
Description:	The highest coefficient of variation (%) reported in the literature from different volume or biomass forest inventories in forest plantations, natural forests, agro-forestry and/or silvo-pastoral systems
Source of data:	literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Cwpcl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the harvested wood products carbon pool of LU/LC class cl
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A

Comments:	N/A

Data Unit / Parameter:	Cwpfcl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the harvested wood products carbon pool of final post-deforestation class fcl
Source of data:	only once at project start and when mandatory
Value applied:	See Accounting Model, PD Template, Tables X, Y, Z, AA, AB, AC, AD
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	Cwpicl
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the harvested wood products carbon pool of initial forest class icl
Source of data:	
Value applied:	See Accounting Model, PD Template, Table V
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	Cwplt,icl,t
Data unit:	
Description:	Carbon stock in the long-term wood products carbon pool at the time of deforestation t of the initial forest class icl
Source of data:	
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Cwpmt,icl,t
Data unit:	
Description:	Carbon stock in the medium-term wood products carbon pool at the time of deforestation t of the initial forest class icl
Source of data:	
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Cwpz
Data unit:	t CO2-e ha-1
Description:	Average carbon stock per hectare in the harvested wood products carbon pool per zone z
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	CXBw,icl,t
Data unit:	t CO2-e ha-1
Description:	Mean carbon stock per hectare of extracted biomass carbon by class of wood product w from forest class icl at time t
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	d1, d2, ..., dn
Data unit:	cm
Description:	Diameters of intersecting pieces of dead wood
Source of data:	measured or estimated from literature
Value applied:	N/A

Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	DBH
Data unit:	cm
Description:	Diameter at Breast Height
Source of data:	measured or estimated from literature
Value applied:	See Forest Carbon Stock Inventory workbook
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	DBI
Data unit:	kg d.m. head-1 day-1
Description:	Daily biomass intake
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	dc
Data unit:	dimensionless
Description:	1, 2, 3 dead wood density classes
Source of data:	defined
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	DC
Data unit:	dimensionless

Description:	Total number of density classes (3)
Source of data:	defined
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Ddc
Data unit:	tonnes d. m. m-3
Description:	Dead wood density of class dc
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Dj
Data unit:	t d.m.m-3
Description:	Mean wood density of species j
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	DLF
Data unit:	%
Description:	Displacement Leakage Factor
Source of data:	defined
Value applied:	0.163
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of leakage
Comments:	

Data Unit / Parameter:	Dm
Data unit:	g cm-3
Description:	Deadwood density
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	DMpl
Data unit:	tonnes of d.m.
Description:	Dry mass of sample pl;
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	e
Data unit:	dimensionless
Description:	Euler number (2,71828)
Source of data:	
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	E
Data unit:	%
Description:	allowable error (□10% of the mean)
Source of data:	
Value applied:	See Uncertainty Estimates for Forest and Non-forest carbon stocks in carbon stock workbooks
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	E%
Data unit:	%
Description:	allowable sample error in percentage (□10%)
Source of data:	
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	EADLK
Data unit:	t CO2-e
Description:	Cumulative total increase in GHG emissions due to displaced forest fires
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	EADLKt
Data unit:	t CO2-e
Description:	Total ex ante increase in GHG emissions due to displaced forest fires at year t
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	EBBBSLPAt
Data unit:	t CO2-e
Description:	Sum of (or total) baseline non-CO2 emissions from forest fire at year t in the project area

Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	EBBBSLtoticl
Data unit:	t CO2-e
Description:	Sum of (or total) actual non-CO2 emissions from forest fire at year t in strata i in forest class icl
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	EBBBSPA
Data unit:	t CO2-e
Description:	Cumulative baseline non-CO2 emissions from forest fire at year t in the project area
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	EBBCH4icl
Data unit:	t CO2-e
Description:	CH4 emission from biomass burning in forest class icl
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	EBBCO2icl
Data unit:	t CO2-e ha-1
Description:	Per hectare CO2 emission from biomass burning in slash and burn in forest class icl
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	EBBN2Oicl
Data unit:	t CO2-e
Description:	N2O emission from biomass burning in forest class icl
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	EBBPSPA
Data unit:	t CO2-e
Description:	Cumulative (or total) actual non-CO2 emissions from forest fire at year t in the project area
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	EBBPSPAt
Data unit:	t CO2-e
Description:	Sum of (or total) actual non-CO2 emissions from forest fire at year t in the project area
Source of data:	calculated

Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	EBBtoticl
Data unit:	t CO2-e
Description:	Total GHG emission from biomass burning in forest class icl
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ECH4fermt
Data unit:	t CO2-e
Description:	CH4 emissions from enteric fermentation at year t
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ECH4mant
Data unit:	t CO2-e
Description:	CH4 emissions from manure management at year t
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	EdirN2Omant
Data unit:	t CO2-e
Description:	Direct N2O emissions from manure management at year t
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	EF1
Data unit:	kg CH4 head-1 yr-1
Description:	Enteric CH4 emission factor for the livestock group
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	EF2
Data unit:	kg CH4 head-1 yr-1
Description:	Manure management CH4 emission factor for the livestock group
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	EF3
Data unit:	kg N2O-N (kg N-1) head-1 yr-1
Description:	Emission factor for N2O emissions from manure management for the livestock group
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	

Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	EF4
Data unit:	kg N2O-N (kg NH3-N and NOx-N emitted)-1 head-1 yr-1
Description:	Emission factor for N2O emissions from atmospheric deposition of forage-sourced nitrogen on soils and water surfaces
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	EgLK
Data unit:	t CO2-e
Description:	Cumulative Emissions from grazing animals in leakage management areas at year t
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	EgLKt
Data unit:	t CO2-e
Description:	Emissions from grazing animals in leakage management areas at year t
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	EI
Data unit:	%
Description:	Ex ante estimated Effectiveness Index
Source of data:	defined
Value applied:	0.71
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	EindNOmant
Data unit:	t CO2-e
Description:	Indirect N2O emissions from manure management at year t
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ELK
Data unit:	t CO2-e
Description:	Cumulative sum of ex ante estimated leakage emissions at year t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template, Table AO
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ELKt
Data unit:	t CO2-e
Description:	Sum of ex ante estimated leakage emissions at year t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template, Table AO
Justification of choice of data or description of measurement methods and procedures applied:	

Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ELPMLK
Data unit:	t CO2-e
Description:	Cumulative total ex increase in GHG emissions due to leakage prevention measures
Source of data:	calculated
Value applied:	See Accounting Model, PD Template, Table AO
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of leakage
Comments:	

Data Unit / Parameter:	ELPMLKt
Data unit:	t CO2-e
Description:	Annual total increase in GHG emissions due to leakage prevention measures at year t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template, Table AO
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of leakage
Comments:	

Data Unit / Parameter:	EN2Omant
Data unit:	t CO2-e
Description:	N2O emissions from manure management at year t
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ERCH4
Data unit:	dimensionless

Description:	Emission ratio for CH4 (IPCC default value = 0.012)
Source of data:	defined
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ERN2O
Data unit:	dimensionless
Description:	Emission ratio for N2O (IPCC default value = 0.007)
Source of data:	defined
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	f(t)
Data unit:	
Description:	A function of time
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Fburnticl
Data unit:	%
Description:	Proportion of forest area burned during the historical reference period in the forest class icl
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	fcl
Data unit:	dimensionless
Description:	1, 2, 3 … Fcl final (post-deforestation) non-forest classes
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	fj(DBH,H)ab
Data unit:	A3-10
Description:	an allometric equation for species, or group of species, or forest type j, linking above-ground tree biomass (in kg tree-1) to diameter at breast height (DBH) and possibly tree height (H).
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	fj(DBH,H)V
Data unit:	
Description:	a commercial volume equation for species or species group j, linking commercial volume to diameter at breast height (DBH) and possibly tree height (H)
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Fracgas
Data unit:	kg NH3-N and NOx-N emitted (Kg N)-1
Description:	Fraction of managed livestock manure nitrogen that volatilizes as NH3 and NOx in the manure management phase
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	GWPCH4
Data unit:	dimensionless
Description:	Global Warming Potential for CH4 (IPCC default value = 21 for the first commitment period)
Source of data:	defined
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	GWPN2O
Data unit:	dimensionless
Description:	Global Warming Potential for N2O (IPCC default value = 310 for the first commitment period)
Source of data:	defined
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	H
Data unit:	meters
Description:	Height of the tree
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of	

measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	L
Data unit:	m
Description:	Length of the line
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	LTFw
Data unit:	
Description:	Fraction of wood products that are considered permanent (i.e. carbon is stored for 100 years or more); it may be assumed no carbon is released
Source of data:	
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	MTFw
Data unit:	
Description:	Fraction of wood products that are retired between 3 and 100 years
Source of data:	
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	NCR
Data unit:	dimensionless
Description:	Nitrogen/Carbon ratio (IPCC default value = 0.01)
Source of data:	defined
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Nex
Data unit:	kg N head-1 yr- 1
Description:	Annual average N excretion per livestock head
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ni
Data unit:	
Description:	Number of samples units to be measured in LU/LC class cl that is allocated proportional to the size of the class. If estimated ncl < 3, set ncl = 3
Source of data:	
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Ni
Data unit:	
Description:	Maximum number of possible sample units for LU/LC class cl, calculated by dividing the area of class cl by the measurement plot area
Source of data:	
Value applied:	N/A
Justification of choice of data or description of	

measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	OFw
Data unit:	dimensionless
Description:	Fraction of wood products that will be emitted to the atmosphere between 5 and 100 years of timber harvest
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	p
Data unit:	dimensionless
Description:	Carbon pool that could burn (above-ground biomass, dead wood, litter)
Source of data:	defined
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Pburntp,icl
Data unit:	%
Description:	Average proportion of mass burnt in the carbon pool p in the forest class icl;
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	PCabpl
Data unit:	tC ha-1
Description:	Carbon stock in above-ground biomass in plot pl
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	PCbbpl
Data unit:	tC ha-1
Description:	Carbon stock in below-ground biomass in plot pl
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	PCxi
Data unit:	$/t
Description:	Average in situ production costs for one ton of product Px in stratum i
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	This variable may have different values within different strata of the reference region

Data Unit / Parameter:	Pforaget
Data unit:	kg d. m. yr-1
Description:	Production of forage at year t
Source of data:	calculated ex ante, measured ex post
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A

Comments:	N/A

Data Unit / Parameter:	Po
Data unit:	g
Description:	Anhydrous weight of sample
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Populationt
Data unit:	number of heads
Description:	Equivalent number of forage-fed livestock at year t
Source of data:	calculated ex ante, measured ex post
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	PPi,t
Data unit:	%
Description:	Proportion of stratum i that is within the project area at time t
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	PPxl
Data unit:	$/t
Description:	Potential profitability of product Px at the location l (pixel or polygon)

Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Ps
Data unit:	g
Description:	Saturated weight of sample
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Px
Data unit:	dimensionless
Description:	Product x produced in the reference region
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	r1
Data unit:	meters
Description:	Radius at the base of the tree
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	r2
Data unit:	meters
Description:	Radius at the top of the tree
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	RBSLRRi,t
Data unit:	%
Description:	Percentage of remaining forest area at year t -1 in stratum i to be deforested at year t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template, Table H
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	Used as an alternative to ABSLRR i,t in baseline approach "c"

Data Unit / Parameter:	RFt
Data unit:	%
Description:	Risk factor used to calculate VCS buffer credits
Source of data:	estimated
Value applied:	See Accounting Model, Ex Post Reporting Parameters
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of project emissions
Comments:	

Data Unit / Parameter:	Rj
Data unit:	dimensionless
Description:	Root-shoot ratio appropriate for species, group of species or forest type j
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of	

measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Rj,pl,tr
Data unit:	dimensionless
Description:	Root-shoot ratio, applicable to tree tr of species j in plot pl
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	S$x
Data unit:	$/t
Description:	Selling price of product Px
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Scl
Data unit:	
Description:	standard deviation of LU/LC class cl
Source of data:	
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	SLFw
Data unit:	dimensionless

Description:	Fraction of wood products that will be emitted to the atmosphere within 5 years of timber harvest
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	SPxl
Data unit:	map
Description:	Selling point l of product Px
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	STFw
Data unit:	
Description:	Fraction of wood products and waste that will be emitted to the atmosphere within 3 years; all carbon shall be assumed to be lost immediately; dimensionless
Source of data:	
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	t
Data unit:	dimensionless
Description:	1, 2, 3 … T a year of the proposed project crediting period
Source of data:	defined
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	

Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	t*
Data unit:	dimensionless
Description:	the year at which the area ABSLPAicl,t is deforested in the baseline case
Source of data:	defined
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	t1
Data unit:	dimensionless
Description:	Start date of the historical reference period
Source of data:	
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	t2
Data unit:	dimensionless
Description:	End date of the historical reference period
Source of data:	
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Taveragei
Data unit:	yr
Description:	Number of years in which Aaveragei is deforested

	in the baseline case
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	taveragei
Data unit:	yr
Description:	Year at which Taveragei ends
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	TBabj
Data unit:	kg tree-1 or t tree-1
Description:	above-ground biomass of a tree of species, or species group, or forest type j
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	TBabtr
Data unit:	kg tree-1 or t tree-1
Description:	Above-ground biomass of tree tr
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	TCabtr
Data unit:	kg C tree-1 or t C tree-1
Description:	Carbon stock in above-ground biomass of tree tr
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	TCbbtr
Data unit:	kg C tree-1
Description:	Carbon stock in below-ground biomass of tree tr
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	TCv
Data unit:	$/t/km
Description:	Average Transport Cost per kilometer for one ton of product Px on land, river or road of type v
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	TDv
Data unit:	$/t/km
Description:	Transport Distance on land, river or road of type v
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	

Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Thrp
Data unit:	yr
Description:	Duration of the historical reference period
Source of data:	defined
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Toptimali
Data unit:	yr
Description:	Number of years since the start of the AUD project activity in which Aoptimal in stratum i is deforested in the baseline case
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	toptimali
Data unit:	yr
Description:	Year at which Toptimali ends
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	tr
Data unit:	dimensionless

Description:	1, 2, 3, … TRpl number of trees in plot pl
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	tst
Data unit:	dimensionless
Description:	t-student value for a 95% confidence level (initial value t = 2)
Source of data:	
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Tsub-optimali
Data unit:	yr
Description:	Number of years in which Asub-optimali is deforested in the baseline case
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	v
Data unit:	dimensionless
Description:	1,2,3, …V type of surface on which transport occurs
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	V1i,t; V2i,t; ...;Vni,t
Data unit:	
Description:	Variables included in a deforestation model
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	Unit of each variable to be specified by the project proponent

Data Unit / Parameter:	VBCt
Data unit:	t CO2-e
Description:	Number of Buffer Credits deposited in the VCS Buffer at time t;
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AP
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of project emissions
Comments:	

Data Unit / Parameter:	VCUt
Data unit:	t CO2-e
Description:	Number of Verified Carbon Units (VCUs) to be made available for trade at time t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AP
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of project emissions
Comments:	

Data Unit / Parameter:	VEF
Data unit:	dimensionless
Description:	Volume Expansion Factor

Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	VEXw,j,fcl,t
Data unit:	m3
Description:	Volume of timber for product class w, of species j, extracted from within forest class fcl at time t
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	VOB10
Data unit:	m3
Description:	Volume Over Bark above 10 cm DBH
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	VOB30
Data unit:	m3
Description:	Volume Over Bark above 30 cm DBH
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Volumedc
Data unit:	m3
Description:	Volume of lying dead wood in the density class dc
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Vpl
Data unit:	m3 plot-1
Description:	Commercial volume of plot pl
Source of data:	
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	Vtr
Data unit:	m3
Description:	Commercial volume of tree tr
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	w
Data unit:	dimensionless
Description:	1, 2, 3 … W Wood product class (sawn-wood, wood-based panels, other industrial round-wood, paper and paper board, and other);
Source of data:	defined
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A

Comments:	N/A

Data Unit / Parameter:	Wcl
Data unit:	
Description:	Ncl/N
Source of data:	
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	WWw
Data unit:	dimensionless
Description:	Wood waste for wood product class w. The fraction immediately emitted through mill inefficiency
Source of data:	measured or estimated from literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	XF
Data unit:	dimensionless
Description:	Plot expansion factor from per plot values to per hectare values
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	z
Data unit:	
Description:	1, 2, 3, … Z post deforestation zones having a

	characteristic mixture of final post-deforestation classes (fcl)
Source of data:	
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ΔCabBSLLKt
Data unit:	t CO2-e
Description:	Total baseline carbon stock changes for the above-ground biomass pool in the leakage belt
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AI
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ΔCabBSLLKt
Data unit:	t CO2-e
Description:	Cumuativel baseline carbon stock changes for the above-ground biomass pool in the leakage belt
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AI
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ΔCabBSLPA
Data unit:	t CO2-e
Description:	Cumulative baseline carbon stock changes for the above-ground biomass pool in the project area
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AE
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions

Comments:	

Data Unit / Parameter:	ΔCabBSLPAt
Data unit:	t CO2-e
Description:	Total baseline carbon stock changes for the above-ground biomass pool in the project area
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AE
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ΔCabBSLRR
Data unit:	t CO2-e
Description:	Cumulative baseline carbon stock changes for the above-ground biomass pool in the reference region
Source of data:	calculated
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	

Data Unit / Parameter:	ΔCabBSLRRt
Data unit:	t CO2-e
Description:	Total baseline carbon stock changes for the above-ground biomass pool in the reference region
Source of data:	calculated
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	

Data Unit / Parameter:	ΔCabct
Data unit:	t CO2-e ha-1

Description:	Average carbon stock change factor in the above-ground biomass carbon pool of category ct
Source of data:	calculated
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	

Data Unit / Parameter:	ΔCADLK
Data unit:	t CO2-e
Description:	Cumulative total decrease in carbon stocks due to displaced deforestation
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Tables AN and AO
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of leakage
Comments:	

