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

Project Title	REDD+ Project for Caribbean Guatemala: The Conservation Coast
Project ID	1622
Version	v 2.7
Report ID	03
Date of Issue	9 July 2020
Project Location	Izabal Department of Izabal, Guatemala
Project Proponent(s)	Fundación para el Ecodesarrollo y la Conservación –FUNDAECO- Phone: (502) 23141900 Address: 25 calle 2-39 zona 1, Guatemala City, Guatemala Contact: Karen Aguilar Email: k.aguilar@fundaeco.org.gt Website: www.fundaeco.org.gt
Prepared By	Ecological Carbon Offsets Partners, LLC (ecoPartners) Phone: +1 (415) 634-4650 Address: 2930 Shattuck Ave, Suite 304, Berkeley, CA 94705 Email: plozano@ecopartnersllc.com Website: www.epcarbon.com;
Validation/Verification Body	AENOR Jose Luis Fuentes Génova 6. 28004 Madrid- Spain. Telephone +34 914326000 jlfuentes@aenor.com aenor.com
GHG Accounting/ Crediting Period	01 April 2012 31 March 2042; 30-year total period
Monitoring Period of this Report	01 January 2019 – 31 December 2019
History of CCB Status	Validation Received 29 March 2017
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.

Table of Contents

1 SUMMARY OF PROJECT BENEFITS

1.1 Unique Project Benefits

Table 1: Unique Project Benefits

Outcome or Impact	Achievements during the Monitoring Period	Section Reference	Achievements during the Project Lifetime
1) Increased Awareness of Ecosystem and Habitat Importance for Native Species	Educational initiatives are being implemented in coordination with public schools so that schoolchildren will be taught Climate Change, Nature values of Caribbean Guatemala, endangered species, and environmental stewardship. The project has enrolled 51 schools and 3800 students to participate in environmental education. By teaching these fundamental concepts to children and youths, the project cultivates a better understanding and better relationships with the natural world.	4.1.1	12864 students from 51 school participated in environmental education activities or visited FUNDAECO Ecotourism sites
2) Widespread protection of forest in the project zone	FUNDAECO has designed a number of activities within the Resource Protection technology (Section 2.2 of the PD) that addresses the lack of law enforcement. These activities include the implementation of forest patrols, governance enhancement and interinstitutional coordination. Forest patrols and the enforcement of local laws would help to curb deforestation agents whose activities are possible due to weak law enforcement. 680 forest patrols were held with FUNDAECO staff, CONAP staff, communities' members and also in coordination with other government agencies; MP and BIM etc..	4.1.4	4112 forest patrols
3) Widespread awareness among women and families on sexual and reproductive rights and health	Satisfying women basic needs will strengthen their participation in the economy and the decision making process of the community; the project includes a specific program on Access to sexual and reproductive health. Access to	4.1.1	5582 people participated in talks on sexual and reproductive rights and health

	sexual and reproductive health services and family planning will also provide 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. Besides contributing directly to Health metrics, this program gives access to information and education so women are more aware on the importance and impacts of sexual and reproductive health and rights. 2308 people participated in talks on sexual and reproductive rights and health		
4) Sufficient household income and Widespread protection	Several project activities are aimed at addressing the Lack of Economic and Employment Opportunities. Namely, the Sustainable Enterprises, Access the Resource, and Education project activities are aimed at diversifying the income sources of families and individuals beyond traditional products and activities. Additional income can also be derived from forest protection through the government forest incentive programs PINFOR/ PINPEP/PROBOSQUE; incentivizing landowners to maintain forested areas. Application to these programs, however, involves several technical steps and the support of forestry technicians is required. The project covers all expenses related to the preparation of the files required by forestry incentives programs, so forest owners that are part of the project can be benefited. 42 beneficiaries were newly registered in the PINPEP/PROBOSQUE Programs and are receiving forest	4.1.1	413 beneficiaries were registered in the PINFOR/PINPEP/PROBOSQUE Programs to receive forest and agoforestry incentives

1.2 Standardized Benefit Metrics

Table 2: Standardized Benefit Metrics

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
GHG emission reductions & removals	Net estimated emission removals in the project area, measured against the without-project scenario	Not Applicable		Not Applicable
	Net estimated emission reductions in the project area, measured against the without-project scenario	782,687 tCO_2e	3.2.4	5,206,004 tCO_2e
Forest[1] cover	For REDD[2] projects: Number of hectares of reduced forest loss in the project area measured against the without-project scenario	1,493 ha	5.1.3	12,392 ha
	For ARR[3] projects: Number of hectares of forest cover increased in the project area measured against the without-project scenario	Not Applicable	-	Not Applicable
Improved land management	Number of hectares of existing production forest land in which IFM[4] practices have occurred as a result of the project's activities, measured against the without-project scenario	Not Applicable		Not Applicable
	Number of hectares of non-forest land in which improved land management has occurred as a result of the project's activities, measured against the without-project scenario	0	5.1.1	2,449.42

[1] Land with woody vegetation that meets an internationally accepted definition (e.g., UNFCCC, FAO or IPCC) of what constitutes a forest, which includes threshold parameters, such as minimum forest area, tree height and level of crown cover, and may include mature, secondary, degraded and wetland forests (*VCS Program Definitions*)
[2] Reduced emissions from deforestation and forest degradation (REDD) - Activities that reduce GHG emissions by slowing or stopping conversion of forests to non-forest land and/or reduce the degradation of forest land where forest biomass is lost (*VCS Program Definitions*)
[3] Afforestation, reforestation and revegetation (ARR) - Activities that increase carbon stocks in woody biomass (and in some cases soils) by establishing, increasing and/or restoring vegetative cover through the planting, sowing and/or human-assisted natural regeneration of woody vegetation (*VCS Program Definitions*)
[4] Improved forest management (IFM) - Activities that change forest management practices and increase carbon stock on forest lands managed for wood products such as saw timber, pulpwood and fuelwood (*VCS Program Definitions*)

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
Training	Total number of community members who have improved skills and/or knowledge resulting from training provided as part of project activities	2730	2.1.10 2.2.6 2.2.7 2.3.13 4.1.1	5366
	Number of female community members who have improved skills and/or knowledge resulting from training provided as part of project activities of project activities	1451	2.1.10 2.2.6 2.2.7 2.3.13 4.1.1	1998
Employment	Total number of people employed in of project activities,[5] expressed as number of full time employees[6]	87	2.3.13	97
	Number of women employed in project activities, expressed as number of full time employees	26	2.3.13	26
Livelihoods	Total number of people with improved livelihoods[7] or income generated as a result of project activities	644	4.1.1	821
	Number of women with improved livelihoods or income generated as a result of project activities	157	4.1.1	246
Health	Total number of people for whom health services were improved as a result of project activities, measured against the without-project scenario	3675	4.1.1	48038

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

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

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

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
	Number of women for whom health services were improved as a result of project activities, measured against the without-project scenario	2527	4.1.1	16856
Education	Total number of people for whom access to, or quality of, education was improved as a result of project activities, measured against the without-project scenario (this metric include access to scholarships and special training programs)	138	4.1.1	235
	Number of women and girls for whom access to, or quality of, education was improved as a result of project activities, measured against the without-project scenario (this metric include access to scholarships and special training programs)	115	4.1.1	170
Water	Total number of people who experienced increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	not applicable		not applicable
	Number of women who experienced increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	not applicable		not applicable

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
Well-being	Total number of community members whose well-being[8] was improved as a result of project activities	7684	4.1.1	55488
	Number of women whose well-being was improved as a result of project activities	4334	4.1.1	28109
Biodiversity conservation	Change in the number of hectares significantly better managed by the project for biodiversity conservation,[9] measured against the without-project scenario	233.08	2.1.7	30,691.49
	Number of globally Critically Endangered or Endangered species[10] benefiting from reduced threats as a result of project activities,[11] measured against the without-project scenario	30	5.4.1	30

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

[9] Biodiversity conservation in this context means areas where specific management measures are being implemented as a part of project activities with an objective of enhancing biodiversity conservation.

[10] Per IUCN's Red List of Threatened Species

[11] In the absence of direct population or occupancy measures, measurement of reduced threats may be used as evidence of benefit

2 GENERAL

2.1 Project Description

2.1.1 Implementation Description

Located in Department of Izabal in the Sarstun-Motagua reference region, the REDD+ Project for Caribbean Guatemala 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) category.

The Guatemalan Regulation Decree 07-2013, gives landowners the rights to emission reductions generated in either voluntary or compliance markets, and allows the Project to pursue a Grouped Project design where FUNDAECO as project proponent, can represent landowners and manage the development of a REDD+ project on their behalf. The project forests have experienced a continued reduction in biomass due largely to small-scale farmers and weak law enforcement. The project aims to alleviate these pressures on the forests through the support of governance capacity, the generation of alternative economic activities and income sources, and through capacity building. The project is estimated to generate 24,445,681 tCO2e of GHG Emissions Reductions over 30 years, and during this verification, it has generated 782,687 tCO2e in net emissions reductions. The Project Objectives are:

- *Climate Objectives*
  - Reduce CO2 emissions that result from the conversion of intact forest to agricultural and pastoral land
- *Community Objectives*
  - 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.
- *Biodiversity Objectives*
  - Maintain habitat for viable, abundant and diverse natural populations.
  - Reduce threats to rare, threatened and endangered species.
  - Maintain the function of the natural ecosystems.
  - Support local and global knowledge of biodiversity in the project zone.

The project's main goals during this monitoring period have been to improve forest protection through forest patrols, law enforcement, conservation agreements and by strengthening the protected areas governance, as well as supporting forest owners and possessors to access the government forest incentive programs, PROBOSQUE and PINPEP. As lack of economic and employment opportunities was identified as the strongest underlying factor for deforestation, FUNDAECO has been addressing related drivers by improving two basic conditions a) Access to Resources and Economic Opportunities, and b) Education. The project is supporting local producers accessing; supplies, technical assistance and training for diversified economic activities such as bakery, handicrafts, and agroforestry projects with value crops, as well as accessing to education opportunities especially for young women. During this period FUNDAECO continued its efforts on creating conditions to contribute to the project financial sustainability.

Finally the project gives special attention to improve general community safeguards and wellbeing providing access to health services and training in topics of interest for local development.

2.1.2 Project Category and Activity 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. The project is a grouped project.

2.1.3 Project Proponent(s)

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.

Table 3: Project proponent details.

Organization name	Fundación para el Ecodesarrollo y la Conservación FUNDAECO
Contact person	Karen Aguilar Ponce
Title	Director of Development
Address	25 calle 2-39 zona 1
Telephone	(502)23141900
Email	k.aguilar@fundaeco.org.gt

2.1.4 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.

Organization name	**Ecological Carbon Offset Partners, LLC (ecoPartners)**
Role in the project	EcoPartners has provided technical consulting services to FUNDAECO on project design, documentation, carbon accounting, validation, and remote sensing, as well as in drafting the Project Description Document.

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

Althelia Ecosphere is a fund dedicated to funding innovative models that lead to long term transitions to sustainable land use 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 caliber social, environmental and economic performance, they aim to demonstrate that financial performance can be fully aligned with sound environmental stewardship and social development.

Organization name	**Althelia Ecosphere**
Role in the project	In the context of the REDD+ Project for Caribbean Guatemala, Althelia has provided financing for project development costs.
Contact person	Adam Gibbon,
Title	Chief Technical Officer
Address	Ecosphere Capital Partners LLP (advisors), 7 Chalcot Road, Primrose Hill, London NW1 8LH
Telephone	
Email	adam.gibbon@althelia.com

2.1.5 Project Start Date (G1.9)

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 from the PD) 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 with the Netherland government that supported FUNDAECO in the implementation of conservation activities across the network of protected areas 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.xlsm for a list of all PAI start dates on April 1, 2012 and the activities that correspond to those dates.

2.1.6 Project Crediting Period (G1.9)

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 third monitoring and implementation period spanning from January 1, 2019 to December 31, 2019.

2.1.7 Project Location

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.

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 1.

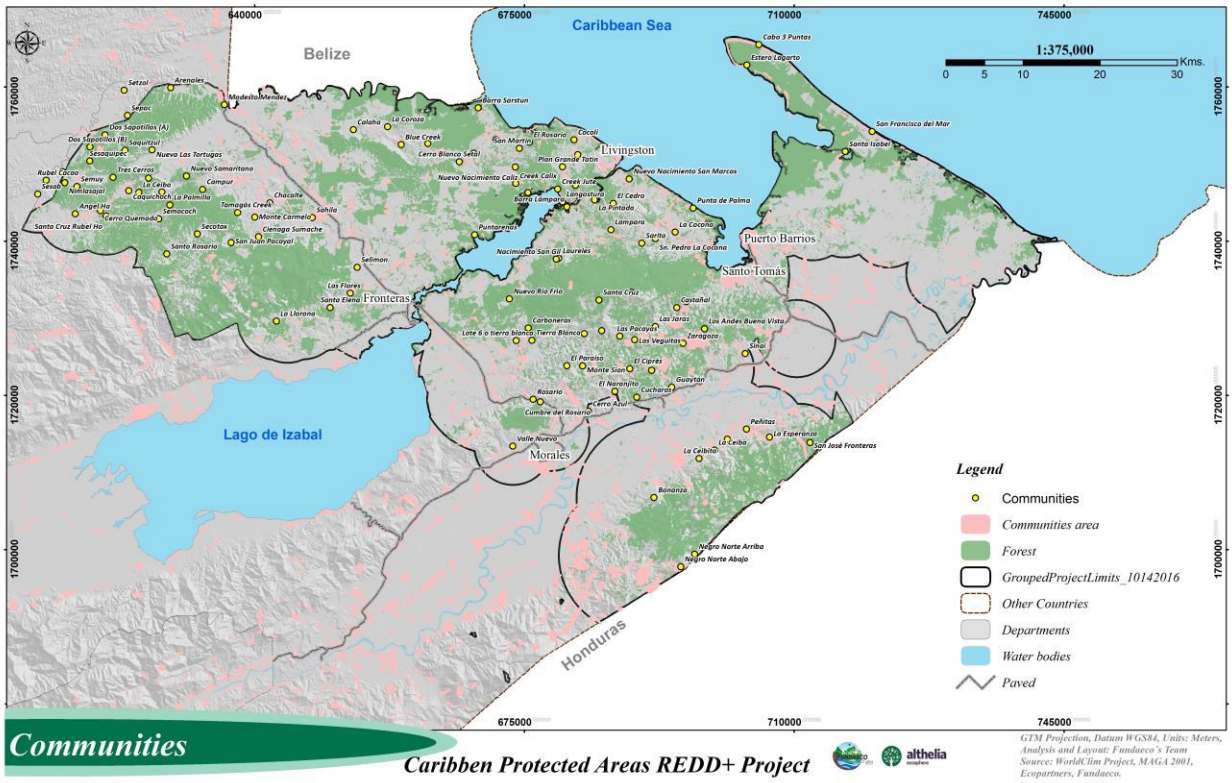

Figure 1: Map of communities identified inside project zone.

Grouped Project Area

This project is a grouped project and also uses the programmatic approach. The Grouped Project Area is shown in Figure 2 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 2 for a map of the Grouped Project Area.

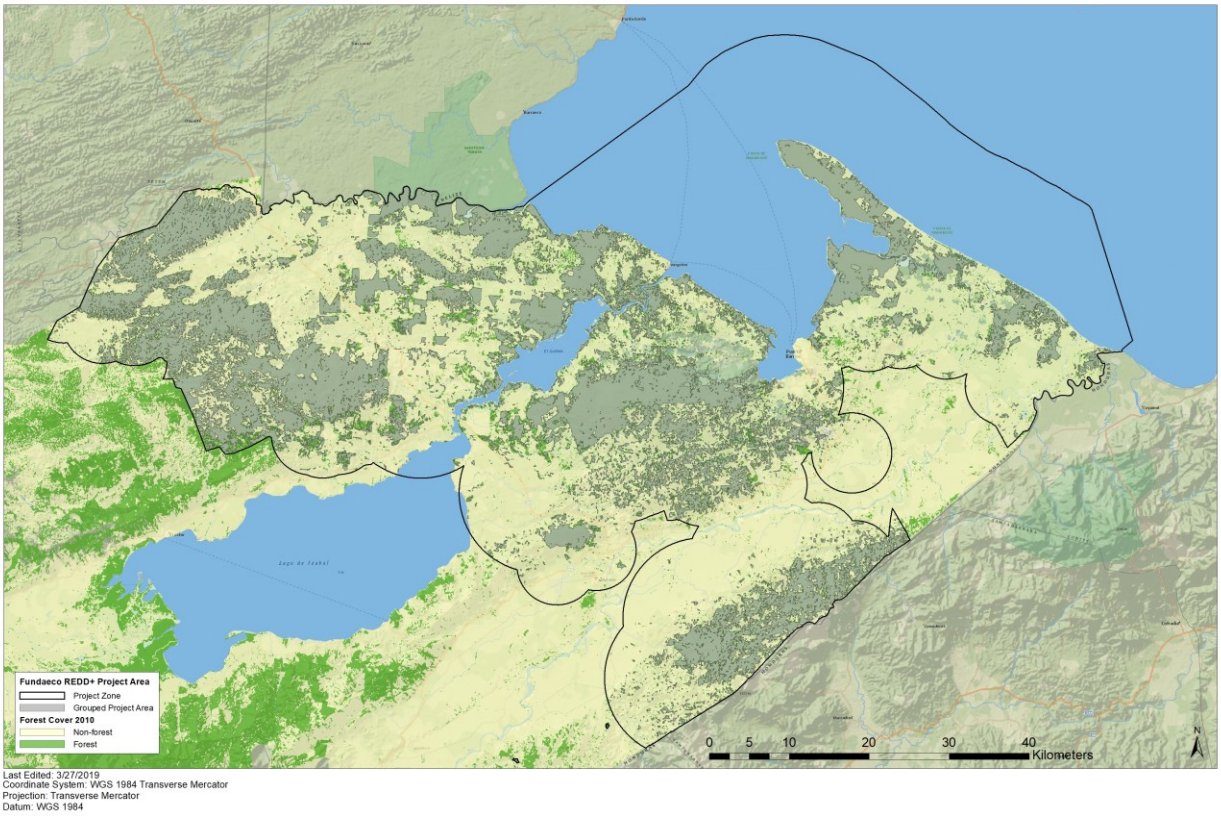

Figure 2: Grouped Project Area and Project Zone.

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.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 this monitoring period, there are 743 different parcels that make up the 55,341 hectares of the Project Area, where project ownership has been transferred to FUNDAECO. Since the previous monitoring period, no new parcels have been added to the Project Area and the total remain in 743 parcels. Figure 3 below provides a map of the Project Area that includes all previously validated project activity instances. The size of the Project Area is expected to increase over time as new Project Activity Instances are established.

