Technical Specification
Marqués de Comillas

2022

Technical Specification (Part G)

Scolel'te: Marqués de Comillas

(Includes San Isidro, La Corona & Reforma Agraria Project Areas)

Project Coordinator: Cooperativa Ambio

Updated Technical Specification according to Plan Vivo Standard 2013

Version 2.2 – July 25th, 2022

Technical Specifications- Marqués de Comillas

Part G: Technical Specifications – Marqués of Comillas

This is a revision of a Technical Specification that was originally approved in 2003, under a much earlier version of the Standard. It has been updated to both assess, for the success of activities that occurred from 2000 to the present day, and to provide estimation of benefits that will occur in a 5 years period. The original technical specification set out an *ex ante* calculation and sales of carbon certificates, and indeed a number of such credits have been sold. However, at this point many credits generated by the project activities since 2000 have not been issued.

This Technical Specification will therefore provide calculations to emissions that actually occurred in the first 15 years of the project operations (using deforestation data from 2000-2014 inclusive), effectively offering an *ex post* estimation of Carbon Certificates generated, and the use of an *ex ante* calculation method to estimate emissions that would result from these activities continuing until the end of 2026.

While this is a 27-year intervention duration, activities are split between three sites with different starting dates, with each having a 15-year intervention duration.

This Technical Specification should be updated again if any substantive change in the project operations or drivers of deforestation occurs, and at the latest by the end of 2021.

G1 Project intervention and activities

The technical specification will be applied in the Marqués of Comillas Municipality. Marqués of Comillas is located in the extreme eastern corner of Chiapas, around the Montes Azules Reserve of de Lacandona Jungle, which include vegetation such as: humid tropical forest, wetlands, flooded rainforest.

It borders the Montes Azules Reserve and is characterized by some of the highest deforestation rates in the state of Chiapas, due to increase in the livestock pasture areas and palm oil plantations. The Montes Azules Biosphere Reserve (REBIMA) is the largest and best-preserved area of wet forests in the state of Chiapas.

AMBIO works in the region since 2000, with the Scolel 'te Program and other initiatives that have promoted activities in the area, such as environmental services, fire and sustainable land management, that have facilitated the accompaniment and the development of territorial regulations at the ejido level, the update of internal regulations and the promotion of good practices for agricultural and livestock production management.

AMBIO´s activities in the region aim to contribute and support local processes oriented to sustainable land management, conservation, and protection of areas with forest cover for the conservation of environmental services that contribute to livelihoods of the rural population in the areas of work.

To strengthen AMBIO's institutional activities, alliances have been established with other NGO´s and with governmental institutions that include the National Forestry Commission (CONAFOR) and the Commission for Natural Protected Areas (CONANP-REBIMA). AMBIO currently participates in the REBIMA Advisory Council.

Based on the relevance of the area due to the location of the REBIMA, the institutional presence of AMBIO and the allies seek to promote land-based solutions for the conservation of forests and of environmental services in the area. To define the eligibility criteria for the implementation of the forest management system (avoided deforestation) in the area, the following conditions are detailed:

G.1.1. Selected areas and target population

It has been considered the participation of ejidos and work groups whose members, preferable, are smallholders1. Vulnerable groups, such as women, youth and older adults are encouraged to participate in decision-making, implementation of activities and monitoring activities.

The areas with the next characteristics are considered for selection for the Scolel´te Program:

- Ejido´s with common areas of forest cover or parceled areas with forest cover, which form compact areas and whose legitimate owners agree to work together. In both cases, land ownership must be recognized by the legal mechanisms that govern ejidos and rural communities in Mexico.
- Areas that are not subject to legal litigation or other type of internal conflicts, that could affect the performance of the activities that are part of this specification, or that by entering to the program under this system, causes or aggravates social conflicts between the participants.
- Areas with forest cover that constitute common reserves in ejidos or compact areas with forest cover that belong to organized groups of people, that are destined for the protection of water sources, fuel supply or for obtaining other common goods.

G.1.1.1 Procedure to demonstrate eligibility

The ejidos that are interested in participating in Scolel´te, must be withing the polygon area of the municipality of Marqués of Comillas, in the state of Chiapas.

- The participating ejidos will prove their legal personality by submitting the land rights certificate, as well as the map of the ejidos, for verification with the AMBIO personnel, as well as their corresponding registration in the National Agrarian Registry. Participants in the working group modality must individually prove ownership of the land through the legal mechanisms in force by the ejidos and communities. The working group must be recognized by the ejido´s authority, this recognition will be made in a written document, additionally, in the aforementioned letter must state that there is no litigation or social conflict associated with the land area where the system that will be implemented.
- The working groups must present a record stating the approval of the ejidal authority.
- Development of the Plan Vivo according to the planning methodology used in the Scolel'te program and endorsed by the ejidal authority.
- The areas where the system will be implemented must meet the conditions for forest definition of the National Forest Commission (CONAFOR), which includes the following indicators: canopy cover greater than 10% at maturity, with a minimum area of 0.5 hectares and a minimum height of 5 meters, excluding trees in agricultural lands, parks, and gardens (Morales-Barquero, 2014).

[1] According to Plan Vivo producers eligible for the Project are: Small-scale farmers, land-users or forest dwellers with recognized land tenure or user rights; organized, or in the process of being organized, into cooperatives, associations, community-based organizations or other organizational forms able to contribute to the social and economic development of their members and communities and democratically controlled by the members; and able to use existing farmland, forest, woodland or other land type for project activities without undermining livelihood needs.

G.1.2. Types of vegetation that could be implemented in the forest management system (avoided emissions).

Eligible areas must be based on the criteria defined by CONAFOR, which describes a forest area, in the following categories[2]:

- Secondary arboreal vegetation of medium and high jungle perennifolia and subperennifolia
- Medium and high jungle perennifolia and subperennifolia, shrub secondary vegetation (improved fallow)
- Gallery vegetation

G.1.3. Description of the implementation area.

***General information about population**.[3]*

The municipality of Marqués of Comillas has a total population of 11,444 (INEGI, 2015), 28 communities and with a 34%. It is located in the oriental part of Chiapas and borders at the northeast with the municipality of Ocosingo, at the east with the municipality of Benemérito de Las Américas and at the south with the Republic of Guatemala.

It was colonized in 1970s with peasants brought from the northern part of the country. Its elevation to the rank of free municipality was approved in a council session on July 8th, 1998. Almost the entire municipality is an ejido property, so the National Agrarian Registry has a registration of 28 ejidos. (IRE Lacandona, 2016).

The main towns of the municipality are: Zamora Pico de Oro, Emiliano Zapata, Quiringüicharo, San Isidro and Tierra y Libertad. About seventy percent of the population lives in towns with less than 500 inhabitants (CEIG Chiapas, 2015). In regard to the measurement of poverty, based on the information of the National Council for the Evaluation of Social Development Policy (CONEVAL, 2015), the population of the municipality has high poverty levels.

The 20.94% of this population is illiterate, 67.88% of the population over 15 years of age has incomplete basic education, only 14.98% of the population has access to health, 35.97% has piped water, 12.88% has drainage and 2.51% does not have electricity (CONEVAL, 2015).

Magnitude of inequality between women and man

The Inequality Relation between men and women4, for Marqués of Comillas is classified in a “low” category. It´s important to consider that this indicator it´s generated from other 4 indicators, this for all the municipalities at a country level. From the four gaps that the index evaluates, in the Municipality of Marqués of Comillas, the one corresponding to unpaid work stands out, which is 67.1% towards women (Table 1).

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[2] The types of vegetation categories included in this specification correspond to those used in the soil cover (2015) with a hybrid classification approach, which was prepared using high resolution images SPOT6 and SPOT7, of an approximated scale of 1:40,000 (Castillo, 2019)

[3] The population information is based on the census published in 2015. These data will be updated when the results of the population census that will take place in the country in 2020.

[4] Statistics measure by the gaps between women and men. This indicator allows to measure inequality (INMUJERES, 2007).

Table 1. Based on the information Gender Gaps. Municipality of Marqués of Comillas.

Gaps	Men (%)	Women (%)	Gaps (%)
No Access to health services	16.1	13.8	**2.3**
No Education	17.6	24.5	**6.9** t
Low income	18.9	19.9	**1**
Performs unpaid work	23.2	90.3	**67.1**

Source: INECC. Atlas of Vulnerability to Climate Change

General Information and location

The municipality of Marqués of Comillas is located at the geographical coordinates 16 ° 20'00 " N 92 ° 46'00 " W and has an area of 90, 980 hectares, with elevations between 100 and 300 meters. (IRE Lacandona, 2016).

The climate is humid (warm type) with abundant rains in summer. On a smaller surface, the climate is warm sub-humid with rains in summer. The temperature ranges from 24 ° to 28 ° C and precipitation from 1500 to 3500 m.m. (Geographic Information File, INEGI, 2015).

The municipality is located around the Sierras of Chiapas and Guatemala physiographic province and Sierra Lacandona subprovince. The topo form system corresponds to hills with plains. The types of soil are: Luvisol (41.05%), Gleysol (20.37%), Umbrisol (14.31%), Vertisol (12.05%), Fluvisol (8.78%), Phaeozem (1.29%) and Cambisol (1.24%) (IBID).

The municipality is in the Grijalva-Usumacinta hydrographic region, sub-basins of the Lacantún River (81.2%) and the Chixoy River (18.8%). The main perennial rivers are: Bravo, Lacantún, Salado, Las Delicias, El Bravo, Manzanares and Lagarto (IBID).

Types of vegetation and land use.

The municipality of Marqués of Comillas has different types of vegetation with more relevance according to the area[5]. There is secondary tree vegetation of medium and high perennifolia and subperennifolia (21.09%), secondary herbaceous vegetation (19.9%) and medium and high perennifolia and subperennifolia (16.03%), *See table 2.*

In this region, the flood forests, the high perennifolia forest and the medium subperennifolia are established, as well as various wetlands. In the sub-basins of the Great Usumacinta, Chacamax, Chancalá and Tzeltal's, the topography is slightly steep (25 to 50%) and the same types of forest are established, except for floods (IRE Lacandona, 2016).

The rainforests have the highest values of species richness than any other terrestrial ecosystem. In particular, the high perennifolia forest represents the best developed type of vegetation, the most lush and rich in species, with several hundred plant species per hectare (in addition to a great diversity of fauna). Despite the high species richness, there is no high variation in the composition of species between sites (i.e., their β diversity is relatively low) (IBID).

It is important to highlight the loss that gallery vegetation has occurred in recent years, which makes evident the need to promote recovery actions on the areas surrounding the rivers. The most important land uses, in terms of area, are agriculture, cultivated grassland (24.63%),

[5] Year of reference 2015

agriculture (0.54%) and urban areas (0.05%).

On the other hand, it is important to note that from the period 2005-2015 there was an increase in palm oil plantations, although this land use has a tree component, may have a negative effect on biodiversity.

Table 2 shows the main types of vegetation and land uses from the period 2005-2015. Figure 1 indicates the 2015 land use and coverage of the municipality of Marqués of Comillas.

Table 2. Vegetation and land use 2005, 2010 y 2015, Municipality of Marqués of Comillas.