Data Unit / Parameter:	ΔCADLKt
Data unit:	t CO2-e
Description:	Total decrease in carbon stocks due to displaced deforestation at year t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Tables AN and AO
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of leakage
Comments:	

Data Unit / Parameter:	ΔCbbct
Data unit:	t CO2-e ha-1
Description:	Average carbon stock change factor in the below-ground biomass carbon pool of category ct
Source of data:	calculated
Value applied:	NA
Justification of choice of data or description of	

measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	

Data Unit / Parameter:	ΔCBSLLK
Data unit:	t CO2-e
Description:	Cumulative carbon stock changes in leakage management areas in the baseline case
Source of data:	calculated
Value applied:	See Accounting Model, MR Template Table BG
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ΔCBSLLKt
Data unit:	t CO2-e
Description:	Annual carbon stock changes in leakage management areas in the baseline case at year t
Source of data:	calculated
Value applied:	See Accounting Model, MR Template Table BG
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ΔCBSLPA
Data unit:	t CO2-e
Description:	Total baseline carbon stock changes in the project area
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AP
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ΔCBSLPA
Data unit:	t CO2-e
Description:	Total net cumulative baseline carbon stock change in final classes within the project area at year t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AP
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ΔCBSLPAf
Data unit:	t CO2-e
Description:	Total cumulative baseline carbon stock change in final classes within the project area at year t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AP
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ΔCBSLPAft
Data unit:	t CO2-e
Description:	Total baseline carbon stock change in final classes within the project area at year t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AP
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ΔCBSLPAft
Data unit:	t CO2-e
Description:	Total annual baseline carbon stock change in final classes within the project area at year t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AP
Justification of choice of data or description of	

measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ΔCBSLPAi
Data unit:	t CO2-e
Description:	Total cumulative baseline carbon stock change in initial forest classes within the project area at year t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AP
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ΔCBSLPAit
Data unit:	t CO2-e
Description:	Total baseline carbon stock change in initial forest classes within the project area at year t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AP
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ΔCBSLPAt
Data unit:	t CO2-e
Description:	Total baseline carbon stock change within the project area at year t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AP
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ΔCBSLt
Data unit:	tCO2-e
Description:	Total baseline carbon stock change at year t in the project area
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AP
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ΔCdwct
Data unit:	t CO2-e ha-1
Description:	Average carbon stock change factor in the dead wood biomass carbon pool of category ct
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AP
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ΔClct
Data unit:	t CO2-e ha-1
Description:	Average carbon stock change factor in the litter carbon pool of category ct
Source of data:	calculated
Value applied:	See Accounting Model, PD Template
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of baseline emissions
Comments:	

Data Unit / Parameter:	ΔCLK
Data unit:	t CO2-e
Description:	Total cumulative decrease in carbon stocks within the leakage belt at year t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Tables AO and AP

Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of leakage
Comments:	

Data Unit / Parameter:	ΔCLKt
Data unit:	t CO2-e
Description:	Total decrease in carbon stocks within the leakage belt at year t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Tables AO and AP
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of leakage
Comments:	

Data Unit / Parameter:	ΔCLPMLK
Data unit:	
Description:	Cumulative carbon stock decrease due to leakage prevention measures
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AO
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of leakage
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCLPMLKt
Data unit:	
Description:	Carbon stock decrease due to leakage prevention measures at year t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AO
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of leakage
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPAdPA
Data unit:	t CO2-e
Description:	Cumulative decrease in carbon stock due to all planned activities at year t in the project area
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AM
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of project emissions
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPAdPAt
Data unit:	t CO2-e
Description:	Total decrease in carbon stock due to all planned activities at year t in the project area
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AM
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of project emissions
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPAiPA
Data unit:	t CO2-e
Description:	Cumulative increase in carbon stock due to all planned activities at year t in the project area
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AM
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of project emissions
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPAiPAt
Data unit:	t CO2-e
Description:	Total increase in carbon stock due to all planned activities at year t in the project area
Source of data:	calculated

Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPDdPA
Data unit:	t CO2-e
Description:	Cumulative decrease in carbon stock due to planned deforestation at year t in the project area
Source of data:	calculated
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPDdPAt
Data unit:	t CO2-e
Description:	Total decrease in carbon stock due to planned deforestation at year t in the project area
Source of data:	calculated
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPFdPA
Data unit:	t CO2-e
Description:	Cumulative decrease in carbon stock due to planned fuel-wood and charcoal activities at year t in the project area
Source of data:	calculated
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPFdPAt
Data unit:	t CO2-e
Description:	Total decrease in carbon stock due to planned fuel-wood and charcoal activities at year t in the project area
Source of data:	calculated
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPFiPA
Data unit:	t CO2-e
Description:	Cumulative increase in carbon stock due to planned fuel-wood and charcoal activities at year t in the project area
Source of data:	calculated
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPFiPAt
Data unit:	t CO2-e
Description:	Total increase in carbon stock due to planned fuel-wood and charcoal activities at year t in the project area
Source of data:	calculated
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCpicl,t=t*
Data unit:	tCO2-e ha-1

Description:	Average carbon stock change factor for carbon pool p in the initial forest class icl applicable at time t
Source of data:	
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ΔCPLdPA
Data unit:	t CO2-e
Description:	Cumulative decrease in carbon stock due to planned logging activities at year t in the project area
Source of data:	calculated
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPLdPAt
Data unit:	t CO2-e
Description:	Total decrease in carbon stock due to planned logging activities at year t in the project area
Source of data:	calculated
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPLiPA
Data unit:	t CO2-e
Description:	Cumulative increase in carbon stock due to planned logging activities at year t in the project area
Source of data:	calculated
Value applied:	NA
Justification of choice of data or description of	

measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPLiPAt
Data unit:	t CO2-e
Description:	Total increase in carbon stock due to planned logging activities at year t in the project area
Source of data:	calculated
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPNiPA
Data unit:	t CO2-e
Description:	Cumulative increase in carbon stock due to planned protection of growing forest classes in the project area at year t
Source of data:	calculated
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPNiPAt
Data unit:	t CO2-e
Description:	Total increase in carbon stock due to planned protection of growing forest classes in the project area at year t
Source of data:	calculated
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPSLK
Data unit:	t CO2-e
Description:	Total cumulative carbon stock change in leakage management areas in the project case
Source of data:	calculated
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPSLKt
Data unit:	t CO2-e
Description:	Total annual carbon stock change in leakage management areas in the project case
Source of data:	calculated
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPSPA
Data unit:	t CO2-e
Description:	Cumulative project carbon stock change within the project area at year t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AP
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of project emissions
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPSPAt
Data unit:	t CO2-e
Description:	Total project carbon stock change within the project area at year t
Source of data:	calculated

Value applied:	See Accounting Model, PD Template Table AP
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of project emissions
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCpt
Data unit:	t CO2-e
Description:	Carbon stock change factor applicable to pool p at time t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AM
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of project emissions
Comments:	

Data Unit / Parameter:	ΔCpz,t=t*
Data unit:	tCO2-e ha-1
Description:	Average carbon stock change factor for carbon pool p in zone z applicable at time t = t*
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	N/A

Data Unit / Parameter:	ΔCsocct
Data unit:	t CO2-e ha-1
Description:	Average carbon stock change factor in the soil organic carbon pool of category ct
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	

Data Unit / Parameter:	ΔCtotct
Data unit:	t CO2-e ha-1
Description:	Average carbon stock change factor in all accounted carbon pools of category ct
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	

Data Unit / Parameter:	ΔCtotct,t
Data unit:	t CO2-e ha-1
Description:	Carbon stock change factor (also called emission factor) for all accounted carbon pools in category ct at time t
Source of data:	calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	

Data Unit / Parameter:	ΔCtoticl,t
Data unit:	t CO2-e ha-1
Description:	Average carbon stock change of all accounted carbon pools in forest class icl at time t
Source of data:	calculated
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	

Data Unit / Parameter:	ΔCUDdPA
Data unit:	t CO2-e
Description:	Cumulative actual carbon stock change due to unavoided unplanned deforestation at year t in the

	project area
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AM
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of project emissions
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCUDdPAt
Data unit:	t CO2-e
Description:	Total actual carbon stock change due to unavoided unplanned deforestation at year t in the project area
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AM
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of project emissions
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCwpct
Data unit:	t CO2-e ha-1
Description:	Average carbon stock change factor in the harvested wood products carbon pool of category ct
Source of data:	calculated
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	N/A
Comments:	

Data Unit / Parameter:	ΔREDD
Data unit:	t CO2-e
Description:	Cumulative met anthropogenic greenhouse gas emission reduction attributable to the AUD project activity
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AP
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of project emissions

Comments:	ex ante and ex post

Data Unit / Parameter:	ΔREDDt
Data unit:	t CO2-e
Description:	Net anthropogenic greenhouse gas emission reduction attributable to the AUD project activity at year t
Source of data:	calculated
Value applied:	See Accounting Model, PD Template Table AP
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of the data:	Calculation of project emissions
Comments:	ex ante and ex post

5.3 Data and Parameters Monitored (CL4, CM4, & B4)

5.3.1 Climate

Data Unit / Parameter:	APDPAicl,t
Data unit:	ha
Description:	Areas of planned deforestation in forest class icl at year t in the project area
Source of data:	measured or estimated from literature
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 25a
Comments:	ex ante and ex post

Data Unit / Parameter:	APFPA icl,t
Data unit:	ha
Description:	Annual area of planned fuel-wood and charcoal activities in forest class icl at year t in the project area
Source of data:	calculated ex ante, measured ex post
Description of measurement methods and	

procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 25, Table 26c
Comments:	ex ante and ex post

Data Unit / Parameter:	APLPAicl,t
Data unit:	ha
Description:	Areas of planned logging activities in forest class icl at year t in the project area
Source of data:	calculated ex ante, measured ex post
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 25b, Table 26b
Comments:	ex ante and ex post

Data Unit / Parameter:	APNiPAicl,t
Data unit:	ha
Description:	Annual area of forest class icl with increasing carbon stock without harvest at year t in the project area
Source of data:	calculated ex ante, measured ex post
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 26a
Comments:	ex ante and ex post

Data Unit / Parameter:	CUCdPAt
Data unit:	t CO2-e
Description:	Total decrease in carbon stock due to catastrophic events at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 25f, Table 25g
Comments:	ex post

Data Unit / Parameter:	EADLK
Data unit:	t CO2-e
Description:	Cumulative total increase in GHG emissions due to displaced forest fires
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	See Accounting Model, MR TemplateTable BI
Monitoring equipment:	GIS software, Landsat imagery
QA/QC procedures to be applied:	Data is to be entered into internal archive. Archive is accessed by qualified, authorized technical experts. All documents for monitoring, validation, verification and certification are reviewed and signed off by several team members. Data will be reported to project proponents and stakeholders. Discrepancies or disagreements will be justified by explanation or by visitation of the activities in question. All available satellite data for monitoring, validation, verification and certification will be archived and made available to auditors.
Purpose of the data:	Calculation of leakage
Calculation method:	See Table 34, Table 35
Comments:	ex ante and ex post

Data Unit / Parameter:	EADLKt
Data unit:	t CO2-e
Description:	Total ex ante increase in GHG emissions due to

	displaced forest fires at year t
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	See Accounting Model, MR TemplateTable BI
Monitoring equipment:	GIS software, Landsat imagery
QA/QC procedures to be applied:	Data is to be entered into internal archive. Archive is accessed by qualified, authorized technical experts. All documents for monitoring, validation, verification and certification are reviewed and signed off by several team members. Data will be reported to project proponents and stakeholders. Discrepancies or disagreements will be justified by explanation or by visitation of the activities in question. All available satellite data for monitoring, validation, verification and certification will be archived and made available to auditors.
Purpose of the data:	Calculation of leakage
Calculation method:	See Table 34, Table 35
Comments:	ex ante and ex post

Data Unit / Parameter:	EBBBSLPAt
Data unit:	t CO2-e
Description:	Sum of (or total) baseline non-CO2 emissions from forest fire at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	See Accounting Model, MR TemplateTable BJ
Monitoring equipment:	GIS software, Landsat imagery
QA/QC procedures to be applied:	Data is to be entered into internal archive. Archive is accessed by qualified, authorized technical experts. All documents for monitoring, validation, verification and certification are reviewed and signed off by several team members. Data will be reported to project proponents and stakeholders. Discrepancies or disagreements will be justified by explanation or by visitation of the activities in question. All available satellite data for monitoring, validation, verification and certification will be archived and made available to auditors.
Purpose of the data:	Calculation of baseline emissions
Calculation method:	See equation 19, Table 24, Table 36
Comments:	ex ante and ex post

Data Unit / Parameter:	EBBBSLtoticl
Data unit:	t CO2-e
Description:	Sum of (or total) actual non-CO2 emissions from forest fire at year t in strata i in forest class icl
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 24
Comments:	ex ante and ex post

Data Unit / Parameter:	EBBBSPA
Data unit:	t CO2-e
Description:	Cumulative baseline non-CO2 emissions from forest fire at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	See Accounting Model, MR TemplateTable BJ
Monitoring equipment:	GIS software, Landsat imagery
QA/QC procedures to be applied:	Data is to be entered into internal archive. Archive is accessed by qualified, authorized technical experts. All documents for monitoring, validation, verification and certification are reviewed and signed off by several team members. Data will be reported to project proponents and stakeholders. Discrepancies or disagreements will be justified by explanation or by visitation of the activities in question. All available satellite data for monitoring, validation, verification and certification will be archived and made available to auditors.
Purpose of the data:	Calculation of baseline emissions
Calculation method:	See equations 17, 19, Table 24, Table 36
Comments:	ex ante and ex post

Data Unit / Parameter:	EBBCH4icl

Data unit:	t CO2-e
Description:	CH4 emission from biomass burning in forest class icl
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See equations 11, 13
Comments:	ex ante and ex post

Data Unit / Parameter:	EBBN2Oicl
Data unit:	t CO2-e
Description:	N2O emission from biomass burning in forest class icl
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See equations 11, 12
Comments:	ex ante and ex post

Data Unit / Parameter:	EBBPSPA
Data unit:	t CO2-e
Description:	Cumulative (or total) actual non-CO2 emissions from forest fire at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	See Accounting Model, MR TemplateTable BJ
Monitoring equipment:	GIS software, Landsat imagery
QA/QC procedures to be applied:	Data is to be entered into internal archive. Archive is accessed by qualified, authorized technical experts. All documents for monitoring, validation, verification and certification are reviewed and

	signed off by several team members. Data will be reported to project proponents and stakeholders. Discrepancies or disagreements will be justified by explanation or by visitation of the activities in question. All available satellite data for monitoring, validation, verification and certification will be archived and made available to auditors.
Purpose of the data:	Calculation of project emissions
Calculation method:	See Table 28, Table 29, Table 36
Comments:	ex ante and ex post

Data Unit / Parameter:	EBBPSPAt
Data unit:	t CO2-e
Description:	Sum of (or total) actual non-CO2 emissions from forest fire at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	See Accounting Model, MR TemplateTable BJ
Monitoring equipment:	GIS software, Landsat imagery
QA/QC procedures to be applied:	Data is to be entered into internal archive. Archive is accessed by qualified, authorized technical experts. All documents for monitoring, validation, verification and certification are reviewed and signed off by several team members. Data will be reported to project proponents and stakeholders. Discrepancies or disagreements will be justified by explanation or by visitation of the activities in question. All available satellite data for monitoring, validation, verification and certification will be archived and made available to auditors.
Purpose of the data:	Calculation of project emissions
Calculation method:	See equations 17,19, Table 28, Table 29, Table 36
Comments:	ex ante and ex post

Data Unit / Parameter:	EBBtoticl
Data unit:	t CO2-e
Description:	Total GHG emission from biomass burning in forest class icl
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually

Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See equation 11
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCFCdPA
Data unit:	t CO2-e
Description:	Cumulative decrease in carbon stock due to forest fires and catastrophic events at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	CFCdPA
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 25g, Table 27
Comments:	ex post

Data Unit / Parameter:	ΔCFCdPAt
Data unit:	t CO2-e
Description:	Total decrease in carbon stock due to forest fires and catastrophic events at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 25g, Table 27
Comments:	ex post

Data Unit / Parameter:	ΔCFCiPA
Data unit:	t CO2-e

Description:	Cumulative increase in carbon stock due to forest fires and catastrophic events at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 26g, Table 27
Comments:	ex post

Data Unit / Parameter:	ΔCFCiPAt
Data unit:	t CO2-e
Description:	Total increase in carbon stock due to forest fires and catastrophic events at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 26g, Table 27
Comments:	ex post

Data Unit / Parameter:	ΔCLPMLK
Data unit:	
Description:	Cumulative carbon stock decrease due to leakage prevention measures
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	See Accounting Model, MR TemplateTable BI
Monitoring equipment:	GIS software, Landsat imagery
QA/QC procedures to be applied:	Data is to be entered into internal archive. Archive is accessed by qualified, authorized technical experts. All documents for monitoring, validation, verification and certification are reviewed and

	signed off by several team members. Data will be reported to project proponents and stakeholders. Discrepancies or disagreements will be justified by explanation or by visitation of the activities in question. All available satellite data for monitoring, validation, verification and certification will be archived and made available to auditors.
Purpose of the data:	Calculation of leakage
Calculation method:	See Table 30c, Table 33, Table 35
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCLPMLKt
Data unit:	
Description:	Carbon stock decrease due to leakage prevention measures at year t
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	See Accounting Model, MR TemplateTable BI
Monitoring equipment:	GIS software, Landsat imagery
QA/QC procedures to be applied:	Data is to be entered into internal archive. Archive is accessed by qualified, authorized technical experts. All documents for monitoring, validation, verification and certification are reviewed and signed off by several team members. Data will be reported to project proponents and stakeholders. Discrepancies or disagreements will be justified by explanation or by visitation of the activities in question. All available satellite data for monitoring, validation, verification and certification will be archived and made available to auditors.
Purpose of the data:	Calculation of leakage
Calculation method:	See Table 30c, Table 33, Table 35
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPAdPA
Data unit:	t CO2-e
Description:	Cumulative decrease in carbon stock due to all planned activities at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually