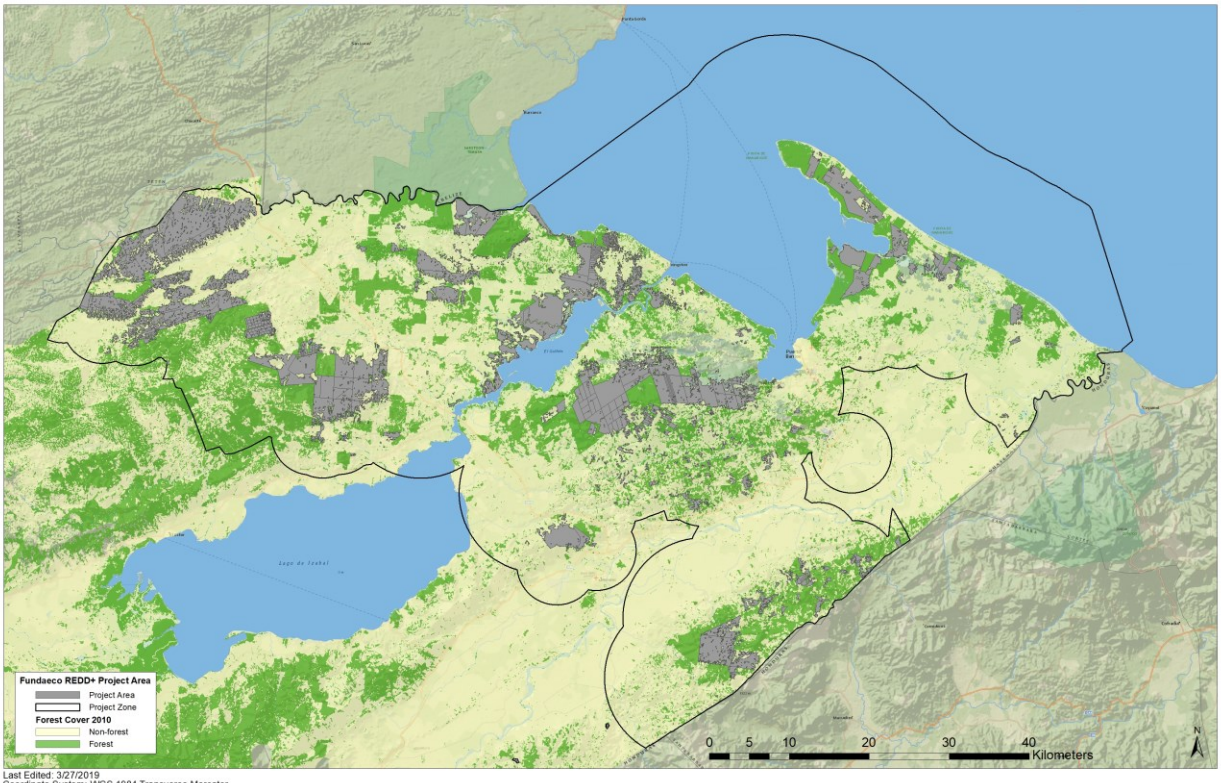

Figure 3: Project Area and Project Zone.

2.1.8 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 v4.0.

2.1.9 Other Programs (G5.9)

- Emission Trading Programs and Other Binding Limits: The emissions reductions and removals generated by the project are not used for compliance with any emissions trading program or to meet any binding GHG emissions limit. Guatemala has presented a subnational ERPD to the FCPF, however this ERPD is limited just to some areas around Guatemala, and the project zone is not included. To avoid double counting, emissions reductions will only be issued as Verified Carbon Units (VCUs).
- Other Forms of Environmental Credit: The project has not and does not intend to generate any related environmental credit for GHG emissions reductions or removals other than those claimed under the VCS Program. No other forms of environmental credit will be sought by the project proponent.
- Participation under Other GHG Programs: The project has not been, and will not be, seeking registration under any other GHG programs other than VCS and CCB. CCB verification will demonstrate positive climate, community and biodiversity impacts, but does not produce any registered emissions reductions or credits.
    - Currently, there is no national or jurisdictional REDD+ program. Therefore, the project is not located within a jurisdiction covered by a REDD+ jurisdictional program in Guatemala and not required to follow the VCS jurisdictional REDD+ requirements.
    - However, the Guatemalan government led by the Ministry of Environment and Natural Resources (MARN) as the REDD+ focal point is in the process of developing a national REDD+ strategy. The Guatemala National REDD+ Strategy actually under development has followed a jurisdictional nested approach and has delineated five regions that will independently establish reference emission levels (RELs). See Documento del Paquete de Preparación REDD+. The REDD+ Project for Caribbean Guatemala falls within the Sarstun-Motagua region which has initiated the collection of data for determining a REL. The REDD+ Project for Caribbean Guatemala is moving faster than the national strategy, however, it recognizes the importance and need to harmonize with programmatic details that have been established. FUNDAECO is participating in the national REDD+ strategy discussions, and is also coordinating with Universidad Valle (UVG) to ensure that all information produced on deforestation and degradation, carbon estimates, and land use classification can be used in the development of the REDD+ Project for Caribbean Guatemala.

2.1.10 Sustainable Development

The Katun 2032 National Development Plan launched by Guatemala in 2014, Includes as fundamental goals of this welfare for the people, wealth for all, natural resources for today and tomorrow, and that citizen participation is a fundamental element of long-term development. Project staff who are local community promoters, technicians and professionals are close to the communities needs to achieve this goals, and are trained to listen, understand and implement activities based on local dynamics, and making improvements and changes based on an adaptive management approach.

The Conservation Coast Project Community objectives and technologies, includes actions to foster and support sustainable development in local communities in ways that support broader national goals for sustainable development. The project technologies have 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 (see PD Section 2.4), 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 and forest patrols, improved land use management by supporting agroforestry and reforestation projects, supporting access to the forestry incentive programs PROBOSQUE, PINFOR and PINPEP, and improving economic opportunities. 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. See FUNDAECO Bird Monitoring Program 2019.

Regarding the Sustainable Development Goals, Guatemala has prioritized specific targets for each goal. Table 4 below shows the SDG targets[12] , that the Project is aiming to address, as well as the project activity related.

Table 4: Sustainable development goals for the REDD+ Project for Caribbean Guatemala.

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	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 complemented to monitor incomes in year 2021, when yields starts

[12] 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.

value addition and non-farm employment.			
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 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	15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type	Purchase of land for protection (9)	# of hectares 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 hectares 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 park guards to prevent transfer of amphibian fungus to amphibian conservation areas (66)	# of guards trained # of trainings held

2.2 Project Implementation Status

2.2.1 Implementation Schedule (G1.9)

FUNDAECO started the early design and finance of a REDD+ Project in Caribbean Guatemala in 2010, through a MOU signed with BNP-Paribas, a feasibility study was produced in 2012 and the project was finally validated in 2017, table 5 below shows the key dates and milestones in the project development and implementation:

Table 5: Project Milestones

Date	Milestone(s) in the project's development and implementation
08/05/2010	Signature and start of the implementation of a Memorandum of Understanding between FUNDAECO and BNP Paribas to explore REDD+ as an strategy to protect forest in Caribbean Guatemala
04/01/2012	Start of project activities
09/14/2012	Production of the Feasibility Study for a REDD+ Project in Caribbean Guatemala
04/30/2015	Hiring of ecoPartners as our principal adviser for the project validation and verification
05/05/2015	Signature of agreement with Althelia Ecosphere for the financing of project development costs and early activities
03/29/2017	Validation Report Issued
11/12/2017	First Verification Report Issued
03/06/2018	Signature of contracts to include new project activities instances in the Monitoring Period 2017-2018
07/19/2019	Second Verification Report Issued
13/01/2020	Hiring of ecoPartners as our principal adviser for the project verification Monitoring Period January 1st 2019 - December 31st 2019
04/01/2020	Hiring of VVB fir Monitoring Period January 1st 2019 - December 31st 2019

2.2.2 Methodology Deviations

2.2.2.1 Methodology Deviations for MP3

There are no new methodology deviations for MP3 at this time.

2.2.2.2 Methodology Deviations for Previous Monitoring Periods

The following methodology deviations were granted during previous monitoring periods.

Table 6: First 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 (EXCWP) is more accurate than the estimate in VM0015 (CXBicl). 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 EXCWP 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 v4.0 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.

Table 7: Second Methodology Deviation

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	This procedure is related to measurement and conflicts with the

Measurement:	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 v4.0 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.

2.2.3 Minor Changes to Project Description (*Rules* 3.5.6)

2.2.3.1 Minor Changes to Project Description for the Current Monitoring Period

Table 8: First and second Minor Changes for current monitoring period

First change	
Source:	Project Description Section 8.3.2
Criteria and Procedures:	Updating the Community Impact Indicators
Relation to Monitoring or Measurement:	This procedure is related to community monitoring. Indicators were established for the monitoring of community impacts, which have been added to the Project Description. These indicators were monitored during this monitoring period and results can be found in Section 4
Requested change:	a) Originally the project presented a series of indicators that were

	suitable for the first monitoring of community impacts; One of the activities generating community impacts is Training on Ecotourism (63 and 58). This activity and its indicators; # of ecotourism vendors and ecotourism staff participated (No. 63); # of trainings held (No. 63); # people trained (No. 58) are now being monitored under merged activities and indicators with: Teaching new design for handcrafts (No. 56) # of workshops held and # people trained; and with Training on how to manage a business (organizational skills) (59) # of people trained and # of trainings held (59). The new activity and its indicators are: Training for new productive activities and entrepreneurship (56) # People trained and # of trainings held.
Justification:	During the third monitoring period and under the adaptive management approach the project revised the indicators for a more efficient monitoring, as a result of this revision similar activities which final result will be to increase economic opportunities were merged under "Training for new productive activities and entrepreneurship". This new activity also allows the project to include and monitor other similar trainings that could not be monitored under the previous activities and indicators.
Quantification Impact:	This change has no impact on carbon quantification since it relates to community monitoring, not forest and carbon monitoring.
Second Minor change	
Source:	Project Description Section 1.5 Other Entities Involved in the Project
Criteria and Procedures:	Updating Entities Involved in the Project
Relation to Monitoring or Measurement:	This procedure is not related to any monitoring measurement.
Requested change:	The validated PD states UVG-CEAB as one of the main organizations providing services for the development of Project, specifically for the Establishment of LULC maps over the historical reference period, development of species specific allometric equations, and measurement of carbon stocks. However UVG-CEAB has no further participation nor in the project implementation or monitoring.
Justification:	The involvement of UVG-CEAB into the project was only planned for the preparation of the reference level, specifically for: the Establishment of LULC maps over the historical reference period, development of species specific allometric equations, and measurement of carbon stocks. It is necessary to present a minor change as they are not proving any more services to the project.

Quantification Impact:	This change has no impact on any climate, community or biodiversity indicators, since it is strictly under the scope of section Section 1.5.

2.2.3.2 Minor Changes to Project Description for Previous Monitoring Periods

The following minor changes to the project description were made during previous monitoring periods.

Table 9: Minor Change to Project Description

Minor change	
Source:	Project Description Section 7.3
Criteria and Procedures:	Updating the Community Impact Indicators
Relation to Monitoring or Measurement:	This procedure is related to community monitoring. Indicators were established for the monitoring of community impacts, which have been added to the Project Description. These indicators were monitored during this monitoring period and results can be found in Section 4
Requested change:	Originally the project presented a series of indicators that were suitable for the first monitoring period and included "first stage activities" in the route to community impacts; specifically the establishment of community nurseries to supply community plantations as a first stage activity. Therefore the Monitoring Matrix 2017-2017 V1, is updated by eliminating activity 82 Nursery establishment, and by removing indicators: # nurseries established for activity 27.
Justification:	During the second monitoring period the route for community impact didn´t required new nurseries but only to support local farmers with technical assistance and minor inputs.
Quantification Impact:	This change has no impact on carbon quantification since it relates to community monitoring, not forest and carbon monitoring.

2.2.4 Project Description Deviations (*Rules* 3.5.7 – 3.5.10)

2.2.4.1 Project Description Deviations for the Current Monitoring Period

The following project description deviation is requested for the current monitoring period

Table 10: Fifth Project Description Deviation (Monitoring Period 2019)

Fifth Deviation	
Source:	Project Description Section 1.2.6
Criteria and Procedures:	The exclusion of 33 hectares of previously verified areas of the project area across 29 different Project Activity Instances due to identified overlaps in boundaries with ARR Project ID 1558.
Relation to Monitoring or Measurement:	This procedure is related to measurement. Projects must not claim credit twice for the same GHG emission reduction or removal under the VCS Program. This deviation has no impacts on the applicability of the methodology, additionality, or the appropriateness of the baseline scenario.
Requested Deviation:	The verified project area shall be modified to remove all 33 hectares of overlap between the verified boundaries and ARR Project ID 1558. The previously verified leakage area shall also be subsequently modified due to a change in project area boundaries. Any calculated over-issuance of credits that occurred during previous verifications shall be removed from the total VCU estimate for the 2019 verification.
Justification:	The project proponent determined that there were 33 hectares within the project area boundaries that overlapped with ARR Project ID 1558. As these areas of land were receiving crediting through two different projects verified under the Verified Carbon Standard, double counting was occurring on these properties against VCS Requirements. The FUNDAECO project has removed these areas from the verified project area boundaries and revised the crediting estimates over the project lifetime to determine the total VCUs that had been previously generated from these 33 hectares of land. A project description deviation was determined to be necessary for the VCS Standard. However, the magnitude and nature of this adjustment does not require the revision of the Project Description document itself, as the changes do not affect the applicability of the methodology, additionality, or the appropriateness of the baseline scenario as per VCS Requirement 3.18.2. This revision also does not require a CCB Standard PD Deviation or update, as the nature of grouped projects exempt them from the relevant requirement in section 3.5.7 of the CCB Program rules. Additionally, the revisions to the project boundary and the resulting change in NERs as a result of their exclusion would be considered *de-minimus*, and thus not be considered a risk to the accuracy of the project's quantification of emissions reductions and removals as discussed below.
Quantification Impact:	This Project Description deviation meets the VCS Standard principle of accuracy. The impact of removing all areas with

	overlapping boundaries has resulted in the quantification of 886 tCO2e in Net Emissions Reductions that were over-estimated during previous monitoring periods. This number of tonnes has been removed from the VCU estimates for 2019 through their addition to the project accounting as an estimated project emission during this monitoring period. While the original quantified project emissions for this monitoring period were calculated to be 351,460 tCO2e, the reported emissions in section 3.2 is 352,347 tCO2e to account for the overage of 886 tonnes. While these over-estimations of NERs due to these 33 hectares has been rectified in the accounting, it is important to note that the impact of these changes in project area boundary and over-issuance are *de-minimis* and constitute 0.02% of previously verified NERs, well below the 1% threshold of materiality for large-scale AFOLU projects. A description of the modifications along with the calculations of NERs that were over-issued can be found in section 3.2 of this report.

2.2.4.2 Project Description Deviations for Previous Monitoring Periods

The following project description deviations were approved during previous monitoring periods. Three project deviations were presented in the Monitoring Report dated on February 2016, and a fourth project description deviation was added during the previous monitoring period. These project deviations are detailed in the tables below:

Table 11: First Project Description Deviation (Monitoring Period 2012-2016)

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 v4.0 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.

Table 12: Second Project Description Deviation (Monitoring Period 2012-2016)

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.

Table 83: Third Project Description Deviation (Monitoring Period 2012-2016)

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 5.4
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.

Table 94: Third Project Description Deviation (Monitoring Period 2017-2018)

Fourth Deviation	
Source:	Project Description Section 5.5.3
Criteria and Procedures:	Updating Market Leakage deduction to more accurately reflect actual market leakage effects by eliminating this deduction
Relation to Monitoring or Measurement:	While market leakage is not monitored it is accounted for each monitoring period.
Requested Deviation:	This project was validated with the default market leakage deduction of 20%. Additional research in the region and a new analysis of the market impacts of the baseline scenario has demonstrated that the market leakage impact of the project is in fact *de minimis*. Therefore the project is adjusting the calculation of NERs to no longer include this deduction.
Justification:	In section 5.5.3 of the PD it is written, "While it is expected that these (market leakage) impacts will be small, it is very difficult to estimate the significance of the potential for market impacts as a result of restrictions on this market commodity due to a lack of literature on the supply chains and markets for timber in Izabal." However, since project validation, additional documentation and research has been identified within Guatemala that demonstrates that project impacts on commodities associated with logging and cattle ranching are very unlikely to result in significant deforestation or emissions elsewhere in Guatemala. Section 3.2.3.2 provides further justification for this deviation.
Quantification Impact:	The leakage deduction when calculating final VCUs will only include activity shifting leakage and the market leakage deduction will be reduced from 20% of NERs to 0%.

2.2.5 Grouped Projects

1) **New Project Areas and Communities (G1.13)**

There were no new project areas or communities added during the current monitoring period.

2) **Removed Project Areas and Communities (G1.13)**

No parcels were removed since the last validation or verification.

3) **Eligibility Criteria for Grouped Projects (G1.14)**

Not Applicable.

4) **Scalability Limits for Grouped Projects (G1.15)**

Not Applicable.

5) **Risk Mitigation for Grouped Projects (G1.15)**
Not Applicable.

6) **Project Zone Map (G1.13)**
Not Applicable.

7) **Changes to Management (G4.1)**
Not Applicable.

2.2.6 Risks to the Project (G1.10)

The project area, as defined in Section 2.1.7, 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 15 and individual non-permanence risk reports have been provided separately to validators (see Fundaeco REDD+ Non-Permanence Risk Report_Risk Area A.pdf and Fundaeco REDD+ Non-Permanence Risk Report_Risk Area B.pdf). The risk rating for the third monitoring period has remained at 10%. This change is mostly attributable to changes in the financial viability and opportunity cost scores. More information on these changes can be found within the Risk Reports. 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.

*Table 105: Non-Permanence risk rating for each defined risk area within the Grouped Project Area. *Overall risk rating cannot be below 10.*

Risk Category	Risk Area A Rating	Risk Area B Rating
a) Internal Risk	3	3
b) External Risk	0	0
c) Natural Risk	0	0
Overall Risk Rating (a + b + c)	**10***	**10***

1.1.1.1 2.2.6.1 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. To implement these program activities, FUNDAECO is part of several workgroups with action at different levels: At the national level, FUNDAECO is 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 workgroups, 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. See Project endorsement.

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 several governance roundtables such as the Executive Councils for Protected Areas –CELs- and the Interinstitutional Roundtable for Land Conflicts –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, FUNDAECO is also providing technical assistance to forest owners so they can access the Forest Incentives Programs -PROBOSQUE and PINPEP, and receive monetary benefits from forest conservation and finally FUNDAECO also works with Ecosphere+ as a commercial partner specialized in approaching carbon markets.

1.1.1.2 2.2.6.2 Community Risks

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 tackling this risk through:
  - Providing local producers with training and commercial support: FUNDAECO is providing agroforestry producers with technical training to implement BPA, improve productivity and finding value chain opportunities. In the case of other producers such as women dedicated to cooking, handcrafts and tourism services, FUNDAECO is supporting through training, and product and services upgrades.
  - The creation of a commercial Direction in charge of finding markets for FUNDAECO biocenters products and beneficiary producers, and promoting The Conservation Coast trademark these products. FUNDAECO have already created a value chain for cardamom partnering a private company dedicated to essential oils production and commercialization, and is looking for other companies interested in buying from The Conservation Coast.
  - As explained in the previous section in the case of VCUs FUNDAECO works with Ecosphere+ as a commercial partner specialized in approaching carbon markets.
- 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.