Category	2005 [ha]	2005 [%]	2010 [ha]	2010 [%]	2015 [ha]	2015 [%]
Middle and hign jungle perennifolia and subperennifolia	17,249.65	18.97	16,040.44	17.64	14,571.77	16.03
Secondary Vegetation arboreal with high perennifolia jungle and subperennifolia	22,783.47	25.06	20,357.61	22.39	19,175.67	21.09
Tular/Popal	26.34	0.03	26.41	0.03	27.85	0.03
Herbaceous secondary vegetarion	17,444.29	19.18	17,388.08	19.12	18,092.36	19.90
Shrubb secondary vegetation	9,113.45	10.02	7,001.18	7.70	6,294.00	6.92
Galery vegetation	4.76	0.01	5.78	0.01	2.23	0.00
Forest plantation	64.22	0.07	72.95	0.08	72.95	0.08
Agricultural plantation	15.53	0.02	15.67	0.02		
Palm oil	696.63	0.77	797.06	0.88	1,761.11	1.94
Agricultural	22,568.44	24.82	28,198.28	31.01	29,841.95	32.82
Human settlement	484.42	0.53	494.99	0.54	509.55	0.56
Devoid of vegetation	333.98	0.37	382.98	0.42	426.77	0.47
Bodies of water	142.95	0.16	146.70	0.16	151.91	0.17

Source: Castillo, 2019

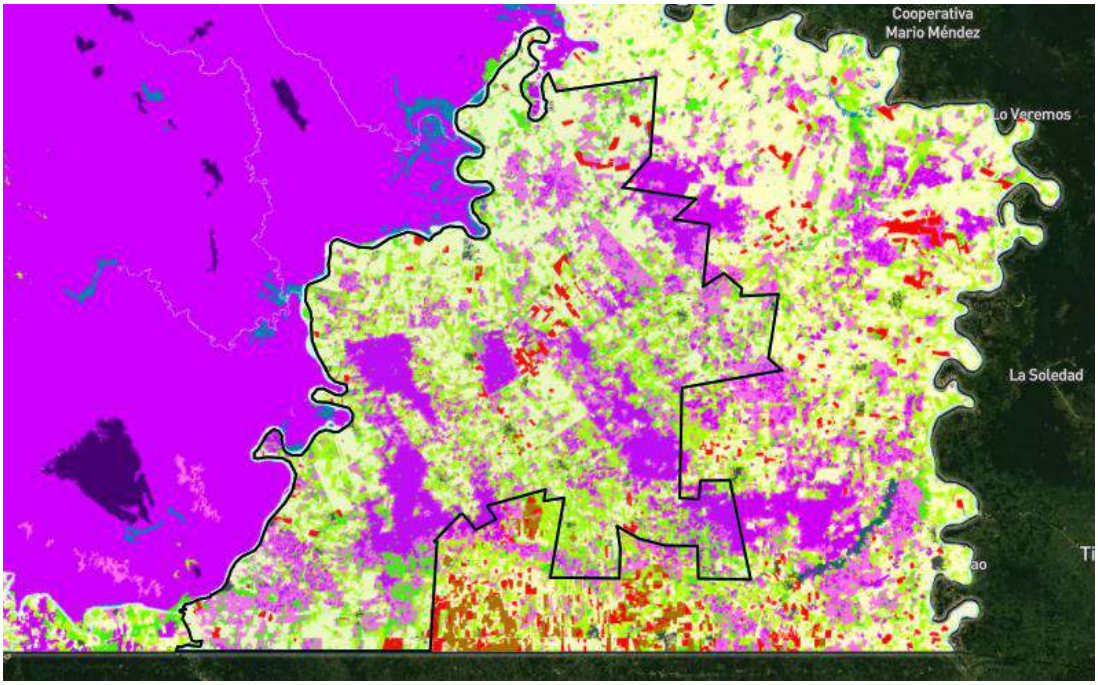

Figure 1. Coverage and land use 2015. Municipality of Marqués of Comillas, Chiapas (Castillo, 2019)[6]

Land use and deforestation rates

The Program for Investment of Emissions Reduction for the Lacandona Region, Chiapas (2016) indicates that extensive livestock farming is the main responsible for the change in land use, followed by deforestation for agricultural purposes, and the cultivation of palm oil. In a lesser extent, agricultural practices for corn and beans, as well as illegal extraction of flora and fauna, which are agents responsible for degradation of the forests of the municipality.

On the other hand, the document indicates that in the Lacandona Region (covered by the municipalities of Ocosingo, Maravilla Tenejapa, Marqués de Comillas and Benemérito de las Américas deforestation reached their lowest level in 2002 (5,594 hectares) and the highest in 2009 (18,080 hectares).

The changes in forest cover for the municipality of Marqués de Comillas, having as reference the analysis of maps with information from Miguel Castillo, researcher of the College of the Southern Frontier (ECOSUR) for the area, from 2005-2015, allows to estimate deforestation[7], in a surface of 6,529.5 hectares, which corresponds to 7.2% municipal area (Castillo, 2019).

It is important to note that this estimate does not consider as deforestation, the transitions that go from secondary shrub vegetation to agricultural use, since in general, in the state of Chiapas it is commonly used for productive lands to have rest periods.

Transitions considered as deforestation are those that originate from mature forest cover, secondary tree forest and the agroforestry system that changes to bush, agricultural or human settlements cover.

[6] https://bosqueschiapas.ecosur.ourecosystem.com/interface/

[7] The definition of deforestation in México is: "the loss of forest vegetation in a permanent form, by causes induced or natural" (General Law of Forest Development).

The changes in the coverage from the 2005-2015 period are shown in Table 3. It is noteworthy that more than half of the ejido's surface during this period remained under agricultural land use.

Table 3. Land use changes 2005-2015 Municipality of Marqués of Comillas.

Category	Area (has)	Percentage (%)
Deforestation	6,529.5	7.2
Forest Permanence	33,544.6	36.9
Agropecuarian Permanence	49,382.0	54.3
Reforestation	135.6	0.1
Regeneration	216.0	0.2
Other permanences	982.3	1.1
Other changes	138.2	0.2
Total area	90,928.2[8]	100

Source: Castillo, 2019.

The deforestation risk estimated through a model that considers the variable accessibility[9], estimates an area of 32,300.8. This corresponds to the 35.5% of the municipal area with a high risk of deforestation, as presented in table 4.

Table 4. Risk of deforestation. Municipality of Marqués of Comillas.

Category of risk for deforestation	Area (hectares)	Percentage of the municipal area (%)
Low	1,429.6	1.6
Medium	96.4	0.1
High	32,300.8	35.5

Castillo, 2019.

The types of vegetation that are in the category of high risk of deforestation are: secondary tree vegetation of medium and high perennifolial and sub- perennifolial forests with an estimated area of 18,288 hectares and vegetation of medium and high perennifolial and sub- perennifolial forest with an estimated area of 14,012 hectares.

Much of Marqués of Comillas has previously been deforested and the actual areas with forest cover, which are in high risk of deforestation, although the risk, there are small patches of medium to high biomass forest remaining. It is in these areas that the interventions described in this Technical Specification should take place (Figure 2).

[8] There is a little variation according to the official figure of INEGI for the municipal, according to the sources for the estimation.

[9] In this model, the accessibility variable integrates different indicators that favor deforestation: proximity of suitability of the land for anthropocentric activities, distance to roads, slopes, established agricultural use.

a) Regional picture b) Zoom on the MdC municipality

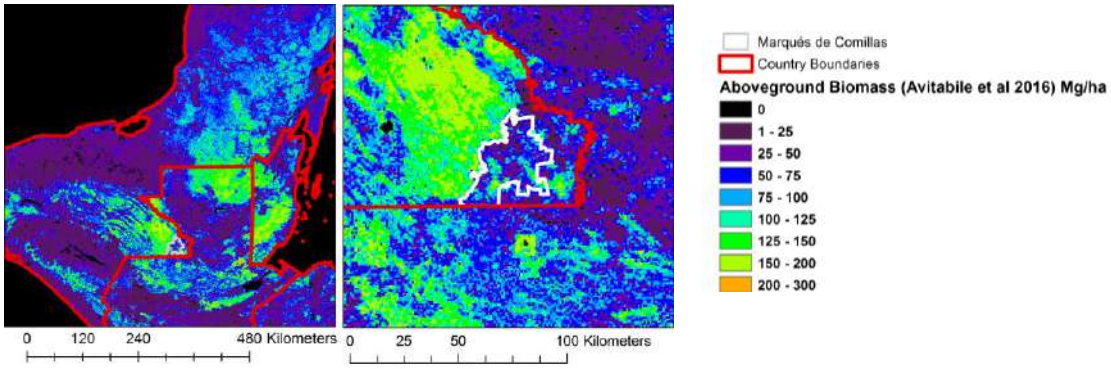

Figure 2. The Marqués of Comillas region in its geographic context, over a map of aboveground biomass for circa 2005.

A high risk factor for deforestation in Marqués of Comillas is also reported by the organization Mongobay LATAM in 2018, with an investigation carried out in the area. In this research was documented that a strong illegal cattle traffic is reported from Central America, particularly Guatemala and that it is crossed to Mexico by Marqués of Comillas and it also has connection to narcotraffic.

Mongobay points out through one of the interviews, that the circulation can go up to 30 cages of cattle per day from Central America, with an average of between 80 and 85 animals that arrive in that area to be fattened. The above is hardly estimated as a problem, so it has not been measured with accurate numbers, but has a high incidence, according to reports in the area. This represents a large presence of cattle, which need from areas for their maintenance and causes degradation and deforestation of forest areas.

On the other hand, areas of forest protection under this Technical Specification need to meet Mexico's forest definition. There is confusion here regarding Mexico´s definition, as its definition submitted in its Forest Reference Emission Level[10] (FREL) to the UNFCCC, which acts as a national REDD+ reference. This is different to the definition used by the National Forest Commission (CONAFOR) and for FAO Forest Resource Assessment reporting.

The FREL defines forest, as patches of vegetation consisting of trees with the capacity to reach at least 4 m at maturity, at least 0.5 hectares in size, with a minimum average canopy cover of 10 %, whose land use it not predominantly agricultural or urban. In contrast, the definition used by CONAFOR (the Mexican National Forestry Commission) matches the standard FAO definition, suggesting a canopy cover great than 10% at maturity, with a minimum area of 0.5 ha and a minimum height of 5 m, excluding trees in agricultural lands, parks and gardens (Morales-Barquero, 2014).

As it can be seen, these are somewhat contradictory. As the 0.5 ha minimum area and the minimum height of 4 m 'at maturity' are both rather difficult to use in the field, we propose following the CONAFOR definition for the purpose of this project. However, it should be noted that this will cause inconsistencies in the baseline, forest area and other numbers reported for the region from this Plan Vivo project compared to national-level statistics for the region. This is not

a problem for the Plan Vivo Standard, which allows projects to use whichever forest definition is seen as appropriate, with justification: here we believe it is appropriate and justifiable to use the CONAFOR definition.

Therefore, this Technical Specification can be applied only to the conservation of areas:

1) That are defined as forest (using the CONAFOR definition described above)
2) That are within the boundaries of the Municipality of Marqués de Comillas
3) Where the communities have clear control, decision about management, and tenure of forested areas.

G.1.4 Project Activities

The project activities involve:

Ejido representatives or interested groups must comply with the procedures to demonstrate eligibility described in section G.1.1.1. of this specification. Preparation of the Planes Vivos according to the methodology used in the Scolel'te program, which includes:

-Field visits in coordination with AMBIO to make the initial description of the site, georeferenced and collection of relevant information in a previously designed format.
-Integration of the work plan where the ejido´s authorities, ejidal committees, working groups, men, women, youth and elderly participate.
-The incorporation of the work plan where AMBIO participates as a facilitator of the process.
The basic aspects that the work plan must include, depending on the characteristics of the area and the dynamics of land use, are:
i) Forest fires management plan, including establishing and maintenance of firebreaks
ii) Developing and the implementation of regulations for illegal poaching of animals and illegal extraction of flora or fauna from the forest areas
iii) Developing of a local management plan to enhance biodiversity and carbon storage in the forest areas
iv) Promoting of good practices for productive agricultural management aimed at improving economic incomes and to reduce land use changes.
-In collaboration with the reserve administrators, a joint work with the activities to be developed in the forest areas of their jurisdiction and that border to communities or activities that put them at risk due to fires, illegal logging, illegal invasions, and others.

As with all Plan Vivo Carbon Projects, livelihood and biodiversity benefits are expected and monitored. The carbon benefits for the forest management system will be estimated using the following procedure.