Value monitored:	See Accounting Model, MR TemplateTable BH
Monitoring equipment:	GIS software, Landsat imagery
QA/QC procedures to be applied:	Data is to be entered into internal archive. Archive is accessed by qualified, authorized technical experts. All documents for monitoring, validation, verification and certification are reviewed and signed off by several team members. Data will be reported to project proponents and stakeholders. Discrepancies or disagreements will be justified by explanation or by visitation of the activities in question. All available satellite data for monitoring, validation, verification and certification will be archived and made available to auditors.
Purpose of the data:	Calculation of project emissions
Calculation method:	See Table 25d, Table 27, Table 29
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPAdPAt
Data unit:	t CO2-e
Description:	Total decrease in carbon stock due to all planned activities at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	See Accounting Model, MR TemplateTable BH
Monitoring equipment:	GIS software, Landsat imagery
QA/QC procedures to be applied:	Data is to be entered into internal archive. Archive is accessed by qualified, authorized technical experts. All documents for monitoring, validation, verification and certification are reviewed and signed off by several team members. Data will be reported to project proponents and stakeholders. Discrepancies or disagreements will be justified by explanation or by visitation of the activities in question. All available satellite data for monitoring, validation, verification and certification will be archived and made available to auditors.
Purpose of the data:	Calculation of project emissions
Calculation method:	See Table 26d, Table 27, Table 29
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPAiPA
Data unit:	t CO2-e

Description:	Cumulative increase in carbon stock due to all planned activities at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	See Accounting Model, MR TemplateTable BH
Monitoring equipment:	GIS software, Landsat imagery
QA/QC procedures to be applied:	Data is to be entered into internal archive. Archive is accessed by qualified, authorized technical experts. All documents for monitoring, validation, verification and certification are reviewed and signed off by several team members. Data will be reported to project proponents and stakeholders. Discrepancies or disagreements will be justified by explanation or by visitation of the activities in question. All available satellite data for monitoring, validation, verification and certification will be archived and made available to auditors.
Purpose of the data:	Calculation of project emissions
Calculation method:	See Table 26d, Table 27, Table 29
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPAiPAt
Data unit:	t CO2-e
Description:	Total increase in carbon stock due to all planned activities at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 25a
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPDdPA
Data unit:	t CO2-e
Description:	Cumulative decrease in carbon stock due to planned deforestation at year t in the project area
Source of data:	calculated

Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 25a
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPDdPAt
Data unit:	t CO2-e
Description:	Total decrease in carbon stock due to planned deforestation at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 25c, Table 25d
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPFdPA
Data unit:	t CO2-e
Description:	Cumulative decrease in carbon stock due to planned fuel-wood and charcoal activities at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPFdPAt
Data unit:	t CO2-e
Description:	Total decrease in carbon stock due to planned fuel-wood and charcoal activities at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 25c, Table 25d
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPFiPA
Data unit:	t CO2-e
Description:	Cumulative increase in carbon stock due to planned fuel-wood and charcoal activities at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 26c, Table 26d
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPFiPAt
Data unit:	t CO2-e
Description:	Total increase in carbon stock due to planned fuel-wood and charcoal activities at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA

QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 26c, Table 26d
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPLdPA
Data unit:	t CO2-e
Description:	Cumulative decrease in carbon stock due to planned logging activities at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 25b, Table 25d
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPLdPAt
Data unit:	t CO2-e
Description:	Total decrease in carbon stock due to planned logging activities at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 25b, Table 25d
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPLiPA
Data unit:	t CO2-e
Description:	Cumulative increase in carbon stock due to planned logging activities at year t in the project area

Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 26b, Table 26d
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPLiPAt
Data unit:	t CO2-e
Description:	Total increase in carbon stock due to planned logging activities at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 26b, Table 26d
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPNiPA
Data unit:	t CO2-e
Description:	Cumulative increase in carbon stock due to planned protection of growing forest classes in the project area at year t
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 26a, Table 26d
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPNiPAt
Data unit:	t CO2-e
Description:	Total increase in carbon stock due to planned protection of growing forest classes in the project area at year t
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 26a, Table 26d
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPSLK
Data unit:	t CO2-e
Description:	Total cumulative carbon stock change in leakage management areas in the project case
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 30b, Table 30c
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPSLKt
Data unit:	t CO2-e
Description:	Total annual carbon stock change in leakage management areas in the project case
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA

QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 30b, Table 30c
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPSPA
Data unit:	t CO2-e
Description:	Cumulative project carbon stock change within the project area at year t
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	See Accounting Model, MR TemplateTables BH and BJ
Monitoring equipment:	GIS software, Landsat imagery
QA/QC procedures to be applied:	Data is to be entered into internal archive. Archive is accessed by qualified, authorized technical experts. All documents for monitoring, validation, verification and certification are reviewed and signed off by several team members. Data will be reported to project proponents and stakeholders. Discrepancies or disagreements will be justified by explanation or by visitation of the activities in question. All available satellite data for monitoring, validation, verification and certification will be archived and made available to auditors.
Purpose of the data:	Calculation of project emissions
Calculation method:	See Table 27, Table 29, Table 36
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCPSPAt
Data unit:	t CO2-e
Description:	Total project carbon stock change within the project area at year t
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	See Accounting Model, MR TemplateTables BH and BJ
Monitoring equipment:	GIS software, Landsat imagery
QA/QC procedures to be applied:	Data is to be entered into internal archive. Archive

	is accessed by qualified, authorized technical experts. All documents for monitoring, validation, verification and certification are reviewed and signed off by several team members. Data will be reported to project proponents and stakeholders. Discrepancies or disagreements will be justified by explanation or by visitation of the activities in question. All available satellite data for monitoring, validation, verification and certification will be archived and made available to auditors.
Purpose of the data:	Calculation of project emissions
Calculation method:	See equations 19, 21, Table 27, Table 29, Table 36
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCUCdPA
Data unit:	t CO2-e
Description:	Cumulative decrease in carbon stock due to catastrophic events at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 25f, Table 25g
Comments:	ex post

Data Unit / Parameter:	ΔCUCiPA
Data unit:	t CO2-e
Description:	Cumulative increase in carbon stock in areas affected by catastrophic events (after such events) at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 26f, Table 26g

Comments:	ex post

Data Unit / Parameter:	ΔCUCiPAt
Data unit:	t CO2-e
Description:	Total increase in carbon stock in areas affected by catastrophic events (after such events) at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 26f, Table 26g
Comments:	ex post

Data Unit / Parameter:	ΔCUDdPA
Data unit:	t CO2-e
Description:	Cumulative actual carbon stock change due to unavoided unplanned deforestation at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	See Accounting Model, MR TemplateTable BH
Monitoring equipment:	GIS software, Landsat imagery
QA/QC procedures to be applied:	Data is to be entered into internal archive. Archive is accessed by qualified, authorized technical experts. All documents for monitoring, validation, verification and certification are reviewed and signed off by several team members. Data will be reported to project proponents and stakeholders. Discrepancies or disagreements will be justified by explanation or by visitation of the activities in question. All available satellite data for monitoring, validation, verification and certification will be archived and made available to auditors.
Purpose of the data:	Calculation of project emissions
Calculation method:	See Table 27, Table 29
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCUDdPAt
Data unit:	t CO2-e
Description:	Total actual carbon stock change due to unavoided unplanned deforestation at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	See Accounting Model, MR TemplateTable BH
Monitoring equipment:	GIS software, Landsat imagery
QA/QC procedures to be applied:	Data is to be entered into internal archive. Archive is accessed by qualified, authorized technical experts. All documents for monitoring, validation, verification and certification are reviewed and signed off by several team members. Data will be reported to project proponents and stakeholders. Discrepancies or disagreements will be justified by explanation or by visitation of the activities in question. All available satellite data for monitoring, validation, verification and certification will be archived and made available to auditors.
Purpose of the data:	Calculation of project emissions
Calculation method:	See equation 16, Table 27 Table 29
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔCUFdPA
Data unit:	t CO2-e
Description:	Cumulative otal decrease in carbon stock due to unplanned (and planned – where applicable) forest fires in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 25e, Table 25g
Comments:	ex post

Data Unit / Parameter:	ΔCUFdPAt
Data unit:	t CO2-e
Description:	Total decrease in carbon stock due to unplanned (and planned – where applicable) forest fires at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 25e, Table 25g
Comments:	ex post

Data Unit / Parameter:	ΔCUFiPA
Data unit:	t CO2-e
Description:	Cumulative increase in carbon stock in areas affected by forest fires (after such events) in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 26e, Table 26g
Comments:	ex post

Data Unit / Parameter:	ΔCUFiPAt
Data unit:	t CO2-e
Description:	Total increase in carbon stock in areas affected by forest fires (after such events) at year t in the project area
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually

Value monitored:	NA
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Purpose of the data:	N/A
Calculation method:	See Table 26e, Table 26g
Comments:	ex post

Data Unit / Parameter:	ΔREDD
Data unit:	t CO2-e
Description:	Cumulative net anthropogenic greenhouse gas emission reduction attributable to the AUD project activity
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	See Accounting Model, MR TemplateTable BG
Monitoring equipment:	GIS software, Landsat imagery
QA/QC procedures to be applied:	Data is to be entered into internal archive. Archive is accessed by qualified, authorized technical experts. All documents for monitoring, validation, verification and certification are reviewed and signed off by several team members. Data will be reported to project proponents and stakeholders. Discrepancies or disagreements will be justified by explanation or by visitation of the activities in question. All available satellite data for monitoring, validation, verification and certification will be archived and made available to auditors.
Purpose of the data:	Calculation of project emissions
Calculation method:	See equation 21
Comments:	ex ante and ex post

Data Unit / Parameter:	ΔREDDt
Data unit:	t CO2-e
Description:	Net anthropogenic greenhouse gas emission reduction attributable to the AUD project activity at year t
Source of data:	calculated
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	annually
Value monitored:	See Accounting Model, MR TemplateTable BJ

Monitoring equipment:	GIS software, Landsat imagery
QA/QC procedures to be applied:	Data is to be entered into internal archive. Archive is accessed by qualified, authorized technical experts. All documents for monitoring, validation, verification and certification are reviewed and signed off by several team members. Data will be reported to project proponents and stakeholders. Discrepancies or disagreements will be justified by explanation or by visitation of the activities in question. All available satellite data for monitoring, validation, verification and certification will be archived and made available to auditors.
Purpose of the data:	Calculation of project emissions
Calculation method:	See equations 19, 20, 23, Table 36
Comments:	ex ante and ex post

5.3.2 Community (CM4)

Project Activity Group	Number	Project Activity	Indicator	Frequency	Data Source/ Reference	Monitoring Result
Resource Protection, Governance, and Monitoring	3	Registered land into PINFOR or PINPEP	# hectares of lands FUNDAECO helped to register with PINFOR/PINPEP	Annually	PINFOR/PINPEP database	7891.37
Resource Protection, Governance, and Monitoring	12	Protection and management of community water sources	# hectares of water source protected	Annually	conservation agreements, watershed protection database	14101.21
Resource Protection, Governance, and Monitoring	14	Conflict resolution roundtable	# meetings participated in on roundtable	Annually	meeting records/ reports/ minutes	6
Resource Protection, Governance, and Monitoring	14	Conflict resolution roundtable	Records of meetings	Annually	records	6
Sustainable Enterprises	25	FUNDAECO nurseries	# nurseries established	Annually	nurseries database	1
Sustainable Enterprises	27	Community nurseries	# nurseries established	Annually	nurseries database/ nurseries contracts	12
Sustainable Enterprises	30	Hire agroforestry promoters/te	# agroforestry promotors hired from the project	Annually	invoices/ agreements	19

		chnician from the project region	region			
Sustainable Enterprises	18	Creation of agroforestry plots	# farmers participating in agroforestry projects	Annually	agroforestry database	137
Sustainable Enterprises	22	Reforestation and Agroforestry PINFOR or PINPEP	# landowners participating in program	Annually		107
Sustainable Enterprises	30	Hire agroforestry promoters from project region	# agroforestry promotors hired from project region	Annually	payrolls (planillas)	19
Sustainable Enterprises	27	Community nurseries	# community entrepeneurs	Annually	invoices/agreements	12
Sustainable Enterprises	23	Construction of ecotourism sites	# of ecotourism sites established	Annually	ecotourism infraestrcuture investments inventory	1
Sustainable Enterprises		Support to women in sustainable enterprises productive projects	# of women supported	Annually	records	50
Sustainable Enterprises	22	Reforestation and Agroforestry PINFOR or PINPEP	$ per hectare of benefits for landowners in program	Annually	PINFOR/PINPEP databas	Q15,600.00
Community Empowerment & Inclusiveness	33	Legalized private and community land	# hectares newly registered in both local and national land registry	Annually	database for land legalization	6358.92
Community Empowerment & Inclusiveness	39	Creation of health facilities: women clinics and communitary first-aid cabinets clinics	# of women clinics and communitary first-aid cabinets clinicsestablished	Annually	database for sexual and reproductive health services	12
Community Empowerment & Inclusiveness	39	community management of health facilities	# of health community commisions (community management	Annually	community health commisions minutes	12

			bodies)			
Community Empowerment & Inclusiveness		Community participation in protected area management	# of communities particpating in second level associations and protected areas councils	Annually	CEL minutes	4 associations, 1 CEL
Community Empowerment & Inclusiveness	37	Engage fishermen in reef monitoring	# of community fishermen attended	Annually	monitoring reports	7
Community Empowerment & Inclusiveness	42	support to cultural religious activities	# of events supported	Annually	event minutes, pictures, etc	2
Community Empowerment & Inclusiveness	39	Creation and working of women health clinics	# of midwives engaged in the clinics	Annually	engagement inform consents (consetimientos informados)	12
Community Empowerment & Inclusiveness	42	Protection of sacred sites	# of patrols	Annually	patrol reports	9
Community Empowerment & Inclusiveness	41	Supporting community-led nurseries	$funds from FUNDAECO going to support nuerseries	Annually	agreements (seed funding)	Q107,614.00
Education	45	Train community members on marine biodiversity and monitoring	# of community members attended	Annually	training reports	7
Education	47	Provision of health services	# of workshops held	Annually	workshops reports	135
Education	47	Provision of health services	# outreach events held within communities	Annually	event reports	3
Education	47	Provision of health services	# peer-to-peer health educators	Annually	volunteering agreements	6
Education	48	Training and workshops on agroforestry production and care	# farmers attended	Annually	logbook, sworkshops reports/participants lists	51

Education	55	Provide access to FUNDAECO agronomist	# of landowners/communities attended	Annually	logbooks	132
Education	56	Teaching new designs for handicrafts	# of people attended	Annually	workshop reports/participants lists	50
Education	56	Teaching new designs for handicrafts	# of workshops held	Annually	workshop reports/participants lists	2
Education	59	Training on how to manage a business (organizational skills)	# of people participated	Annually	workshop reports/participants lists	84
Education	59	Training on how to manage a business (organizational skills)	# of trainings held	Annually	workshop reports/participants lists	5
Education	62	General community training	# of people participated	Annually	workshop reports/participants lists	52
Education	62	General community training	# of trainings held	Annually	workshop reports/participants lists	3
Education	63	Training for ecotourism services	# of ecotourism vendors and ecotourism staff participated	Annually	workshop reports/participants lists	15
Education	63	Training for ecotourism services	# of trainings held	Annually	workshop reports/participants lists	2
Education	45	Train community members on marine biodiversity and monitoring	# of community members attended	Annually	training reports	7
Education	47	Provision of health services	# of workshops held	Annually	training report/participants lists	135
Education	47	Provision of health services	# outreach events held within communities	Annually	training report/participants lists	3
Education	47	Provision of health services	# peer-to-peer health educators	Annually	volunteering agreements	6
Education	48	Training and workshops	# of people attended	Annually	training reports/parti	51

		on agroforestry production and care			cipants list	
Education	48	Training and workshops on agroforestry production and care	# of workshops held	Annually	training reports/participants list	4
Education	50	Environmental education for schools	# schools participating with FUNDAECO	Annually	event reports/participants list	24 schools, 942 students
Education	50	Environmental education for schools	# students visiting ecotourism centers	Annually	event reports/participants list	4071
Education	51	Environmental education for interested communities	# workshops or events held	Annually	event reports/participants list	10
Education	56	Teaching new designs for handicrafts	# of people attended	Annually	training reports/participants list	50
Education	56	Teaching new designs for handicrafts	# of workshops held	Annually	training reports/participants list	2
Education	58	Training on ecotourism services	# people trained	Annually	training reports/participants list	15
Education	59	Training on how to manage a business (organizational skills)	# trainings held	Annually	training reports/participants list	5
Education	62	General community training	# trainings held	Annually	training reports/participants list	3
Improved Access to Resources	70	PINFOR or PINPEP payments	# families receiving PINFOR/PINPEP payments	Annually	PINFOR/PINPEP database	158
Improved Access to Resources	71	support to management plan implementation for PINFOR or PINPEP	# landowners FUNDAECO helped with management plans devised	Annually	PINPEP/PINFOR files with forestry regent	158
Improved Access to Resources	72	Legal services	# landowners/communities FUNDAECO	Annually	denonciation records	1

			assisted with legal services			
Improved Access to Resources	73	Process and travel logisitics for land legalization	# landowners, individuals, communities FUNDAECO assisted with transportation and logistics for land legalization	Annually	activity report	9 communities
Improved Access to Resources	76	Provision of health services	# of patients treated	Annually	sexual and reproductive health database	15832
Improved Access to Resources	76	Provision of health services	# of women using contraceptive methods	Annually	sexual and reproductive health database	1041
Improved Access to Resources	76	Provision of health services	# of communities with access to services	Annually	sexual and reproductive health database	103
Improved Access to Resources	78	Agroforestry stock for new and existing plots	# seedlings/plants provided for new plots	Annually	nurseries database	295975
Improved Access to Resources	82	Nursery establishment	# nurseries established	Annually	nurseries contracts	12
Improved Access to Resources	83	Buy nursery stock from communities	# plants bought by FUNDAECO	Annually	nurseries contracts/invoices	295975
Improved Access to Resources	84	Protection and management of community water sources	# hectares of water source protected	Annually	conservation agreements, patrol reports	14101.21
Improved Access to Resources	86	Provide access to FUNDEACO agronomist	# of communities/landowners receiving access to agronomist	Annually	logbooks, agroforestry contracts	107

Table 23. Community data and parameters monitored.