2.2.6.3 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.pdf and Fundaeco REDD+ Non-Permanence Risk Report_Risk Area B.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 Estudio Viabilidad agroforesteria 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.

2.2.7 Benefit Permanence (G1.11)

FUNDAECO considers that the political risks to the project are low based on the fact that the country has a Climate Change Law that recognizes carbon rights for forest owners and possessors, and that the country is progressing towards the Consolidation of a National REDD+ Strategy. During 2019 the Carbon

Project Registry was launched and the Conservation Coast Project is already registered as part of the efforts to reduce GEI emissions, see http://www.marn.gob.gt/ [13].

- Climate: Seventy % of the actual project area is declared as protected area according to Guatemala Protected Aras Law Decreto 4-89. Also according to FUNDAECO bylaws and to the statement from the Assembly, FUNDAECO land is to be considered for conservation purposes under perpetuity. Besides FUNDAECO has permanent coordination with government institutions in order to enhance and ensure the application of the protected areas law, and the implementation of project activities. FUNDAECO is also supporting legal and administrative mechanisms to guarantee reduction of GHG emission from deforestation beyond the project lifetime. During the Monitoring period the project actively promoted the operation of three participative governance mechanism considered in the Protected areas Law "Consejos Ejecutivos Locales" -CEL-. In order to increase legal protection within the grouped project area, FUNDAECO is also promoting the creation of a new protected area the Technical study for its creation was finalized and presented to the National Protected Areas Council and 37 meetings were held to finalize the protected area design and inform about the process.
- Community: For the Project Design FUNDAECO used the Theory of Change as a proved model to identify and implement actions that generate long term positive impacts for the community wellbeing and socioeconomic conditions. Project technologies include activities that will change in the medium and long term, the community situation regarding access to resources and economic opportunities, and education. Based on this model It is expected project activities to, improve and diversify livelihoods, access to reproductive health, education for opportunities and education for life presented in section 6 of the PD, will impact local socioeconomic dynamics and generate impacts beyond the project lifetime.
- Biodiversity:

As stated before FUNDAECO is supporting all legal and administrative mechanism to extend project benefits beyond the project lifetimes, this include the enhancement of protected areas governance and the creation of a new protected area, so existing forest remain still and can sustain the biodiversity within these ecosystems. Another important strategy is environmental education, as it is expected not only that it increases awareness on forest and biodiversity importance but also to result as a change factor towards the adoption of positive actions for its conservation and sustainable management. FUNDAECO is engaged in the promotion, organization and implementation of environmental education activities with schools, communities and visitors.

2.3 Stakeholder Engagement

2.3.1 Stakeholder Access to Project Documents (G3.1)

Access to project information and project documents for stakeholder engagement is provided though FUNDAECO project web site, email communication, social media and different meetings with community associations and other groups, these meetings ensures the active engagement and participation of all stakeholders throughout the project implementation period. These meetings were called by project technicians and social and gender assistants, by direct invitation or through community leaders or local promoters. 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.

13 https://snicc.azurewebsites.net/Busqueda/Resultado?powerbi=https://app.powerbi.com/view?r=eyJrIjoiZTNiYzdjMzItNWZhNy00ZDdjLWJhNWUtNGE3ZTFiOGE2NTdmIiwidCI6IjhmYmFhNWJmLTJlY2MtNGRjOC1iNTZiLThmOTJlMzA3ZjA3NiIsImMiOjR9

2.3.2 Dissemination of Summary Project Documents (G3.1)

FUNDAECO has provided summary documents for the Project Description and all Monitoring Reports in the local language and has made them available through the channels described in section 2.3.1. During this monitoring period FUNDAECO prepared a Spanish summary of the Monitoring Report for 2019. A copy of this document was announced as available during the Public Comment Period via public information channels including the FUNDAECO website and social media pages to distribute as well as the network of women health clinics in the project zone. See annex: MIR Resumen 2019, esquema de proceso de verificación and Bulletin.

2.3.3 Informational Meetings with Stakeholders (G3.1)

During the monitoring period 64 meetings were held to inform on different project activities. These were held in formal and informal contexts, in case of formal context such as meetings with authorities, or with entities such as Protected Areas Executive Councils, meeting are announced by written calls, and by personal telephone invitation done by FUNDAECO technicians, in the case of informal meetings the invitation is personal by phone of visit and it can be made by FUNDAECO technician or community representatives. The meetings covers three main subjects: progress on project activities and needs, decision making meetings, informative and educational meetings to strengthen project priority subjects such as protected areas and climate change.

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

As part of the FPIC process FUNDAECO used Banners and Power Points in order to explain the project costs, risks and benefits. Information was presented in different levels; at early stages general information was presented finalizing with the discussion of carbon contracts where detailed information on financial costs, the monetary benefits and risks was presented, meaning that all engaged forest owners received information before signing the carbon contracts. In several cases forest owners asked for additional meetings to discuss specific elements of the project contract, this type of meeting was held with coordinators or FUNDAECO's lawyer.
Also the PD Summary contains section 1.8 where community risks and benefits are explained.

2.3.5 Information to Stakeholder on Verification Process (G3.3)

Before the validation/verification body site visit, the Project opened a Public comment period which is disseminated by the local technicians and the social and gender assistants. Specific information about the verification process and the VVB is contained in the Project Status schema 2019 and the MIR Summary 2019. This allowed stakeholders to reach the VVB during the site visit or to present their comments through the suggestion/grievances box located in each one of the project offices, women clinics and FUNDAECO headquarters.

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

The verification audit was implemented under exceptional circumstances during the global pandemic of COVID-19; Guatemala closed its borders since March 2020, and several restrictions of mobilization were implemented inside the country. Due to this situation, in collaboration with the VVB, a remote audit process was designed and implemented, ensuring the achievement of a reasonable level of assurance. As required by the VVB FUNDAECO organized teleconferences between the auditor and project stakeholders and beneficiaries. During these meetings people who was interviewed got the time not only to answer to the auditor interview but also to express any additional questions or concerns regarding the project.

2.3.7 Stakeholder Consultation (G3.4)

During the 25 years of working in Izabal, FUNDAECO has succeeded in maintaining a strong relationship with several groups and local associations involved in all the programs implemented in the region. Through these connection efforts FUNDAECO has acknowledged the needs of the local communities. In addition, the Deforestation Agents and Drivers Analysis, developed for the project, has identified the activities of community interest to tackle drivers and threats related to deforestation, including those referred to community needs. (See document "*Brief on agents and drivers V2*" and "*CNCG SM Drivers of Deforestation_final_1.pdf*"). According to both analyses, communities identified lack of access to economic opportunities and lack of employment opportunities, between the main factors for deforestation in the project region. In response, the project includes direct actions to support local communities to cover these needs.

FUNDAECO has implemented different actions such as meetings and assemblies with the organized and unorganized groups, individuals, Departmental Development Councils (CODEDE), Municipal Development Councils (COMUDES), Community Development Councils (COCODES), Women Rights Groups and governmental institutions. These community structures have been used to implement Free Prior and Informed Consent activities.

The "Social and Gender Participation Assistants" (APSG in Spanish) are the social figure responsible of strengthen the capacities of the organized community groups and accompany the conformation of community groups when needed. For the project design, APSG had helped to identify possible beneficiaries and to socialize the project. (See document "*Base socioeconomic - Althelia.pdf*").

The Free Prior and Informed Consent process implementation initiated before PD validation FUNDAECO with the participation of identified stakeholders mentioned in point 2.7.2 of the PD and the document Plan de Socialización, CPLI y Comunicación.doc. Between 2015 and 2019 the project team and field technicians developed 288 meetings, workshops and assemblies to present the project to the communities and institutions involved in the project, to discuss their support or consent, and to inform and discuss project activities.

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 document *Informe de Proceso FPIC*

The strategy followed during the implementation of the FPIC process (detailed in document Plan de Socialización, CPLI y Comunicación.do) 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.

2.3.8 Continued Consultation and Adaptive Management (G3.4)

Along this monitoring period FUNDAECO continued systematic communication and consultation with project beneficiaries and stakeholders through the channels explained in section 2.3.8. Consultation for project implementation and adaptive management included more than 100 meetings, workshops and assemblies. During this meetings we receive several requests that have adopted and incorporated in the projects activities, including:

- Request: agroforestry technical assistance by communities inside and outside REDD + perimeters for cardamom planting; Response and Change: Before the project was focused on giving technical assistance only to producers whom plantation where established with the support of the project however in the last year we included other producers and increasing technical assistance to new communities;
- Request: Incidence for the payment of PINPEPs; Response and Change: Greater work for the Mobilization of the support of Deputies to the Congress of the Republic.
- Request: inter-institutional patrols and patrols in the border area of Honduras and Complaints about the entry of migrants from Honduras by border communities of Morales; Response and Change: Alliance with UNHCR for green jobs program for migrants.
- Request: Changes to the zoning of the Protected Area proposed in Sierra Santa Cruz to leave communities out and not leave them in a buffer zone (due to difficulties in legalizing their lands); Response and change: revision of the Zoning and proposal of new modification; Socialization of the new proposed zoning.

Besides this requests and implemented changes, non-major changes were made and project design strategic lines contained in the PD and the Project Implementation Plan V6.doc, however minor changes were made considering necessary timelines to measure impacts and to improve financial efficiency; these changes are managerial and do not affect expected project benefits. For minor changes refer to section 2.2.3 and Project Implementation Plan.

2.3.9 Stakeholder Consultation Channels (G3.5)

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, have been key partners during the FPIC activities , 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.
- **Protected Area Executive Councils or Boards of Directors ("Consejos Ejecutivos Locales de Áreas Protegidas")** are 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.

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

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.
Stakeholders participate through meetings called by project technicians and coordinators in Community assemblies and workgroups promoted and supported by the project, specifically: meetings with Community Councils COCODES and meetings with the three Protected Area Executive Councils (Sierra Caral, Rio Sarstun and Cerro San Gil). During this monitoring period 43 meetings were held to coordinate activities and decision making with stakeholders.

2.3.11 Anti-Discrimination Assurance (G3.7)

FUNDAECO implements this project under all its Code of Ethics and the Gender and Non Discrimination Policy in order to ensure compliance with CCB Standards and in order to avoid discrimination or harassment based on gender, race, religion, and sexual orientation, these policies, specific activities adopted are:

- Training for women and girl focal groups, on climate change, REDD+ and project implementation
- Adoption of the Code of Ethics as part of contractual policies for project collaborators
- Support for girl education opportunities through the girls scholarship program
- Support for women training in opportunities in productive activities
- Support to specific women projects
- Hiring of Queqchi' spoken collaborator in Queqchi' spoken area
- Respect for cultural practices through a special clause in the carbon contract, and the protection of cultural HCV.
- Permanent task force on gender and non-discrimination; Social and Gender Participation Assistants.
- Inclusion of the Code of Ethics and Gender and Non Discrimination Policy as part of the Grievance Mechanism.

2.3.12 Grievances (G3.8)

The project redress procedure stablish a chain to guarantee access to resolution to local stakeholders, as stated in the PD section, first channel foe expressing grievances is through local technicians and social and gender assistants. During this project monitoring period 1 information request was received and the project team solved the doubts regarding it. Grievances and resolutions are compiled in a database managed by the Social and Gender National Coordinator and the REDD+ Manager. For a description on attended grievances. see annex Grievances LogBook.

2.3.13 Worker Training (G3.9)

FUNDAECO trains all the staff in 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 ensure that additional training is provided to staff, where needed, with efforts from FUNDAECO or from external support; during the monitoring period 11 training activities were held covering subjects according to identified needs.

Table 116: Workers' and other partners Training Summary

Training	Charges involved	Number of training events	Number of participants
Maternal health	Nurses	1	2
General health	Midwives and Community health servers	1	10
Project preparation and financing	Protected area coordinator	1	1
International parkguards course	Chief of Control and Surveillance	1	1
Biodiversity and Amphibians	park guards	2	6
Trail design for Ecological parks	Field technicians	1	2
Environmental Impact assessment (updates course)	Technicians and GIS analyst	1	2
Reporting of Control and Surveillance actions	park guards	1	9
Tourists services	Women group	1	17
Snakes identification and first aid	Ecotourism guides and administration	1	10

The project also supports community partners by organizing and facilitating access to trainings relevant to the project benefits, during the monitoring period 122 people participated in 12 trainings for diverse new productive activities and entrepreneurship, and 146 people participated in agroforestry trainings

2.3.14 Community Employment Opportunities (G3.10)

The project give opportunities to local technicians and communities through three different mechanisms; by direct hiring, by supporting productive projects from individual entrepreneurs or producers, or by supporting community productive projects.

Most of the employees hired by the project -88%- are local technicians or professional born in the zone or that have been living there for more than 20 years. See table **¡Error! No se encuentra el origen de la referencia.**7 below. The dissemination of project positions is made locally and one of the requirements is to be from the project region. Additionally in Queqchi areas speaking Queqchi is one of the requirements.

Table 127: summary of employees' local engagement

Time living in the area	# of employees	% of the total
less than five years	2	2%
between 5-10 years	4	5%
between 10 - 20 years	5	6%
more than 20 years	32	37%
native to the project zone	44	51%

Support is given to entrepreneurs that live in areas prioritized according to land use and land cover change dynamics. Individual producers are informed about these support opportunities during community assemblies or meetings with local groups, and there´s equal access to anybody that is committed to productive activities; 270 producers are being supported under this mechanism. Community or group projects are supported specifically in cases where communities are in extreme conditions of poverty and lack of opportunities. Both individuals and communities supported by the project have access to

resources and training. During this monitoring period the project supported 8 community projects with the participations of local women and man as: agroforestry producers, tourism services and cookers, community promoters and park guards, fisher producers and artisans.

2.3.15 Relevant Laws and Regulations Related to Worker's Rights (G3.11)

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 were done 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 Operational Management Committee (CDO), 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.

2.3.16 Occupational Safety Assessment (G3.12)

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. This document was prepared by Operation Directive Committee of FUNDAECO after assessing possible risks related to the institutional work (see Politica y Plan de Salud y Segurdad Ocupacional en FUNDAECO). 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 above Policy and related documents are communicated in different manners established in the document *Plan de comunicación y divulgacion de riesgos*; the policy was presented to all project workers 2016, new employees receive this information as part of the induction process, signs are placed at the offices and other facilities, specific trainings are provided each year, and meetings are held periodically to address the policy elements, and internal social media are also used as non-formal tools to keep messages regarding risk prevention and procedures during specific situations.

The body responsible for ensuring compliance with all laws and regulations is the Operations Directive Committee or CDO, 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.

2.4 Management Capacity

2.4.1 Required Technical Skills (G4.2)

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. This structure guarantees not only geographical coverage, but adequate management. See Figure 4 for a detailed organizational structure.

The project team is composed by technicians and professional with relevant experience in the different components of the project, as shown in Figure 4 below, there is a Unit specifically dedicated to community engagement and social monitoring (Dirección de Participación Social y Genero/Programa Niña y Mujer Sana y Empoderadas), and the REDD+ Management Unit that integrates GIS technicians, and biodiversity technicians and experts coordinating general project monitoring as well as biodiversity monitoring. Table 18 below lists part of team positions and experience that guarantee the necessary skills for project implementation.

Table 138: Team positions and relevant skills

Position	Name	Profession, experience and skills	Years of experience
FUNDAECO General Director	Marco Cerezo	Development Economist and PA Management specialist	30
Technical Director	Byron Villeda	Natural Resources Engineer specialized in Project Implementation	30
Commercial Director	Rafael Mejía	Agronomy engineer specialized in marketing and comments	20
Monitoring Director	Walter Chavez	Forest Engineer specialized in environmental economy	30
Land Planning Director and REDD+ Manager	Karen Aguilar	Natural Resources Engineer specialized in Sustainable Development and trained in REDD+ mechanism and CCB/VCS standards	14
Regional Director	Oswaldo Calderon	Agronomist specialized in PA management	25
National Social and Gender Director	Karen Dubois	Social and gender expert	15
Subnational Social and Gender Director	Sandra Portela	Social worker	8
Biological Research Director	Alexis Cerezo	Biologist PhD Population Ecology	20
Amphibians and AZE sites	Carlos Vasquez	Biologist PhD Amphibians	20

specialist			
Communications Coordinator	Griselda Pacheco	Social Communications	10
Sierra Caral Coordinator	Elder Perez	Agroforestry Technician trained in forest and carbon measurement	20
Sierra Santa Cruz Coordinator	Ingrid Pelico	Natural resources Engineer trained in forest and carbon measurement	8
Protection and Surveillance Coordinator	Otto Palencia	Natural resources Engineer trained in forest and carbon measurement	10
Rio Sarstun Coordinator	Emilio Pitan	Social promoter trained in community relations	10
GIS Coordinator	Kathya Mejía	Natural Resources Engineer and GIS technician	12
Regional GIS Technician	Erick Aldana	Environmental Engineer and GIS technician	8

Figure 4: FUNDAECO's organizational structure.

2.4.2 Management Team Experience (G4.2)

Created in 1990, the FUNDAECO leadership team and the REDD+ Project team has extensive experience in community engagement, biodiversity assessment, land management and forest measurement in Guatemala.

During the past 20 years, FUNDAECO has successfully designed and promoted the establishment of a regional "cluster" of protected areas in Caribbean Guatemala. The institution has successfully designed and obtained the legal Declaration of two protected areas (Rio Sarstun and Sierra Caral); it has established one Municipal Protected Area in a vital ecological corridor (Parque Montaña Chiclera, covering 1,700 hectares); it has implemented an land acquisition Program for Cerro San Gil, in order to protect highly threatened forests and to secure land rights in key habitat within the protected areas and has successfully promoted the establishment of private reserves by local private land owners and communities (over 8,000 hectares protected). In the project zone FUNDAECO is the government partner for the management of 4 protected areas and one special protection area.

For the past nineteen years, FUNDAECO has operated a GIS department that is part of the Carbon and Land Management Direction. To monitor its interventions, FUNDAECO uses geo-referenced information generated in the field, combining and overlaying it on the national geographic bases, especially the digital database for the Republic of Guatemala (the most complete and updated).

FUNDAECO use as input statistics generated by the National Statistics Institute, the Environmental Statistics Annuals, the Annual Environmental Profiles for Guatemala, the National Forest Inventory, and the local forest inventories. FUNDAECO technical team has been trained for forest carbon inventories and biomass and carbon field measurements across the project region. FUNDAECO also runs the longest bird Monitoring Program in Latin America, and has been monitoring amphibian sites and population since 2008.

Over the past seven years, FUNDAECO has been developing the necessary technical and institutional capacities to successfully design and implement a REDD+ project in Guatemala. As part of this effort, FUNDAECO has actively participated in all Forest Carbon and REDD+ working groups in the country. Between 2012 and 2016, FUNDAECO was part of the following technical groups:

- Workgroup to generate the Subnational Baseline for Sarstun-Motagua (workgroup leader: Universidad del Valle, with the technical support of Winrock International)
- National Committee for the preparation of land cover and land use Maps (Committee leader: Ministerio de Agricultura Ganaderia y Alimentacion)
- Platform on Forest, Biodiversity Climate Change Group (GBBCC)

FUNDAECO is also part of the following consultation groups:

- Guatemalan group of REDD+ project implementers (GIREDD+)
- National Climate Change Round Table
- National Environmental and Social Safeguards Committee (CNSAS)

The organizational structure for the REDD+ Project for Caribbean Guatemala as well as the team's experience is detailed in the Implementation Plan (see Plan de Implementación REDD.docx).