In this revised technical specification carbon benefits are calculated through:

-Georeferenced polygons detailing the forest conservation area and the community managed land (including forest and non-forest, called the Project Zone), collected using handheld GPS units.
-A polygon of the full municipality of Marqués de Comillas, provided by the Mexican government, to be used to calculate baseline deforestation rates for the non-protected

areas
-Circular forest plots of 1000 m^2 within the forest block, where all trees with a diameter greater than 10 cm have been measured
-Annual deforestation data from 2000-2014 from the Landsat satellites, produced by Hansen *et al.* (2013), downloaded from http://earthenginepartners.appspot.com/science-2013-global-forest/download_v1.2.html, to give baseline deforestation rates for the municipality, and comparative rates for the project areas.

The next table, shows the detail of general activities that will be carried out in the three ejidos:

Table 5. Table of activities to be carried out by the ejidos participating in the Project

Activity/Indicator	How to measure?	Who will monitor the activity?	Frequency of measurement
Avoid grazing within the forest areas	Written management agreements	Community technicians (1 for each ejido)	According to the goals, it will be done once a year between the months of march and april
Surveillance routes (forest fires, hunting and illegal logging)	Work calendar	Notebooks with incidents´ registration	Monthly from February to may will be deliver 3 travel cards per month.
Capacity building with beneficiaries of carbon capture services, gender perspective local biodiversity capital, sustainable productive practices	Number of workshops Number of people (trained men and women) Information collected from interviews and focus groups	Community technicians	Annual.
Number in kilometers of firebreaks	Georeferencing and photographic archiving	Community fire protection brigade, Community technicians	Annual
Establishment of permanent sampling sites for the monitoring of native tree species	Number of established sampling sites. Log of information Number of native species.	Community technicians and ejidos	Annual
Establishment of carbon sampling sites (if this is not possible due to the available resources, literature data will provide the inputs)	Number of established sampling sites. Log of information	Community technicians and ejidos	Once a year, between the months of april and june for dry season.

It is expected that the impacts of the program are able to improve the quality of life of rural households, given that forestry systems provide raw materials used for food, shelter, construction and support materials (poles, boards) and firewood for cooking.

The degree of organization of the communities and groups that participate in the program has also been identified as an indirect benefit. It is not immediately perceived, but it sets a framework to manage other programs, besides to contributing to the local capacities and social capital that the program promotes.

Table 6. Livelihoods benefits are identified in the next table because of the activities of the program

Food and agriculture	Agroforestry systems strengthen agriculture and knowledge forests assets enriches the diet.
Financial assets and income	By improving productive systems, these are strengthened and diversified, which gives the alternative opportunity for financial assets and income, since their productivity is not affected.
Ecosystem services (water, soil, etc.)	The conservation activities maintain the provision of environmental services. The connection of biological corridors is also widely promoted.
Energy	Firewood plays an important role in rural areas. It is not affected by the program but on the contrary, some activities promote the sustainable management of firewood.
Timber and non-timber forests products (including aliments)	The use and sustainable management of local forest species. Non-timber species are also promoted as an alternative for food, medicine, or local sustainable commerce.
Land tenure security	The land is owned by the ejidos
Rights of use to natural resources	No right of use is affected, it´s regulated by local governance agreements.
Social and cultural assets	These are not affected. The preparation and evaluation of Plan Vivos, allows their prior identification and design of management strategies.

Alternative economical, permanent and productive schemes need to be planned and developed for the area. Ecotourism activities represent a diversified source of income, but there is continued need for infrastructure, especially in terms of access to the area, and in order to provide an economic alternative to practices such as extensive cattle ranching. The Scolel´te Program has been exploring jointly with CONANP and CONAFOR, to support apiary projects that can provide alternative incomes, with sustainable practices, that can be commercialized in local and regional markets. There is also promoted the continuous strengthening of local capacities and the inclusion of women and young people in the activities, an inclusive vision of different stakeholders, to all the different alternatives present in the area.

G2 Additionality and Environmental Integrity

G.2.1. Relevant regulation for forest management and land tenure.

The Agrarian Law of Mexico, in the Article 9, recognizes that: *ejido or ejido population centers have legal personality and their own assets and are owners of the lands that have been endowed or acquired by any other title.*

In this municipality, land tenure is ejidal, this means, it is a social property, and it belongs to the ejidos and all of them have the documents that give them legal ownership for being the primary legal entity of those lands. Internally the ejidos hold monthly, bi-monthly or quarterly meetings (ejido´s assemblies), where the ejidos discuss and analyze their problems and situations to solve, as well as the planning of activities.

In these assemblies, minutes are elaborated, in which the agreements, solutions or alternatives are enforced, and these agreements are recognized and respected by all the inhabitants of the ejidos.

If there are specific agreements, such as the participation in a project or participation in payments for environmental services programs to develop in the forest areas, the internal regulations are registered, which are determined under the Ejidal Assembly Agreements and they are recognized and respected by all the inhabitants. In case of developing forest harvesting or non-timber management activities, it is necessary to develop a management plan which must be officially approved by SEMARNAT.

G.2.2. Financial, social, technical and cultural barriers.

As part of the barriers identified in the ejidos participating in the project, we acknowledged the fact that in the region the primary productive activities are livestock and palm oil cultivation, since they are a highly profitable activities for the region and represents a constant market demand, which is an economic alternative for the smallholders.

The livestock activity received strong economic support from 1975 to 1985, facilitating its accelerated growth due to the impulse of the subsidies dedicated to this sector and given the cultural origins of the ejidatarios themselves, who have seen in this activity, a greater economic benefit and a form of savings. Starting in 1995, FONAES financed livestock in the area (Marquéz, 2001).

Extensive livestock activity has remained under constant financial and commercial inestability, coupled with poor or absent technical assistance, which has prevented the technical-productive development of these systems, maintaining very marginal productivity and profitability, however, it continues being an option as form of savings for the ejidos. (IRE Lacandona, 2016).

These dynamics have resulted in the progressive deforestation of large areas of high forest and its degradation due to invasion of livestock in areas, losing diversity of the undergrowth and impacting on the quality of the soil structure by compactation (Ibid).

According to the results of the Forest 2020 Platform (Ecometrica, 2019), with the information collected for Marqués of Comillas, the use of land for agricultural systems has increased from 21,293.8 hectares in 2002 to 32, 825.7 hectares for 2012. Therefore, the agricultural frontier has been gaining ground to the jungle, as shown in Figure 3.

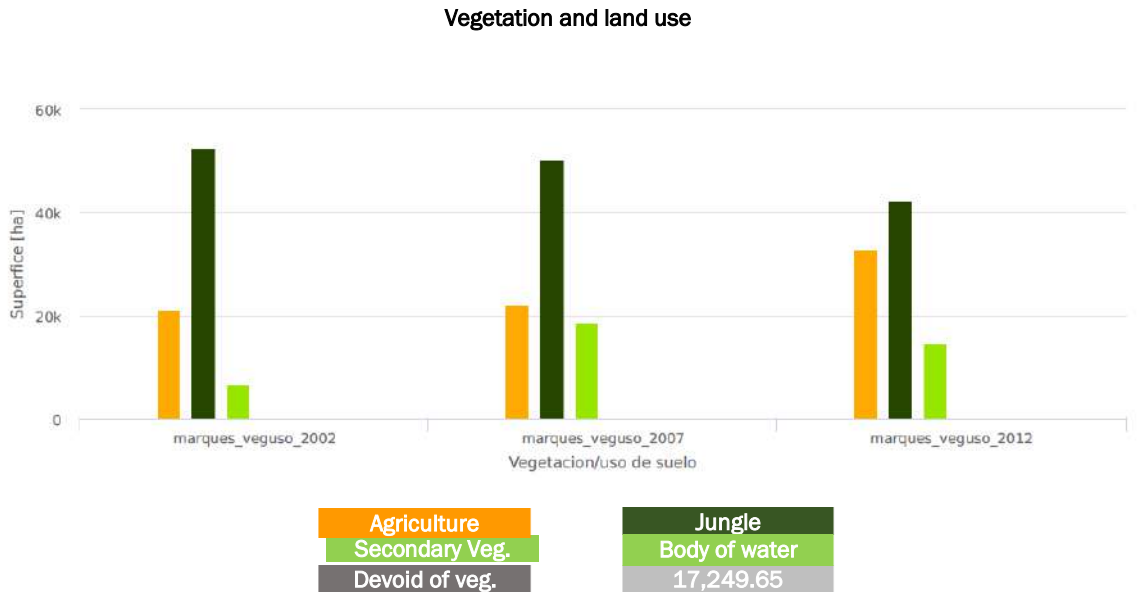

Figure 3: Information from the Ecometrica Platform 2020, with the support of ECOSUR, AMBIO and Pronatura Sur for Marqués of Comillas.

On the other hand, palm oil (*Elaeis guineensis*) was introduced to the region during the period 2007-2012, due to a state´s support, specifically from the disappeared Institute for Productive and Bioenergetic Reconversion (IRBIO), which promoted the deployment of private processors, granted plants and a resource per hectare/per year to establish the crop, encouraging small producers to venture into the palm oil cultivation, mainly in the municipalities of Marqués de Comillas and Benemérito de las Américas (IRE, 2016, p. 39).

During 2017, the Government of Chiapas reported through Program for Phytosanitary Prevention for the State, that Marqués de Comillas registered 1,412 hectares of land cultivated with palm oil, 1,851 tons of production and 2,267 thousands of pesos (approximately 113 US dollars) of revenues per hectare.

These activities are developed with poor planning and can also result to be a driver of forest fires due to land use changes. With these barriers, the search for alternative productive activities and the diversification of income opportunities, like payments for ecosystem services can contribute to switch livestock and palm oil activities as the main sources of incomes.

G.2.3. Evidence that the project had no negative impact.

In the Marqués de Comillas Region, high and middle perennifolia forest predominates, dominated by trees and palms of different species that form several tree strata, which makes them ecosystems rich in species. The fragmentation of these forest areas and diverse public policies that promoted livestock and palm oil plantations have caused a significant impact on the biodiversity present in the area.

The different projects related to the conservation of natural resources in the Region, as the Payments for Environmental Services of the National Commission of Forests (CONAFOR) has given the opportunity to generate capacities among the ejidatarios (including the 3 ejidos of the project, they have participated with CONAFOR), owners of the forest areas, in relation to the work that has been done with the forest inventories, we can find plant species in the Region that determine richness values such as the rare *Sloanea ternifolia* species and the *Tripsacum dactyloides* species.

The fauna has been monitored with footprints and camera traps, with results of presence of jaguars (*Pantera onca*), jaguarundis (*Felis weidii*), dantas, monkeys, anteaters, among others. Birds have been found and protected, like nests of Toucan (*Ramphastus sulfuratus*), Scarlet Macaw (*Ara macao*), Trogon among other birds, hence the importance of having forest areas protected for nesting, so they can become habitat of the species mentioned.

An additional aspect that was developed with organizations and scientific institutions working in this Region, it is the application of methodologies that evaluate biodiversity in these forest areas, contributing to the reflection on environmental services and ecosystems protection, within the lands of the ejidos and communities from the Marqués of Comillas. Figures 4 and 5 show evidence of forest cover from the year 2000 to the year 2013, it can be appreciated that there is no evidence of major negative impacts in the project´s area.

However, a present risk for the area is the constant flow of goods due to the proximity of the State´s Frontier and the possibility that productive and extractive practices have an impact on the jungle, as has happened over many years with extensive cattle activities. A negative effect that the project seeks to resolve is the dependence on the payments for environmental services for

conservation activities in the area, as the only alternative to avoid the degradation of the forest.

The Guacamayas Ecotourism Center has proven to be a successful model for an alternative sustainable management of the area, but it has required a significant investment of public funds, promotional campaigns with the Tourism Sector, and access to the area continues to be difficult for tourists. Schemes such as the management of apiary projects, represent a local alternative to encourage sustainable productive activities for a local and regional market, which has been explored through the ejidos participating in the project and with the support of public institutions such as CONANP and CONAFOR.

G.2.4. Initiatives and other projects in the area that avoid double counting.

Since 2010, México constructed a REDD+ Strategy called ENAREDD+, to give incentives that avoid deforestation and forest degradation. Chiapas and the Lacandona Jungle has been part of this Strategy, with the National Commission of Forests (CONAFOR) working in Marqués of Comillas with the Program for Sustainable Management, Conservation and Restoration of the Lacandona Jungle (PESL) seeking to avoid deforestation and degradation in the area, with Payments for Ecosystem Services (IRE Lacandona, 2016).