5.3.3 Biodiversity (B4)

Project Activity Group	Number	Project Activity	Indicator	Frequency	Data Source/Reference	Monitoring Result
Resource Protection, Governance, and Monitoring	1	Legalized private and community land	# hectares newly registered in both local and national land registry	Annually	land legalization database	6368.52
Resource Protection, Governance, and Monitoring	3	Registered land into PINFOR or PINPEP	# hectares of lands FUNDAECO helped to register with PINFOR/PINPEP	Annually	PINFOR/PINPEP database	7891.37
Resource Protection, Governance, and Monitoring	7	Engage fishermen to reef monitoring	# of workshops held	Annually	monitoring reports	5
Resource Protection, Governance, and Monitoring	7	Engage fishermen to reef monitoring	amount of coastline surveyed	Annually	monitoring reports	21.83ha
Resource Protection, Governance, and Monitoring	8	Implementation of fishing restriction zones	#of fishing restriction zones	Annually	community agreements/technical reports	4
Resource Protection, Governance, and Monitoring	9	Purchase land for protection	# of hectares purchased	Annually	land aquisition files	733.38
Resource Protection, Governance, and Monitoring	10	Manage protected areas	# of hectares managed, # of patrols	Annually	patrol reports, logbooks	1800 patrols

Resource Protection, Governance, and Monitoring	11	Creation of protected areas	Records of FUNDAECO's input/assistance in creation of protected areas	Annually	meetings records	6, 1 sobrevuelo
Resource Protection, Governance, and Monitoring	12	Protection and management of community water sources	# hectares of water source protected	Annually	conservation agreements, patrol reports, logbooks	14101.21
Resource Protection, Governance, and Monitoring	13	Forest patrols	forest patrol logs including reports of any incidents requiring higher forms of enforcement (police, military, etc.)	Annually	patrol reports, logbooks	1800 patrols
Resource Protection, Governance, and Monitoring	17	Environmental litigation and advocacy	# advocacy events attended/participated in	Annually	reports	12
Resource Protection, Governance, and Monitoring	17	Environmental litigation and advocacy	records of any litigation with FUNDAECO involvement	Annually	reports	4
Resource Protection, Governance, and Monitoring	38	Participate on CEL for protected areas	Records of CEL meetings	Annually	minutes	9
Community Empowerment & Inclusiveness	37	Engage fishermen in reef monitoring	# of community fishermen attended	Annually	monitoring reports	7
Education	43	Biodiversity Monitoring	# of monitoring events	Annually	logbooks, reports	21
Education	45	Engage community members on	# of community members	Annually	reports, participants lists	7

		marine biodiversity and monitoring	attended			
Education	45	Marine biodiversity monitoring	# of monitoring events	Annually	reports, participants lists	6
Education	46	Support university research on marine sciences	# of research expeditions conducted	Annually	reports, participants lists	5
Education	46	Support university research on marine sciences	# of students participating in research with FUNDAECO	Annually	reports, participants lists	60
Education	46	Support university research on marine sciences	types of research activities conducted	Annually	support letters, research reports	4
Education	50	Environmental education for schools	# schools participating with FUNDAECO	Annually	reports, participants lists	24 schools, 942 participants
Education	50	Environmental education for schools	# students visiting ecotourism centers	Annually	reports, participants lists	4071
Education	51	Environmental education for interested communities	# communities participating in environmental education opportunities	Annually	reports, participants lists	15
Education	51	Environmental education for interested communities	# workshops or educational events held	Annually	reports, participants lists	10
Education	57	Ecotoursim site establishment	# visitors	Annually	visitors records	25119
Education	66	Train park guards to prevent transfer of amphibian fungus to amphibian	# of guards trained	Annually	reports, participants lists	6

		conservation areas				
Education	66	Train park guards to prevent transfer of amphibian fungus to amphibian conservation areas	# of trainings held	Annually	reports, participants lists	1
Improved Access to Resources	84	Protection and management of community water sources	# hectares of water source protected	Annually	conservation agreements, patrol reports	14101.21

Table 24. Biodiversity data and parameters monitored.

6 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS (GCL1, CL2, CL3)

6.1 Baseline Emissions (CL1)

Baseline emissions changed slightly for the project and leakage areas due to the fact that the ex-post accounting was done with a fixed project and leakage area as opposed to the estimated project and leakage areas discussed in the PD, as well as the updates made to the carbon stocks for the humid forest, annual agriculture, and other non-forest classes. Ex-post baseline estimates of activity data within the project and leakage areas were calculated by applying the baseline model estimates of end land use to the defined boundaries for the project and leakage areas. The project area is comprised of smaller parcels with different land owners and Project Activity Instance start dates. The baseline data were extracted on a parcel-level and the deforestation estimates were adjusted based off of the PAI start dates. For the baseline estimates of end-land use in the leakage area, the estimates were calculated across the entire area. Where needed for partial years between LULC change predictions or observations, LULC change was interpolated as described in the PD.

Baseline emissions estimates using ex-post project and leakage areas are included in the tables below. For the monitoring and implementation period, the reference area remained the same, however the carbon pools and carbon stocks were updated as described in sections 2.9.2, 4.2, and 5.1.2.1.3.

Area deforested per forest class *icl* within the reference region			Total baseline deforestation in the reference region	
ID_{icl}			$ABSLRR_t$	ABSLRR
Name	*Very Humid Forest*	*Humid Forest*	annual	cumulative
Project year t	ha	ha	ha	ha
1	4,663	10,728	15,392	15,392

2	7,987	12,517	20,503	35,895
3	9,927	10,576	20,503	56,399
4	11,113	9,391	20,503	76,902
5	11,481	9,023	20,503	97,405
6	11,622	8,881	20,503	117,909
7	11,653	8,850	20,503	138,412
8	11,755	8,749	20,503	158,916
9	11,555	8,949	20,503	179,419
10	11,322	9,182	20,503	199,923
11	11,226	9,278	20,503	220,426
12	11,578	8,925	20,503	240,929
13	12,166	8,337	20,503	261,433
14	12,218	8,286	20,503	281,936
15	12,200	8,304	20,503	302,440
16	12,578	7,925	20,503	322,943
17	13,070	7,433	20,503	343,447
18	13,760	6,743	20,503	363,950
19	14,726	5,778	20,503	384,454
20	15,513	4,991	20,503	404,957
21	16,343	4,161	20,503	425,460
22	15,088	5,416	20,503	445,964
23	14,551	5,953	20,503	466,467
24	18,274	2,229	20,503	486,971
25	19,780	724	20,503	507,474
26	18,171	335	18,506	525,980
27	0	0	0	525,980
28	0	0	0	525,980
29	0	0	0	525,980
30	0	0	0	525,980

Table 25. Annual areas deforested per forest class icl within the reference region in the baseline case (baseline activity per forest class)

Area deforested per forest class *icl* within the project area			Total baseline deforestation in the project area	
ID_{icl}	1	2	$ABSLPA_t$	ABSLPA
Name	*Very Humid Forest*	*Humid Forest*	annual	cumulative
Project year t	ha	ha	ha	ha
1	352	609	961	961
2	777	985	1,762	2,723

3	858	1,037	1,895	4,619
4	1,197	935	2,133	6,751
5	1,357	961	2,318	9,069
6			0	9,069
7			0	9,069
8			0	9,069
9			0	9,069
10			0	9,069
11			0	9,069
12			0	9,069
13			0	9,069
14			0	9,069
15			0	9,069
16			0	9,069
17			0	9,069
18			0	9,069
19			0	9,069
20			0	9,069
21			0	9,069
22			0	9,069
23			0	9,069
24			0	9,069
25			0	9,069
26			0	9,069
27			0	9,069
28			0	9,069
29			0	9,069
30			0	9,069

Table 26. Annual areas deforested per forest class icl within the project area in the baseline case (baseline activity per forest class)

Area deforested per forest class *icl* within the leakage belt area			Total baseline deforestation in the leakage belt area	
ID_{icl}	1	2	$ABSLLK_t$	ABSLLK
Name	*Very Humid Forest*	*Humid Forest*	annual	cumulative
Projtect year t	ha	ha	ha	ha
1	195	1,055	1,250	1,250
2	258	1,299	1,557	2,807
3	290	958	1,247	4,055
4	328	809	1,137	5,192
5	362	791	1,152	6,344
6			0	6,344
7			0	6,344
8			0	6,344
9			0	6,344
10			0	6,344
11			0	6,344
12			0	6,344
13			0	6,344
14			0	6,344
15			0	6,344
16			0	6,344
17			0	6,344
18			0	6,344
19			0	6,344
20			0	6,344
21			0	6,344
22			0	6,344
23			0	6,344
24			0	6,344
25			0	6,344
26			0	6,344

27			0	6,344
28			0	6,344
29			0	6,344
30			0	6,344

Table 27. Annual areas deforested per forest class icl within the leakage belt area in the baseline case (baseline activity per forest class)

Activity data per LU/LC category *ct* within the reference region									Total baseline deforestation in the reference region	
ID_{ct}	4	5	6	7	8	9	10	11	$ABSLRR_t$	ABSLRR
Name	Water	Urban	Wetland	Permanent Agriculture	Annual Agriculture	Pasture	Shrubs	Other non-forest	annual	cumulative
Project year t	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha
1	0	6	0	4,073	182	9,528	1,450	152	15,392	15,392
2	0	8	0	6,003	186	11,247	1,392	1,667	20,503	35,895
3	0	5	0	3,209	1,119	9,173	1,453	5,545	20,503	56,399
4	0	1	0	2,341	1,219	8,843	1,537	6,563	20,503	76,902
5	0	0	0	1,582	1,610	8,870	1,643	6,799	20,503	97,405
6	0	0	0	1,344	2,597	8,825	2,111	5,627	20,503	117,909
7	0	0	0	1,080	3,078	8,488	2,986	4,871	20,503	138,412
8	0	0	0	1,002	3,580	6,177	5,513	4,232	20,503	158,916
9	0	0	0	908	4,042	4,025	8,084	3,445	20,503	179,419
10	0	0	0	806	4,039	3,228	9,508	2,922	20,503	199,923
11	0	0	0	692	3,820	2,758	10,876	2,357	20,503	220,426
12	0	0	0	610	3,745	2,278	11,780	2,090	20,503	240,929
13	0	0	0	577	3,646	1,911	12,491	1,879	20,503	261,433
14	0	0	0	562	3,579	1,682	13,094	1,586	20,503	281,936
15	0	0	0	513	3,400	1,469	13,765	1,357	20,503	302,440
16	0	0	0	425	2,870	1,139	15,046	1,023	20,503	322,943
17	0	0	0	377	2,528	875	15,850	873	20,503	343,447
18	0	0	0	336	2,411	720	16,182	854	20,503	363,950
19	0	0	0	373	3,407	680	15,104	940	20,503	384,454
20	0	0	0	580	5,458	751	12,661	1,053	20,503	404,957
21	0	0	0	592	8,028	695	9,660	1,529	20,503	425,460
22	0	0	0	664	7,884	629	10,069	1,258	20,503	445,964

23	0	0	0	1,122	3,699	1,125	13,101	1,456	20,503	466,467
24	0	0	0	1,071	934	923	16,799	777	20,503	486,971
25	0	0	0	1,670	864	808	16,966	195	20,503	507,474
26	0	0	0	896	459	118	16,911	111	18,495	525,969
27	0	0	0	0	0	0	0	0	0	525,969
28	0	0	0	0	0	0	0	0	0	525,969
29	0	0	0	0	0	0	0	0	0	525,969
30	0	0	0	0	0	0	0	0	0	525,969

Table 28. Baseline activity data for LU/LC change categories (ct) in reference region.

Activity data per LU/LC category *ct* within the project area									Total baseline deforestation in the project area	
ID_{ct}	4	5	6	7	8	9	10	11	$ABSLPA_t$	ABSLPA
Name	Water	Urban	Wetland	Permanent Agriculture	Annual Agriculture	Pasture	Shrubs	Other non-forest	annual	cumulative
Project year t	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha
1	0	5	0	0	19	816	121	0	961	961
2	0	7	0	1	24	1,592	137	0	1,762	2,723
3	0	5	0	3	18	1,773	97	0	1,895	4,619
4	0	1	0	4	18	2,024	86	0	2,133	6,751
5	0	0	0	3	15	2,223	77	0	2,318	9,069
6									0	9,069
7									0	9,069

8									0	9,069
9									0	9,069
10									0	9,069
11									0	9,069
12									0	9,069
13									0	9,069
14									0	9,069
15									0	9,069
16									0	9,069
17									0	9,069
18									0	9,069
19									0	9,069
20									0	9,069
21									0	9,069
22									0	9,069
23									0	9,069
24									0	9,069
25									0	9,069
26									0	9,069
27									0	9,069
28									0	9,069
29									0	9,069

30									0	9,069

Table 29. Baseline activity data for LU/LC change categories (ct) in project area.

Activity data per LU/LC category ct within the leakage belt									Total baseline deforestation in the leakage belt	
ID_{ct}	4	5	6	7	8	9	10	11	$ABSLLK_t$	ABSLLK
Name	Water	Urban	Wetland	Permanent Agriculture	Annual Agriculture	Pasture	Shrubs	Other non-forest	annual	cumulative
Project year t	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha
1	0	0	0	0	10	1,133	105	2	1,250	1,250
2	0	0	0	0	9	1,450	97	1	1,557	2,807
3	0	0	0	0	5	1,185	57	1	1,247	4,055
4	0	0	0	0	3	1,085	49	1	1,137	5,192
5	0	0	0	0	4	1,106	42	0	1,152	6,344
6									0	6,344
7									0	6,344
8									0	6,344
9									0	6,344
10									0	6,344
11									0	6,344
12									0	6,344
13									0	6,344

14									0	6,344
15									0	6,344
16									0	6,344
17									0	6,344
18									0	6,344
19									0	6,344
20									0	6,344
21									0	6,344
22									0	6,344
23									0	6,344
24									0	6,344
25									0	6,344
26									0	6,344
27									0	6,344
28									0	6,344
29									0	6,344
30									0	6,344

Table 30. Baseline activity data for LU/LC change categories (ct) in leakage belt.

6.2 Project Emissions (CL2)

In order to calculate the emissions released in the project area, a 2017 LULC map was created, as described in section 5.1.2.1. Landsat data was pre-processed for use in the 2017 LULC map and was classified using the same classes used in the 2001-2010 LULC maps.

6.2.1 Observed LULC Changes

Emissions from the project area are quantified using the LULC transitions in the project area, 2017 LULC relative to the 2010 benchmark map. The LULC transitions that occurred within this time period were assumed to be distributed linearly from 2010-2017 and were interpolated based off of each Project Activity Instance start date to the end of the first monitoring period so as to accurately account for the project's emissions reductions. The monitoring results of activity data in the project area are summarized below for this time period. These transitions are calculated in Fundaeco VM0015 Accounting Model v1.99.xlsm. As shown in table 31, the total amount of forest converted to pasture and cropland in the project area adjusted by the PAI start dates was 2,336 hectares. There were no emissions associated with any of the implemented project activities.

Activity data per LU/LC category *ct* within the project area									Total *ex post* deforestation in the project area	
ID_{ct}	4	5	6	7	8	9	10	11	$ABSLPA_t$	ABSLPA
Name	Water	Urban	Wetland	Permanent agriculture	Annual agriculture	Pasture	Shrubs	Other non-forest	annual	cumulative
Project year t	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha
1	1	0	5	15	55	136	105	2	318	318
2	1	1	7	23	86	219	159	4	500	818
3	1	1	7	23	87	222	160	4	506	1,324
4	1	1	7	23	87	223	160	4	506	1,830
5	1	1	7	23	87	223	160	4	507	2,337
6									0	2,337

7									0	2,337
8									0	2,337
9									0	2,337
10									0	2,337
11									0	2,337
12									0	2,337
13									0	2,337
14									0	2,337
15									0	2,337
16									0	2,337
17									0	2,337
18									0	2,337
19									0	2,337
20									0	2,337
21									0	2,337
22									0	2,337
23									0	2,337
24									0	2,337
25									0	2,337
26									0	2,337
27									0	2,337
28									0	2,337

29									0	2,337
30									0	2,337

Table 31. Ex post activity data for LU/LC change categories (ct) in project area.