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

FUNDAECO has been strengthening the project team skills and creating local capacities for the project implementation, and is also partnering three organizations in order to have a high quality project:

- ecoPartners: FUNDAECO partnered with this company in order to guarantee the good implementation of the VCS and CCB standards and methodologies, as well as to develop carbon accounting for the project. ecoPartners has provided FUNDAECO training workshop to increase the GIS team and the REDD+ Manager skills, as well as the Directors comprehension on the CCB and VCS standards in the past, and continues to provide support for the team as needed.
- AME Guatemala: AME Guatemala is a Guatemalan NGO specialized in women rights a gender. FUNDAECO partner this organization in order to have an external observer for the gender policy implementation, and for the development and implementation of gender protocols for the women health clinics.
- Althelia/Ecosphere: Besides supporting project investments this partnership supports VCUs marketing and sales.
- Panthera: FUNDAECO has partnered with Panthera specifically to implement new methodologies for mammals monitoring, specially jaguars and other felines that are subject to illegal poaching.

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

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, 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

and Ecosphere+. 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.

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

FUNDAECO is one of the main conservation organizations in Guatemala, and is a certified NGO under the International "NGO Benchmarking Standards" of the Swiss firm SGS. Winner of the 2006 Edition of the "Fundación BBVA Award for Best Biodiversity Conservation Project in Latin America", FUNDAECO is legally accredited in the Civil Registry of Guatemala, the Tax Administration Authority (SAT), the Social Security Institute (IGSS), the Labor Ministry and the Accounting Authority Office (Contraloría General de Cuentas). FUNDAECO is registered as a co-managing partner in the National Protected Areas Council (CONAP), the National Forests Institute (INAB), the National Agrarian Institution and Land Fund (FONTIERRA), the National Institute of Tourism (INGUAT) and the National Council of Science and Technology (CONCYT). FUNDAECO is a Member of the World Union for Nature (IUCN) since 1993, and is a Founding Member of the National Association of Environmental NGO´s (ASOREMA), and the Trinational Alliance for the Conservation of the Gulf of Honduras (TRIGOH).

FUNDAECO Accounting Systems and financial controls have been verified and certified by USAID-Guatemala, and are based on a series of institutional manuals and procedures. See Institutional documents. Through the implementation of internal manual and procedures, annual audits, the Code of Ethics and the Policy against corruption and bribery, FUNDAECO implements best management practices to avoid the involvement of its team and collaborators in in any form of corruption such as bribery, embezzlement, fraud, favoritism, cronyism, nepotism, extortion, and collusion.

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

The following document and information are commercially sensitive and not publically available. This information will be presented to the validator:

- Project budget
- Financial projections
- FUNDAECO Manuals, Policies and regulations
- Contracts between FUNDAECO and forest owners
- Any other agreements or contacts related to the project

2.5 Legal Status and Property Rights

2.5.1 Recognition of Property Rights (G5.1)

Based on the VCS Standard v4.0, the project demonstrates that the proponents have project ownership over the emission reductions.
"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 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 arises 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.

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

FUNDAECO is implementing a continuous Free Prior and Informed Consent process. Since 2015, the project team and field technicians developed more than a 138 meetings (38 during the monitoring period), workshops and assemblies to present the project to the communities and institutions involved in the project, and to discuss their support or consent; 4206 people participated, 1944 women and 2362 men. A See Informe de Proceso FPIC 2015-2016 and Informe de Proceso FPIC 2017-2018. Also as part of the FPIC process, during the Monitoing Period FUNDAECO call and developed 37 meeting with local communities and stakeholders to consult on the creation of a new protected area within the project zone; Sierra Santa Cruz. See Muestra de verificadores consulta Sierra Santa Cruz

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 Plan de Socialización, CPLI y Comunicación.doc and Informe de Proceso FPIC 2015-2016.

The strategy followed during the implementation of the FPIC process 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. During these meeting forest owners and possessors indicated their intention to participate in the REDD+ Project for Caribbean Guatemala, the individual meeting were carried on to present the Carbon Contract and give more detailed information as required by each community or individual. Carbon

contracts signed contains clauses respecting Guatemalan Laws regarding property and carbon rights, as well as a clause stating the free prior and informed consent.

The implementation of project activities such as control and surveillance is coordinated with government authorities under the related laws of Guatemala, specifically the Protected Areas Law, The Law for the Protection and Enhancement of the Environment, the Forestry Law and the National Police Law. Other activities such as forest incentives, reforestation or agroforestry are implemented according to the local governance schemas in coordination with the community associations, COCODES or directly with the individuals, and only with the voluntary consent of the participants.

2.5.3 Property Right Protection (G5.3)

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 FPIC 2015-2016.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.

Based on the VCS Standard 4.0, 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+ the Conservation Coast project 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 arises 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 project, 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.

2.5.4 Identification of Illegal Activity (G5.4)

Illegal activities that have historically occurred within the project area include deforestation for land use change purposes, and 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 19 below.

Table 19: Illegal activities which may negatively affect the Project.

Illegal activity	Action	Description
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

2.5.5 Ongoing Disputes (G5.5)

If disputes over lands and resources are identified, FUNDAECO first analyze the type of conflict identifying possible involved parties and the institution in charge; in order to find a positive resolution for all parts involved and depending on the level of the dispute FUNDAECO will facilitate meetings between involved parties, or will directly inform INAB (when forest outside protected areas), CONAP (when forest inside protected areas or biodiversity in general), municipalities when rivers or water disputes, and the Interinstitutional Group for Land Conflict Resolution Izabal -MICAI when land disputes. FUNDAECO can be called for specific meetings or for a systematic participation in working groups. FUNDAECO participation in these mechanism seeks for pacific resolution respecting Guatemalan Laws regarding land and protected areas; in this sense FUNDAECO will not prejudice the outcome of a conflict that is directly related to the project's implementation. For the case of land disputes the procedure for conflict resolution consist on the presentation of the case to the MICAI; the case or request for mediation and resolution can be presented by government authorities, an involved party or a third party. The MICAI study the case and define a path for its resolution and involved parties are called as part of the resolution process.

Additionally, a Grievance mechanism and 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.

According to MICAI, the Conflict Map for Izabal Department during the monitoring period showed 8 cases in process, from these 6 were located within the project and all of them are still in process.

The tables below present the cases addressed by MICAI inside the Project Zone between 2012-2018 and during the monitoring period.

Table 20: Conflicts addressed in the Project Zone between 2012-2018

No.	2012-2018 Cases	Location	Status
1	Comunidad Creek Monte Verde/Familia Milian	Inside Project Zone	Solved
2	Creek Agua Caliente/ Tamejas	Inside Project Zone	Solved
3	Vista Hermosa (San Carlos EL Porvenir)/Alejandra	Inside Project Zone	Solved (initial agreements)
4	Creek Maya/Alejandra	Inside Project Zone	Solved
5	El Cedro/La Pintada	Inside Project Zone	Solved
6	Gilberto Reyes/Creek Blanco	Zone	Solved
7	Punta de Palma/San Andres	Inside Project Zone	Solved
8	San Miguelito/Finca 1842	Inside Project Zone	Solved
9	El Rosario y San Martin/Finca Tapon Creek	Inside Project Zone	Solved
10	Barra Lampara/ La Angostura	Inside Project Zone	Solved
11	La Pintada/Barra Lampara	Inside Project Zone	Solved
12	Creeke Gallo II/Nuevo Nacimiento La Arca	Inside Project Zone	Solved
13	Playa Sarstun Creek/fincas varias	Inside Project Zone	In process
14	Peñitas	Inside Project Zone	In process
15	Sarita/Finca Laboratorios Piersen	Inside Project Zone	In process
16	Comunidad Puerto Modesto Mendez/Finca	Inside Project Zone	In process

	Chocon		
17	Comunidad Baltimore/Yojoa (Finca Juan Maegli)	Inside Project Zone	In process
18	Quebradas	Inside Project Zone	In process
19	Grupo Vista Hermosa, Finca Alejandra	Inside Project Zone	solved
20	Problemática en Áreas Protegidas, nuevos asentamientos	Inside Project Zone	in process
21	Comunidad Río Nacimiento Los Espinos	Inside Project Zone	In process
22	Asociación Cerro 1,019 (Chacalte II, San Lucas Tierra Colorada	Inside Project Zone	In process
23	Área Protegida Cerro San Gil, (Consejo Superior Comunitario)	Inside Project Zone	in process
24	Instalaciones ICTA, Aldea Cristina	Inside Project Zone	in process
25	Finca Chachahualilla/FEGUA, Pro. Barrios	Inside Project Zone	in process
26	Instalaciones de DIGESA/MAGA, Finca Navajoa, Morales	Inside Project Zone	in process

Table 141: Conflicts addressed in the Project Zone during the monitoring period

No.	2019 cases	Location	Status
1	Lote G Cienega y Chocon	Inside the Project zone	In process
2	Lindero común entre Cacahuila Livingston, Izabal y Volcan Semox Chahal	Outside Project zone	solved
3	Lindero común entre Monte Alegre Semau, Volcan Semox Chahal	Outside Project zone	In process
4	Finca KAMPURA	Inside the Project zone	In process
5	Casos varios Sierra Santa Cruz	Inside the Project zone	In process
6	Problemática entre Nimlasajal, Semuy, y Rosario	Inside the Project zone	In process
7	Problemática entre El Rosario y Las Nubes	Inside the Project zone	In process

2.5.6 National and Local Laws (G5.6)

FUNDAECO and the REDD+ Project are compliant with all valid relevant local and national laws, including those listed in table 22 below. No new regulations were approved during this monitoring period.

Table 152: Laws, their relevance, and project compliance.

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	This law creates economic incentives for possessors of

of Small Extensions of Land for Forestry or Agroforestry Use (PINPEP). Decree 51-2010	small parcels to participate in agroforestry or forest conservation activities.
Draft of the Law for Promoting the Establishment, Recovery, Restoration, Management, Production, and Protection of Forests in Guatemala (PROBOSQUE)	This law is the continuation of PINFOR law for 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	This policy's objective is to achieve improvements in the

Development (PNDRI)	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
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

3. CLIMATE

3.1 Monitoring GHG Emission Reductions and Removals

3.1.1 Data and Parameters Available at Validation

Data / 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 / 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 / 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 / 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 / Parameter	Aaverage i
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 / 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 / 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 / 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 / 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 / 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 / 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 / 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	ABSLPA

Data / 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	ABSLPAct,t

Data / 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	ABSLPAct,t

Data / 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	ABSLPAi,t

Data / 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 / 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	ABSLPAt

Data / 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 / 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	ABSLRR

Data / 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 / 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	ABSLRRi,t

Data / 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	ABSLRRt

Data / Parameter	ABSLRRtaverage,i
Data unit	ha
Description	Annual area of baseline deforestation in stratum i within the Reference region at a year taverage$_i$
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 / 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 / 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 / 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 / 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 / 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 / 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 / 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 / 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 / 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 / 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 / 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 / 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 / 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 / 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 / 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 / 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 / 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 / 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 / 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	Cabfcl

Data / 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	Cabicl

Data / 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 / 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 / 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 / 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 / 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 / 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	Cbbfcl

Data / 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	Cbbicl

Data / 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 / 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 / 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 / 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 / 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	Cdwfcl

Data / 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	Cdwicl

Data / 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 / 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 / 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 / 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 / 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 / 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 / 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 / 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 / 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 / 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 / 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 / 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	Clfcl

Data / 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	Clicl

Data / 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 / 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 / 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 / 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 / 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 / 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 / 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 / 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 / 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 / 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

3.1.2 Data and Parameters Monitored

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	annually

monitoring/recording:	
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 31, Table 32
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 31, Table 32
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	Data is to be entered into internal archive. Archive is

be applied:	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 total 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

3.1.3 Monitoring Plan

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. 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 3.1 and 3.2.

As shown in section 2.4.1, the project directive structure comprises the REDD+ Manager, The Technical Director, the Social and Gender Director and the Commercial Director. The REDD+ manager works with

these different teams to guarantee project the monitoring of climate, community and biodiversity impacts. For the Climate impacts the REDD+ Manager coordinates with FUNDAECO GIS technicians and Ecopartners LLC, an external support hired by FUNDAECO since 2015. FUNDAECO GIS technicians are in charge of generating and managing the PAIs and contracts databases, and geospatial analysis related to community and biodiversity, and the Ecopartners team is responsible for overseeing the monitoring of the climate data and quantification of emissions reductions for the project. The structure of the Ecopartners team along with their expertise, roles and responsibilities as it pertains to monitoring are as follows:

Technical Expert: The technical expert is responsible for developing and overseeing the use of the image classification tool in the LULC map generation process, along with developing and scripting the carbon accounting models used to calculate the project's emissions reductions. This individual is also responsible for the high-level QAQC of the map products generated along with the accounting model results. The technical expert has a Ph.D. in remote sensing and biometrics along with extensive REDD+ development experience.

Technical Manager: The technical manager is responsible for the oversight and management of all technical work implemented by the team to generate activity data and emissions reductions calculations. The technical manager conducts QAQC assessments on the work products generated and advises technical analysts on best practices related to technical analyses. This individual has extensive experience in the technical development and design of REDD+ projects

Analysts: The analysts are responsible for executing the processes to download, process, classify, and generate final map products for the project. They also are responsible for processing and conducting QAQC assessments on data to input into carbon accounting models. Analysts have technical experience working within ArcGIS and Excel, along with REDD+ development experience.

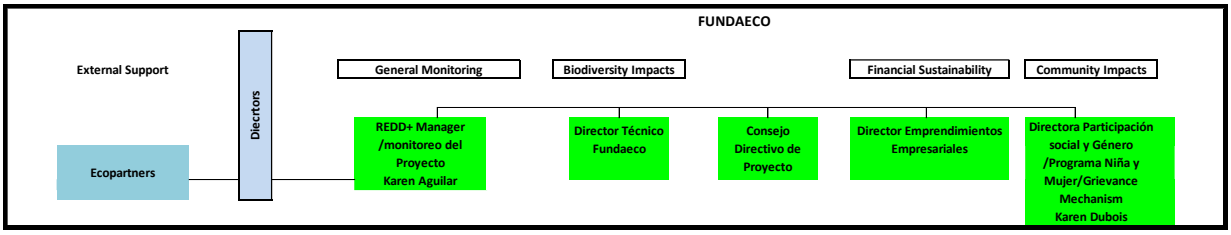

Figure 5: FUNDAECO's organizational structure.

The climate impact on the project and other areas was monitored using remote sensing 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.

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.

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:

Table 23: Selected Carbon Pools in the Project Scenario

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

3.1.3.1 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.

3.1.3.2 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 the previous monitoring report.

3.1.3.2.1 Data

The primary source of data used during the production of this final map was spectral satellite imagery collected by the Sentinel-2 satellite. This imagery has 20m resolution and is freely available through the European Space Agency (ESA), allowing for reduced monitoring costs.
The final map product consists of 9 Sentinel-2 scenes covering the entire grouped project and leakage area (Table 164:). These 12 Sentinel-2 scenes were selected based on image quality and low rates of cloud cover in the areas of interest, allowing for the production of a product with optimized coverage of the project and leakage areas. Each image was classified independently, but the final map product consisted of the classified images mosaicked in order of image date starting with the most recent imagery on top with a final cloud cover of less than 10% in the final mosaic. All images had the same parameters listed in Table 25.

Table 164: Data used for historical LULC analysis.

Image Name	Acquisition Date (D/M/Y)
S2B_MSIL2A_20200305T162039_N0214_R040_T16PBC_20200305T203647.SAFE	05/03/2020
S2A_MSIL2A_20200206T161431_N0214_R140_T16PCC_20200206T202214.SAFE	06/02/2020
S2B_MSIL2A_20200302T161059_N0214_R140_T16PCC_20200302T201433.SAFE	02/03/2020
S2B_MSIL2A_20200224T162149_N0214_R040_T16PBC_20200224T203050.SAFE	24/02/2020
S2B_MSIL2A_20200224T162149_N0214_R040_T16PCC_20200224T203050.SAFE	24/02/2020
S2B_MSIL2A_20200204T162449_N0214_R040_T15PZT_20200204T202946.SAFE	04/02/2020
S2B_MSIL2A_20200115T162629_N0213_R040_T16PBC_20200115T202433.SAFE	15/01/2020
S2B_MSIL2A_20200112T161629_N0213_R140_T16PCC_20200112T200537.SAFE	12/01/2020
S2B_MSIL2A_20191226T162659_N0213_R040_T16PBC_20191226T202203.SAFE	26/12/2019

Table 175: Parameters of data used for LULC analysis.

Sensor	Data Product	Spatial Resolution	Spectral Resolution (bands)	Coverage (km^2)
Sentinel-2	Level-2A	10m/20m/60m	13 bands (4/6/3)	10,000

The generated LULC map has been assigned the date of 5 March 2020 since all imagery was acquired between December 2019 and March 2020, and the majority of the LULC map was generated from the March 5th image. Each scene was classified separately and they were then mosaicked with the most recent image on top, so a significant majority of the classification map is using data from March 2020.

Classification Methods

The procedure for classifying the imagery improved on the methods used in the previous reporting period as detailed below.

Pre-Processing

Sentinel 2 Level 2-A data products were downloaded from the ESA data hub Copernicus. These Level 2-A data products were preprocessed by the ESA data hub using the Sen2Cor atmospheric processor available through the Sentinel Application Platform (SNAP Desktop). A single mask file was created for each satellite image, and this mask was used to standardize all image bands and classification layers created from that image. The mask was also used to extract the 2019 LULC data matching the extent of that satellite image.

Secondly, the Level 2-A data scene classifications for each image were extracted into individual layers. The bands comprising the image were also extracted into individual layers. These individual layers generated from each Sentinel image were then all standardized to identical extent and resolution settings using the mask image.

Processing

The Sentinel 2 data were classified using a Bayesian MAP classifier. This classifier is concerned with estimating the parameters of a posterior distribution conditional on observed data and prior distributions. Using conventional statistical notation in the context of the present classification problem, we define the posterior distribution $p(\omega_i|x, y, \hat{\theta}_i) \propto p(x|\omega_i, \hat{\theta}_i) \times p(\omega_i|y)$ where ω_i indicates the prior detection of degraded forest for a particular pixel, $\hat{\theta}_i$ are the estimated class parameters by training, x are the pixel elements of an image at a particular pixel and y is an indicator vector on prior class labels of the

benchmark map in the neighborhood of a particular pixel for the i^{th} class. We assume x are normally distributed while ω_i follow a binomial (two classes, not degraded and degraded) distribution conditional on the values of a $m \times m$ spatial window centered at the pixel coordinate of x in the benchmark map.