At the area of work, the ejidos participating in Scolel´te receive payments for environmental services that are related to the conservation of hydrological services, as part of a public policy of CONAFOR. The two environmental services (water and carbon) become complementary and do not duplicate the activities (since they are carried out in the same areas).

The corresponding PES agreements that have been made with the ejidos, have differentiated the activities. Additionally, it is ensuring by the delimitation of permanence of the area and the productive areas of management.

Another initiative that has been supported by the government, through the Tourism Government Entities, is in the Ejido Reforma Agraria. The governmental institution supported the creation of the Ecotourism Centre Las Guacamayas, one of the most important ecotourism centers of the state of Chiapas. The ejido manages the Centre, and as part of the attraction, they do tours with small groups of tourists in the adjacent areas of the conservation area of the project.

It is also important to state that one of the most important commitments Mexico related to the Paris Agreement and the Intended Nationally Determined Contributions of Mexico (INDC, for its acronym in English) has set out a general route to address the forests strategy to comply with international commitments (Commitments on Mitigation and Adaptation to Climate Change 2020-2030, 2015, page 11).

The goal of the INDC of Mexico for the reduction of greenhouse gases committed in an unconditional way (2020-2030) is -22%. The participation of the different sectors to achieve the goals of contributions of Mexico, it is indicated for the forestry and agricultural sector will comply with following goals:

1.- Reach zero deforestation rate by 2030

2.- Improve Forest management (synergies with REDD + actions are included)

3.- Promote the sustainable technification of the field

4.- Promote biodigesters in agricultural farms

5.- Recover grasslands

Despite having set these goals, to date, there is not a clear route or document that punctually addresses how to achieve these goals and there is no clear allocation of resources to the sector, and which will be the registration mechanism for the INDC. There is no clear route for registering REDD+ actions and activities related to avoided emissions for the fulfilment of national goals.

G3 Project Period

The three project areas had different starting years, and in each case, interventions are expected to last fifteen years, as stated below:

La Corona: 2000-2015

Reforma Agraria: 2002-2017

San Isidro: 2007-2022

Conservation is currently active in all three areas, so these projects are ongoing, but carbon benefits are calculated from each starting date respectively, with updated periods of 5 years. These three project areas are included in the same technical specification as they have the same starting conditions and the same baseline and calculation methodology is applied.

G4 Baseline scenario

Describe current conditions and trends in the project area (PV requirement 5.12)

As predicted in the original Technical Specification and project documents, the area has undergone rapid deforestation since 2000. When the project started, the area had blocks of intact forest, surrounded by a mosaic landscape of agriculture and degraded forest, expanding around settlements and from roads. Figure 4 shows the forest cover situation in 2000, overlaying the Project Areas to show that they were within areas of continuous high canopy cover forest at that point. The underlying dataset used is Hansen (2013), which includes a global map of forest canopy cover that can be assumed to be reasonably accurate for assessing baseline conditions.

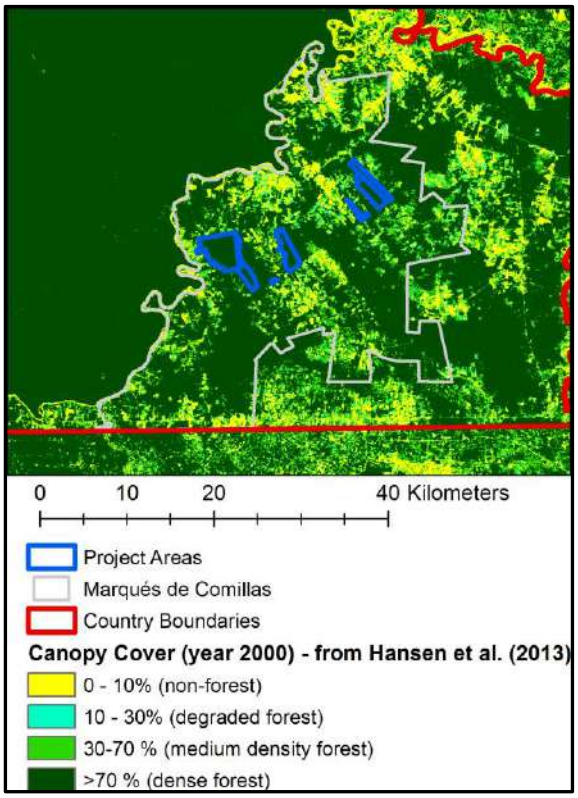

Figure 4. Canopy cover in 2000.

As can be seen from Figure 4, in the year 2000 most forest was high density forest, with a canopy cover greater than 70%. The areas of each are summarised in Table 6.

Over the subsequent 13 years much of the forest in Marqués of Comillas was lost, as shown in Figure 5, using the deforestation dataset from Hansen (2013). In total 19,708 hectares were deforested, 24.9% of the forest area in the year 2000, a rate of 1.92 %/yr.

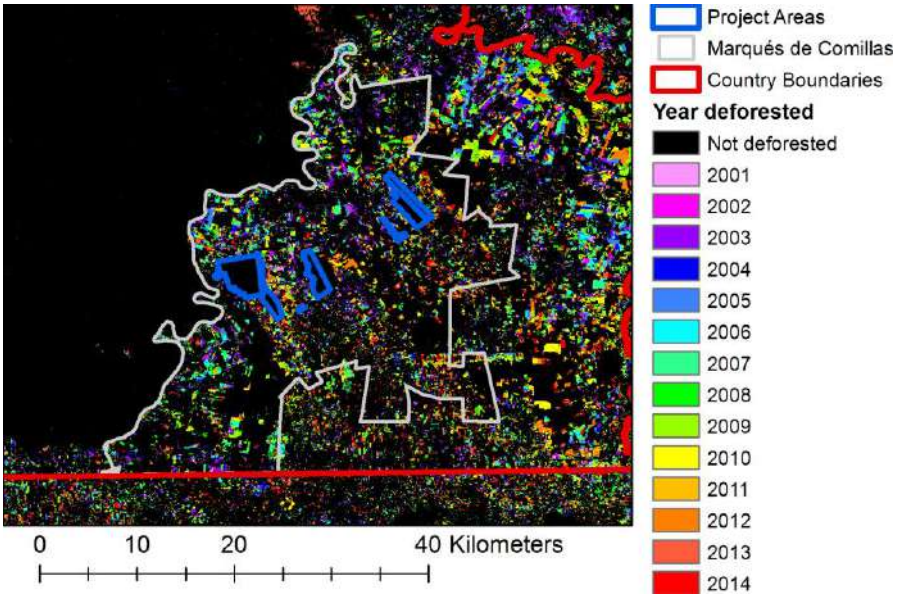

Figure 5. Deforestation 2000-2014.

Table 7. Forest area in 2000 by canopy cover class.

Canopy cover	Area (ha)
0-10%	11,899
10-30%	3,729
30-70 %	11,027
>70%	64,273
Total	**90,928**

The 3,441 hectares of Project Areas, where conservation efforts were concentrated, has been effective over this period of protection. Just 27 hectares are recorded to be deforested by this dataset within the Project Areas from 2000-2014. The assumption of this technical specification is that in the absence of the project, the baseline scenario is that they would have been subject to the same deforestation pressure as the rest of the area, and approximately 25% of their total area would have been lost.

G.4.1. Carbon pools.

Carbon Pools. *List the carbon pools and emissions sources that will be accounted for and justify why any others have been excluded. (PV requirement 5.15)*

For carbon pools, this Technical Specification will account for aboveground biomass and belowground biomass carbon pools only. Conservation of forest will not have a negative effect on the other potential carbon pools (soil carbon, leaf litter, dead wood), but in all likelihood, a positive effect.

The carbon pools that are expected to make the most significant contribution to the climate benefits of project activities are above-and below-ground woody biomass, since these are expected to be reduced under the baseline scenario, and project activities are expected to prevent emissions associated with the decline.

Carbon stocks in non-tree biomass, litter, dead wood, and soil are also expected to decline under the baseline scenario, and the decline is expected to be reduced under the project scenario. These carbon pools are either considered unlikely to generate significant emission reductions (non-tree biomass, litter, dead wood), or too costly to quantify (soil) so are conservatively excluded.

GHG emissions from biomass burning (other than CO_2 emissions from loss of above- and below-ground biomass) are also conservatively excluded on the basis that they are expected to be higher in the baseline scenario than project scenario.

Under the Plan Vivo requirement, carbon pools can be ignored if they are not expected to decrease. The decision not to measure soil carbon is due to the expenses of measurement and its patchiness in the landscape. Soil carbon is normally lost following deforestation however, so its exclusion means that carbon benefits estimated from the project are likely to be conservative.

For the emission sources, the activities to be performed for conservation are not expected to result in significantly increased emissions compared to the baseline conditions. Patrols and other protection activities are on foot, so there will be no emissions related to fossil fuel burning, and no growing of additional crops or trees with associated fertilizer use is a part of activities related to this technical specification.

The only significant potential emission source is the creation and maintenance of firebreaks, which reduces standing biomass. Overall though this covers a very small proportion of the total area and is accounted for in the emissions reduction calculations as these do not assume a total prevention of deforestation within the project area, just a reduction.

Indeed, it is likely that at least some of the losses observed by the Hansen dataset during 2000 – 2014 were related to firebreaks creation. These losses are accounted for within the models: they are not ignored, as that would not be conservative.

G.4.2. Baseline Methodology.

Baseline methodology. *Quantify the initial carbon stock for each carbon pool and describe how this was assessed (PV requirement 5.18).* The initial carbon stock in the forest areas at each site were assessed through the collection of field plot data in circular 1000 m2 (0.1 ha) plots from 2006 for the first two sub-projects (La Corona and Reforma Agraria, which started in 2000 and 2002 respectively), and 2011 for the newer project sub-area San Isidro (started 2007).

These plots were placed randomly within forested areas within the project zones, mostly in secondary forest – thus the carbon stocks estimated from them are conservative, and their carbon stocks are increasing through time. In these plots the diameter of trees at breast height (1.3 m, DBH) was determined for all trees in an inner circle of 100 m2, and all stems with a DBH greater than 10 cm in a larger circle of 1000 m2. Height was also measured for every tree using a clinometer, and species was identified with the assistance of a botanist.

Aboveground biomass was calculated using the pantropical equation including height from Chave (2014):

AGB = [0.0673 x (ρD2H) 0.976/1000

Where AGB is the aboveground biomass in Mg, where ρ is the wood specific gravity in g cm-2, D is tree diameter in cm, and H is tree height in m.

D and H were measured in the field, ρ was estimated using the species specific values from the Global Wood Density Database (Zanne et al 2009), or the genus average is species data were not available. The AGB value for each plot in Mg ha-1 was then calculated by multiplying the AGB of all trees >10 cm by 10, and of trees <10 cm by 100, to account for the plot sizes of 1000 m2 and 100 m2 respectively. Below-ground biomass was added by multiplying AGB by a conservative value of 0.3-0.35 (IPCC 2003), and carbon stocks estimated from biomass by multiplying by the default value of 0.5 (IPCC 2003). These numbers per site are shown in Table 2, with plot level data presented in Appendix 1.

The plots were remeasured annually from 2006 to 2013. They have increased with time, and this is included in table 8 – however it is unclear if the forest patches also increased in carbon stock over this period: they may have started at a higher value, but not being secondary forest, they may not have increased as rapidly.

Therefore, to be conservative with the baseline carbon stocks will use the value from the earliest plots for which we have data, and it will be assumed that forest protected by the project stayed

the same biomass through the project. The increased value with time is presented here merely to prove that these are conservative assumptions.