Project year t	Total carbon stock decrease due to unplanned activities		Total carbon stock increase due to planned activities		Total carbon stock decrease due to unavoided unplanned deforestation		Total carbon stock change in the project scenario	
	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
	$\Delta CPAdPA_t$	$\Delta CPAdPA$	$\Delta CPAiPA_t$	$\Delta CPAiPA$	$\Delta CUDdPA_t$	$\Delta CUDdPA$	$\Delta CPSPA_t$	$\Delta CPSPA$
	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e
1	138,691	138,691	0	0	424,077	424,077		0
2	221,817	360,508	0	0	786,259	1,210,336		0
3	229,972	590,480	0	0	863,669	2,074,005		0
4	235,740	826,220	0	0	976,595	3,050,600		0
5	242,173	1,068,393	0	0	1,077,695	4,128,296		0
6		1,068,393	0	0		4,128,296		0
7		1,068,393	0	0		4,128,296		0
8		1,068,393	0	0		4,128,296		0
9		1,068,393	0	0		4,128,296		0

10		1,068,393	0	0		4,128,296		0
11		1,068,393	0	0		4,128,296		0
12		1,068,393	0	0		4,128,296		0
13		1,068,393	0	0		4,128,296		0
14		1,068,393	0	0		4,128,296		0
15		1,068,393	0	0		4,128,296		0
16		1,068,393	0	0		4,128,296		0
17		1,068,393	0	0		4,128,296		0
18		1,068,393	0	0		4,128,296		0
19		1,068,393	0	0		4,128,296		0
20		1,068,393	0	0		4,128,296		0
21		1,068,393	0	0		4,128,296		0
22		1,068,393	0	0		4,128,296		0
23		1,068,393	0	0		4,128,296		0
24		1,068,393	0	0		4,128,296		0
25		1,068,393	0	0		4,128,296		0
26		1,068,393	0	0		4,128,296		0
27		1,068,393	0	0		4,128,296		0
28		1,068,393	0	0		4,128,296		0
29		1,068,393	0	0		4,128,296		0
30		1,068,393	0	0		4,128,296		0

Table 32. Ex post estimated net carbon stock change in the project area under the project scenario.

6.3 Leakage (CL3)

Leakage from activity displacement was monitored within the leakage belt. Ex-post emissions were quantified using the LULC transitions in the leakage area, for the 2017 LULC map relative to the 2010 benchmark map. The LULC transitions that occurred within this time period were assumed to be distributed linearly from 2010-2017 and were interpolated based off of the Project Start Date to the end of the first monitoring period so as to accurately account for activity-shifting leakage emissions.

6.3.1 Leakage Belt

As specified by section 1.1.3 of the applicable methodology, VM0015 version 1.1 Methodology for Avoided Unplanned Deforestation, the creation of a leakage belt is required and subject to monitoring, reporting and verification, especially if there is not a jurisdictional system already in place. The leakage area is defined within VM0015 version 1.1 as consisting of the forested land areas surrounding the project area in which baseline activities could be displaced due to project activities implemented in the project area.

To define the boundaries of the leakage belt, the mobility analysis (Option II) was selected from the possibilities outlined in the methodology. A participatory rural appraisal was carried out by FUNDAECO in the form of a socioeconomic baseline study (see Base socioeconómica - Altelia.pdf). Within this study, a variety of questions were asked in interviews with local community members throughout the Project Zone.

Two questions which concerned direct deforestation by community agents were used to carry out the mobility analysis. These questions asked the interviewees how far they would be willing to walk in order to obtain wood (i.e. for building etc.) and how far they would be willing to walk in order to obtain firewood.

Reponses for these two questions were collected and then averaged separately (see Fundaeco Leakage Data.docx and Leakage - Agents Mobility v1.1.xlsx). According to the results, community agents would be willing to walk an average of approximately 2.6 kilometers for wood and 1.6 kilometers for firewood. To exercise conservativeness, the greater of the two averages (2.6 kilometers) was used as the maximum distance one would be willing to walk for wood resources and thus, the maximum distance for the leakage belt boundaries. Roads, trails and pathways were considered the routes on which agents would travel in order to reach wood resources.

A 2.6 kilometer buffer was created around all roads, trails and pathways that existed within the Project Area. In this buffering process, an area was created where any part of a road, trail or pathway existing inside the project area acted as a central point from which 2.6 kilometers extended outward. In many instances, these buffered areas overlapped the Project Area and thus would be subject to the project activities which inhibited deforestation by agents for purposes of wood collection. These buffered areas which overlapped the project area were not considered part of the leakage area.

The buffered area, also known as the Leakage Management Zone (see Figure 20) includes both the forest and non-forest areas within the buffer extending outward from the Project Area boundaries. The forested areas within the buffer are not subject to project activity implementation and thus would be susceptible to leakage. Therefore, the forest areas falling within the 2.6 kilometer buffer outside of the project area boundaries were uniquely exported and designated as the Leakage Area.

Figure 21 below shows the Leakage Area, which consists of the forest area within the 2.6 km buffer around any roads that cross through the Project Area.

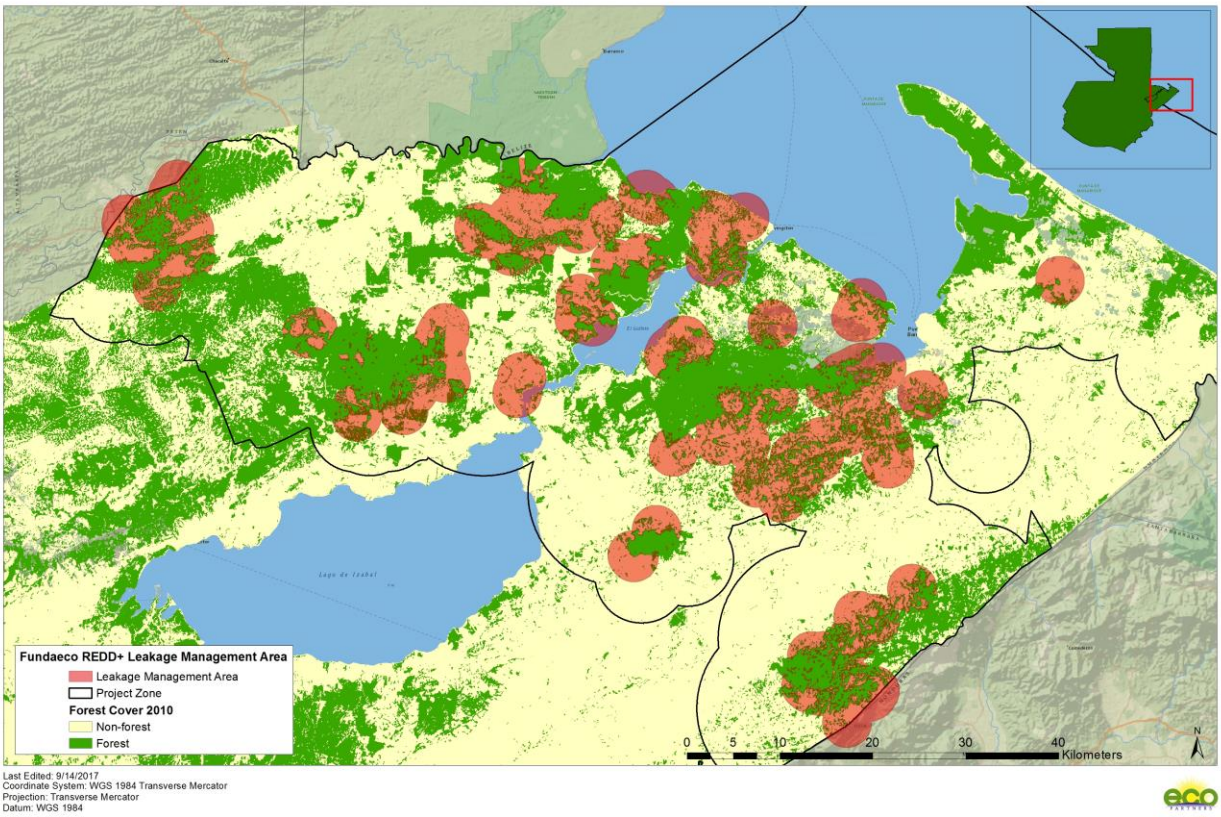

Figure 20: Leakage Management Zone and Project Zone

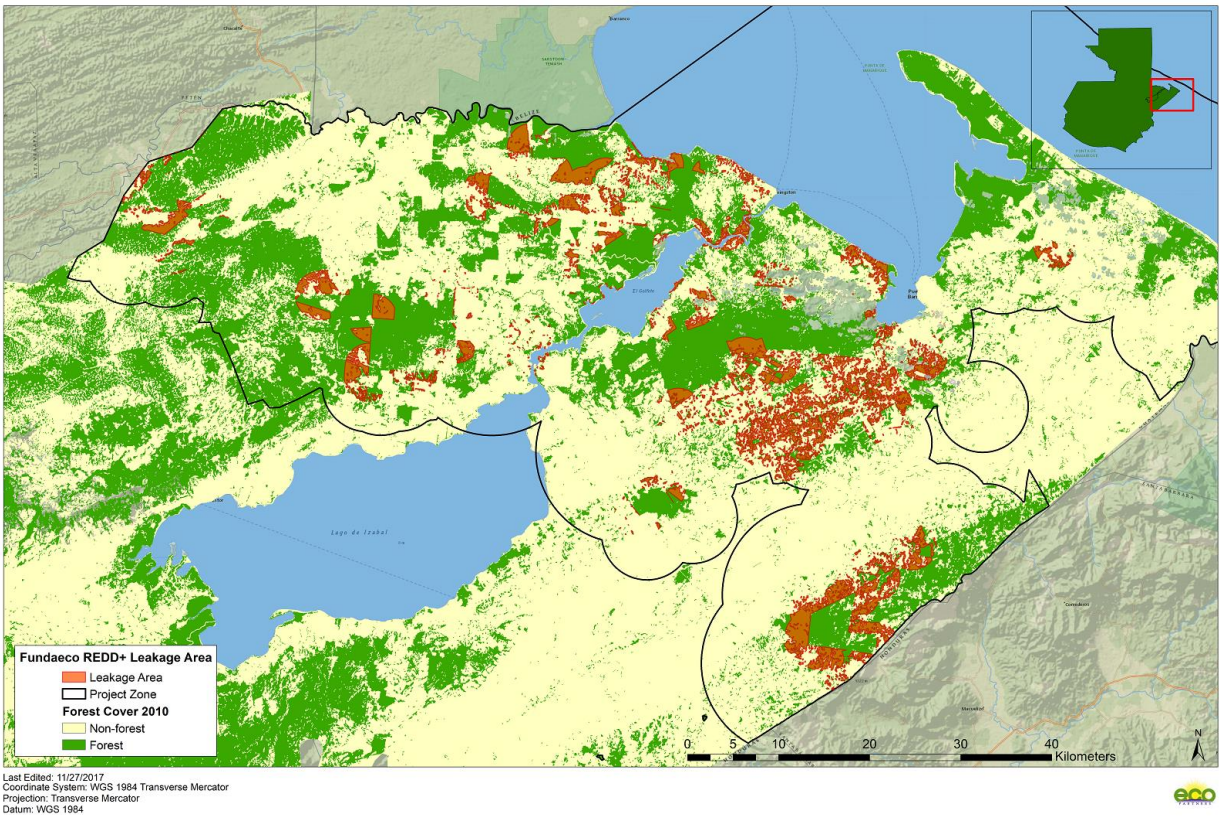

Figure 21. Map of the Leakage Area, consisting of only forest area.

6.3.2 Leakage Emissions

Any ex-post emissions in the leakage belt that were found to exceed the baseline estimate were considered to be a result of leakage due to activity displacement. The results of carbon stock and emissions monitoring within the leakage belt are summarized in the tables below. It is estimated that there were 1,582 total hectares deforested within the leakage area. However, this was less deforestation than estimated in the baseline scenario, thus the total emissions from activity-shifting leakage was 0 tons. The only emissions from leakage occurred to the default market effects leakage, calculated as 20% of the gross ex-post emissions reductions, and shown in Table 35.

Activity data per LU/LC category *ct* within the leakage belt									Total *ex post* deforestation in the leakage belt	
ID_{ct}	4	5	6	7	8	9	10	11	$ABSLLK_t$	ABSLLK
Name	Water	Urban	Wetland	Permanent agriculture	Annual agriculture	Pasture	Shrubs	Other non-forest	annual	cumulative
Project year t	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha
1	1	0	2	10	53	118	65	2	250	250
2	1	0	3	13	71	156	86	3	333	583
3	1	0	3	13	71	156	86	3	333	916
4	1	0	3	13	71	156	86	3	333	1,248
5	1	0	3	13	71	157	86	3	334	1,582
6									0	1,582
7									0	1,582
8									0	1,582
9									0	1,582
10									0	1,582
11									0	1,582
12									0	1,582
13									0	1,582
14									0	1,582
15									0	1,582
16									0	1,582
17									0	1,582
18									0	1,582
19									0	1,582
20									0	1,582
21									0	1,582
22									0	1,582
23									0	1,582
24									0	1,582
25									0	1,582
26									0	1,582
27									0	1,582
28									0	1,582
29									0	1,582
30									0	1,582

Table 33. Ex post activity data for LU/LC change categories (ct) in leakage belt..

Project year t	Total *ex ante* net baseline carbon stock change in the leakage area		Total *ex post* net actual carbon stock change in the leakage area		Total ex post market effects leakage		Total *ex post* leakage	
	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
	$\Delta CBSLLK_t$	$\Delta CBSLLK$	$\Delta CBSLLK_t$	$\Delta CBSLLK$			$\Delta CBSLLK_t$	$\Delta CBSLLK$
	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e
1	566,106	566,106	111,405	111,405	57,077	57,077	57,077	57,077
2	723,885	1,289,990	151,883	263,287	112,888	169,966	112,888	169,966
3	596,917	1,886,907	155,768	419,055	126,739	296,705	126,739	296,705
4	558,158	2,445,065	159,653	578,708	148,171	444,876	148,171	444,876
5	576,979	3,022,044	163,998	742,707	167,105	611,981	167,105	611,981
6		3,022,044		742,707	0	611,981	0	611,981
7		3,022,044		742,707	0	611,981	0	611,981
8		3,022,044		742,707	0	611,981	0	611,981
9		3,022,044		742,707	0	611,981	0	611,981
10		3,022,044		742,707	0	611,981	0	611,981
11		3,022,044		742,707	0	611,981	0	611,981
12		3,022,044		742,707	0	611,981	0	611,981
13		3,022,044		742,707	0	611,981	0	611,981
14		3,022,044		742,707	0	611,981	0	611,981
15		3,022,044		742,707	0	611,981	0	611,981
16		3,022,044		742,707	0	611,981	0	611,981

17		3,022,044		742,707	0	611,981	0	611,981
18		3,022,044		742,707	0	611,981	0	611,981
19		3,022,044		742,707	0	611,981	0	611,981
20		3,022,044		742,707	0	611,981	0	611,981
21		3,022,044		742,707	0	611,981	0	611,981
22		3,022,044		742,707	0	611,981	0	611,981
23		3,022,044		742,707	0	611,981	0	611,981
24		3,022,044		742,707	0	611,981	0	611,981
25		3,022,044		742,707	0	611,981	0	611,981
26		3,022,044		742,707	0	611,981	0	611,981
27		3,022,044		742,707	0	611,981	0	611,981
28		3,022,044		742,707	0	611,981	0	611,981
29		3,022,044		742,707	0	611,981	0	611,981
30		3,022,044		742,707	0	611,981	0	611,981

Table 34. Total net baseline carbon stock change in the leakage belt

Project year t	Total ex post estimated increase in GHG emissions due to market leakage		Total net carbon stock change due to leakage		Total net increase in emissions due to activity displacement leakage	
	annual	cumulative	annual	cumulative	annual	cumulative
			ΔCLK_t	ΔCLK	ELK_t	ELK
	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e
1	57,077	57,077	0	0	0	0
2	112,888	169,966	0	0	0	0
3	126,739	296,705	0	0	0	0
4	148,171	444,876	0	0	0	0
5	167,105	611,981	0	0	0	0
6	0	611,981	0	0	0	0
7	0	611,981	0	0	0	0
8	0	611,981	0	0	0	0
9	0	611,981	0	0	0	0
10	0	611,981	0	0	0	0
11	0	611,981	0	0	0	0
12	0	611,981	0	0	0	0
13	0	611,981	0	0	0	0
14	0	611,981	0	0	0	0
15	0	611,981	0	0	0	0
16	0	611,981	0	0	0	0
17	0	611,981	0	0	0	0
18	0	611,981	0	0	0	0
19	0	611,981	0	0	0	0
20	0	611,981	0	0	0	0
21	0	611,981	0	0	0	0
22	0	611,981	0	0	0	0
23	0	611,981	0	0	0	0

24	0	611,981	0	0	0	0
25	0	611,981	0	0	0	0
26	0	611,981	0	0	0	0
27	0	611,981	0	0	0	0
28	0	611,981	0	0	0	0
29	0	611,981	0	0	0	0
30	0	611,981	0	0	0	0

Table 35. Ex post estimated total leakage, for a full table please refer to the VM0015 Accounting Model.

6.4 Net GHG Emission Reductions and Removals (CL1, CL2)

Net GHG emission reductions were quantified using equation 19 of the methodology and calculated in the Accounting model (Fundaeco VM0015 Accounting Model v1.99.xlsm). The full calculation of net emissions reductions, taking into account the differences between the baseline scenario, the ex-post project emissions and the leakage emissions is shown in MR tables section of the accounting model, Table BJ. Vintages were established by year, 2012 vintages were prorated based on the project start date. Net GHG emissions reductions are presented in Table 36 and VCUs are shown in Table 37 per equations 20 and 21 of the methodology. The risk rating remains at 14% (Table 8), unchanged since validation.

Years	Emission reductions from avoided deforestation (tCO2e)	Project emissions (tCO2e)	Leakage emissions (tCO2e)	Estimated net GHG emission reductions or removals (tCO2e)
2012	424,077	138,691	57,077	228,309
2013	786,259	221,817	112,888	451,553
2014	863,669	229,972	126,739	506,958
2015	976,595	235,740	148,171	592,684
2016	1,077,695	242,173	167,105	668,418
Total	**4,128,296**	**1,068,393**	**611,981**	**2,447,922**

Table 36. Total ex –post Net GHG emissions reductions.