Following from the selected model, its discriminant function is

$$g_i(x) = -\frac{1}{2}\ln|\hat{\Sigma}_i| - \frac{1}{2}(x-\hat{\mu}_i)^T\hat{\Sigma}_i^{-1}(x-\hat{\mu}_i) - \ln w^T y$$

where $\hat{\theta}_i = (\hat{\mu}_i, \hat{\Sigma}_i)$, $\hat{\mu}_i$ is the estimated class mean, $\hat{\Sigma}_i^{-1}$ is the estimates class variance-covariance matrix and w_i is the neighborhood weight vector whose elements sum to one (see Figure 6). Discriminant functions as they relate to classification models are thoroughly described in Richards 2013. As g_i is a function $\hat{\theta}_i$, these parameters must be estimated by training prior to pixel discrimination.

0.05	0.1	0.05
0.1	0.4	0.1
0.05	0.1	0.05

Figure 6: The $m \times m = 3 \times 3$ neighborhood weight vector w arranged in a spatial window.

Training

Prior to pixel discrimination, class parameters $\hat{\theta}_i$ were estimated using standard maximum likelihood techniques conditional on training data. Training data were obtained by labeling a subset of the pixels in a scene as observed in the 2019 classification map produced for the second monitoring period (2019 LULC). A generative k-means process was applied to each subset to automatically segment pixel elements into similar classes each sharing the label of the training subset.

This generative process minimizes the risk of violating the normality assumption of x by using the subset as a Gaussian mixture. Each subclass comprising the mixture was tested for divergence from the whole subset using a chi-squared test on the likelihood ratio of $\hat{\theta}_i$ and its equivalent for the subset (Richards 2013). Where the test was statistically significant, inference was that the subclass was not of the same class as the subset and was therefore dropped from the training process. Depending on the result of the test and presence of available, labeled subsets in a scene, a total of 25 possible subclasses could be trained for each scene.

Implementation

The discriminant function was applied to all pixel elements in each scene for up to 25 times per pixel corresponding to the number of trained subclasses for each scene. The label associated with that particular subclass giving the highest value of g_i was assigned to each pixel in the scene to produce the updated LULC map for that particular scene. In the cases of cloud and cloud shadow where no prior information existed, the term $\ln w^T y$ in the discriminant function was simply set to zero. The training process and discriminant function were implemented using custom software written in a combination of C#, C++ and CUDA. Compiled CUDA implementations ran on a Quadro GPU to accelerate classification as compared to CPU-based software (approximately 10 minutes per scene versus 10 hours per scene).

All parameterized classes were checked for sufficient sample size, singularity in $\hat{\Sigma}_i$ and rationality of $|\hat{\Sigma}_i|$. Insufficient class distributions were dropped from the classification processes. Each pixel was assigned one of the 10 classes found in Table 186 below.

Table 186: List of LULC Classes included in 2019 LULC Classification

Pixel Value	Class Name
1	Very Humid Forest
2	Humid Forest
4	Water

Pixel Value	Class Name
5	Urban
6	Wetlands
7	Permanent Agriculture
8	Annual Agriculture
9	Pasture
10	Shrubs
11	Other Non-Forest

Post-Processing

The statistical classification process described above produced 9 raster files indicating LULC classification. These 9 rasters were processed to standardize spatial resolution, reference extents, and pixel alignment before being mosaicked together in chronological order (with the most recent image on top) into a single raster file. The mosaicking process conservatively preferred deforestation transitions; if a forest pixel was observed to have been deforested in the previous 2019 classification or in any of the 9 2020 image classifications, that pixel was marked as deforested in the final 2020 classification. This conservatively excluded any areas of regeneration from non-forest to forest classes.

A final set of post-processing adjustments were made to the classified 2020 image to generate a final map product. Several areas were observed where flooding caused the classifier to misclassify forest areas as water or wetland areas. These seasonal fluctuations were accounted for by applying a raster calculator equation to ensure these areas were properly classified as Forest. The resulting classification applied the logic shown in Table 27. The final result of this post-processing can be seen in Figure 7 below.

Table 197: Conservative Post-Processing Adjustments to final LULC map

2019 Classification	2020 Initial Classification	2019 Final Adjusted Classification
Either Forest Class	Either Forest Class	Either Forest Class
Either Forest Class	Water or Wetland	Either Forest Class
Either Forest Class	Permanent Agriculture	Permanent Agriculture
Either Forest Class	Annual Agriculture	Annual Agriculture
Either Forest Class	Pasture	Pasture
Either Forest Class	Urban	Urban
Either Forest Class	Shrubs	Shrubs
Either Forest Class	Other Non-Forest	Other Non-Forest
Permanent Agriculture	Either Forest Class	Permanent Agriculture
Annual Agriculture	Either Forest Class	Annual Agriculture
Pasture	Either Forest Class	Pasture
Wetlands	Either Forest Class	Wetlands
Urban	Either Forest Class	Urban
Shrubs	Either Forest Class	Shrubs
Other Non-Forest	Either Forest Class	Other Non-Forest
Water	Any Class	Water

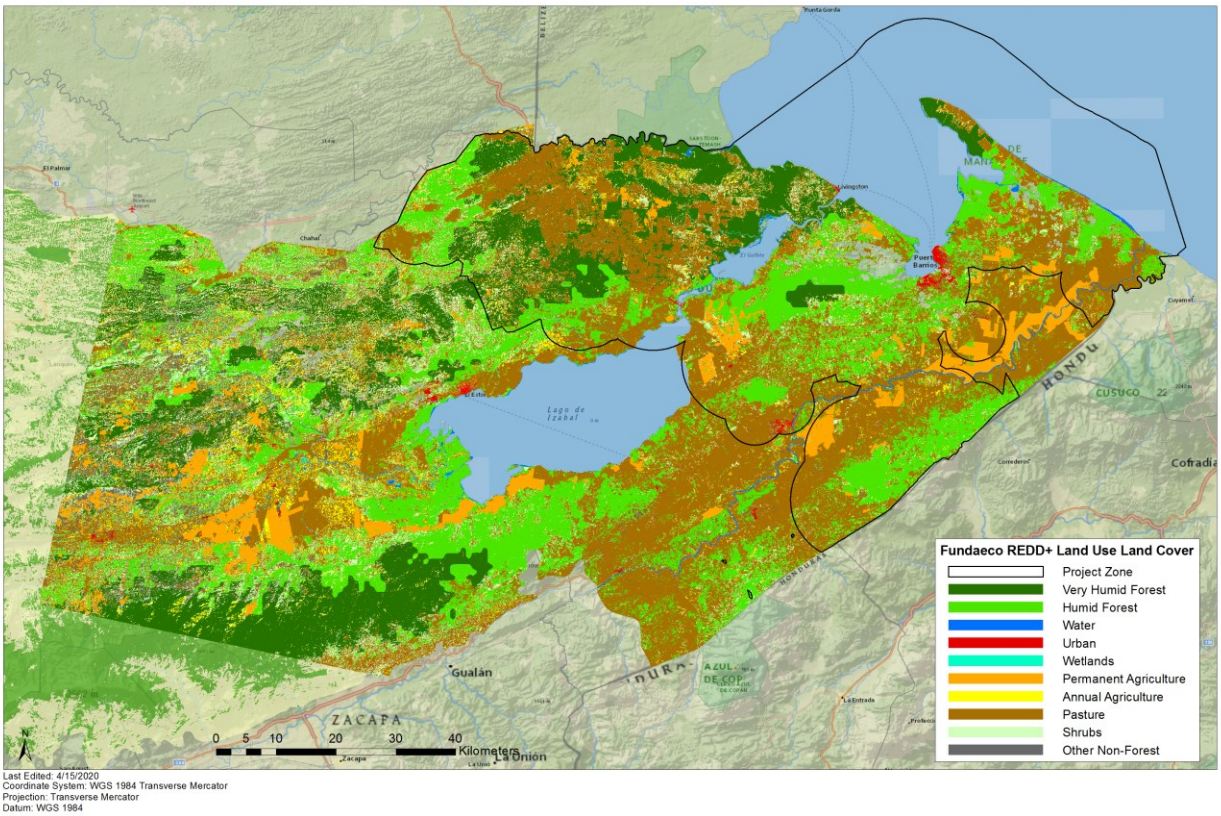

Figure 7: Final LULC Map

Thematic Accuracy Assessment

To ensure that the 2020 LULC classification map produced for this monitoring period met the accuracy thresholds of VM0015, a thematic accuracy assessment was conducted by comparing the results of the classification against reference data. The accuracy assessment completed used similar methods as those utilized for the project's validation.

A total of 551 accuracy assessment points were randomly assigned to each class (see Figure 8) within the reference region, following similar accuracy assessment procedures used in the previous monitoring period. In keeping with the VM0015 methodology requirements, a minimum of 50 points were allocated to each class. Each point was then buffered by 50m and then clipped down again to the respective class so that only the pixels of the class of interest were assigned classifications. Each of these points was manually assigned one of the 10 LULC classes listed in Table 26 using reference remote sensing imagery, including Sentinel-2, Landsat-8, or Google Earth. Very Humid Forest and Humid Forest were combined into one Forest class for the accuracy assessment since this is not a classification distinction but is instead based on stratification completed at project validation, as stated in section 5.3.2 of the Project Description. After assigning a class to each grid point, a confusion matrix was created in order to assess the accuracy for each class. The overall accuracy achieved across the 2019 LULC map was 91% with each class achieving greater than 80% accuracy, exceeding the requirements of the VM0015 methodology (see Table 28).

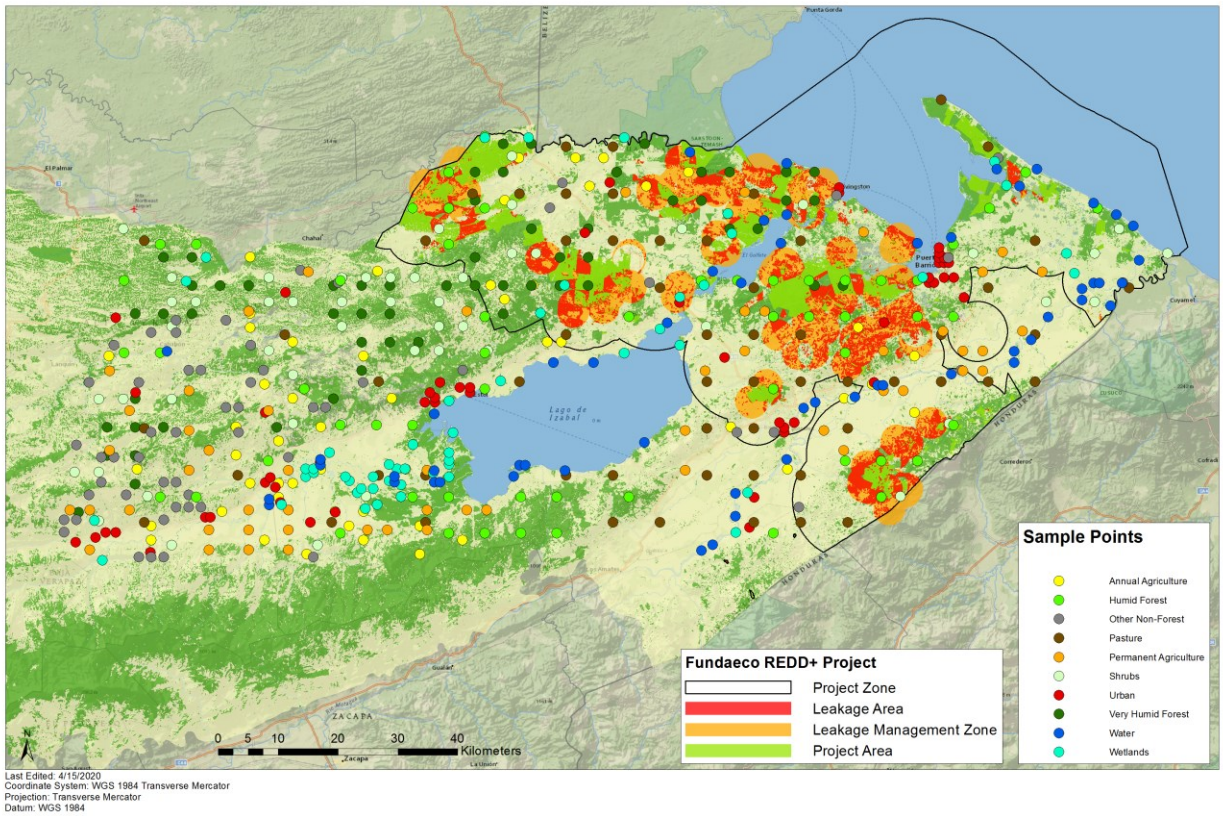

Figure 8: Thematic Accuracy Assessment Sample Points

Table 208: Confusion Matrix for Thematic Accuracy Assessment

	Observed										
	Annual Agriculture	Forest	Other Non-Forest	Pasture	Permanent Agriculture	Shrubs	Urban	Water	Wetlands	Total Classified Points	Classified Correctly
Annual Agriculture	44	5	0	0	2	0	1	0	0	52	**84.6%**
Forest	2	107	1	1	0	5	0	0	0	116	**92.2%**
Other Non-Forest	1	2	47	0	0	0	6	0	0	56	**83.9%**
Pasture	0	2	0	55	1	0	0	0	0	58	**94.8%**
Permanent Agriculture	0	4	0	0	50	0	1	0	0	55	**90.9%**
Shrubs	1	2	1	1	2	46	0	0	0	53	**86.8%**
Urban	1	0	0	0	1	3	48	0	0	53	**90.6%**

Water	0	0	0	0	0	0	0	56	0	56	**100.0%**
Wetlands	0	0	0	0	1	0	0	0	51	52	**98.1%**
Total Reference Points	49	122	49	57	57	54	56	56	51	**504/551**	**Total Accuracy (%)**
Classified Correctly (%)	**89.8%**	**87.7%**	**95.9%**	**96.5%**	**87.7%**	**85.2%**	**85.7%**	**100.0%**	**100.0%**	**Total Accuracy (%)**	***91.47%***

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

Along the monitoring period, FUNDAECO informed on the project progress during meetings organized with different communities and stakeholders, almost 64 meetings were organized to inform on project progress as well as to invite new forest owners to participate in the project. The monitoring results are disseminated through summary reports informing on the project activities and results along the period, the summaries contains a quick remain on project objectives, carbon contracts, project status, activities and achieved results. These are disseminated during meetings and are also available in the project offices and women health clinics across the project zone. During assemblies or group meetings and are also available with PD summary and the Monitoring reports summaries, in each project office and health facilities. Per the CCBA rules, this monitoring report is available in the project offices and women health clinics one month before the audit visit for the public comments period.

3.2 Quantification of GHG Emission Reductions and Removals

Baseline emissions changed slightly from the previous monitoring period for the project and leakage areas due the removal of roughly 33 hectares of project area that overlapped with a neighboring ARR project (see Project Description Deviation section 2.2.4 of the MIR). The spatial model itself remains unchanged from validation. Ex-post baseline estimates of activity data within the project and leakage areas were calculated by extracting the baseline spatial model data of end land use within the newly revised 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.

Table 219: Baseline Activity Data for LULC Change categories (ct) within the project area

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	1,591	137	0	1,761	2,722
3	0	5	0	3	18	1,768	97	0	1,891	4,613
4	0	1	0	4	18	2,020	86	0	2,129	6,741

5	0	0	0	3	15	2,223	77	0	2,318	9,059
6	0	0	0	4	14	2,213	80	0	2,312	11,371
7	0	0	0	10	39	2,082	202	0	2,333	13,703
8	0	0	0	12	98	1,528	620	1	2,259	15,962
9									0	15,962
10									0	15,962
11									0	15,962
12									0	15,962
13									0	15,962
14									0	15,962
15									0	15,962
16									0	15,962
17									0	15,962
18									0	15,962
19									0	15,962
20									0	15,962
21									0	15,962
22									0	15,962
23									0	15,962
24									0	15,962
25									0	15,962
26									0	15,962
27									0	15,962
28									0	15,962
29									0	15,962
30									0	15,962

Table 30: Ex-Post Activity Data for LULC Change categories (ct) within the 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	1,136	105	2	1,253	1,253
2	0	0	0	0	9	1,451	97	1	1,558	2,811
3	0	0	0	0	5	1,190	57	1	1,252	4,063

4	0	0	0	0	3	1,089	49	1	1,141	5,204
5	0	0	0	0	4	1,107	42	0	1,153	6,357
6	0	0	0	0	3	1,058	42	0	1,103	7,460
7	0	0	0	0	2	877	119	0	998	8,458
8	0	0	0	1	18	625	398	0	1,042	9,500
9									0	9,500
10									0	9,500
11									0	9,500
12									0	9,500
13									0	9,500
14									0	9,500
15									0	9,500
16									0	9,500
17									0	9,500
18									0	9,500
19									0	9,500
20									0	9,500
21									0	9,500
22									0	9,500
23									0	9,500
24									0	9,500
25									0	9,500
26									0	9,500
27									0	9,500
28									0	9,500
29									0	9,500
30									0	9,500

3.2.2 Project Emissions

In order to calculate the emissions released in the project area, a 2020 LULC map was created, as described in section 3.1.3.2. Sentinel-2 data was pre-processed for use in the 2020 LULC map and was classified using the same classes used in the 2001-2010 LULC maps and the prior monitoring period.

Emissions from the project area are quantified using the LULC transitions in the project area, 2020 LULC relative to the 2019 map. The LULC transitions that occurred within this time period were assumed to be distributed linearly from 2019-2020 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 and are calculated in Fundaeco VM0015 Accounting Model.xlsm. As shown in table 31, the total amount of forest lost in the project area adjusted by the PAI start dates during MP3 was 766 hectares for a total of 3,570 hectares across all monitoring periods. There were no emissions associated with any of the implemented project activities.

Due to the change in boundaries of the project area during this monitoring period to remove all 33 hectares of overlap with a neighboring ARR project's boundaries, the ex-post monitoring data for previous monitoring periods was also revised and the new numbers are shown in the table below. Any change in the net VCUs issued during previous monitoring periods will be deducted from the NER calculations for this monitoring period, as described in section 2.2.4 of the report.