Table 8. Carbon stocks in the three subproject areas

Project sub-area	Area (ha)	AGB (2006) Mg C ha-1	BGB (2006) Mg C ha-1	Total mean carbon stocks (2006) Mg C ha-1	*Total mean carbon stocks (2013) Mg C ha^{-1}*	Number of field plots	Total estimated baseline carbon stocks Mg C
La Corona	1012	60.7	15.2	75.9	*111.5*	12	76,792
Reforma Agraria	1452	127.0	31.7	158.7	*215.0*	12	230,452
San Isidro	977	60.3*	15.1*	75.4 *	n/a	10	73,624

*San Isidro plots were only measured in 2011 – the sub-project in San Isidro started later than the others, so these measurements are at the same point into the project as for the other two sites, and thus the baseline calculations are equivalent.

G.4.3. Baseline Emissions.

Following the baseline scenario described above, we assume in the absence of the project annual deforestation of 1.92 % per year would have taken place. This would have resulted in annual losses of carbon as shown in Tables 9, 10 and 11. Here and throughout, Mg C are converted to tCO_2e using the standard IPCC conversion factor of 3.667.

Table 9. Baseline carbon stocks and emissions in La Corona (1012 ha)

Year	*Deforestation rate*	*AGB stocks at start of year*	*BGB stocks at start of year*	*Total carbon stocks*	*Carbon stocks lost*	*Carbon stocks lost*
		Mg C	**Mg C**	**Mg C**	**Mg C**	***tCO_2e***
2000	1.92%	61,434	15,358	76,792	1,474	*5,407*
2001	1.92%	60,254	15,064	75,318	1,446	*5,303*
2002	1.92%	59,097	14,774	73,871	1,418	*5,201*
2003	1.92%	57,963	14,491	72,453	1,391	*5,101*
2004	1.92%	56,850	14,212	71,062	1,364	*5,003*
2005	1.92%	55,758	13,940	69,698	1,338	*4,907*
2006	1.92%	54,688	13,672	68,359	1,313	*4,813*
2007	1.92%	53,638	13,409	67,047	1,287	*4,721*
2008	1.92%	52,608	13,152	65,760	1,263	*4,630*
2009	1.92%	51,598	12,899	64,497	1,238	*4,541*
2010	1.92%	50,607	12,652	63,259	1,215	*4,454*
2011	1.92%	49,635	12,409	62,044	1,191	*4,368*
2012	1.92%	48,682	12,171	60,853	1,168	*4,284*
2013	1.92%	47,748	11,937	59,685	1,146	*4,202*
2014	1.92%	46,831	11,708	58,539	1,124	*4,121*
2015	1.92%	45,932	11,483	57,415	1,102	*4,042*
2016	1.92%	45,050	11,262	56,312	1,081	*3,965*

2017	1.92%	44,185	11,046	55,231	1,060	*3,889*
2018	1.92%	43,337	10,834	54,171	1,040	*3,814*
2019	1.92%	42,504	10,626	53,131	1,020	*3,741*
2020	*project ends*	41,688	10,422	52,110		
				TOTAL	**24,682 Mg C**	**90,507 tCO_2e**

Table 10. Baseline carbon stocks and emissions in Reforma Agraria (1452 ha)

Year	*Deforestation rate*	*AGB stocks at start of year*	*BGB stocks at start of year*	*Total carbon stocks*	*Carbon stocks lost*	*Carbon stocks lost*
		Mg C	**Mg C**	**Mg C**	**Mg C**	***tCO_2e***
2002	1.92%	184,346	46,086	230,432	4,424	16,224
2003	1.92%	180,806	45,202	226,008	4,339	15,912
2004	1.92%	177,335	44,334	221,669	4,256	15,607
2005	1.92%	173,930	43,483	217,413	4,174	15,307
2006	1.92%	170,591	42,648	213,238	4,094	15,013
2007	1.92%	167,315	41,829	209,144	4,016	14,725
2008	1.92%	164,103	41,026	205,129	3,938	14,442
2009	1.92%	160,952	40,238	201,190	3,863	14,165
2010	1.92%	157,862	39,465	197,327	3,789	13,893
2011	1.92%	154,831	38,708	193,539	3,716	13,626
2012	1.92%	151,858	37,965	189,823	3,645	13,365
2013	1.92%	148,942	37,236	186,178	3,575	13,108
2014	1.92%	146,083	36,521	182,603	3,506	12,856
2015	1.92%	143,278	35,819	179,097	3,439	12,610
2016	1.92%	140,527	35,132	175,659	3,373	12,368
2017	1.92%	137,829	34,457	172,286	3,308	12,130
2018	1.92%	135,183	33,796	168,978	3,244	11,897
2019	1.92%	132,587	33,147	165,734	3,182	11,669
2020	1.92%	130,041	32,510	162,552	3,121	11,445
2021	1.92%	127,545	31,886	159,431	3,061	11,225
2022	project ends	125,096	31,274	156,370		
				TOTAL	**74,063 Mg C**	**271,588 tCO_2e**

Table 11. Baseline carbon stocks and emissions in San Isidro (977 ha)

Year	*Deforestation rate*	*AGB stocks at start of year*	*BGB stocks at start of year*	*Total carbon stocks*	*Carbon stocks lost*	*Carbon stocks lost*
		Mg C	**Mg C**	**Mg C**	**Mg C**	***tCO_2e***
2007	1.92%	58,901	14,725	73,627	1,414	5,184
2008	1.92%	57,770	14,443	72,213	1,386	5,084

2009	1.92%	56,661	14,165	70,827	1,360	4,987
2010	1.92%	55,573	13,893	69,467	1,334	4,891
2011	1.92%	54,506	13,627	68,133	1,308	4,797
2012	1.92%	53,460	13,365	66,825	1,283	4,705
2013	1.92%	52,433	13,108	65,542	1,258	4,615
2014	1.92%	51,427	12,857	64,283	1,234	4,526
2015	1.92%	50,439	12,610	63,049	1,211	4,439
2016	1.92%	49,471	12,368	61,839	1,187	4,354
2017	1.92%	48,521	12,130	60,651	1,165	4,270
2018	1.92%	47,589	11,897	59,487	1,142	4,188
2019	1.92%	46,676	11,669	58,345	1,120	4,108
2020	1.92%	45,780	11,445	57,224	1,099	4,029
2021	1.92%	44,901	11,225	56,126	1,078	3,952
2022	1.92%	44,038	11,010	55,048	1,057	3,876
2023	1.92%	43,193	10,798	53,991	1,037	3,801
2024	1.92%	42,364	10,591	52,955	1,017	3,728
2025	1.92%	41,550	10,388	51,938	997	3,657
2026	1.92%	40,752	10,188	50,941	978	3,587
2027	project ends	39,970	9,993	49,963		
				TOTAL	**23,664 Mg C**	**86,777 tCO_2e**

Sources.

- *G.4.4. Data Sources.* The following data sources were used in the calculation of these baselines: Deforestation data from Hansen (2013) for the complete region of Marqués of Comillas from 2000 – 2014
- The total area of each of the Project Areas, as calculated through their boundaries using GPS data and area calculated using the UTM projection in ArcGIS

The biomass of each of the three project sub-areas in the year 2000, estimated through the estimation of carbon stocks for plots located in and around each area as described in the previous section, using the latest pantropical allometric equation (Chave, 2014), locally measured diameter and height, and species specific wood density values from the global wood density database (Zanne, 2009).

G5 Ecosystem Service Benefits

G.5.1. Climate Benefits Methodology

The project aimed to stop all deforestation in the Project Areas, allowing the forest to either stay at a constant biomass or naturally regenerate, and as such generating climate benefits against the baseline scenario. Inevitably a small amount of forest clearance is expected to take place, in part due to the creation of firebreaks. This is quantified, as with the baseline scenario, through the use of a remote sensing-based deforestation dataset (Hansen, 2013), confirming the loss rates within the Project Areas.

Further, a set of permanent plots set up in and around the project areas, as used in G4, are monitored annually to assess the changes of carbon stock within the forest. The plots are on average increasing rapidly in biomass (see Table 2), however it is not known if these plots are representative of the rate of change of the whole forest.

Therefore, these are used only as evidence that the forest carbon pools are not decreasing in carbon stocks through this time, and conservatively it is assumed that the carbon stock per hectare remains constant in the Project Area throughout the project period.

G.5.2. Expected Climate Benefits.

Expected climate benefits. *Estimate the climate benefits (carbon benefits) for each carbon pool showing how these were calculated relative to the baseline (In G4) (PV requirement 5.1.3, 5.7, 5.15 & 5.18)*

The combined project areas had a total of 27.3 hectares of deforestation from 2001 – 2014 inclusive (Hansen, 2013). Over the 3,441 hectares total project area this is an annual deforestation rate of 0.061 %. This deforestation rate is used to calculate the with-project carbon stock estimates for each carbon pool, and then subtracted from the baseline scenario, to give the total climate benefits in tCO2e.

Table 12. Expected Climate Benefits in La Corona

Year	With-project deforestation rate	AGB stocks remaining (with project) Mg C	BGB stocks remaining (with project) Mg C	Total carbon stocks remaining (with project) Mg C	Carbon stocks lost (with project) MgC	*Carbon stocks lost (with project)* tCO_2e	*Baseline Scenario C stocks lost* tCO_2e	*Climate benefits* tCO_2e
2000	0.061%	61,434	15,358	76,792	47	*172*	*5,407*	***5,235***
2001	0.061%	61,396	15,349	76,745	47	*172*	*5,303*	***5,131***
2002	0.061%	61,359	15,340	76,698	47	*172*	*5,201*	***5,029***
2003	0.061%	61,321	15,330	76,652	47	*171*	*5,101*	***4,930***
2004	0.061%	61,284	15,321	76,605	47	*171*	*5,003*	***4,832***
2005	0.061%	61,246	15,312	76,558	47	*171*	*4,907*	***4,736***
2006	0.061%	61,209	15,302	76,511	47	*171*	*4,813*	***4,642***
2007	0.061%	61,172	15,293	76,465	47	*171*	*4,721*	***4,549***
2008	0.061%	61,134	15,284	76,418	47	*171*	*4,630*	***4,459***
2009	0.061%	61,097	15,274	76,371	47	*171*	*4,541*	***4,370***
2010	0.061%	61,060	15,265	76,325	47	*171*	*4,454*	***4,283***
2011	0.061%	61,023	15,256	76,278	47	*171*	*4,368*	***4,198***
2012	0.061%	60,985	15,246	76,232	47	*171*	*4,284*	***4,114***
2013	0.061%	60,948	15,237	76,185	46	*170*	*4,202*	***4,032***
2014	0.061%	60,911	15,228	76,139	46	*170*	*4,121*	***3,951***
2015	0.061%	60,874	15,218	76,092	46	*170*	*4,042*	***3,872***
2016	0.061%	60,837	15,209	76,046	46	*170*	*3,965*	***3,795***
2017	0.061%	60,800	15,200	76,000	46	*170*	*3,889*	***3,719***
2018	0.061%	60,763	15,191	75,953	46	*170*	*3,814*	***3,644***
2019	0.061%	60,725	15,181	75,907	46	*170*	*3,741*	***3,571***
2020	0.061%	60,688	15,172	75,861				
				TOTAL	**931 Mg C**	***3,416 tCO_2e***	***90,507 tCO_2e***	***87,091 tCO_2e***