Years	Estimated GHG emission reductions or removals (tO2e)
2012	188,355
2013	372,531
2014	418,240
2015	488,965
2016	551,445
Total estimated VCUs	**2,019,536**

Table 37.VCUs; Total ex-post estimated emissions reductions, net of the allocation to the buffer pool.

6.5 Climate Change Adaptation Benefits (GL1)

The project is not seeking Gold Level verification for climate change adaption benefits this monitoring period.

7 COMMUNITY

7.1 Net Positive Community Impacts (CM2 & CM4)

A study on the drivers of deforestation in the Sarstun Motagua Region identifies the lack of economic and employment opportunities as the strongest factor for deforestation in the region where the REDD+ Project is located. This underlying driver can be tackled by improving two basic conditions that will then trigger positive long-term impacts: a) Access to Resources and Economic Opportunities, and b) Education.

Other factors such as the lack of laws and law enforcement were recognized as well and need to be addressed not only trough forest protection in the field, but also through the litigation and the guarantee of a legal protection status for the most vulnerable forests.

Also, the study indicated the importance of the demand of the communities to participate in avoiding deforestation; because if local communities are not involved the development of the project, then the project will hardly be successful. Since most of the communities participating in the proposed project have organized groups and other links, it is important to always considerate them in order to create catalytic impacts.

7.1.1 Resource Protection

Lack of Law and Law enforcement were mentioned as factors in the drivers of deforestation analysis, and they were also mentioned during the workshops carried out during project development at various conflict-resolution roundtable meetings which meet annually (Table 38).

Protection, Control and Surveillance:
Even when part of the project is located in protected areas, the Guatemalan government does not enough budget to hire the number of park guards needed to cover the project area surface, or to finance the control and surveillance activities. Therefore several forests without control and surveillance are more vulnerable to deforestation. During the reporting period, the project hired more park guards in order to increase presence in vulnerable areas and provided equipment, supplies and fuel to develop patrolling activities. This program was implemented with the National Council of Protected Areas (CONAP) and the Nature Protection Department of the National Police (DIPRONA). During the reporting period, 14,443 ha of watersheds were protected as important water source for communities and towns in the project zone. (Table 38)

Establishment of Nature Reserves:
This activity includes actions such as: conservation agreements with local communities; protection of individual and community forest through forest incentives PINFOR and PINPEP; and land acquisition as a strategy used to protect highly threatened forests, where there is need of immediate action; and also for strategically located forests, which protection can avoid the deforestation of other threatened lands, by stopping or reducing access. During the reporting period 8383.42ha of forest were registered in the forest incentive programs PINFOR and PINPEP

Environmental Litigation and Advocacy:

In order to deter illegal logging and illegal deforestation, FUNDAECO sought to strengthen forestry and protected area law enforcement in the project region. This was carried out through legal complaints and selective litigation in relevant or precedent setting cases.

FUNDAECO worked closely with the National Police, the Public Prosecutor Office ("Ministerio Público") and the local Courts in order to ensure proper follow-up to high priority cases. In addition, legal advice was provided to forest owners seeking counsel or assistance, in cases where their forests might be threatened. Also in order to reduce conflicts around land and forest, the project fostered a constant dialogue through the Conflict Resoluction Roundtable; FUNDAECO participated in 14 meetings during the reporting period.

Lobbying efforts were concentrated mainly in the Declaration by the National Congress of Sierra Caral and Sierra Santa Cruz Protected Area. FUNDAECO is lobbying Government Agencies in order to ensure their overall support to project activities and more particularly to programs in the region that will leverage public funds in support of the project, such as the PINFOR-PROBOSQUE and PINPEP Forest Subsidy Programs, as described below in Table 38.

Finally, as the project encompasses the removal of technical staff in government agencies, lobbying actions ensure that entrant public officials are informed of the project, understand its importance, and support its successful implementation over the years. Monitoring results for this project activity group are presented below.

Project Activity Group	**Number**	**Project Activity**	**Indicator**	**Frequency**	**Data Source/ Reference**	**Monitoring Result**
Resource Protection, Governance, and Monitoring	3	Registered land into PINFOR or PINPEP	# hectares of lands FUNDAECO helped to register with PINFOR/PINPEP	Annually	PINFOR/PINPEP database	8383.42
Resource Protection, Governance, and Monitoring	12	Protection and management of community water sources	# hectares of water source protected	Annually	conservation agreements, watershed protection database	14,443.93
Resource Protection, Governance, and Monitoring	14	Conflict resolution roundtable	# meetings participated in on roundtable	Annually	meeting records/ reports/ minutes	14
Resource Protection, Governance,	14	Conflict resolution	Records of meetings	Annually	records	14

and Monitoring		roundtable				

Table 38. Resource Protection and Governance monitoring records.

7.1.2 Sustainable Enterprise

Access to resources covered the first part of the productive cycle, leading to long-term impacts if economic activities become sustainable in the long term. FUNDAECO experience is that funding is not enough, over the time and in scale, if people do not have the ability and the conditions to be self-sufficient. In this sense, the project supports local enterprise so that stakeholders are presented with opportunities to become economically empowered through sustainable activity.

The project supported agroforestry producers, handcraft producers and people giving ecotourism services through the creation of avenues to assist in selling products and services as well as the provision of services to show how to sustainably manage economic activity. FUNDAECO has directly hired 21 individuals from the project region as agroforestry promotors and technicians, and has also enrolled 264 landowners in the project region in PINPEP or PINFOR reforestation and agroforestry programs during the reporting period. Through the enrollment into these programs, beneficiaries are receiving or will receive Q15,600.00 per hectare of benefits. (Table 39). In providing alternative sources of revenue to participants in the project, FUNDAECO supports economic empowerment of local communities through sustainable practices.

Other activities under this program include support for marketing and branding of products and ecotourism sites as well as access to markets. The project especially aimed to support women in sustainable enterprise and in since project commencement, has support 76 women in achieving sustainable production goals (see Table 39).

The project also produced plants in community nurseries, which are given to farmers as part of the Access to Resources Program. The project has supported the established of 34 nurseries by local or community entrepreneurs.

With long-term support from FUNDAECO, stakeholders and local enterprise currently experience and look forward to continued economic empowerment through sustainable activities. More detailed monitoring results for this project activity group are presented below.

Project Activity Group	Number	Project Activity	Indicator	Frequency	Data Source/ Reference	Monitoring Result
Sustainable Enterprises	25	FUNDAECO nurseries	# nurseries established	Annually	nurseries database	1
Sustainable Enterprises	27	Community nurseries	# nurseries established	Annually	nurseries database/ nurseries contracts	34
Sustainable Enterprises	30	Hire agroforestry promoters/t	# agroforestry promotors hired from	Annually	invoices/ agreements	21

		echnician from the project region	the project region			
Sustainable Enterprises	18	Creation of agroforestry plots	# farmers participating in agroforestry projects	Annually	agroforestry database	283
Sustainable Enterprises	22	Reforestation and Agroforestry PINFOR or PINPEP	# landowners participating in program	Annually		147
Sustainable Enterprises	30	Hire agroforestry promoters from project region	# agroforestry promotors hired from project region	Annually	payrolls (planillas)	21
Sustainable Enterprises	27	Community nurseries	# community entrepreneurs	Annually	invoices/agreements	34
Sustainable Enterprises	23	Construction of ecotourism sites	# of ecotourism sites established	Annually	ecotourism infrastructure investments inventory	3
Sustainable Enterprises		Support to women in sustainable enterprises productive projects	# of women supported	Annually	Records	76
Sustainable Enterprises	22	Reforestation and Agroforestry PINFOR or PINPEP	$ per hectare of benefits for landowners in program	Annually	PINFOR/PINPEP database	Q15,600.00

Table 39. Sustainable enterprises monitoring records.

7.1.3 Community Empowerment and Inclusiveness

FUNDAECO's experience has demonstrated that to include communities in the management of natural resources decision, means not only the respect communities Rights but also to trigger a positive effect that raises awareness on nature values and services, and guarantees nature conservation in the long term.

Land legalization
Land tenure was mention as a deforestation factor, and was one of the main demands from communities during the consultation. The project supports communities in the legal process to obtain their land titles, and works closely with all institutions involved in the process such as municipalities, FONTIERRA and MICAI. The project has already registered roughly 7,535 hectares into local and national databases for legal land registration (Table 40). Land legalization increases engagement in the fight against deforestation and enables any new communities to integrate their forest into the project to generate VCUs, and also to present these forests to the national incentives forest program.

Participatory Protected Area Governance and Management
With support from the Project, and in close coordination with CONAP, FUNDAECO fosters the participatory governance and management of protected areas in the project region. This was done by supporting the establishment and continued operation of a series of formal mechanisms and local governance bodies that ensure the participation of local stakeholders, communities and resource users in management decision making.

In protected areas across the region, Local Executive Councils or Local Advisory Councils (as established in each Protected Area's Decree of establishment), which integrate both Government Officials, Municipal Authorities and Community representatives, are conveyed and supported.; also, "Protected Area Inter-Communal Councils", or General Assemblies of communities located within a given protected area, are also being established (locations not formally established), conveyed and supported. Four associations and 1 CEL participated in protected area management and helped to serve in protected area councils (Table 40).

Likewise, Resource User Associations, such as fishermen associations or specific resource managers (such as Xate Producers) were supported, in order to ensure their direct participation in management activities for each resource. In exchange for their support, 42 fishermen have participated in reef monitoring in the project area (Table 40). Strengthening community involvement in protected area governance and maintenance allows for direct inclusion of local stakeholders into project happenings. Other groups were also supported for their direct participation and involvement: 21 local health commissions are directly administrating community health facilities (Clínicas Comunitarias de la Mujer), and 26 midwives are enrolled to increase their skills and are using the health facilities and equipment provided by the Project to provide their services.

These mechanisms support conflict resolution, participatory planning, self-regulation and strong endorsement to key management decisions in support of forest conservation across the region. Monitoring results for this project activity group are presented below.

Project Activity Group	Number	Project Activity	Indicator	Frequency	Data Source/ Reference	Monitoring Result
Community Empowerment & Inclusiveness	33	Legalized private and community land	# hectares newly registered in both local and national land registry	Annually	database for land legalization	7535.32
Community Empowerment & Inclusiveness	39	Creation of health facilities: women clinics and community first-aid cabinets clinics	# of women clinics and community first-aid cabinets clinics established	Annually	database for sexual and reproductive health services	21
Community Empowerment & Inclusiveness	39	community management of health facilities	# of health community commissions (community management bodies)	Annually	community health commissions minutes	21
Community Empowerment & Inclusiveness		Community participation in protected area management	# of communities participating in second level associations and protected areas councils	Annually	CEL minutes	4 associations, 2 CEL
Community Empowerment & Inclusiveness	37	Engage fishermen in reef monitoring	# of community fishermen attended	Annually	monitoring reports	42
Community Empowerment & Inclusiveness	42	support to cultural religious activities	# of events supported	Annually	event minutes, pictures, etc	4
Community Empowerment & Inclusiveness	39	Creation and working of women health clinics	# of midwives engaged in the clinics	Annually	engagement inform consents (consetimientos informados)	26
Community Empowerment & Inclusiveness	42	Protection of sacred sites	# of patrols	Annually	patrol reports	15
Community Empowerment &	41	Supporting community-led nurseries	$funds from FUNDAECO going to	Annually	agreements (seed funding)	Q107,614.00

Inclusiveness			support nurseries			

Table 40. Community empowerment and inclusiveness monitoring records.

7.1.4 Education

Education can influence multiples situations; access to better job opportunities, decision making in family economy, and decision making in natural resources management, which implies that it can generate multiple positive impacts. Therefore in the project, education as a project activity has several approaches.

Education for opportunities
The project provides direct training and education opportunities to youth, especially to women. This allows youngsters to develop new capacities for the implementation of sustainable productive activities that a have a good potential in the project area, such as; ecotourism, agroforestry and sale of agroforestry products and forest protection. Past training events participation has included: 86 attendees at an annual workshop for designing handicrafts, 174 attendees at an annual workshop for managing a business and 25 attendees at an annual workshop for training for ecotourism services (Table 41).

In terms of the youth, 40 schools with a total of 968 students participated in environmental education programs and 4,554 students were recorded as visiting ecotourism centers in the last year which were set up by the project (Table 41).

Education for Life

Education triggers to a life change not only because technical capacities are increased, but because people can envision different paths to their future. As explained in the community section, conditions without the project, girls living in the project region are turned in to moms at a very young age, condemning them and their families to poverty.

The project tackles this situation by supporting girls to finish elementary school and continue to high school and accompanying benefited girls with integral education on girl and women rights, especially family planning rights. In addition to the many opportunities for agroforestry, handicraft and small business training available for women, the project has carried out events to educate about health and health services, especially concerning women. In the past year, the project team give and organized 376 talks on sexual and reproductive rights and heath, 62 health outreach events were held within communities in the project, and 12 contracts (volunteers) were signed for peer-to-peer health educators acting as volunteers in their communities. Please see the table below for more details.

Education for Resource Management
Communities are willing to take the best decisions that guarantee natural resources in the long term as well as reduce emissions from deforestation; therefore the project provides training that creates the ability and capacity of communities to implement sustainable resource management techniques. These have included at least 20 workshops specific to marine biodiversity monitoring, agroforestry production and care as well as ecotourism.

Education positive impacts

- ✓ Widespread awareness among women and families of reproductive rights and health
- ✓ Increased access to health information and care within the project zone
- ✓ Widespread access to community capacity building and educational opportunities
- ✓ Recognition and assistance in protection of significant traditional, cultural, spiritual, and religious sites.

Monitoring results for this project activity group are presented in the table below.

Project Activity Group	Number	Project Activity	Indicator	Frequency	Data Source/ Reference	Monitoring Result
Education	45	Train community members on marine biodiversity and monitoring	# of community members attended	Annually	training reports	65
Education	47	Provision of health services	# of workshops held	Annually	workshops reports	376
Education	47	Provision of health services	# outreach events held within communities	Annually	event reports	59
Education	47	Provision of health services	# peer-to-peer health educators	Annually	volunteering agreements	12
Education	48	Training and workshops on agroforestry production and care	# farmers attended	Annually	logbooks, workshops reports /participants lists	51
Education	55	Provide access to FUNDAECO agronomist	# of landowners/communities attended	Annually	logbooks	164
Education	56	Teaching new designs for handicrafts	# of people attended	Annually	workshop reports /participants lists	86
Education	56	Teaching new designs for handicrafts	# of workshops held	Annually	workshop reports /participants lists	7
Education	59	Training on how to manage a business (organizational skills)	# of people participate	Annually	workshop reports /participants lists	90
Education	59	Training on how to manage a business (organizational skills)	# of trainings held	Annually	workshop reports /participants lists	10
Education	62	General community training	# of people participate	Annually	workshop reports /participants lists	68

Education	62	General community training	# of trainings held	Annually	workshop reports /participants lists	4
Education	63	Training for ecotourism services	# of ecotourism vendors and ecotourism staff participate	Annually	workshop reports /participants lists	25
Education	63	Training for ecotourism services	# of trainings held	Annually	workshop reports /participants lists	3
Education	45	Train community members on marine biodiversity and monitoring	# of community members attended	Annually	training reports	52
Education	47	Provision of health services	# of workshops held	Annually	training report /participants lists	376
Education	47	Provision of health services	# outreach events held within communities	Annually	training report /participants lists	62
Education	47	Provision of health services	# peer-to-peer health educators	Annually	volunteering agreements	12
Education	48	Training and workshops on agroforestry production and care	# of people attended	Annually	training reports /participants list	164
Education	48	Training and workshops on agroforestry production and care	# of workshops held	Annually	training reports /participants list	7
Education	50	Environmental education for schools	# schools participating with FUNDAECO	Annually	event reports /participants list	40 schools, 1735 students
Education	50	Environmental education for schools	# students visiting ecotourism centers	Annually	event reports /participants list	4554
Education	51	Environmental education for interested communities	# workshops or events held	Annually	event reports/participants list	13
Education	56	Teaching new designs for	# of people	Annually	training reports /participants list	86

		handicrafts	attended			
Education	56	Teaching new designs for handicrafts	# of workshops held	Annually	training reports/participants list	5
Education	58	Training on ecotourism services	# people trained	Annually	training reports /participants list	25
Education	59	Training on how to manage a business (organizational skills)	# trainings held	Annually	training reports/participants list	10
Education	62	General community training	# trainings held	Annually	training reports/participants list	4

Table 41. Education monitoring records.

7.1.5 Access to Resources

People depend on the expansion of agriculture and need land for growing crops. The experience of FUNDAECO in the region has showed that people deforest because they need land to expand their crops and where yields barely produce incomes to local farmers.

Implementing a model where people don't depend on extracting timber for their household or expanding agricultural lands for the culture of crops with low productivity yields (that can barely feed them and give them a little extra money) requires the provision of conditions and resources that guarantee sustainable livelihoods. During the consultation, people asked for support to implement new and more productive crops. Some of them are individuals and some others are already organized in producers associations, that although they have achieved some success, they still needed training and funding or to start working.

With more than 20 years of work in the region FUNDAECO with some communities, have experienced with alternative economic activities, and found several that well accepted by people and that profit from the natural potential of the region; ecotourism, forestry and agroforestry.

Livelihoods
Under this program, the project ensures supplies and conditions to help local farmers in the initial but fundamental phases for sustainable livelihoods. The idea is to support the whole production cycle so at the end communities or individuals are not only producing quality products that can be sold and generate incomes; the impact is not only that people generate sufficient household income but that pressure over the forest will be reduced. Through the creation of nurseries and provision of more than 868,956 plants/seedlings, FUNDAECO has helped to support 283 beneficiaries through the whole production cycle so that associated costs are less burdensome and stakeholders have room to make more sustainable choices (Table 35).