Table 31: Ex-Post Activity Data for LULC Change categories (ct) within the project area

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	135	104	2	317	317
2	1	1	7	23	86	219	158	4	499	816
3	1	1	7	23	87	222	159	4	504	1,320
4	1	1	7	23	87	222	160	4	504	1,824
5	1	1	7	23	87	223	160	4	506	2,330
6	3	1	13	30	25	98	73	2	245	2,575
7	3	1	13	31	21	90	68	2	229	2,804
8	0	19	0	61	95	421	90	80	766	3,570
9									0	3,570
10									0	3,570
11									0	3,570
12									0	3,570
13									0	3,570
14									0	3,570
15									0	3,570
16									0	3,570
17									0	3,570
18									0	3,570
19									0	3,570
20									0	3,570
21									0	3,570
22									0	3,570
23									0	3,570
24									0	3,570
25									0	3,570
26									0	3,570
27									0	3,570

28									0	3,570
29									0	3,570
30									0	3,570

Table 222: Ex-Post Estimated Net Carbon Stock Change in the project area under the project scenario

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	138,307	138,307	0	0	423,992	423,992		0
2	221,165	359,472	0	0	785,796	1,209,788		0
3	229,187	588,659	0	0	861,439	2,071,227		0
4	234,933	823,592	0	0	974,641	3,045,868		0
5	241,343	1,064,935	0	0	1,077,488	4,123,357		0
6	132,443	1,197,378	0	0	1,099,031	5,222,388		0
7	128,576	1,325,954	0	0	1,137,681	6,360,069		0
8	351,460	1,677,414	0	0	1,135,033	7,495,103		0
9		1,677,414	0	0		7,495,103		0
10		1,677,414	0	0		7,495,103		0
11		1,677,414	0	0		7,495,103		0
12		1,677,414	0	0		7,495,103		0
13		1,677,414	0	0		7,495,103		0
14		1,677,414	0	0		7,495,103		0
15		1,677,414	0	0		7,495,103		0
16		1,677,414	0	0		7,495,103		0
17		1,677,414	0	0		7,495,103		0
18		1,677,414	0	0		7,495,103		0
19		1,677,414	0	0		7,495,103		0
20		1,677,414	0	0		7,495,103		0
21		1,677,414	0	0		7,495,103		0
22		1,677,414	0	0		7,495,103		0
23		1,677,414	0	0		7,495,103		0
24		1,677,414	0	0		7,495,103		0
25		1,677,414	0	0		7,495,103		0
26		1,677,414	0	0		7,495,103		0
27		1,677,414	0	0		7,495,103		0
28		1,677,414	0	0		7,495,103		0
29		1,677,414	0	0		7,495,103		0
30		1,677,414	0	0		7,495,103		0

3.2.3 Leakage

Leakage from activity displacement was monitored within the leakage belt. Ex-post emissions were quantified using the LULC transitions in the leakage belt, for the 2020 LULC map relative to the 2019 benchmark map. The LULC transitions that occurred within this time period were assumed to be distributed linearly from 2019-2020 and were interpolated based off of the end of the previous monitoring period to the end of this monitoring period so as to accurately account for activity-shifting leakage emissions.

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 belt 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. The leakage belt was modified during this monitoring period, to account for the change in project area as a result of the removal of ARR project boundary overlap. The previous leakage belt boundaries were revised due to these changes as well. Both the baseline and ex-post data for all monitoring periods were re-extracted using the revised leakage belt boundaries for all three monitoring periods.

Figure 5 below shows the leakage belt, which consists of the forest area within the 2.6 km buffer around any roads that cross through the project area.

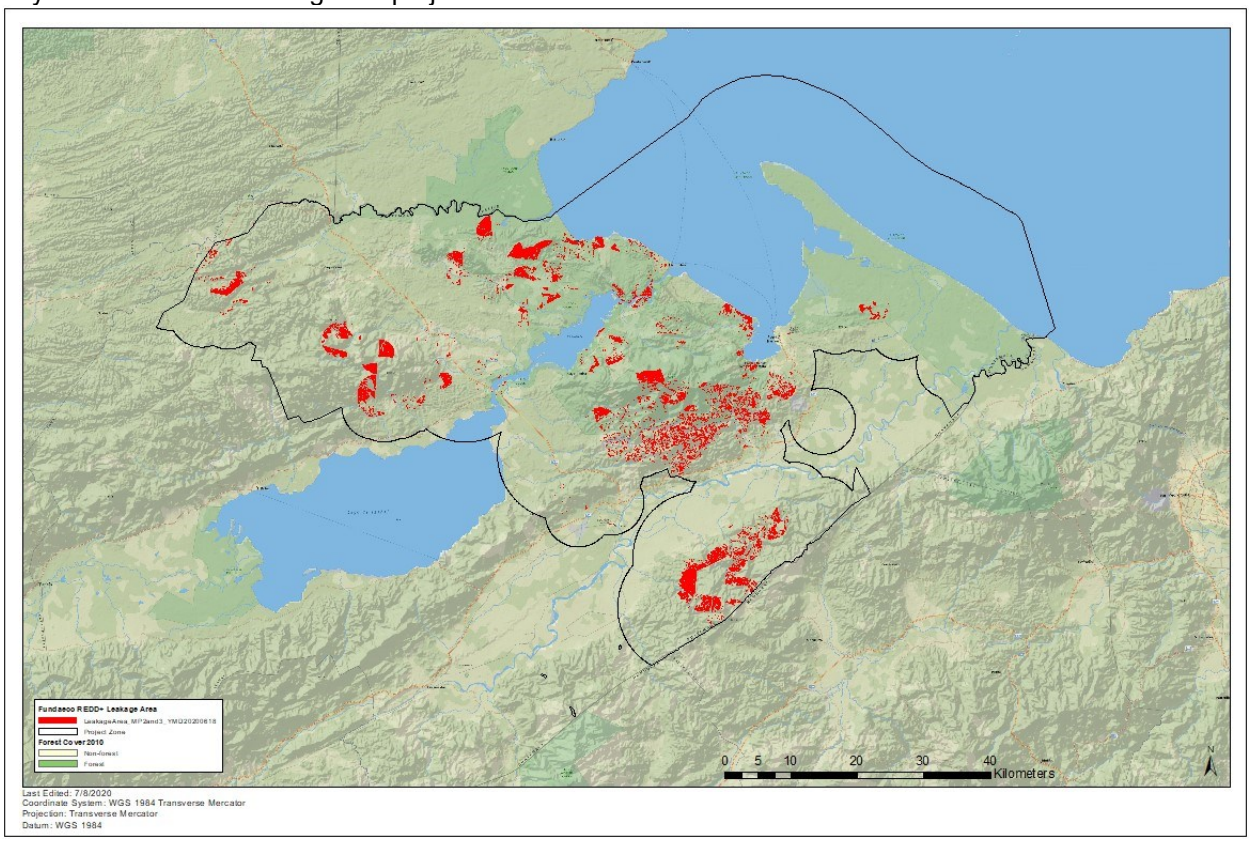

Figure 5: Map of the leakage belt, consisting of only forest area.

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 during this monitoring period there were 303 additional hectares deforested within the leakage belt for a total of 2,336 hectares across the project lifetime. However, this was less deforestation than estimated in the baseline scenario, thus the total emissions from activity-shifting leakage was 0 tons.

Table 233: Ex-Post Activity Data for LULC Change Categories (ct) within the Leakage Belt

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	252	252
2	1	0	3	13	71	157	86	3	334	586
3	1	0	3	13	71	157	86	3	334	920
4	1	0	3	13	71	157	86	3	334	1,254
5	1	0	3	13	71	158	86	3	335	1,589
6	1	0	5	23	22	124	49	2	225	1,815
7	2	0	5	23	19	122	47	2	218	2,033
8	0	14	0	27	40	171	30	20	303	2,336
9									0	2,336
10									0	2,336
11									0	2,336
12									0	2,336
13									0	2,336
14									0	2,336
15									0	2,336
16									0	2,336
17									0	2,336
18									0	2,336
19									0	2,336
20									0	2,336
21									0	2,336
22									0	2,336
23									0	2,336
24									0	2,336
25									0	2,336
26									0	2,336
27									0	2,336
28									0	2,336
29									0	2,336
30									0	2,336

In the previous monitoring report (section 3.2.3.2) the monitoring and deduction of market effects leakage was determined and justified not to be applicable to the project moving forward. Therefore, the total leakage calculated for this monitoring period can be found in Tables 34 and 35 below.

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	567,322	567,322	111,977	111,977	57,137	57,137	57,137	57,137
2	724,335	1,291,657	152,663	264,640	112,926	170,063	112,926	170,063
3	599,176	1,890,833	156,569	421,209	126,450	296,514	126,450	296,514
4	560,225	2,451,058	160,474	581,683	147,942	444,455	147,942	444,455
5	577,301	3,028,359	164,842	746,524	167,229	611,684	167,229	611,684
6	565,169	3,593,528	120,065	866,590	0	611,684	0	611,684
7	531,430	4,124,959	119,752	986,342	0	611,684	0	611,684
8	561,995	4,686,954	153,415	1,139,756	0	611,684	0	611,684
9		4,686,954		1,139,756	0	611,684	0	611,684
10		4,686,954		1,139,756	0	611,684	0	611,684
11		4,686,954		1,139,756	0	611,684	0	611,684
12		4,686,954		1,139,756	0	611,684	0	611,684
13		4,686,954		1,139,756	0	611,684	0	611,684
14		4,686,954		1,139,756	0	611,684	0	611,684
15		4,686,954		1,139,756	0	611,684	0	611,684
16		4,686,954		1,139,756	0	611,684	0	611,684
17		4,686,954		1,139,756	0	611,684	0	611,684
18		4,686,954		1,139,756	0	611,684	0	611,684
19		4,686,954		1,139,756	0	611,684	0	611,684
20		4,686,954		1,139,756	0	611,684	0	611,684
21		4,686,954		1,139,756	0	611,684	0	611,684
22		4,686,954		1,139,756	0	611,684	0	611,684
23		4,686,954		1,139,756	0	611,684	0	611,684

24		4,686,954		1,139,756	0	611,684	0	611,684
25		4,686,954		1,139,756	0	611,684	0	611,684
26		4,686,954		1,139,756	0	611,684	0	611,684
27		4,686,954		1,139,756	0	611,684	0	611,684
28		4,686,954		1,139,756	0	611,684	0	611,684
29		4,686,954		1,139,756	0	611,684	0	611,684
30		4,686,954		1,139,756	0	611,684	0	611,684

Table 244: Total Net Baseline Carbon Stock Change in the Leakage Belt

Table 255: Ex-Post Estimated Total Leakage

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	57,137	57,137	0	0	0	0
2	112,926	170,063	0	0	0	0
3	126,450	296,514	0	0	0	0
4	147,942	444,455	0	0	0	0
5	167,229	611,684	0	0	0	0
6	0	611,684	0	0	0	0
7	0	611,684	0	0	0	0
8	0	611,684	0	0	0	0
9	0	611,684	0	0	0	0
10	0	611,684	0	0	0	0
11	0	611,684	0	0	0	0
12	0	611,684	0	0	0	0
13	0	611,684	0	0	0	0
14	0	611,684	0	0	0	0
15	0	611,684	0	0	0	0
16	0	611,684	0	0	0	0
17	0	611,684	0	0	0	0
18	0	611,684	0	0	0	0
19	0	611,684	0	0	0	0
20	0	611,684	0	0	0	0
21	0	611,684	0	0	0	0
22	0	611,684	0	0	0	0
23	0	611,684	0	0	0	0
24	0	611,684	0	0	0	0
25	0	611,684	0	0	0	0
26	0	611,684	0	0	0	0
27	0	611,684	0	0	0	0
28	0	611,684	0	0	0	0
29	0	611,684	0	0	0	0
30	0	611,684	0	0	0	0

3.2.4 Net GHG Emission Reductions and Removals

Net GHG emission reductions were quantified using equation 19 of the methodology and calculated in the Accounting model (Fundaeco VM0015 Accounting Model.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 although no years required any proration since the monitoring period runs a full year, from 1 January 2019 to 31 December 2020.

As an adjustment was made to the boundaries of the project and leakage areas to remove the identified ARR project area overlap (see section 2.2.4), the previously verified VCUs is now slightly different. In order to account for any over-crediting that occurred during the project lifetime due to this necessary adjustment in project area boundaries has been added into the calculation of VCUs for this monitoring period. It was determined that a total of 886 net GHG emission reductions have been over-estimated by the project during previous monitoring periods. These overages in terms of estimates of NERs, Buffer Allocation, and VCUs were subtracted from the estimates for this current monitoring period in order to account for all potential over-issuance.

Net GHG emissions reductions that account for the removal of areas with ARR overlap are presented in Table 37 and VCUs are shown in Table 38 per equations 20 and 21 of the methodology. Table 36 shows the direct comparison with the between the previously verified and newly calculated values for NERs that account for the removal of ARR areas. The calculated difference of 886 tCO2e was added as a project emission in 2019 in order to account for any overages in crediting. The risk rating has remained at 10% for both risk areas A and B (Table 15). VCU credit generation during this monitoring period is estimated at 704,418 tCO_2e, bringing total VCUs across the project lifetime to 4,501,636 tCO_2e, as shown in the final adjusted VCU generation table (Table 38).

Table 266: Previously verified NERs compared with newly revised NERs removing ARR overlap

Years		Previously Verified Estimated net GHG emission reductions or removals (tCO2e)	Estimated net GHG emission reductions or removals (tCO2e)	Overages in Total Net GHG emissions reductions or removals (tCO2e)
2012		228,309	228,548	-239
2013		451,553	451,705	-152
2014		506,958	505,802	1,156
2015		592,684	591,767	917
2016		668,418	668,916	-498
2017		966,596	966,588	8
2018		1,008,799	1,009,105	-306
Total		**4,423,317**	**4,422,431**	**886**

Table 37: Net GHG Emissions Reductions and Removals – Adjusted to remove ARR overlap and over-issuance in 2019

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Total Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
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
2017	1,099,533	132,937	0	966,596
2018	1,137,859	129,059	0	1,008,799
2019	1,135,033	352,347	0	782,687
Total	**7,500,721**	**1,682,736**	**611,981**	**5,206,004**

Table 278: Total Buffer Allocation and VCU generation across Project Lifetime- Adjusted to remove ARR overlap and over-issuance in 2019

Years	Estimated net GHG emission reductions or removals (tCO2e)	Buffer Allocation (tCO2e)	Estimated VCU Credit Generation (tCO2e)
2012	228,309	39,954	188,355
2013	451,553	79,022	372,531
2014	506,958	88,718	418,240
2015	592,684	103,720	488,965
2016	668,418	116,973	551,445
2017	966,596	96,660	869,942
2018	1,008,799	100,880	907,920
2019	782,687	78,269	704,418
Total	**5,206,004**	**704,195**	**4,501,816**

3.3 Optional Criterion: Climate Change Adaptation Benefits

This project is not seeking Gold Level verification for climate change adaption benefits this monitoring period.

4. COMMUNITY

4.1 Net Positive Community Impacts

4.1.1 Community Impacts (CM3.2)

Community Group	Forest owners and possessor within the grouped project area
Impact	186.59 new ha of forest are under the forest incentives program
Type of Benefit/Cost/Risk	Benefit/predicted and direct

Change in Well-being	Resource protection and improved access to resources

Community Group	All community groups and individuals within the project zone
Impact	14997ha of watershed under increased protection
Type of Benefit/Cost/Risk	Benefit/predicted and direct
Change in Well-being	Resource protection and improved governance

Community Group	Communities affected by land conflict within the project zone
Impact	8 meetings to support conflict resolution
Type of Benefit/Cost/Risk	Benefit/predicted and indirect
Change in Well-being	Improved governance

Community Group	All community groups and individuals within the project zone
Impact	541 local producer participating in agroforestry projects and other productive projects
Type of Benefit/Cost/Risk	Benefit/predicted and direct
Change in Well-being	Improved access to resources and opportunities, and support to sustainable enterprises

Community Group	Individuals with reforestation or agroforestry projects
Impact	119 landowners participating in the reforestation of agroforestry incentives program
Type of Benefit/Cost/Risk	Benefit/predicted and direct
Change in Well-being	Improved access to resources and opportunities and support to sustainable enterprises

Community Group	Individuals with forest
Impact	211 families are receiving incentives from the national incentives program PROBOSQUE and PINPEP, thanks to the project support in the preparation of the technical and legal files. Incentives received on annual basis: Agroforestry Q8,500.00-Q9,157.00 and for forest Q13,760.0- Q18,313.00
Type of Benefit/Cost/Risk	Benefit/predicted and direct
Change in Well-being	Improved access to resources and opportunities, and support to sustainable enterprises

Community Group	Individuals with reforestation or agroforestry projects
Impact	166 local farmers with access to a agroforestry technician
Type of Benefit/Cost/Risk	Benefit/predicted and direct
Change in Well-being	Access to resources and opportunities, and support to sustainable enterprises

Community Group	Individuals with reforestation or agroforestry projects
Impact	146 farmers participated in agroforestry training activities
Type of Benefit/Cost/Risk	Benefit/predicted and direct
Change in Well-being	Access to resources and opportunities, and support to sustainable enterprises

Community Group	Local producers and Entrepreneurs and Women groups
Impact	122 people were trained diverse new productive activities and entrepreneurship (70 women and 62 men)
Type of Benefit/Cost/Risk	Benefit/predicted and direct
Change in Well-being	Access to opportunities

Community Group	
Impact	64 people trained on how to manage a business (organizational skills) (4 training events)
Type of Benefit/Cost/Risk	Benefit/predicted and direct,
Change in Well-being	Access to opportunities, and support to sustainable enterprises

Community Group	Girls and youngsters
Impact	A total of 124 youngsters benefitted: 56 girls have participated in the scholarship program to finish elementary and/or high school, and 68 youngsters (37 girls and 31 boys) have participated in the special training program “Eco Club nautico”, were they learn skill such as boat mechanics, sailing, carpentry, basic electric and electronics and others
Type of Benefit/Cost/Risk	Benefit/predicted and direct
Change in Well-being	Education

Community Group	School students
Impact	3800 students participated in environmental education talks
Type of Benefit/Cost/Risk	Benefit/predicted and direct
Change in Well-being	Education

Community Group	All community groups
Impact	18 environmental education events with communities
Type of Benefit/Cost/Risk	Benefit/predicted and direct
Change in Well-being	Access to opportunities

Community Group	Women from All community groups
Impact	109 talks and 9 outreach events on sexual and reproductive rights and health
Type of Benefit/Cost/Risk	Benefit/predicted and direct
Change in Well-being	Education and community empowerment and inclusiveness

Community Group	All community groups
Impact	33 volunteers girls trained and supported for peer to peer promotion of sexual and reproductive health, sustainable livelihoods and nature conservation
Type of Benefit/Cost/Risk	Benefit/predicted and direct
Change in Well-being	Education and community empowerment and inclusiveness

Community Group	Midwives
Impact	24 midwives engaged in the clinics with increased training
Type of Benefit/Cost/Risk	Benefit/predicted and direct
Change in Well-being	community empowerment and inclusiveness, Creation and working of women health clinics

Community Group	All community groups and individuals within the project zone
Impact	2 women/community first-aid cabinets clinics established
Type of Benefit/Cost/Risk	Actual/predicted and direct
Change in Well-being	Improved access to resources and community empowerment and inclusiveness

Community Group	All community groups and individuals within the project zone
Impact	147 communities benefitted from health services

Type of Benefit/Cost/Risk	Actual/predicted and direct
Change in Well-being	Improved access to resources and community empowerment and inclusiveness

Community Group	All community groups and individuals within the project zone
Impact	3675 people provided with health services
Type of Benefit/Cost/Risk	Actual/predicted and direct
Change in Well-being	Improved access to resources and community empowerment and inclusiveness

Community Group	Women
Impact	150 women received access to family planning methods
Type of Benefit/Cost/Risk	Actual/predicted and direct
Change in Well-being	Improved access to resources and community empowerment and inclusiveness

Community Group	All community groups and individuals in the jurisdiction of these 8 health community commissions
Impact	8 health community commissions (community management bodies)
Type of Benefit/Cost/Risk	Benefit/predicted and indirect
Change in Well-being	community empowerment and inclusiveness

Community Group	Community groups from: Rio Sarton, Cerro San Gil and Sierra Caral
Impact	2 second level associations and 3 protected areas councils supported
Type of Benefit/Cost/Risk	Benefit/predicted and indirect
Change in Well-being	community empowerment and inclusiveness

Community Group	Fishermen
Impact	2 community fishermen attended to marine and coastal monitoring
Type of Benefit/Cost/Risk	Benefit/predicted and direct

Change in Well-being	community empowerment and inclusiveness

Community Group	Forest owners and possessors
Impact	9 landowners /communities FUNDAECO assisted with legal services
Type of Benefit/Cost/Risk	Benefit/predicted and indirect
Change in Well-being	Improved access to resources

Community Group	All community groups within the project zone
Impact	39 patrols across sacred sites and support to 6 mayan cultural activities
Type of Benefit/Cost/Risk	Benefit/predicted and direct
Change in Well-being	community empowerment and inclusiveness, support to the protection of cultural values

Community Group	Historical communities without legal land rights
Impact	4 communities, 129 families FUNDAECO assisted with social and legal support and logistics for land legalization
Type of Benefit/Cost/Risk	Benefit/predicted and direct
Change in Well-being	community empowerment and inclusiveness, improved access to resources, improved governance

Community Group	Individuals with reforestation or agroforestry projects
Impact	9,000 seedling/plants provided to local producers for agroforestry plots
Type of Benefit/Cost/Risk	Benefit/predicted and direct
Change in Well-being	Improved access to resources

4.1.2 Negative Community Impact Mitigation (CM2.2)

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. All project participants keep their land ownership and this is ensured with the voluntarily signature of a contract between FUNDAECO and project participants, the contract contains a clause that clarifies that

land ownership is not affected. As part of the FPIC process, project staff worked to mitigate any confusion regarding land rights. Additionally, during this monitoring period the project has helped legalize private and community land in local and national land registries. During this monitoring period the project supported land legalization process for 4 communities with 129 families benefitted.