Table 13. Expected Climate Benefits in Reforma Agraria

Year	With-project deforestation rate	AGB stocks remaining (with project) Mg C	BGB stocks remaining (with project) Mg C	Total carbon stocks remaining (with project) Mg C	Carbon stocks lost (with project) MgC	*Carbon stocks lost (with project)* *tCO_2e*	*Baseline Scenario C stocks lost* *tCO_2e*	*Climate benefits* *tCO_2e*
2002	0.061%	184,346	46,086	230,432	141	515	16,224	15,708
2003	0.061%	184,233	46,058	230,292	140	515	15,912	15,397
2004	0.061%	184,121	46,030	230,151	140	515	15,607	15,092
2005	0.061%	184,009	46,002	230,011	140	515	15,307	14,793
2006	0.061%	183,897	45,974	229,871	140	514	15,013	14,499
2007	0.061%	183,784	45,946	229,730	140	514	14,725	14,211
2008	0.061%	183,672	45,918	229,590	140	514	14,442	13,929
2009	0.061%	183,560	45,890	229,450	140	513	14,165	13,652
2010	0.061%	183,448	45,862	229,310	140	513	13,893	13,380
2011	0.061%	183,336	45,834	229,170	140	513	13,626	13,114
2012	0.061%	183,224	45,806	229,031	140	512	13,365	12,852
2013	0.061%	183,113	45,778	228,891	140	512	13,108	12,596
2014	0.061%	183,001	45,750	228,751	140	512	12,856	12,345
2015	0.061%	182,889	45,722	228,612	139	511	12,610	12,098
2016	0.061%	182,778	45,694	228,472	139	511	12,368	11,856
2017	0.061%	182,666	45,667	228,333	139	511	12,130	11,619
2018	0.061%	182,555	45,639	228,194	139	510	11,897	11,387
2019	0.061%	182,444	45,611	228,054	139	510	11,669	11,159
2020	0.061%	182,332	45,583	227,915	139	510	11,445	10,935
2021	0.061%	182,221	45,555	227,776	139	510	11,225	10,715
2022	0.061%	182,110	45,527	227,637				
				TOTAL	**2,795 Mg C**	***10,249 tCO_2e***	***271,588 tCO_2e***	***261,338 tCO_2e***

Table 14. Expected Climate Benefits in San Isidro

Year	With-project deforestation rate	AGB stocks remaining (with project) Mg C	BGB stocks remaining (with project) Mg C	Total carbon stocks remaining (with project) Mg C	Carbon stocks lost (with project) MgC	*Carbon stocks lost (with project)* tCO_2e	*Baseline Scenario C stocks lost* tCO_2e	*Climate benefits* tCO_2e
2007	0.061%	58,902	14,725	73,627	45	165	5,184	5,019
2008	0.061%	58,866	14,716	73,582	45	165	5,084	4,920
2009	0.061%	58,830	14,707	73,537	45	164	4,987	4,822
2010	0.061%	58,794	14,698	73,492	45	164	4,891	4,727
2011	0.061%	58,758	14,690	73,448	45	164	4,797	4,633
2012	0.061%	58,722	14,681	73,403	45	164	4,705	4,541
2013	0.061%	58,686	14,672	73,358	45	164	4,615	4,450
2014	0.061%	58,651	14,663	73,313	45	164	4,526	4,362
2015	0.061%	58,615	14,654	73,268	45	164	4,439	4,275
2016	0.061%	58,579	14,645	73,224	45	164	4,354	4,190
2017	0.061%	58,543	14,636	73,179	45	164	4,270	4,107
2018	0.061%	58,508	14,627	73,134	45	164	4,188	4,025
2019	0.061%	58,472	14,618	73,090	45	163	4,108	3,944
2020	0.061%	58,436	14,609	73,045	45	163	4,029	3,866
2021	0.061%	58,401	14,600	73,001	45	163	3,952	3,788
2022	0.061%	58,365	14,591	72,956	45	163	3,876	3,713
2023	0.061%	58,329	14,582	72,912	44	163	3,801	3,638
2024	0.061%	58,294	14,573	72,867	44	163	3,728	3,565
2025	0.061%	58,258	14,565	72,823	44	163	3,657	3,494
2026	0.061%	58,223	14,556	72,778	44	163	3,587	3,424
2027	0.061%	58,187	14,547	72,734				
				TOTAL	**893 Mg C**	***3,275 tCO_2e***	***86,777 tCO_2e***	***83,502 tCO_2e***

***Summary**. Calculate the total benefits for all carbon pools combined. Present figures as tCO_2 per year. Include these figures in Table F1. (PV Requirement 5.15 & 5.18)*

Table 15. Total Carbon Benefit of the Project								
Year	**Climate benefit La Corona**	**Climate benefit Reforma Agraria**	**Climate benefit San Isidro**	**Project total**	**Leakage (5%)**	**Project total after leakage**	***Buffer (20%)***	**Total credits available for sale**
	tCO_2e	***tCO_2e***	***tCO_2e***	***tCO_2e***	***tCO_2e***	***tCO_2e***	***tCO_2e***	***tCO_2e***
2000	5,235	0	0	5,235	262	4,973	*995*	**3,979**
2001	5,131	0	0	5,131	257	4,874	*975*	**3,900**
2002	5,029	15,708	0	20,738	1,037	19,701	*3,940*	**15,761**
2003	4,930	15,397	0	20,327	1,016	19,311	*3,862*	**15,449**
2004	4,832	15,092	0	19,924	996	18,928	*3,786*	**15,142**
2005	4,736	14,793	0	19,529	976	18,553	*3,711*	**14,842**
2006	4,642	14,499	0	19,141	957	18,184	*3,637*	**14,547**
2007	4,549	14,211	5,019	23,780	1,189	22,591	*4,518*	**18,073**
2008	4,459	13,929	4,920	23,307	1,165	22,142	*4,428*	**17,713**
2009	4,370	13,652	4,822	22,844	1,142	21,702	*4,340*	**17,361**
2010	4,283	13,380	4,727	22,390	1,120	21,271	*4,254*	**17,016**
2011	4,198	13,114	4,633	21,944	1,097	20,847	*4,169*	**16,677**
2012	4,114	12,852	4,541	21,507	1,075	20,432	*4,086*	**16,345**
2013	4,032	12,596	4,450	21,078	1,054	20,024	*4,005*	**16,019**
2014	3,951	12,345	4,362	20,658	1,033	19,625	*3,925*	**15,700**
2015	3,872	12,098	4,275	20,246	1,012	19,234	*3,847*	**15,387**
2016	3,795	11,856	4,190	19,841	992	18,849	*3,770*	**15,079**
2017	3,719	11,619	4,107	19,444	972	18,472	*3,694*	**14,777**
2018	3,644	11,387	4,025	19,055	953	18,102	*3,620*	**14,482**
2019	3,571	11,159	3,944	18,674	934	17,740	*3,548*	**14,192**
2020	0	10,935	3,866	14,800	740	14,060	*2,812*	**11,248**

2021	0	10,715	3,788	14,504	725	13,779	*2,756*	**11,023**
2022	0	0	3,713	3,713	186	3,527	*705*	**2,822**
2023	0	0	3,638	3,638	182	3,456	*691*	**2,765**
2024	0	0	3,565	3,565	178	3,387	*677*	**2,709**
2025	0	0	3,494	3,494	175	3,319	*664*	**2,655**
2026	0	0	3,424	3,424	171	3,253	*651*	**2,602**
TOTAL	**87,091**	**261,338**	**83,502**	**431,932**	**21,597**	**410,335**	***82,067***	**328,268**

G6 Leakage & Uncertainty

G.6.1. Leakage methodology

Leakage is expected to be equal to or greater than 5% of the overall project benefits. As described in the PDD, the project participants have land tenure over the areas of forest to be protected from deforestation and are engaged in other programs. Scolel'te project improves their livelihoods and prevent their need for deforestation.

Given the local circumstances and drivers of deforestation, the project participants have identified the project as mechanism for protecting forests, but with the commitment to avoid deforestation elsewhere.

Potential drivers of leakage include all natural resources used for different activities, which have the potential to cause deforestation or forest degradation. This displacement if intended to be reduced within the project area, as a result of the project activities.

Since there is little potential for leakage from the major drivers of deforestation and forest degradation, an expected leakage emissions proportion (L) of 5% will be adopted for the first project period. At the end of the project period, analysis of remote sensing data will be used to estimate the actual emissions from leakage in a leakage area within 5km of PACT, and for subsequent project periods a value of L will be adopted to reflect the leakage observed in previous project periods using the leakage area approach.

Potential for displacement also depends on the agents of deforestation and degradation linked to specific drivers. The agents and drivers with potential to cause leakage, and areas that could be affected by displacement are summarized in Table 16.

Table 16. Potential agents and drivers of leakage

Agent	Driver	Displacement potential	Justification
The ejidos	Unsustainable timber harvesting	Low	The agreement with the Project and the activities of the ejido establish not to harvest the areas. Since some years ago, there is a regulation for the timber extraction in the ejidos, and all agreements are reinforced by the commitments with the carbon sales.
	Expansion of livestock and palm oil activities outside the Project area	medium	For the community plan vivo designing, leakages are considered for these activities, but it´s important to examine regularly that this don´t occur
	Expansion of smallholder agriculture (lemon plantations)	Low	At the beginning of 2006, an important expansion of these crops began, there was a high expectation about them, however the interest has been decreasing over the years, so there is currently no expansion of these crops, the areas of this cultivation have been maintained.
	Expansion of agroforestry systems through support programs	low	Participants have defined their areas of agricultural production management. Planning has been done in the project and this helps to redirect the supports, with sustainable practices, like honey management.
	Forest fires	Medium	AMBIO has been providing training and equipment for forest fires prevention and management. On the other hand, the communities know that if the fires affect their

			forest areas, the payment for the environmental benefits will be affected, so they organize themselves internally to protect the area.
Outsiders	Illegal timber harvesting and poaching	low	The illegal trading of species has happened by people outside´s of the ejido's authorization, but when they are located, they receive a sanction from the ejido Some the activities aim to prevent these incursions that could displace these activities to other forest areas. By teaming with other initiatives working in the area, has given the ejidos financial and productive diversification through sustainable practices. It is important to note that the risks require comprehensive attention, through strengthening of the governance of the ejidos.

G.6.2 Potential leakage

Potential leakage emissions are estimated using the equation in AA-CFREDD and the parameters described in Section G.6.1 (see Table 16). Potential leakage emissions for the first project period is set at 21,587 tCO2.

Table 17 Potential leakage emissions parameters

Parameter	Value
Leakage emissions expected to result from displacement of deforestation and degradation during the project period	**21,597**

G.6.2.1 Uncertainty in calculations

- There are three key datasets used to calculate the emissions reductions presented in this Technical Specification: The total area of each of the polygons within the project area, as calculated through their boundaries using GPS data

- Deforestation data from Hansen (2013) for both the complete region of Marqués of Comillas from 2000 – 2014, and separately for the project areas only.

The biomass of each of the three project sub-areas in the year 2000, estimated through the estimation of carbon stocks for plots located in and around each area. Each are sources of uncertainty, and are taken in turn: GPS Boundary data: GPS data is precise to ±5-10 m in general, and therefore has considerable uncertainty.

However, such errors are random and small at the scale of a project of several thousand hectares, and therefore the total area of forest protected is likely to be accurate to a fraction of a percent. Further, Edward Mitchard checked the boundaries against high resolution optical satellite data available from Google Earth and found that all the areas within the project boundaries appeared forested in ~2015/16, providing some confirmation that these forests are indeed protected. There is therefore no significant uncertainty in the expected project climate benefits resulting from this GPS data.

Forest loss data from Hansen (2013). These forest loss data use a generic algorithm to map deforestation across the world using stacks of hundreds of thousands of Landsat scenes (the complete archive from 2000). They are widely used and trusted, for example forming the basis of

the Global Forest Watch website[11], and their data freely distributed on another website[12]. They likely underestimate the deforestation rate, through missing small patches of forest loss (Joshi, 2015 and Mitchard 2016). Because the rate of forest loss is so much faster outside the project area than within the project area, the use of these data is thus conservative: if the true rate were higher, the climate benefits of the project would increase.

Carbon stock data. The carbon stock data is based on field plots set up in the project areas in 2006. These small plots were set up for another purpose, the monitoring of the regrowth of secondary forest. However, as such, their initial values provide a useful floor value for the carbon stocks of the forest patches. While there is uncertainty in calculating the carbon stocks from small forest plots (Chave, 2003), the use of these data in this case is definitely conservative, as the evidence suggests that these plots are rapidly gaining in carbon stocks, and they represent more disturbed forest than is likely protected. In all cases therefore, while considerable uncertainty exists in the climate benefits of the project, the benefits set out in G5 represent a conservative estimate of the total benefits.

G.6.2.2 Key Assumptions

1. The assumptions used are: That Forest protection continues for 20 years in each site, with the rate of deforestation within the Project Areas not exceeding its current annual rate of 0.061 %. This will be confirmed through annual monitoring on the ground of the protected areas by the AMBIO field teams, and a check against the updated Hansen dataset every year through manual viewing of the web interface[13].