The project also supports individuals and communities to access to the forest incentives program – PINFOR and PINPEP/PROBOSQUE. Currently, there are 224 families receiving payments from PINFOR and PINPEP/PRBOSQUE as a result of the project (Table 42). FUNDAECO has assisted numerous landowners in establishing management plans and has also assisted with legal and logistical services to help landowners successfully register in incentive programs (Table 42). Traditionally, through the preparation of forest inventories, management plans as well as the legal files requires by the programs, the overall costs cannot be paid by poor people. The hope is that with support from FUNDAECO, these programs are more accessible to local stakeholders.

Natural resources

The need for timber and firewood is recognized and integrated in the project. Therefore the project supports legal access to firewood and family wood needs.

Access to reproductive health
Satisfying women basic needs strengthens their participation in the economy and the decision making process of the community, that is why the project includes this program as an integral intervention to the fill the gap in access to women health services. The project has allowed for 2,709 women to receive contraceptive and family planning services (Table 42). Access to sexual and reproductive health services and family planning also provides families a tool to plan their economy and the education of their children, though expanding the impacts of the program in the medium and long term. The program supports a network of women health clinics, already established inside the project zone.

The project has helped to establish health services for 116 communities which have allowed for treatment of 32,341 patients (Table 42). Data records have been collected and are managed and updated through a project-established sexual and reproductive health database.

Access to resources and economic opportunities positive impacts

- ✓ All marginalized and vulnerable communities with customary right have legalized land
- ✓ Ability and capacity of communities to implement sustainable resource management techniques
- ✓ Inclusion of all marginalized and vulnerable communities with customary rights in resource management decisions that may impact them.
- ✓ Sufficient household income from provision of ecotourism services, sale of agroforestry products, and resource protection
- ✓ Protection of ecosystem services important to livelihoods and health
- ✓ Resource management with consideration of traditional, cultural, spiritual, and religious rights

Monitoring results for this project activity group are presented below.

Project Activity Group	Number	Project Activity	Indicator	Frequency	Data Source/ Reference	Monitoring Result
Improved Access to Resources	70	PINFOR or PINPEP payments	# families receiving PINFOR/PINPEP payments	Annually	PINFOR/ PINPEP database	224
Improved Access to Resources	71	support to management plan implementation for PINFOR or PINPEP	# landowners FUNDAECO helped with management plans devised	Annually	PINPEP/ PINFOR files with forestry regent	224
Improved Access to Resources	72	Legal services	# landowners /communities FUNDAECO assisted with legal services	Annually	denunciation records	2
Improved Access to Resources	73	Process and travel logistics for land legalization	# landowners, individuals, communities FUNDAECO assisted with	Annually	activity report	15 communities

			transportation and logistics for land legalization			
Improved Access to Resources	76	Provision of health services	# of patients treated	Annually	sexual and reproductive health database	32,341
Improved Access to Resources	76	Provision of health services	# of women using contraceptive methods	Annually	sexual and reproductive health database	2709
Improved Access to Resources	76	Provision of health services	# of communities with access to services	Annually	sexual and reproductive health database	116
Improved Access to Resources	78	Agroforestry stock for new and existing plots	# seedlings/plants provided for new plots	Annually	nurseries database	1,164,931
Improved Access to Resources	82	Nursery establishment	# nurseries established	Annually	nurseries contracts	34
Improved Access to Resources	83	Buy nursery stock from communities	# plants bought by FUNDAECO	Annually	nurseries contracts/ invoices	868,956
Improved Access to Resources	84	Protection and management of community water sources	# hectares of water source protected	Annually	conservation agreements, patrol reports	14,443.93
Improved Access to Resources	86	Provide access to FUNDEACO agronomist	# of communities / landowners receiving access to agronomist	Annually	logbooks, agroforestry contracts	283

Table 42. Improved access to resources monitoring records.

7.1.6 Potential Negative Community Impacts

While the REDD+ Project has had an overall positive impact on communities and stakeholders within the project region, before project implementation some community members expressed concerns of livelihood threats during the Free, Prior, and Informed Consent process. The project team identified potential negative impacts listed below and took measures to mitigate these impacts so that the project has had a net positive impact on communities.

One major concern mentioned by stakeholders was their fear that the REDD+ project would impact their ownership rights to the land, which could lead to nonconformity in the project and contract cancellation. However, since carbon contracts have not resulted in a loss of land titles, project members worked to mitigate this fear in FPIC meetings through repeated reminders that ownership contracts will continue to be honored (see Table 41 #62). Additionally, the project has helped legalize private and community land in local and national land registries (see Table 40 #33).

Another concern was that without adequate monitoring, leakage would occur, either through project members cutting down trees outside the project area or by non-participating community members logging

within the project area. This leakage has been mitigated (Table 35) through the successful implementation of a more rigorous monitoring and surveillance plan and through educational outreach that reinforced penalties for such actions (see Table 40 #42 and Table 41 #62).

Employees in the logging industry, such as sawmill workers and loggers, raised concerns that the REDD+ Project would lead to unemployment, leading to dissatisfaction and disappointment with the project. These logging industry workers fears were tranquilized by clarifying that these companies were allowed to continue asking for Extraction and Transportation Permits under the parameters of the law and through the promotion of alternative livelihood options (see Table 39 # 25 and 27, Table 41 # 56 and 63).

Community members also identified the reduced access to timber and firewood extraction as a livelihood risk, especially to the most vulnerable community members. As a response, the project has strengthened the educational and awareness programs that focus on reducing cutting trees for firewood by promoting the use of Licenses for Family Consumption authorized in the National Forest and Protected Area Laws. Additionally, the project has promoted the planting of fast-growing trees and the adoption of alternative cooking methods to firewood (see Table 39 # 22 and 27, Table 40 #41 and Table 41 #62). Since some access to forests for firewood continues to occur and alternative methods have reduced the need for this firewood, the positive impacts on these community members have outweighed any negative impacts.

7.2 Negative Offsite Stakeholder Impacts (CM3)

Many of the net positive community impacts from the project activities within the project area have also positively affected stakeholders not directly impacted by these activities. These stakeholders include government institutions, municipalities, and other organized groups that are not community groups. Cattle ranchers were identified as a group of stakeholders at higher risk of being negatively impacted by the project due to reduced land for pasture expansion. However, their average incomes remain high for the area and there has been no evidence of them being harmed by the project. The following table expands on the observed impacts for these identified stakeholders.

Stakeholder	Identified Impact	Monitoring Results
MICAI	The project has provided technical assistance to provide ownership rights to communities that inhabit the project zone and do not have a land title. This has supported MICAI's mission in the region.	Table 40 #33, Table 42 #72 and 73
CODEDE DE IZABAL	The project has positively impacted the participants of FUNDAECO in CODEDE, especially through activity coordination with other stakeholders allowing for information exchange. *FUNDAECO participates at the CODODE as NGO	Table 38 #14, Table 40
CONAP	The project has provided technical assistance by increasing training of forest monitors and financial resources through the paying park guards which has increased law enforcement activities.	Table 40 #42
Municipalidad de Morales	FUNDAECO and Municipalidad de Morales have coordinated control and surveillance activities, providing both personnel for patrols and environmental education.	Table 40 #42, Table 41 #45, 48, 50, 51, and 55
INAB	FUNDAECO has promoted and supported access to PINFOR, PROBOSQUE and PINPEP inside the project zone.	Table 38 #3, Table 39 #22, Table 42 #70
Asociación o Comité	This group has benefited from technical assistance alongside increased promotion and will have	Table 41 #56, 58, and 63

Pimenteros	increased market access for their products through the use of the Conservation Coast trademark.	
Asociación o Comité de Xateros	This group has benefited from technical assistance alongside increased promotion and will have increased market access for their products through the use of the Conservation Coast trademark.	Table 41 #56, 58, and 63
Asociación o Comité de Cardamomeros	This group has benefited from technical assistance alongside increased promotion and will have increased market access for their products through the use of the Conservation Coast trademark.	Table 41 #56, 58, and 63
Asociación de Rambutaneros	This group has benefited from technical assistance alongside increased promotion and will have increased market access for their products through the use of the Conservation Coast trademark.	Table 41 #56, 58, and 63
ASOPROGAL	FUNDAECO and ASOPROGAL have coordinated activities to develop specific productive projects in order to foster community development inside the project zone. Through this coordination, both ASOPROGAL and the Project have provided technical assistance and/or funds.	Table 41 #45 and 62
Asociación Ak´Tenamit	Asociación Ak'Tenamit is an association dedicated to supporting rural development and providing education and health services for indigenous Q'eqchi' communities inside the project zone. Both the project and Ak'tenamit have benefitted from the participation of AkTenamit scholars working at ecotourism sites and particpating in the agroforestry activities in the REDD+ project	Table 39 #30, Table 41 #48, 58, and 63
Cattle Ranchers	This project has limited the ability of cattle ranchers to expand their land for pasture through the cutting down of forests, which has limited their incomes. However, cattle ranchers continue to average higher incomes than most members within the project area. These negative impacts have also been mitigated through the promotion of alternative livelihood options for landowners that are less destructive of forests.	Table 39 # 25 and 27, Table 41 # 56 and 63

Table 43: Other stakeholders impacted by project.

7.3 Exceptional Community Benefits (GL2)

The project is not seeking Gold Level verification for exceptional community benefits this monitoring period.

8 BIODIVERSITY

8.1 Net Positive Biodiversity Impacts (B2 & B4)

In evaluating the net benefits to biodiversity as a result of project activities, the theory of change framework consisting of the problem flow analysis and impact assessment was considered in addition to the historical LULC analysis and the results of LULC modeling. All these factors combined to provide us with quantitative and qualitative assessments of biodiversity benefits across the project's lifetime.

Through a historical analysis of land cover change within the reference region, over the past decade, roughly 55,800 hectares of forest have been lost annually, and the modeled baseline scenario predicts that 4,250 hectares of forest will be lost annually over the next 30 years in the project area without project intervention. Conversely, project activities are expected to substantially reduce deforestation within the project area over this same time frame. As discussed earlier, the reduction in deforestation and forest degradation is the most effective method to reduce threats to biodiversity and improve ecosystem function across the project area. The project has and will continue to increase forest connectivity, protect existing forest ecosystems, and promote the sustainable use of forest and marine species within local communities. Figure 22 shows a comparison of the ex-post deforestation rates estimated for the baseline and project scenarios, and Figure 23 shows a comparison of ex-post deforestation over time between the project and baseline scenarios. These figures show a dramatic reduction in deforestation in the project scenario, which results in net positive benefits to biodiversity through sustained wildlife populations and greater ecosystem integrity.

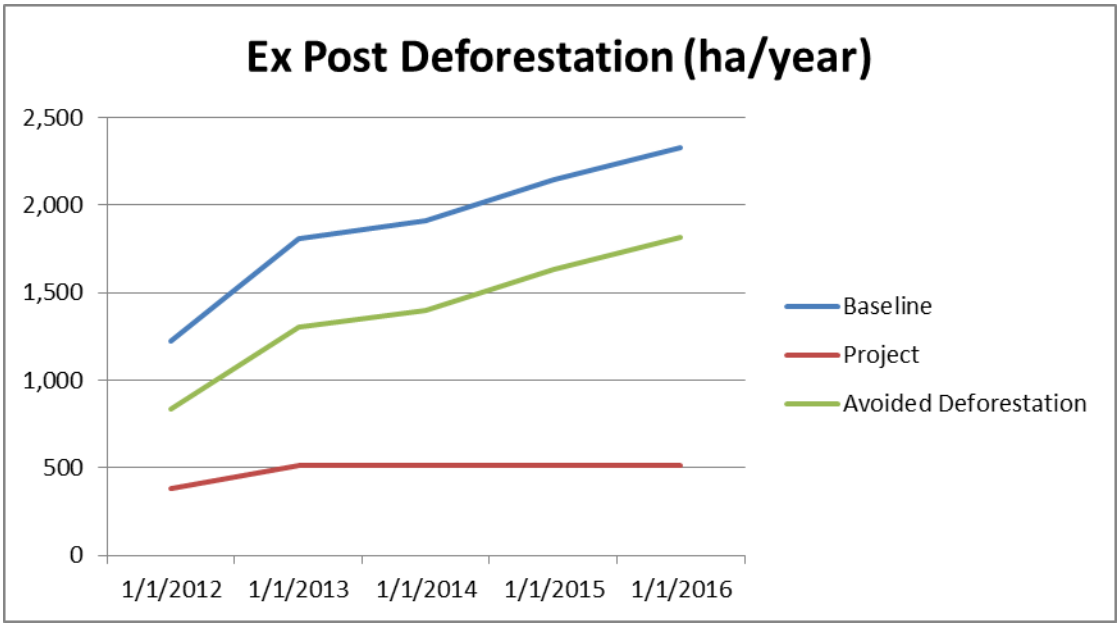

Figure 22. Comparison of baseline and project scenario deforestation (hectares/year) over the first monitoring period.

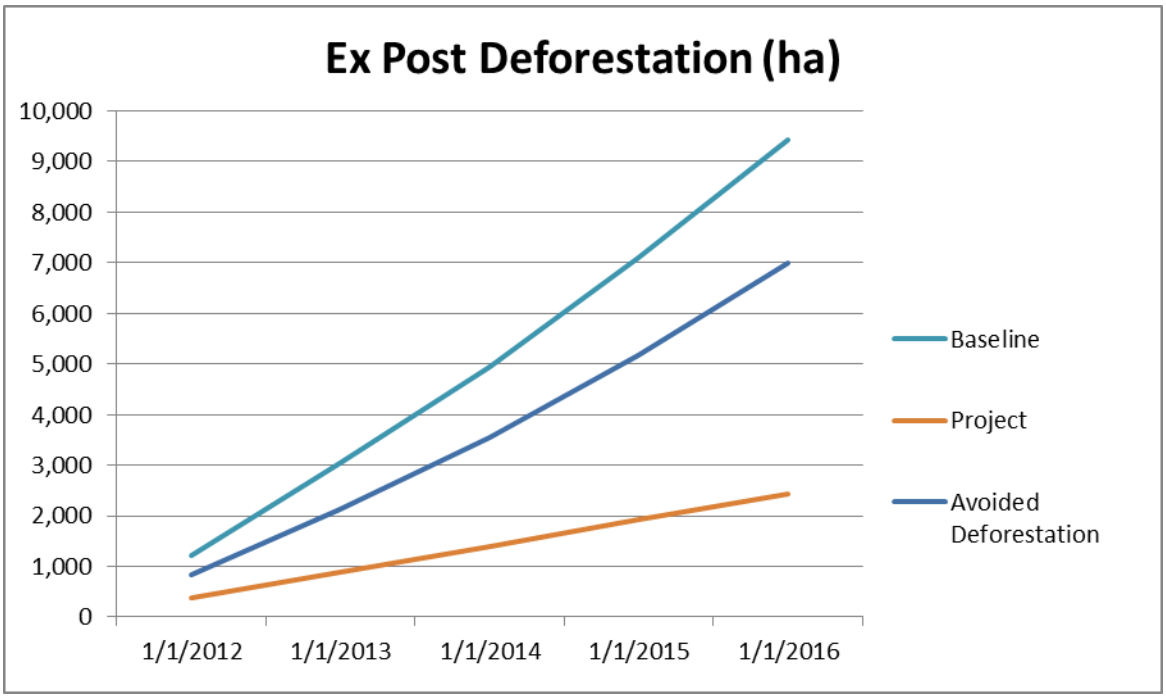

Figure 23. Comparison of baseline and project scenario deforestation (hectares) over the first monitoring period.

8.1.1 Resource Protection

In the without project scenario, the exploitation of forests, water sources, and fisheries would continue un-checked, which would create severe negative impacts on biodiversity within the project zone. In order to address these threats, the project is implementing activities such as the patrolling and enforcement of protected area laws, the management of water sources, and implementation of fish restoration zones. The project has deployed 3432 forest patrols annually and has implemented 4 fishing restricted zones (Table 44). The project has carried out 9 workshops to engage local fishermen in reef monitoring (Table 44) in order to ensure protection and enforcement of laws in these marine zones.

As shown in the Theory of Change matrix (TOC Activity Matrix v1.14.xlsm), these project activities are designed to protect these valuable resources through legal enforcement, and by increasing community awareness and respect for resource integrity and land titles. In particular, the patrolling of protected area core zones serves to enhance biodiversity throughout the project area in addition to maintaining critical project biodiversity HCVs.

Activities regarding governance have been designed to fill an existing void in the local and national governments capacity to enact meaningful land use management and land tenure systems throughout the region. In the without-project scenario, this lack of governance capacity would create further stress on biodiversity through the expansion of illegal settlements, an increase in land disputes, and a lack of political willpower to promote conservation measures. FUNDAECO has designed activities that enable historically established and vulnerable populations to receive land tenure rights while discouraging the establishment of new illegal settlements within forested areas. As evidence, the project has legalized approximately 7,535 hectares of private community land in local and national registries (Table 44). This allows well-established communities and individuals who previously had no legal rights to their land to

invest in their land and forests without the fear of being displaced. FUNDAECO has purchased roughly 2575.64 hectares with the direct intent of forest protection (Table 44).

Additionally, FUNDAECO is an active participant in environmental litigation on a national level and serves on the boards of numerous protected areas in order to advocate for further environmental protection at the local and national level. FUNDAECO has attended and/or participated in 21 environmental litigation advocacy events in the past year (Table 44). All of these actions serve to strengthen local capacity and reduce deforestation and degradation pressures within the project area, which result in positive benefits for biodiversity within the project area and project zone.

Monitoring results for this project activity group are presented in the table below.