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 through the successful implementation of a more rigorous control and surveillance plan and through educational outreach that reinforced penalties for such actions.

Community members also identified the reduced access to timber and firewood extraction as a livelihood risk, especially to the most vulnerable community members. The project has approached any risk of unemployment related to the livelihoods by: supporting the implementation and training for productive projects that does not implies deforestation such as commercial crops on already agricultural lands, eco-tourism services, handcrafts, bakery and cooking entrepreneurships, etc. During the project period: 199 farmers were supported in the implementation or training for their agroforestry projects, 119 of them ere supported to receive reforestation and agroforestry incentives from the government; 122 people received training for new productive activities and entrepreneurship, and 91 women were supported Support to in their sustainable enterprises productive projects. Regarding other activities that could potentially be affected by the project such as family consumption of timber or small local sawmills, the project participants have identified small plots where they will be making the extraction of small volumes for family consumption this volume and the frequency of extraction is limited by the Forest Law and Protected Area Law. In the case of sawmills the Guatemalan law regulates the extraction and commerce of timber; any sawmill independent on the size of their volumes has to accomplish this regulation, and their sources needs to be authorized and traceable; as this is a project is dedicated to avoid unplanned deforestation, wood sources are not affected.

4.1.3 Net Positive Community Well-being (CM2.3, GL1.4)

The project was design to address agents and drivers of deforestation mentioned in the drivers of deforestation study[14], and to contribute to trigger a socio-economic dynamics that result in the reduction of deforestation. In this sense the project activities are designed to work with a wide array of communities that are impacted positively in their wellbeing, this in a scalability design and prioritizing communities located in the areas with more deforestation and also considering different communities interests. People of 147 communities are visiting the 24 Women health clinics and health facilities within the project zone; 199 farmers from 32 communities are being supported with agroforestry and timber plantations; and 543 families, forest owners and farmers, from 40 communities are being supported to access to the forest incentives programs PROBOSQUE and PINPEP. The forest protection and reduced deforestation is contributing to water supply for 70 communities and 3 main towns.

4.1.4 Protection of High Conservation Values (CM2.4)

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 Sarstun River

[14] CNCG SM Drivers of Deforestation_final_1.pdf

- Rio Cocoli
- Siete altares
- Caves and cerros at the north of Sierra Santa Cruz (Rubel Ho, Rubel Cacao, Sesaquipec and Sesaquisuib)

During this monitoring period 39 surveillance patrols were done along these sacred sites.

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 11) 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.

The implemented measures to avoid deforestation and degradation are: the deployment of 680 forest patrols; the enrollment of landowners along watersheds in PROBOSQUE and PINPEP programs, environmental and nature conservation education activities; and support to preserve awareness and respect for traditional, cultural, spiritual and religious identities of communities within the project area.

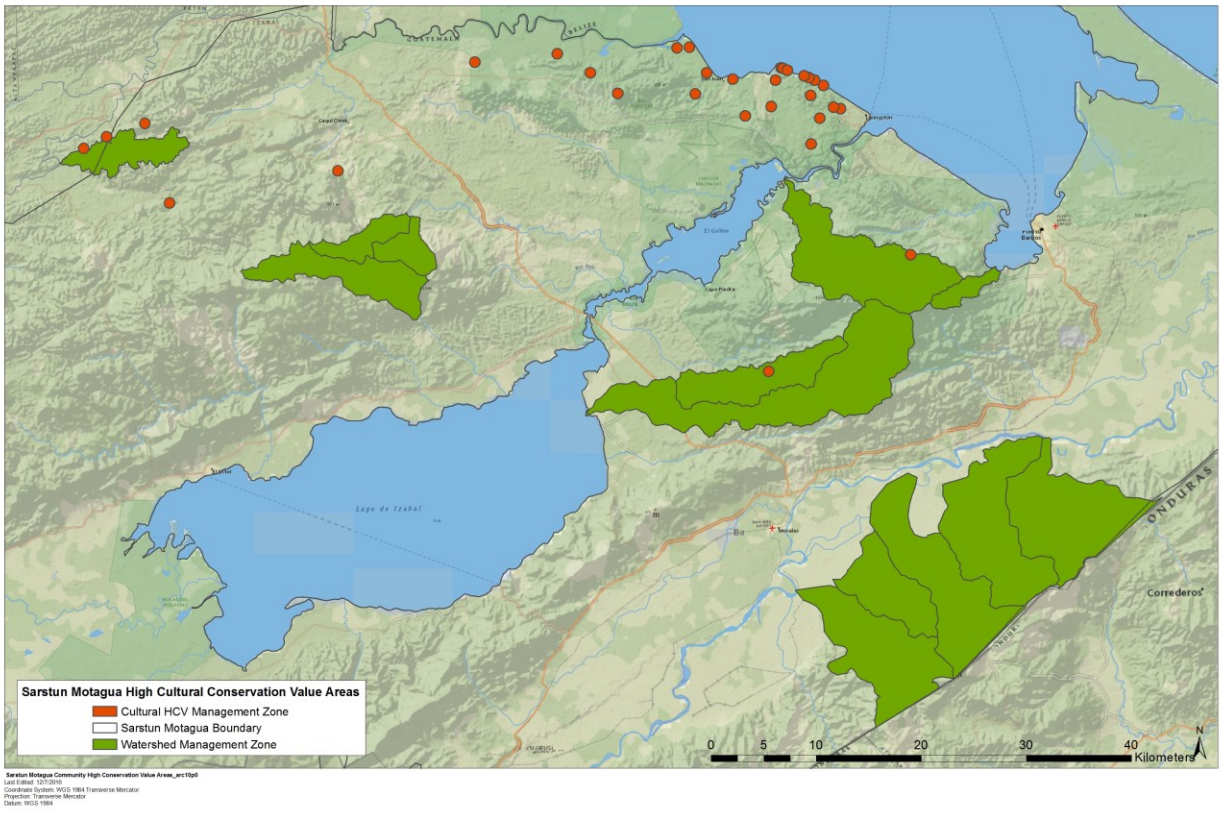

Figure 11: Map of community HCV management areas.

4.2 Other Stakeholder Impacts

4.2.1 Mitigation of Negative Impacts on Other Stakeholders (CM3.2)

Cattle ranchers were identified as a group of stakeholders at low risk of being negatively impacted by the project due to reduced land for pasture expansion. However, most of existing cattle ranchers are small producers and according to official statistics, cattle ranches are underused and still have the possibility to increase livestock; it can be assumed that in case of needing expansion for their activity they still have land. However in order to support cattleranchers who might consider expansion over forested areas, FUNDAECO promotes and support the access to forest incentives provided by the government, the promotion occurs during assemblies and meetings where FUNDAECO informs on the forest incentives program and the support occurs when a forest owner is interested in receiving technical assistance for the preparation of the forest incentive file.

4.2.2 Net Impacts on Other Stakeholders (CM3.3)

According to patrol reports and denunciations presented along this monitoring period, there were no cattle activity related to denunciations; so there is no evidence of any cattle rancher being harmed by the project.

4.3 Community Impact Monitoring

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

The monitoring plan and methods used are detailed in the Project Implementation Plan. Table 39 below presents the monitoring results for the period; it is based on the Theory of Change Developed for the Project and it covers all the benefited community groups.

Table 39: Community Monitoring Plan activities

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	233.08
Resource Protection, Governance, and Monitoring	12	Protection and management of community water sources	# hectares of water source protected	Annually	conservation agreements, watershed protection database	14997
Resource Protection, Governance, and Monitoring	14	Conflict resolution roundtable	# meetings participated in on roundtable	Annually	meeting records/ reports/ minutes	8
Resource Protection, Governance, and Monitoring	14	Conflict resolution roundtable	Records of meetings	Annually	Records	8
Sustainable	27	Community	# nurseries hired	Annually	Administrati	2

Enterprises		nurseries	(supported)		ve logbook	
Sustainable Enterprises	30	Hire agroforestry promoters/technician from the project region	# agroforestry promotors hired from the project region	Annually	invoices/ agreements	22
Sustainable Enterprises	18	Creation of agroforestry plots	# farmers participating in agroforestry projects	Annually	agroforestry database	199
Sustainable Enterprises	22	Reforestation and Agroforestry PINFOR or PINPEP	# landowners participating in program	Annually	agroforestry database	119
Sustainable Enterprises	30	Hire agroforestry promoters from project region	# agroforestry promotors hired from project region	Annually	payrolls (planillas)	22
Sustainable Enterprises	27	Community nurseries	# community entrepreneurs	Annually	invoices/agreements	2
Sustainable Enterprises	23	Construction of ecotourism sites	# of ecotourism sites established	Annually	ecotourism infrastructure investments inventory	0
Sustainable Enterprises		Support to women in sustainable enterprises productive projects	# of women supported	Annually	Records	91
Sustainable Enterprises	22	Reforestation and Agroforestry PINFOR or PINPEP	$ per hectare of benefits per period for landowners in program	Annually	PINFOR/PINPEP database	Agroforestry Q8,500.00-Q9,157.00 and for forest Q13,760.0-Q18,313.00
Community Empowerment & Inclusiveness	33	Legalized private and community land	# hectares newly registered in both local and national land registry	Annually	database for land legalization	1178
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	2

Community Empowerment & Inclusiveness	39	community management of health facilities	# of health community commissions (community management bodies)	Annually	community health commissions minutes	8
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, 3 CEL
Community Empowerment & Inclusiveness	37	Engage fishermen in reef monitoring	# of community fishermen attended	Annually	monitoring reports	2
Community Empowerment & Inclusiveness	42	support to cultural religious activities	# of events supported	Annually	event minutes, pictures, etc.	6
Community Empowerment & Inclusiveness	39	Creation and working of women health clinics	# of midwives engaged in the clinics	Annually	engagement inform consents (consetimientos informados)	24
Community Empowerment & Inclusiveness	42	Protection of sacred sites	# of patrols	Annually	patrol reports	39
Education	45	Train community members on marine biodiversity and monitoring	# of community members attended	Annually	training reports	60
Education	47	Provision of health services	# of workshops held	Annually	workshops reports	109
Education	47	Provision of health services	# outreach events held within communities	Annually	event reports	9
Education	47	Provision of health services	# peer-to-peer health educators	Annually	volunteering agreements	33
Education	48	Training and workshops on agroforestry production and care	# farmers attended	Annually	logbook, workshops reports/participants lists	146

Education	55	Provide access to FUNDAECO agronomist	# of landowners/communities attended	Annually	Logbooks	166
Education	56	Training for new productive activities and entrepreneurship	# of people attended	Annually	workshop reports/participants lists	122
Education	56	Training for new productive activities and entrepreneurship	# of workshops held	Annually	workshop reports/participants lists	12
Education	62	General community training	# of people participated	Annually	workshop reports/participants lists	97
Education	62	General community training	# of trainings held	Annually	workshop reports/participants lists	4
Education	45	Train community members on marine biodiversity and monitoring	# of community members attended	Annually	training reports	60
Education	47	Provision of health services	# of workshops held	Annually	training report/participants lists	109
Education	47	Provision of health services	# outreach events held within communities	Annually	training report/participants lists	9
Education	47	Provision of health services	# peer-to-peer health educators	Annually	volunteering agreements	33
Education	48	Training and workshops on agroforestry production and care	# of people attended	Annually	training reports/participants list	133
Education	48	Training and workshops on agroforestry production and care	# of workshops held	Annually	training reports/participants list	5
Education	50	Environmental education for schools	# schools participating with FUNDAECO	Annually	event reports/participants list	51 schools, 3800 students
Education	50	Environmental education	# students visiting ecotourism	Annually	event reports/parti	100

		for schools	centers		cipants list	
Education	51	Environmental education for interested communities	# workshops or events held	Annually	event reports/participants list	18
Education	62	General community training	# trainings held	Annually	training reports/participants list	4
Improved Access to Resources	70	PINFOR or PINPEP payments	# families receiving PINFOR/PINPEP payments	Annually	PINFOR/PINPEP database	330
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	662
Improved Access to Resources	72	Legal services	# landowners/communities FUNDAECO assisted with legal services	Annually	denunciation records	9
Improved Access to Resources	73	Process and travel logistics for land legalization	# landowners, individuals, communities FUNDAECO assisted with transportation and logistics for land legalization	Annually	activity report	129 families from 4 communities were supported for land legalization
Improved Access to Resources	76	Provision of health services	# of patients treated	Annually	sexual and reproductive health database	3266
Improved Access to Resources	76	Provision of health services	# of women using contraceptive methods	Annually	sexual and reproductive health database	150
Improved Access to Resources	76	Provision of health services	# of communities with access to services	Annually	sexual and reproductive health database	147
Improved Access to Resources	78	Agroforestry stock for new and existing plots	# seedlings/plants provided for new plots	Annually	Administrative logbook	9000
Improved Access to Resources	82	Nursery establishment	# nurseries hired (supported)	Annually	nurseries contracts	2
Improved Access to Resources	84	Protection and management	# hectares of water source protected	Annually	conservation agreements, patrol	14,997

		of community water sources			reports	
Improved Access to Resources	86	Provide access to FUNDEACO agronomist	# of communities/landowners receiving access to agronomist	Annually	logbooks, agroforestry contracts	166

4.3.2 Monitoring Plan Dissemination (CM4.3)

Along the monitoring period, FUNDAECO informed on the project progress during 38 assemblies or group meetings organized with different communities and stakeholders. The monitoring results are disseminated through verbal and/or summary reports informing on the project activities and results along the period, the summaries contains a quick remain on project objectives, carbon contracts, project status, activities and achieved results. The reports are also available in the project offices and women health clinics across the project zone. Per the CCBA rules, this monitoring report is available in the project offices and women health clinics one month before the audit visit for the public comments period.

4.4 Optional Criterion: Exceptional Community Benefits

The project is not seeking Gold Level verification for exceptional community benefits this monitoring period.

4.4.1 Short-term and Long-term Community Benefits (GL2.2)

Not applicable

4.4.2 Marginalized and/or Vulnerable Community Groups (GL2.4)

Not applicable

4.4.3 Net Impacts on Women (GL2.5)

Not applicable

4.4.4 Benefit Sharing Mechanisms (GL2.6)

Not applicable

4.4.5 Governance and Implementation Structures (GL2.8)

Not applicable

4.4.6 Smallholders/Community Members Capacity Development (GL2.9)

Not applicable

5. BIODIVERSITY

5.1 Net Positive Biodiversity Impacts

5.1.1 Biodiversity Changes (B2.1)

Change in Biodiversity	Increased forest protection
Monitored Change	No new areas were incorporated into the project during this monitoring period. The project area remains at 54157 hectares

Justification of Change	New forest owners were incorporated into the project area.

Change in Biodiversity	Increased forest protection
Monitored Change	233.08 hectares of lands FUNDAECO helped to register with PINFOR/PINPEP
Justification of Change	FUNDAECO supported forest owners and possessors in the preparation and presentation of technical and legal files required by the national forest incentives PROBOSQUE and PINPEP, without this support forest owners will not have the chance to participate in the incentives program as they do not have the technical knowledge or the financial resources to prepare the files by their own. In fact most of the forest owners are not even aware about this program.

Change in Biodiversity	Birds are monitored as Key taxa
Monitored Change	16 monitoring events to cover one season for bird monitoring
Justification of Change	The project considers that besides monitoring LULC it is necessary to monitor taxa that can demonstrate ecosystem integrity. Bird monitoring is part of the project implementation plan, and it allow us to analyze in medium term periods the health of the remaining forest, as well as the contribution of agroforestry areas to biodiversity.

Change in Biodiversity	Increased resource and ecosystem protection
Monitored Change	51 ha and 127 km of coastline surveyed
Justification of Change	To support livelihoods for different populations within the project zone is a main concern of the project. Fisheries are key livelihood for the coastal population within the project zone, if coastal and marine ecosystems decay, fisheries will be reduced and coastal population could become deforestation agents.

Change in Biodiversity	Increased resource and ecosystem protection
Monitored Change	4 fishing restriction zones are supported by the project
Justification of Change	To support livelihoods for different populations within the project zone is a main concern of the project. Fisheries are key livelihood for the coastal population within the project zone, if coastal and marine ecosystems decay, fisheries will be reduced and coastal population could become deforestation agents. FUNDAECO has promoted and supported fishing restriction zones for a sustainable management of this resource.

	FUNDAECO supports local communities in their autoregulation and monitoring for this fishing restriction zones.

Change in Biodiversity	Increased forest protection
Monitored Change	680 patrols to prevent deforestation and/or to follow denunciations
Justification of Change	Protection, control and surveillance are some of the main project activities to avoid deforestation. FUNDAECO hires park guards, but also support government agencies in the supervision of institutional park guards and with resources (food, fuel and vehicles) to the execution of interinstitutional patrols

Change in Biodiversity	Increased forest protection and governance
Monitored Change	3 protected areas executive councils CELs are functioning (10 meetings during the monitoring period)
Justification of Change	As presented in the theory of change lack of participation in resource management and protection affects governance. The project promotes the creation and functioning of protected area councils with the participation of key stakeholders (as stated in the protected areas law), the project coordinators organize, call and follow council “CEL” meeting

Change in Biodiversity	Improved land management in non-forested land
Monitored Change	94.9 ha were planted with agroforestry systems and timber over non forested land
Justification of Change	In order to reduce pressure over forest, but also to improved land management and biodiversity connectivity, the project is supporting and implementing agroforestry and timber plantation over non forested land (considered as non-forested land in the project baseline). Surface planted during this monitoring period belong to FUNDAECO as part of the financial sustainability strategy. Besides planting local forest trees the agroforestry systems are combining market value crops to generate revenue, see section 5.1.6 on used species.