2. That forest carbon stocks within the forest do not fall below the initial values measured in the forest plots in 2006. Continued monitoring of these plots, and ground-based confirmation that significant forest degradation (i.e. exceeding the rate of tree growth) is not taking place within the project areas should confirm this. It should be noted that the forest carbon stocks of the project area are currently believed to exceed those estimated from the field plots in 2006.

3. That the Hansen et al (2013) forest loss dataset does not overestimate the rate of deforestation in the surrounding area. In general, the Hansen, method is robust against overestimation, and the forest loss observed appears real compared against field knowledge and independent assessment against Synthetic Aperture Radar from 2007-2014 data performed by Edward Mitchard, January 2017.

That the baseline deforestation rate does not change markedly from 2014 onwards, as it is currently based on the average of 2000-2014. As the rate currently appears to be accelerating in the wider Marqués de Comillas area, it is thought unlikely it could reduce below 1.92% per year by 2020. However, this should be checked annually against the Hansen et al. dataset (which is typically updated ~2 years in arrears) to confirm that there has not been a dramatic fall in deforestation rates.

Annual reports to the Plan Vivo Foundation should provide evidence that none of these four assumptions has been violated. To bring certainty to the data recollected, the project can include for annual measurement of deforestation, the use of free software maps (of public access) with satellite information for the area, such as the Global Forest Watch platform.

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[11] http://www.globalforestwatch.org/
[12] https://earthenginepartners.appspot.com/science-2013-global-forest/download_v1.3.html
[13] http://earthenginepartners.appspot.com/science-2013-global-forest

There is also under development the Map of Resilience to Climate Change (MARACC) introduced by the Government of the State of Chiapas, a digital tool that integrates the forest-agricultural frontier, conservation activities, sustainable use and restoration of ecosystems initiatives, forest resources and their environmental services, to contribute to a better planning of programs and projects. This tool could provide an alternative to monitoring deforestation rates in the area.

G.6.2.3 Validation of assumptions

The main assumption of the project is that if the activities are carried out as planned, they will result in the expected climate benefits. Two types of approach will be used to collect data to validate this assumption:

i) Activity-based monitoring throughout the project period to determine whether activities are being carried out as planned

ii) Verification of climate benefits and updating key parameters at the end of the project period.

AMBIO has the technical capacity to support the monitoring and verification of project activities.

H. Risk Management

The main purpose of the risk management is to minimize the potential of negative impacts in the protected areas. An approach is the use of a carbon buffer, which cannot be sold as Plan Vivo Certificates.

The risk buffer is determined considering the threats of the project and this buffer is not allowed to be used to obtain climate benefits. Risk certificates will be withdrawn at the end of the project period if the verified climate benefits fall below the estimated benefits at the beginning of the project period.

H.1.1 Identification of risk areas

Methodology Risk Assessment

In this section, we seek to guarantee the emission of climate benefit certificates, through identifying and analysing the different risks, to help identify the most suitable buffer for the project.

The methodology for this determination considers the following categories: socioenvironmental, public policies and financial (Plan Vivo, 2015). In addition to the risks, in each category, specific activities were identified that will help mitigate.

The level of each risk was classified as followed:

i) According to the risk that could be presented and the impact that could occur

ii) Probability of the risk: the probability it is happening

The impact and the probability were scored on a five-point scale:

Very low = 0.05, Low = 0.1, Moderate = 0.25, High = 0.5, Very high = 0.75.

The risk was determined by multiplying the impact, probability and a degree of total risk was calculated by adding the risk scores of each factor. The total risk score was used to determine the proportion of certificates held in the risk buffer.

H.1.2 Results of the risk assessment

The results of the risk assessment and the reversal of climate benefits are summarized in the next table:

Table 18. Risk Assessment

Risk	Mitigation of the action	Impact of the mitigation	Probability of the risk
Socioenvironmental			
Extension of livestock activity	Promotion of best livestock practices (improved pastures, trees scattered in paddocks, islands of vegetation) and trainings Establishment of Living Fences and silvopastoral systems	By giving a comprehensive management of livestock and diverting incomes by PES Impact of the measure: moderate	Moderate: Livestock activity is developed throughout the region, but there are also schemes of PES that contribute to mitigate the risk
Agricultural extension and production	Technical advice to improve management Alternative productive projects for agriculture Promote conservation agriculture	Giving crop alternatives for subsistence and sale can help to minimize the impact of burn and slash, as well as promote more sustainable agriculture. Impact of the measure: Moderate	Moderate: The agriculture in the area covers aspects of basic food supply, but applies techniques of high environmental impact which degrades land in the short time, this causes new land to be opened for cultivation of crops like palm oil, persian lemon that are highly profitable crops
Hunting and illegal lodging	Monitoring's and constant surveillance of the areas with the ejido´s authorities	The local governance and relation with neighboring ejidos, contribute to minimize de risk. Impact of the measure: Moderate.	Moderate: Throughout the years, they have managed this risk with local agreements and sanctions.
Forest fires	Application of proper fire management techniques Strengthening of inter-institutional coordination for fire protection Strengthening of capacities for community brigades Information about the NOM 015	Fire management is one of the main activities to develop. There are local capacities in fire prevention and combat. Impact of the measure: High	Low: The use of a forest fire management plan design in the Plan Vivo contributes to minimize de risk

Weakness of local governance	Strengthened of the ejido´s agreements and governance Strengthened ejido´s regulations and sanctions Appointment of an operational team for the follow up of management activities and protection agreements with the ejido authorities	The ejidos have their assemblies and internal agreements, however, sometimes there are violations due to the lack of precise information or because they are not updated periodically, so it is important that these are updated continuously. Impact of the measure: High	Moderate: Traditionally the most important decisions on land management are taken in the assemblies and the ejidos participating have demonstrated until now a satisfactory level of governance
Public Policies			
Policies that promote deforestation	Public policies aligned and consistent with conservation Alignment and improvement of public policies aimed at community development and conservation of natural resources Development of public policy instruments that promote good management	CONAFOR and SADER are the main entities that develop public policies in the area. In the past, the actions of these entities have opposed and have had a different approach to the area. The ideal is that they align their work with a conservation approach. The rules of operation of the programs can include components of biodiversity conservation. Impact of the measure: Moderate	High: The policies are applied at the territorial level, without analyzing the impact they may have. The results over time could be adverse to the objectives of conservation or sustainable management.
Financial			
Lack of economic resources in the ejidos for the development of alternative activities	In order to generate incomes for the ejidos, it is necessary to identify productive alternatives for the inhabitants so they no longer turn their lands to unsustainable productive alternatives and reduce their natural resources.	It is important to generate a series of sustainable productive alternatives for the ejidos, so their livelihoods and incomes don´t become affected Impact of the measure: Moderate	High: It is not possible to make improvements in productive activities, without an investment for productive improvement

H.1.3 Risk Buffer

According to the risk analysis, the buffer to be applied to the project is 20%, since mitigation measures will have an impact on the management of the risks identified for Marques of Comillas.

Table 19. Risk Assessment

Risk	Impact	Probability of the risk	Evaluation of the risk
Livestock raising	20%	Moderate (0.25)	5%
Agricultural extension and production	10%	Moderate (0.25)	2.5%
Hunting and illegal lodging	5%	Moderate (0.25)	1.25%
Forest fires	10%	Low (0.25)	2.5%

Weakness of local governance	5%	Moderate (0.25)	1.25%
Policies that promote deforestation	10%	High (0.5)	5%
Lack of economic resources of the ejidos for the development of alternative activities	5%	High (0.5)	2.5%
Total Sum			**20%**

I Project Coordination & Management

The project coordinator is the Cooperativa AMBIO. It is a Mexican organization legally established in 1998, with more than 20 years of experience in handling similar projects and who is responsible for the technical and administrative coordination of the Scolel'te Program. AMBIO has been working in Marqués of Comillas since 2000. The area of work is three ejidos, so they regulate the activities that are going to be developed.

I.1 Relationships to National Organizations.

One important institutional allied for the work areas has been the National Commission of Forests (CONAFOR). The CONAFOR has worked with the ejidos for several years under the Payments for Ecosystem Services, under the hydrologic services.

Another institutional allied is the National Commission of Natural Protected Areas (NPA), since two ejidos are Areas Voluntarily Dedicated to Conservation AVDC (La Corona and Reforma Agraria) and these areas are jointly managed by national institution and the ejidos. AMBIO collaborates with both entities with the management and conservation works required for the AVDC´s.

The College of the Southern Frontier (Ecosur) has also worked in the area measuring the impact of deforestation for productive activities. They have worked with Ecometrica, as well with AMBIO and Pronatura Sur, to measure the deforestation rate for the municipality and giving data for the Platform Forest 2020. They are an important source of valuable and reliable information.

The ejidos are the most important allies in the Region, since they legally own the lands, and they deliver the ecosystem services.

I.2 Legal Compliance

The main documents for compliance are: the Assembly Agreements, where all the commitments are established between AMBIO and the ejidos; the Community´s Plan Vivo design and PES agreements between AMBIO and the ejidos, where the activities and commitments are described.

In order for the ejidos to prove ownership of the land, they have showed a Certificate of Possession as plot holders, which is issued by the National Agrarian Registry an under the Agrarian Law of México.

There is also the document of the decreed polygons of the reserves administered by CONANP, in this case, two ejidos subscribed their land as Areas Voluntarily Dedicated to Conservation AVDC and they are part of the Natural Protected Areas.

I.3 Project Management.

AMBIO has been working with the ejidos since 2000 with the Scolel´te Program. At this point, the main activities implemented are:

• Selection, training, and equipment for community brigades

• Trainings for the ejidos and the participants of carbon capture, as well as the community technicians

• Sustainable productive practices

• Monitoring of plots for carbon capture and biodiversity conservation

• Elaboration of Planes Vivos and calendars of activities

Concerning the management, administration, and registration in IHS Markit for the sales completed, it is the program coordinator (AMBIO) responsible for negotiating the sales agreements, as well as for processing of sales and recording transactions in the environmental register of IHS Markit. AMBIO already has account in the platform.

I.4 Project Financial Management

AMBIO has the administrative experience in the management of the resources that come from the sales of the certificates for environmental services. In general terms, the revenues of the sales are delivered to the ejidos for the development of the activities identified, which is distributed over the years under the commitment made with the PES Agreements between AMBIO and the ejidos. The remaining part is used by AMBIO to cover the administrative, operational and salary expenses of those responsible for the program in the Region.

AMBIO has bank accounts to collect the resources from the sales of the environmental certificates derived from the Scolel'te Program. The resources are delivered to the ejidos, according to the progress of the programmed activities. These resources are delivered after the compliance with the taxation fees under the Mexican laws.

If ejidos do not have bank accounts, AMBIO supports and accompanies the ejido´s authorities so they can do their registry in the Treasury Office, to comply with the law, transparency and management of the resources.

I.5 Marketing

For the sales of Plan Vivo Environmental Services Certificates, AMBIO has a Sales Area which has worked for almost 12 years with national and international sales for the Scolel´te Program. This Area has a list of current buyers, as well as potential buyers. The objective of the Area is to keep current buyers and add new ones, as well, to work as a bridge of information between AMBIO and the clients.

I.6 Technical Support

AMBIO has developed the institutional and local technical capacities regarding the operation of the Scolel´te Program in the region, with a program designed to develop local capacities. There are currently three community technicians, one for each ejido. AMBIO will continue to be directly responsible for capacity building, to ensure the proper functioning of the program.

J. Benefit Sharing

J.1 PES Agreements

The Scolel'te Program has an agreement signed between the ejidos that participate Project and AMBIO. This document describes objective of the contract, the agreements and commitments of each party and the delivery time. The agreement indicates the area of land that is supported by the program, its objective, the payment table according to the goals achieved and the payments of environmental services.

The document is also conditional, that is, if the goals are not achieved, the payments cannot be made. This creates a certainty for the carbon program and at the same time the ejidos fulfill what is established jointly, and according to what is necessary locally, to comply.