Project Activity Group	Number	Project Activity	Indicator	Frequency	Data Source/ Reference	Monitoring Results
Resource Protection, Governance, and Monitoring	1	Legalized private and communit y land	# hectares newly registered in both local and national land registry	Annually	land legalization database	7535.92
Resource Protection, Governance, and Monitoring	3	Registere d land into PINFOR or PINPEP	# hectares of lands FUNDAE CO helped to register with PINFOR/P INPEP	Annually	PINFOR/PINPEP database	8383.42
Resource Protection, Governance, and Monitoring	7	Engage fishermen to reef monitoring	# of workshop s held	Annually	monitoring reports	9
Resource Protection, Governance, and Monitoring	7	Engage fishermen to reef monitoring	amount of coastline surveyed	Annually	monitoring reports	1522
Resource Protection, Governance, and Monitoring	8	Implement ation of fishing restriction zones	#of fishing restriction zones	Annually	community agreements/technic al reports	4
Resource Protection, Governance, and Monitoring	9	Purchase land for protection	# of hectares purchased	Annually	land acquisition files	2575.64

Resource Protection, Governance, and Monitoring	10	Manage protected areas	# of hectares managed, # of patrols	Annually	patrol reports, logbooks	3432 patrols
Resource Protection, Governance, and Monitoring	11	Creation of protected areas	Records of FUNDAECO's input/assistance in creation of protected areas	Annually	meetings records	9, 1 sobrevuelo
Resource Protection, Governance, and Monitoring	12	Protection and management of community water sources	# hectares of water source protected	Annually	conservation agreements, patrol reports, logbooks	14,443.93
Resource Protection, Governance, and Monitoring	13	Forest patrols	forest patrol logs including reports of any incidents requiring higher forms of enforcement (police, military, etc.)	Annually	patrol reports, logbooks	3432 patrols
Resource Protection, Governance, and Monitoring	17	Environmental litigation and advocacy	# advocacy events attended/participated in	Annually	reports	21
Resource Protection, Governance, and Monitoring	17	Environmental litigation and advocacy	records of any litigation with FUNDAECO involvement	Annually	reports	8
Resource Protection, Governance, and Monitoring	38	Participate on CEL for protected areas	Records of CEL meetings	Annually	minutes	17

Table 44. Resource protection and governance monitoring records.

8.1.2 Empowerment and Inclusiveness

The engagement of local communities in project activities is an important factor in creating biodiversity benefits. By encouraging local participation in biodiversity monitoring activities, community members can gain a greater appreciation and awareness of the importance of biodiversity within the project zone. Additionally, participants in monitoring activities may be able to come away from this work feeling invested in the survival and health of different ecosystems and species.

The project's biodiversity goals centered on community empowerment and inclusiveness focused on the engagement of fishermen to monitor and protect vulnerable marine shoreline. The project engaged 52 fishermen to participate in communal reef monitoring (Table 45). Through increased participation and investment in project activities, community members support and understand the project's biodiversity initiatives and goals in addition to gaining a broader understanding of the importance of biodiversity in a local, regional, and global context. Monitoring results for this project activity group are presented below.

Project Activity Group	Number	Project Activity	Indicator	Frequency	Data Source/ Reference	Monitoring Result
Community Empowerment & Inclusiveness	37	Engage fishermen in reef monitoring	# of community fishermen attended	Annually	monitoring reports	52

Table 45. Community empowerment and inclusiveness monitoring records.

8.1.3 Education

Project activities that are of an educational nature are essential to maintaining and protecting biodiversity within the project zone. FUNDAECO is implementing activities that are aimed at biodiversity and environmental education on local, national, and global scales. FUNDAECO has developed ecotourism sites in several locations along the coast and plans to further enhance the facilities at these sites in order to draw in local and foreign visitors who are interested in learning about the unique ecosystems and species in this region of Guatemala. The ecotourism sites established by the project drew 41,480 visitors annually (Table 46).

Educational initiatives are also being implemented in coordination with public schools so that schoolchildren will be taught the importance of conservation, endangered species, and environmental stewardship. The project has enrolled 40 schools to participate in environmental education programs (Table 46). By teaching these fundamental concepts to young children, the project cultivates a better understanding of and relationship with the natural world in the next generation. Project activities also support the university research and study of biodiversity within the project area; 9 marine biodiversity research trips have been conducted involving 88 university students (Table 46). By deepening the knowledge of species and ecosystem dynamics within the Caribbean coast of Guatemala, FUNDAECO contributes to the global scientific community and brings awareness to the importance of this region's biodiversity on a global level.

Additionally, FUNDAECO has taken steps to protect and enhance the populations of endangered amphibian populations within the project area through educational initiatives. Forest patrols are trained in

techniques to prevent the possible introduction or spread of a fungus that can wreak havoc on amphibian species. A training session was held in which 6 park guards were adequately taught to handle the fungus in the event of an issue (Table 46). By taking conservative measures to protect endangered species, FUNDAECO is ensuring that no project activities have unintended negative impacts on HCVs. Parkguards have also participate in mangrove monitoring as part of activities to protect HCVs - Guatemalan mangroves are listed as an endangered species in the Lista de Especies Amenazadas from CONAP, and are included in the two RAMSAR sites located in the project region–. Monitoring results for this project activity group are presented in the table below.

Project Activity Group	Number	Project Activity	Indicator	Frequency	Data Source/Reference	Monitoring Results
Education	43	Biodiversity Monitoring	# of monitoring events	Annually	logbooks, reports	42
Education	45	Engage community members on marine biodiversity and monitoring	# of community members attended	Annually	reports, participants lists	58
Education	45	Marine biodiversity monitoring	# of monitoring events	Annually	reports, participants lists	18
Education	46	Support university research on marine sciences	# of research expeditions conducted	Annually	reports, participants lists	9
Education	46	Support university research on marine sciences	# of students participating in research with FUNDAECO	Annually	reports, participants lists	148
Education	46	Support university research on marine sciences	types of research activities conducted	Annually	support letters, research reports	8
Education	50	Environmental education for schools	# schools participating with FUNDAECO	Annually	reports, participants lists	40 schools, 763 participants
Education	50	Environmental education for schools	# students visiting ecotourism centers	Annually	reports, participants lists	4554
Education	51	Environmental education for interested communities	# communities participating in environmental education opportunities	Annually	reports, participants lists	18
Education	51	Environmental education for interested communities	# workshops or educational events held	Annually	reports, participants lists	12

Education	57	Ecotoursim site establishment	# visitors	Annually	visitors records	41,830
Education	66	Train park guards to prevent transfer of amphibian fungus to amphibian conservation areas	# of guards trained	Annually	reports, participants lists	6
Education	66	Train park guards to prevent transfer of amphibian fungus to amphibian conservation areas	# of trainings held	Annually	reports, participants lists	3

Table 46. Education monitoring records.

8.1.4 Access to Resources

Through the analysis of agents and drivers of deforestation (see CNCG SM drivers of deforestation_final_1.pdf and Brief on Agents and Drivers v2.docx) FUNDAECO has been able to identify that a large contributing factor to land use change and forest loss is due to a lack of economic opportunities and resources for people within the project zone. As discussed previously, most communities within the project zone live in extreme poverty with limited access to water, electricity, education, and healthcare. Many of these families survive through subsistence agriculture and will turn to illegal logging, cattle ranching, or agriculture expansion in order to take advantage of any economic opportunities available. Many subsistence farmers do not have the technical knowledge or financial means to improve the systems of agricultural production on their existing property, and may resort to clearing more land to increase their agricultural outputs.

During the reporting period, FUNDAECO worked to provide these farmers with the resources needed to create improved and diversified agroforestry systems with their existing cropland. Farmers that participated in these programs received free or subsidized nursery stock to establish their agroforestry plots, in addition to land use planning guidance from FUNDAECO staff.

Land use planning has been aimed at creating diversified income for farmers (i.e. growing rubber and pepper), while also providing basic needs such as food, timber and fuelwood. These agroforestry plans have also been designed to create a structurally and biologically diverse farming system, so as to provide a more habitable environment for native flora and fauna. As a result, approximately 14,443.93 hectares worth of water sources have been protected (Table 47).

During the reporting period, farmers gained access to technical expertise from agroforestry specialists on methods for improving agricultural yields from cash crops such as pepper, rambutan, rubber, and cardamom. Through the implementation of these diversified agroforestry production models, FUNDAECO improved livelihoods, while reducing deforestation pressure throughout the project area. For example, by encouraging farmers to plant fast-growing native trees for timber on their land, these farmers are able to harvest trees whenever necessary without needing to resort to illegal logging. Additionally, farmers who grow cash crops with improved nutrient cycling techniques increased their income from the same area of land without needing to resort to deforestation to increase crop yields.

FUNDAECO is also provided access to legal counsel for landowners without official land title, and to reduce barriers to participation in payment for ecosystem services programs such as PINFOR and PINPEP during the reporting period. Many farmers and landowners within the project zone have little formal education and no financial means to engage in the process of land legalization without assistance. FUNDAECO helped families and communities to become recognized title-holders to their land on the local and national levels by providing documentation and legal counsel services to those needing support.

Additionally, FUNDAECO has been registering and providing land management planning and documentation services to any farmers wanting to participate in government sponsored PINFOR and PINPEP programs during the reporting period. These programs provide incentives for farmers to preserve any forest on their property, however there are numerous forms including a land management plan that must be prepared for a property to be enrolled. Many farmers do not have the technical skills to be able to prepare this documentation on their own, and as such can work with FUNDAECO to be able to gain access to these alternative income sources. By providing consultation services and legal resources to farmers and communities throughout the project zone, FUNDAECO is effectively reducing deforestation pressures tied to land tenure problems and a lack of economic opportunities. Overall, these activities have a net positive effect on biodiversity within the project area and project zone. Monitoring results for this project activity group are presented below.

Project Activity Group	Number	Project Activity	Indicator	Frequency	Data Source/ Reference	Monitoring Result
Improved Access to Resources	84	Protection and management of community water sources	# hectares of water source protected	Annually	conservation agreements, patrol reports	14443.93

Table 47. Improved access to resources monitoring records.

8.2 Negative Offsite Biodiversity Impacts (B3 & B4)

All project activities have been analyzed for any potential negative effects on biodiversity within the project area and project zone. Negative biodiversity impacts for REDD+ projects are most often associated with deforestation-related activities shifting to areas outside the project area, but can come about from the misuse of pesticides and fertilizers as well as ineffective waste management techniques. As discussed in the Project Description Document, other potential risks to project biodiversity benefits include lack of governance capacity resulting in unclear land tenure, changes in local economic conditions that may increase deforestation pressure, and the possibility for displaced forest loss outside of the project area.

FUNDAECO has taken steps to mitigate all potential harmful impacts on biodiversity benefits as a direct and indirect result of project activities. Agroforestry project activities adhere to standard USAID protocols on the safe and judicious use and disposal of pesticides and fertilizers in addition to banning the use of GMO's and invasive species as part of project activities (see Plan General de BPA 2016.docx, EG-PERSUAP-Final_Oct2012.docx, Consultoria Selvin Perez doc Final 10062014.docx). Due to existing agricultural markets and increased economic incentives for small-scale farmers, FUNDAECO does use several non-native species in its agroforestry programs, including rubber, cardamom, rambutan, and pepper. However, these species are non-invasive and were introduced into Guatemala as agricultural

species over 50 years ago. The Guatemalan government considers these species to be “naturalized” and to pose no threats to biodiversity within the country. A detailed justification and analysis of non-native species use in FUNDAECO agroforestry programs can be found in Consultoria Selvin Perez doc Final 10062014.docx. In order to further reduce any risks to biodiversity benefits through the use of non-native species in agroforestry programs, FUNDAECO engages landowners in land-management and planning activities to diversify agricultural commodities across an ownership and to avoid monoculture plantations. Farmers are encouraged to promote a more structurally diverse and natural agroforestry system that is able to support native flora and fauna as opposed to structurally and biologically homogenous plantations (see Consultoria Selvin Perez doc Final 10062014.docx).

Any potential indirect negative impacts on biodiversity caused by project activities are also being minimized and mitigated through FUNDAECO programs. In order to avoid possible activity-shifting deforestation from the project area into the project zone as a result of project activities, FUNDAECO is engaging with landowners throughout the project zone to support land legalization efforts, enroll landowners into PINFOR and PINPEP programs, and eventually incorporate additional landowners with forest area into the grouped project over time. This serves and will continue to serve to minimize deforestation pressures that could result in further biodiversity loss.

FUNDAECO has also taken steps to ensure that biodiversity HCVs are not negatively impacted by project activities. By preventing deforestation within the project area, FUNDAECO is effectively protecting the majority of biodiversity HCVs identified in Section 2.4.2. However, potential negative effects on HCVs as a result of project activities include the spread of fungal diseases to IUCN endangered amphibian species during forest patrol activities. To prevent the spread of any harmful amphibian diseases throughout the project area, forest patrols have been instructed in appropriate decontamination methods for shoes or clothing. While the spread of these diseases through forest patrol activities is unlikely, extra measures are being taken to protect vulnerable wildlife populations.

8.3 Exceptional Biodiversity Benefits (GL3)

The project area and project zone has a number of endangered and critically endangered trigger species within it that qualify this project for exceptional biodiversity benefits under the CCB Standard version 3. The project area qualifies as providing exceptional biodiversity benefits by meeting the vulnerability criteria (a), which requires the regular occurrence of at least a single individual critically endangered or endangered species. The Sierra Caral protected area is a known habitat for 6 critically endangered species *Cryptotriton wakei, Nototriton brodiei, Agalychnis moreletii, Bromeliohyla bromeliacia, Duellmanohyla soralia, Ptychohyla hypomykter*. The IUCN Red List notes that this species is at great risk due to habitat loss and the fungus chytridiomycosis. (See Protocol to avoid Chytrid fungus)

The project was unable to establish a baseline for the number of individuals for the trigger species. Amphibian populations are difficult to estimate, so the use of other indicators, such as presence/absence of related species and habitat are more suitable assessments of their conservation status. During species monitoring activities, it was only possible to find a few individuals for key amphibian species including: *Duellmanohyla soralia, Ptychohyla hypomykter,* and *Agalychnis moreletii.* (See Amphibian monitoring reports and logbooks)

The fact that the trigger species such as, *Cryptotriton nasalis, Cryptotriton wakei, Nototriton brodiei , Duellmanohyla soralia* (all critically endangered and endemic to Sierra El Merendon) *as well as Craugastor Nefrens* (endemic to Sierra Caral) and *Ptychohyla sanctaecrucis* (endemic to Santa Cruz) have been located in the project area at the start of the project shows that the existing forest area is

providing critical habitat for this species. It is expected that if the project were not in place today, that this endangered amphibian species would experience habitat loss and fragmentation, in addition to increased risks of disease, which would likely decimate its existing population. As is discussed in Section 4.3.2 of the monitoring report, biodiversity is highly correlated with forest cover (Richards and Panfil, 2011). Habitat loss has been identified as the primary threat to *Duellmanohyla soralia,* and is a known threat to other endangered species in the area. These forests are threatened by being converted primarily to subsistence agriculture or pasture. The project is taking measures to reduce deforestation and degradation threats within these areas, to ensure that both the ecosystems and the threatened species within those ecosystems will be protected and maintained.

The Theory of Change framework in section 4.4.2.2, Table 18, shows how project activities are designed to achieve positive benefits for threatened and endangered species within the project zone. Several project activities have been implemented to protect endangered amphibians within the project zone, ensuring that the project is maintaining or enhancing the population of the trigger species. Specifically, the government recognition of Sierra Caral as a National Protected Area during this monitoring period, and the enforced protection of this forest area, has worked as the first measure taken to effectively maintain and enhance the population species.

Additionally, all park guards in Sierra Caral are trained to employ measures to prevent the spread of deadly amphibian fungal diseases. Forest patrols use techniques, such as through the bleaching of boots when entering and leaving forests, to prevent the possible introduction or spread of a fungus that can wreak havoc on amphibian species. For this monitoring period, two training sessions were held in which 6 park guards were adequately taught to handle the fungus in the event of an issue. Every time a visitor arrives to the reserve they are informed about chytridiomycosis, and are guided to implement the prevention protocol. (See Protocol to avoid Chytrid fungus)

The project activities related to forest protection and combatting the spread of chytridiomycosis are effectively geared at protecting the trigger species against the greatest threats to its survival. The biodiversity related monitoring plan in section 5.1.2.3, as well as parameters monitored in section 5.3.3, and Table 48 below outline indicators used to determine direct threats to the trigger species as well as measures taken to address those threats. Between 2012 and 2016, FUNDAECO purchased 2,480 hectares of private land specifically for amphibian conservation in Sierra Caral. Also during this period FUNDAECO successfully established the Sierra Caral National Protected area through the Guatemalan Congress and have created the Sierra Caral Amphibian Conservation Reserve. To promote conservation of amphibians and their habitat, FUNDAECO has deployed a series of promotion and education activities using education materials for adults and children that are distributed during environmental talks and fairs. (See Amphibian Conservation Promotion and Education Materials). A report produced in May of 2014 describes in detail the activities implemented specifically related to protecting and monitoring the amphibian trigger species in the project zone, and shows that the project has successfully maintained the population of this species throughout this monitoring period (See Trigger Species Info_2011a_010_fundaeco_final_technical_report).

Project Activity Group	Number	Project Activity	Indicator	Frequency	Data Source/ Reference	Monitoring Result
Resource Protection, Governance, and Monitoring	9	Purchase land for protection	# of hectares purchased in HCV amphibian site	Annually	land aquisition files	2480.84
Resource Protection, Governance, and Monitoring	10	Manage protected areas	# of hectares managed, # of patrols	Annually	patrol reports, logbooks	3432 patrols
Resource Protection, Governance, and Monitoring	11	Creation of protected areas	Records of FUNDAECO's input/assistance in creation of protected areas	Annually	meetings records	9, 1 sobrevuelo
Education	66	Train park guards to prevent transfer of amphibian fungus to amphibian conservation areas	# of guards trained	Annually	reports, participants lists	6
Education	66	Train park guards to prevent transfer of amphibian fungus to amphibian conservation areas	# of trainings held	Annually	reports, participants lists	2

Table 48. Monitoring indicators and results for the health of trigger species in the Project Zone.

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