5.1.2 Mitigation Actions (B2.3)

All project activities have been analyzed for any potential negative effects on biodiversity within the project area and project zone. 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 Estudio Viabilidad agroforesteria 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 Estudio Viabilidad agroforesteria 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 Estudio Viabilidad agroforesteria 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 PROBOSQUE 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 of the PD. Finally, FUNDAECO is constantly training the park guards to improve their skills in nature and species conservation, PA management, as well as in the application of special protocols to prevent the spread of any harmful amphibian diseases throughout the project sensitive sites across the project area.

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

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. 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.

- **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 680 forest patrols and has implemented 4 fishing restricted zones; protection and enforcement of laws in these marine zones prevent fisheries depletion which can become a deforestation driver.

  As shown in the Theory of Change matrix (TOC Activity Matrix.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. During this monitoring period the project supported the legalization of 1778 hectares of community land; 4 communities with 129 were benefitted. 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.

  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 8 environmental litigation advocacy events in the past two years. 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.

- **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. During project lifetime 3 young women were trained to support bird monitoring activities, and 21 fishermen were engaged to participate in communal reef monitoring, 2 of them continue their training and participated in monitoring activities during this monitoring period. 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.

- **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 7623 visitors for the period, reaching other stakeholders than community members.

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 51 schools and to participate in environmental education programs (Table 39). 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; 11 marine biodiversity research trips have been conducted involving 1 university study (Table 39). 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. Training sessions were held with park guards to prevent quitrid fungus. By taking conservative measures to protect endangered species, FUNDAECO is ensuring that no project activities have unintended negative impacts on HCVs. Park guards 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 table 41 below.

- **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 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, 166 farmers are receiving technical assistance for their crop management and 119 were supported to access the agroforestry incentives from the government . These agroforestry plots 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.

5.1.4 High Conservation Values Protected (B2.4)

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 12) in order to focus HCV conservation efforts within the project area. As 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; the primary measure taken to maintain biodiversity HCVs is through the reduction of deforestation within the project areas. 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 forest owners into the project as well as into the PINFOR and PINPEP programs, conservation education initiatives, and agroforestry systems.

Finally, FUNDAECO is constantly training the park guards to improve their skills in nature and species conservation; PA management; and to prevent the spread of deadly amphibian fungal diseases

throughout the sensitive sites across the project area, park guards have been instructed in appropriate decontamination methods for shoes.

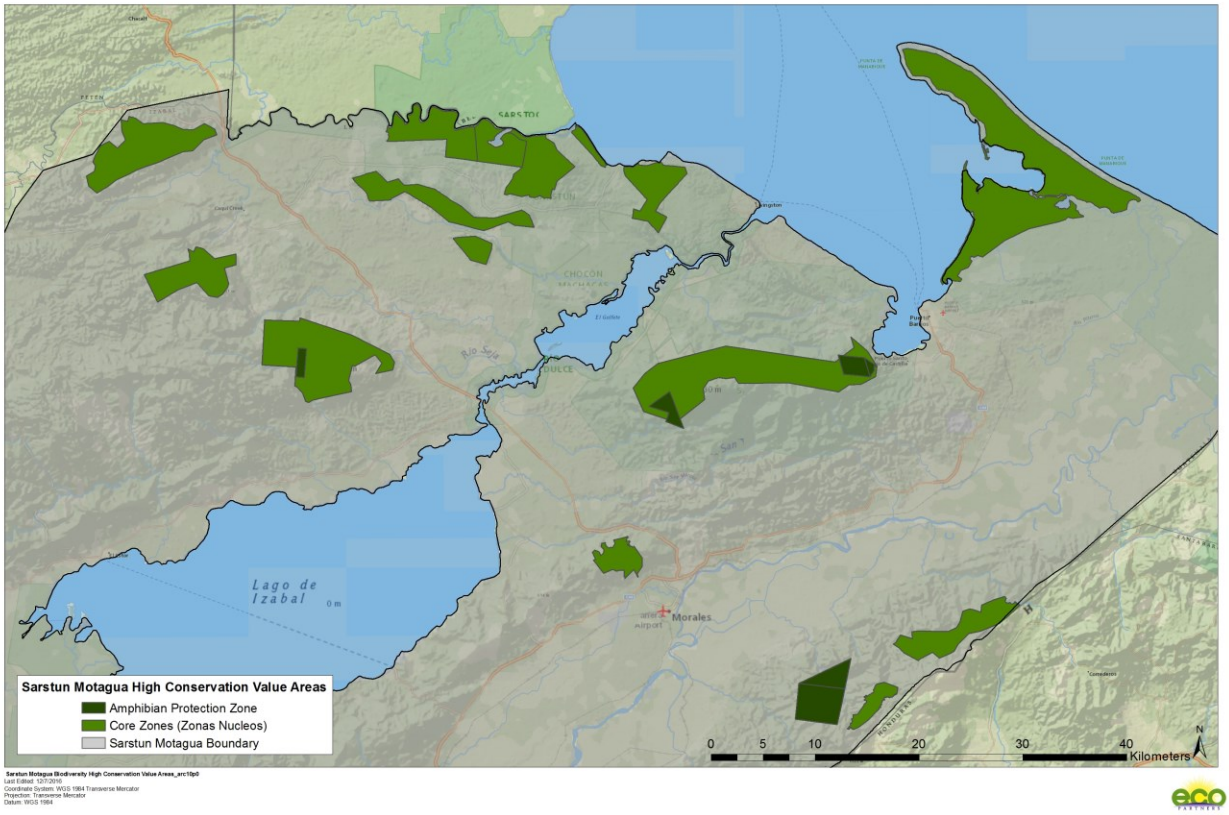

Figure 12: Map of biodiversity HCV management areas.

5.1.5 Invasive Species (B2.5)

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 Estudio Viabilidad agroforesteria 10062014.docx).

5.1.6 Impacts of Non-native Species (B2.6)

Due to existing agricultural markets and increased economic incentives for small-scale farmers, FUNDAECO does use non-native species in its agroforestry programs: rubber, cardamom and rambutan. 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 Estudio Viabilidad agroforesteria 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 best agricultural practices (BAPs), land-management and planning activities to diversify agricultural commodities across an ownership and to avoid monoculture plantations (See BAP Manuals). 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 Estudio Viabilidad agroforesteria 10062014.docx).

Species	*Elettaria cardamomun* Cardamom
Justification of Use	Original from the tropical forest at India, Sri Lanka, Malaysia and Sumatra. Cardamom has been cultivated in Guatemala since the beginning of the 20th century. Today Guatemala is the first worldwide cardamom producer and exporter. The crops not invasive and is well adapted to project region natural conditions. Cardamom can reach very good prices depending on the world supply, but also on quality and processing. Since the very beginning the project visualized a value chain for this product; by supporting technical assistance to local producers, the construction of drying installations (horno de secado), and access to an essential oils company that pays an stable premium price.
Adverse Effect	There is no evidence that cardamom have adverse effects over the project region environment. Instead the cardamom can grow under shadow and is a good source for nectar to several insect, and bird species. Indirect adverse effects could be: i. deforestation for crop expansion due to the good prices that cardamom can reach, however local producers are aware that price is fluctuant according to world supply. The project promotes this crop only on non-forested areas and in combination with trees; ii. the use of harmful agrochemical to avoid pests. The project promotes and implements this crop with BAP and the use of PERSUAP list (see EG-PERSUAP-Final_Oct2012.docx).

Species	*Nephelium lappaceum* Rambutan
Justification of Use	Original from southeast Asia, according to MAGA-PROFRUTA, this crop is in the project zone since 1986. The crop is well adapted to the project zone conditions and is highly productive because the local soils. It can be sold in the local or in the international market and because it's a short cycle fruit crop -it starts production at two to four years with annual harvest of at least 4 month-, it is a good source of cash for local producers. Due to the promotion made by the national program PROFUTA the crop is well known in the project zone. The crop can be combined in Agroforestry systems.
Adverse Effect	There is no evidence that cardamom have adverse effects over the project region environment. Indirect adverse effects could be: the use of harmful agrochemical to avoid pests and diseases, however the project promotes and implement this crop

	with BAP and the use of PERSUAP list (see EG-PERSUAP-Final_Oct2012.docx).

Species	*Hevea brasilensis* Rubber
Justification of Use	This crop is reported for Guatemala since 1940. It starts the resin initial production ("ensayo") at 4 years and can last up to 25, at which point the trees can be used as wood. The resin extraction is easy and besides the care of the first years the crop is highly resistant to pest and diseases.
Adverse Effect	There is no evidence that rubber have adverse effects over the project region environment. Instead there is a report that demonstrates that Hevea plantations are good regarding key bird species and others. Indirect adverse effects could be: i. deforestation for crop expansion due to the good prices. The project promotes this crop only on non-forested areas and in combination with trees.

5.1.7 GMO Exclusion (B2.7)

It is interdicted that project activities use invasive species and GMOs within the project area.

5.1.8 Inputs Justification (B2.8)

Name	Urea
Justification of Use	Fertilizer
Adverse Effect	After its assimilation by plants only leaves small traces of carbon dioxide in the soil, meaning through the interaction of nitrifying bacteria. This carbon dioxide is not harmful to the soil.

Name	Triple 15
Justification of Use	Fertilizer
Adverse Effect	After its assimilation by plants leaves only not harmful residual effects on soil.

Name	Fertilizante foliar Complesal Super
Justification of Use	Fertilizer
Adverse Effect	No major impacts to soil and wildlife in general.

Name	Abono Orgánico Gallinasa

Justification of Use	Fertilizer
Adverse Effect	The use of manure is a clean way of getting rid of bird droppings within the same production sites, which is one of the major health problems facing today's poultry industry.

Name	Cal para enmiendas de suelo
Justification of Use	Improves the cation exchange capacity of soils and their texture and structure.
Adverse Effect	No major impacts to soil and wildlife in general.

Name	Raizal
Justification of Use	Fertilizer
Adverse Effect	No major impacts to soil and wildlife in general.

Name	Roundup
Justification of Use	Herbicide
Adverse Effect	Are minimal if protocols and regulations for pesticide management, especially waste management, surplus and washing containers and utensils product application apply.

Name	Amistar
Justification of Use	Fungicide
Adverse Effect	Are minimal if protocols and regulations for pesticide management, especially waste management, surplus and washing containers and utensils product application apply.

Name	Karben
Justification of Use	Fungicide
Adverse Effect	Are minimal if protocols and regulations for pesticide management, especially waste management, surplus and washing containers and utensils product application apply.

Name	Prevalor
Justification of Use	Fungicide
Adverse Effect	Are minimal if protocols and regulations for pesticide management, especially waste management, surplus and

	washing containers and utensils product application apply.

Name	Fusilade
Justification of Use	Herbicide
Adverse Effect	Are minimal if protocols and regulations for pesticide management, especially waste management, surplus and washing containers and utensils product application apply.

5.2 Offsite Biodiversity Impacts

5.2.1 Negative Offsite Biodiversity Impacts (B3.1) and Mitigation Actions (B3.2)

All project activities have been analyzed for any potential negative effects on biodiversity within the project area and project zone. Negative biodiversity impacts for the project but can come about from the misuse of pesticides and fertilizers as well as ineffective waste management techniques. 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 Estudio Viabilidad agroforesteria 10062014.docx).

Table40: Negative offsite Impacts

Negative Offsite Impact	Mitigation Measure(s)
Biodiversity toxicity	Implementation Best Agricultural Practices, including adequate doses according to fabric instructions and good waste management and disposal. All used products have key toxicity levels between practically not (PNT) to moderate (MT). (See EG-PERSUAP)
Water contamination	Implementation Best Agricultural Practices, including adequate doses according to fabric instructions and good waste management and disposal

5.3 Biodiversity Impact Monitoring

5.3.1 Biodiversity Monitoring Plan (B4.1, B4.2, GL1.4, GL3.4)

Table 281: Biodiversity Monitoring Activities

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	1778 ha were legalized
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	233.08
Resource Protection, Governance, and Monitoring	7	Engage fishermen to reef monitoring	# of workshops held	Annually	monitoring reports	22
Resource Protection, Governance, and Monitoring	7	Engage fishermen to reef monitoring	amount of coastline surveyed	Annually	monitoring reports	51ha and 127km
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 acquisition files	0
Resource Protection, Governance, and Monitoring	10	Manage protected areas	# of hectares managed, # of patrols	Annually	patrol reports, logbooks	680 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	37 meetings

Resource Protection, Governance, and Monitoring	12	Protection and management of community water sources	# hectares of water source protected	Annually	conservation agreements, patrol reports, logbooks	14997 hectares
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	680 patrols
Resource Protection, Governance, and Monitoring	17	Environmental litigation and advocacy	# advocacy events attended/participated in	Annually	Reports	8
Resource Protection, Governance, and Monitoring	17	Environmental litigation and advocacy	records of any litigation with FUNDAECO involvement	Annually	Reports	45
Resource Protection, Governance, and Monitoring	38	Participate on CEL for protected areas	Records of CEL meetings	Annually	minutes	10
Community Empowerment & Inclusiveness	37	Engage fishermen in reef monitoring	# of community fishermen attended	Annually	monitoring reports	2
Education	43	Biodiversity Monitoring	# of monitoring events	Annually	logbooks, reports	18
Education	45	Engage community members on marine biodiversity and monitoring	# of community members attended	Annually	reports, participants lists	60
Education	45	Marine biodiversity monitoring	# of monitoring events	Annually	reports, participants lists	11
Education	46	Support	# of	Annually	reports,	1

		university research on marine sciences	research expeditions conducted		participants lists	
Education	46	Support university research on marine sciences	# of students participating in research with FUNDAECO	Annually	reports, participants lists	1
Education	46	Support university research on marine sciences	types of research activities conducted	Annually	support letters, research reports	1
Education	50	Environmental education for schools	# schools participating with FUNDAECO	Annually	reports, participants lists	51 schools, 3800 participants
Education	50	Environmental education for schools	# students visiting ecotourism centers	Annually	reports, participants lists	100
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	18
Education	57	Ecotourism site establishment	# visitors	Annually	visitors records	7623
Education	66	Train park guards to improve their skills in PA management and nature conservation	# of guards trained	Annually	reports, participants lists	24
Education	66	Train park guards to improve their skills in PA management and nature	# of trainings held	Annually	reports, participants lists	3

		conservation				
Improved Access to Resources	84	Protection and management of community water sources	# hectares of water source protected	Annually	conservation agreements, patrol reports	14997 hectares

5.3.2 Biodiversity Monitoring Plan Dissemination (B4.3)

Along the monitoring period, FUNDAECO informed on the project progress during meetings organized with different communities and stakeholders, 64 meetings were organized to inform on project progress as well as to invite new forest owners to participate in the project. The monitoring results are disseminated through summary reports informing on the project activities and results along the period, the summaries contains a quick remain on project objectives, carbon contracts, project status, activities and achieved results. These are disseminated during meetings and are also available in the project offices and women health clinics across the project zone. During assemblies or group meetings and are also available with PD summary and the Monitoring reports summaries, in each project office and health facilities. Per the CCBA rules, this monitoring report is available in the project offices and women health clinics one month before the audit visit for the public comments period.

5.4 Optional Criterion: Exceptional Biodiversity Benefits

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)

Since its beginning FUNDAECO is focus on protecting lands for these species, by acquiring land to create conservation reserves, or by promoting the creation of protected areas. As a result the Amphibian Conservation Reserva La Firmeza was created in 2012, encompassing 2480 hectares of private land specifically for amphibian conservation, and the whole Sierra Caral was declared as National Protected area through the Guatemalan Congress in 2014. FUNDAECO is seeking to create other reserves and a protected area in amphibian AZE site Sierra Santa Cruz; two lands encompassing 957 hectares were recently acquired for this purpose and 37 meetings were held to discuss the protected area design.

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 possible to find 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.

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)

The Theory of Change framework 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 Amphibian Reserve 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 with 20 park guards were held to enhance knowledge protected areas, climate change impacts on biodiversity and amphibian fungus disease prevention and protected areas management. (See Protocol to avoid Chytrid fungus)

FUNDAECO continue monitoring activities over Sierra Caral Amphibian Reserve and over Cerro San Gil, during the project report several individuals from 3 critically endangered species were reported in both areas showing that management and protection activities are generating positive impacts. See Amphibian Monitoring Report.

Finally during the monitoring period 37 meeting were held to consult and promote the creation of a new Protected area, Sierra Santa Cruz which also report the presence of endemic and endangered amphibians. FUNDAECO is developing a Technical Study for the creation of this protected area, this study is under revision by CONAP. See Enmiendas ETSSC Sept 2019 CONAP.

5.4.1 Trigger Species Population Trends (GL3.3)

Trigger Species	Bird Species with population declinations; highest concern by NFWS and ABC: Woodthrush (*Hylocichla mustelina*), Kentucky Warbler (*Geothlypis formosa*) and Worm-eating Warbler (*Helmitheros vermivorum*)
With-project Scenario	Forest protection specially in Sierra Caral and Cerro San Gil forests, and Bird Monitoring, See Bird Monitoring Report 2019

Trigger Species	Bird species listed as vulnerable by UICN: : Vulnerable", the Keel-billed Motmot (Electron carinatum)
With-project Scenario	Forest protection especially in Sierra Caral and Cerro San Gil forests, and Bird Monitoring. See Bird Monitoring Report 2019

Trigger Species	Critically endangered amphibians according to UICN list: Cryptotriton wakei, Nototriton brodiei, Agalychnis moreletii, Bromeliohyla bromeliacia, Duellmanohyla soralia, Ptychohyla hypomykter, Ptychohyla sanctaecrucis, Craugastor trachydermus
With-project Scenario	Forest protection especially in Sierra Caral and protocol to prevent chitidromicosis, and land acquisition in Sierra Santa Cruz (957ha). See Sierra Santa Cruz Amphibians, Amphibians Monitoring report 2019

Trigger Species	Endangered amphibians according to UICN list: Bolitoglossa odonnelli, Bolitoglossa dunni,, Craugastor charadra, Craugastor sabrinus, Ecnomiohyla minera, Craugastor sandersoni
With-project Scenario	Forest protection, amphibian monitoring and protocol to prevent chitidromicosis, and land acquisition in Sierra Santa Cruz (957ha). See Sierra Santa Cruz Amphibians, Amphibians Monitoring report 2019

Trigger Species	Nearly threatened according to UICN list and is critically endangered according to the Endangered Species List from CONAP: Herpailurus yaguarondi, Leopardus pardalis, Leopardus wiedii, Panthera onca, Puma concolor
With-project Scenario	Forest protection across the project zone and monitoring to detect presence and to detect illegal poaching. See Jaguar Cooectivity Report and Binational Jaguar Connectivity preliminary results.

6. ADDITIONAL PROJECT IMPLEMENTATION INFORMATION

Not Applicable.

7. ADDITONAL PROJECT IMPACT INFORMATION

Not Applicable