According to the work experience of AMBIO, the main risks and mitigation measures identified are presented in table 20.

Table 20. Risk and mitigation actions for PES Agreements

Risk	Mitigation action
Ejidos do not comply with the commitments acquired	One way to minimize this risk is through continuous monitoring of activities, in this case ejido´s technicians have an important role, since this person helps continuously with the monitoring activities.
Changes in local authorities	Every three years the local authorities change in the ejidos, so it is important that the program is known by all the inhabitants, in addition the training the local authorities, once they have assumed the position in the ejidos, is of great importance.
That payments for the environmental services be used for deforestation activities	In the agreements, the use of economic resources will be established, which will be aimed at improving the management of natural resources, local capacities and the acquisition of equipment that strengthens the improvement of productive systems.

J.2 Payments and Benefit Sharing

The payments will be delivered to the ejidos, according to the activities that they have to carry out to mitigate the risks on their forest areas. It is important to note that the activities will be developed as the work plan is designed jointly with the ejidos, giving priority to those at highest risk.

The training will have no costs for them, since it is part of the administrative cost of AMBIO, however additional trainings, purchase of equipment and tools, payments of wages for the development of activities among others, will be covered by them.

In the first year a payment is intended for starting the activities, but from the second payment this will be based on the results, that are part of the monitoring and the evaluation of the activities. The payments details are shown in the table 21.

Table 21. Calendar of Payments.

Year or payment	Approximate Proportional Payment *	Payment type *
1	20%	Divided in 2 payments 50%, at the beginning of the project to the start with activities 50%, once the activities of the first year have been carried out and monitored (if necessary, payment is advanced before the first year)
2	20 %	Monitoring and evaluation of the activities indicated in the work plan
3	20%	Monitoring and evaluation of the activities indicated in the working plan Starting this year, we will seek to include activities that include the participation of women and young people
4	20%	Monitoring and evaluation of the activities indicated in the work plan
5	20%	Monitoring and evaluation of the activities indicated in the work plan

* This proposal may be different as it depends on the results from the second year.

K. Monitoring

K1. Ecosystem Services Benefits

The monitoring of the activities that are related to avoid the change of the forest cover, will oversee the Project Coordinator. The community technicians will give support to the group of local actors, monitor, and follow up the activities. They will be selected in the ejido´s assemblies to have the support and recognition of the ejidos.

The designation of the community technicians will contribute to the organization of the field work and will be the direct contact with the Project Coordinator, as well as with the representatives of forest fire brigades, will help organize the activities of fire prevention or in case of being necessary, and will help with the reporting to relevant authorities. All activities developed in the ejidos must consider, as much as it is possible, to involve vulnerable groups, such as women, young people, and elderly, to promote equity.

The figure 6 shows the main local actors responsible for monitoring and follow up of activities.

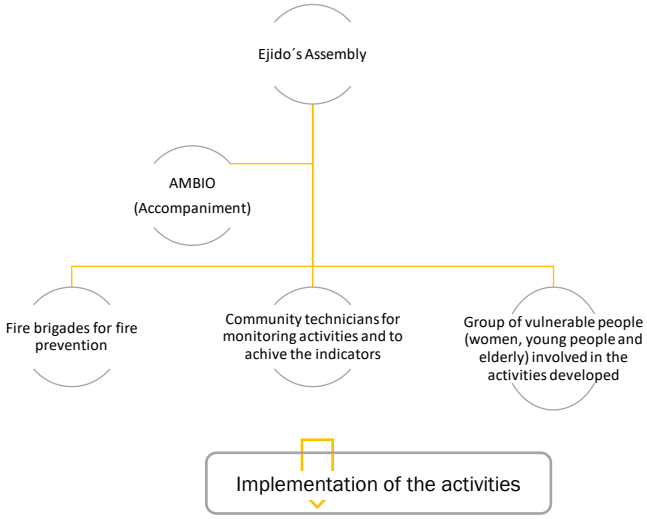

Figure 6. General Structure for Activities Implementation

The monitoring plan will be based on the identification of activities that minimize the risks of deforestation and degradation in each of the ejidos, as well as activities that strengthen the permanence of forest areas. The monitoring and evaluation of these will be carried out through the measurement of activity indicators, as shown in table 22.

Table 22. Monitoring activities and measurement.

Indicator	How will it be measured	Who will monitor	Frequency of measurement	Comments
Surveillance, carbon stocks and biodiversity	Number of routes traced, gps, data collection	Community technicians	Once a month dry season Once a year for carbon stocks and biodiversity	The activity will be supervised by the ejido commissioner with the support of its board
Firebreaks	Number of kilometers enabled or completed	Brigade chief supported by the brigade	Once a year	They do it as a prevention activity, they don´t have an allocated budget for this activity
Management of flammable organic material	Fuel storage to break vertical or horizontal continuity in risk areas	Community technicians and ejido	Once a year	The ejido agrees to handle the flammable organic material that is in the risk zones, as long as they are provided with some economic support
Agreements at the assembly level	Number of agreements established and applied	The board of the ejido commissioner and the supervisory board of the ejido and AMBIO	Every time an activity is carried out	The frequency of the measurement of this indicator will practically be carried out when necessary or when it is not being carried out in accordance with the

				agreement

It is important to note that the activities to be monitored will be based on the needs and priorities of each of the ejidos, especially based on their threats.

K.2 Verification of Climate Benefits

Concerning the evaluation of forest cover, possible changes in coverage or leaks will be analyzed, with the help of Geographic Information Systems, every 5 years, according to the guidelines of the Plan Vivo Standard. In the case of this technical specification, the possibility of installing sites in the field that allows to provide more accurate information on the types of vegetation and carbon contents is being evaluated.

K.3 Socio-economic Impacts

According to AMBIO's experience in this area, the benefits according to the PES agreements (distribution agreements) will be made through the general assembly agreements and will be given only to those ejidatarios who participate in the activities, that is, the economic benefits will be distributed among them.

To monitor the impacts of economic benefits, AMBIO with the support of the community technicians will trace a baseline scenario with the information of the ejido in the National Institution for Statistics and Geography (INEGI) and the databases shared by CONANP and CONAFOR.

It will also be applied a random interview with 10% of the beneficiary population (after each payment). This evaluation is confirmed by guided questions to identify how this economic resource (PES) are spent and the benefits resulting from the payments.

To measure the social impacts, the information will be recollected through the data collected system applied by AMBIO, with the guidelines of the Planes Vivos and in some specific cases, when it is needed, with focus groups. The data collected will seek to comply the indicators of the Sustainable Development Goals (SDG´s) of the United Nations. It is important to note that this evaluation will be applied at the beginning, at the middle and end of each commitment period (year 1, year 3 and year 5). The indicators linked to the SDG's for the project are:

Table 23. Socio-economic Impacts

Contribution to SDG	Program indicator
SDG 1.- No poverty	Number of families participating[14]
	Payments delivered to participants for carbon sales (USD)
SDG4.- Quality education	Total of capacity building programs[15]
	Number of women trained
	Number of men trained
SDG 5.- Gender equality	Number of working groups with women, young people and senior

[14] SDG 1.- No Poverty: This is measured by observing the payments resulting from the project, which have an important impact on the economy of the participants' homes.

[15] SDG 4.- Quality education: the project measures this by the amount of training, which seeks to improve the local knowledge of participants about the impacts of climate change and improve resilience, food security and medicinal use of plants, agroforestry systems, diversification of plots, pest control, land management and gender equality.

	citizens [16]
	Number of women participating in Program activities (training and implementation of productive projects)
	Number of women who receive trainings on how to cultivate native species and their sustainable management
	Number of women that trade non timber products from the forest (honey, mushrooms, agrosilvopastoral, etc.)
SDG 17.- Partnerships for the goals	Participation in National Environment Protection Committees [17]
	Alliances with International Organizations (or national) Indicate name

K.4 Environmental and biodiversity Impacts

By strengthening local capacities and creating environmental awareness on the importance of conserving and protecting biodiversity. The program's management scheme contributes to the generation of benefits in the ecosystems and the livelihoods of ejidatarios.

The use, naturalization, and sustainable management of native species in the area are promoted to contribute to their conservation. It is expected that indirectly the maintenance of the ecological functions of these species from conservation and sustainable management activities can increase the ecosystem services of the area, those related to biodiversity.

The evaluation of impacts on biodiversity will be developed together with the ejidos for the creation of a list of species to monitor the support of the community technicians and the ejidos, through tours within the area. For this, the community technicians and the ejidos will be trained in monitoring of species of trees, birds, in the first years and subsequently the presence of mammals, and reptiles and amphibians, if possible.

For the development of the list of priority species for the area, the species described in NOM 059-Semarnat -2010 and in the IUCN red list will be taken as a reference base, as well as those identified for the area in the National Biodiversity Information System (SNIB) of CONABIO.

The tool for the implementation will be el The Community Forest Protocol that AMBIO has developed with the support of the United States Forest Service will be used as the methodology to measure the biodiversity impacts y se ha. This document describes the methodology, technical and monitoring tools for biodiversity monitoring in the project areas. As well as the socioeconomic indicator, the data collected will seek to comply the indicators of the Sustainable Development Goals (SDG´s) of the United Nations. The monitoring will be carried out every year.

Table 24. Environmental and Biodiversity Impact

Contribution to SDG	Program indicator	Component	Indicator	Product
SDG 13.- Climate Action[18]	Presence of native species	Native species	Number of native species identified	Monitoring sheets

[16] SDG 5.- Gender equality: This is mainly measured through inclusion. All activities are designed to include vulnerable groups, such as women, the youth, and the elderly. Through the Plan Vivo and all the workshops, all family members are invited to participate in the design and implementation of activities.
[17] ODS 17. Partnerships for the goals: Scolel'te has a long list of international and national allies to implement various activities that contribute to the conservation of ecosystems in the state of Chiapas.
[18] Climate Action: The project measures these indicators by listing the areas under reforestation, afforestation and conservation that contribute to mitigating climate change, carbon sequestration and guaranteeing water supply in quantity and quality.

	Number of native species cultivated or with sustainable management	Native species cultivated or with sustainable management	Number of native species with medicinal use, food purposes of local marketing	Monitoring sheets and training sheets
SDG 15.- Life on Land[19]	Number of species within the IUCN Red List or Nom 059 SEMARNAT	Birds	Sighting of flag species (simple registration)	Listings of bird species. Registration of priority, rare, endemic, vulnerable or endangered species.
		Terrestrial Mammals	Sighting of flag species (simple registration)	Listings of bird species. Registration of priority, rare, endemic, vulnerable or endangered species.
		Reptiles and amphibians	Sighting of flag species (simple registration)	Listings of bird species. Registration of priority, rare, endemic, vulnerable or endangered species.

Marqués of Comillas is an area **with high** biodiversity **presence and is** part of the Biosphere Reserve Montes Azules**.** The National Commission for the Knowledge and Use of Biodiversity gathered the national biodiversity data in a **National Biodiversity Information System (SNIB), this base is managed for the CONABIO (Comisión Nacional de la Biodiversidad).**

The SNIIB has created an Atlas for Nature and Society with a map with potential endangered species and listed in the SEMARNAT specialized list for endangered species in Mexico, the Norma Oficial Mexicana NOM-059- SEMARNAT-2010. From this official information, the zone of Marqués de Comillas has a list of 122 species in some category of danger. In the table 26, showed the register these species.

Table 25. Map of Endangered Species of Marqués of Comillas NOM-059.

By cross-referencing the list of CONABIO with the IUCN Red List of Threatened Species, we found that from the 122 listed species for Marqués of Comillas (according to CONABIO), 114 species are currently listed in the Red List, it´s probed the importance in terms of diversity.

[19] Life on Land: The project measures this objective by observing the presence of biodiversity, soil fertility, habitats and the regulation of microclimates.

Table 26. List of Endangered Species Marqués of Comillas in the Red List of IUCN and NOM- 059

COMMON NAME IN SPANISH	COMMON NAME IN ENGLISH	SPECIES NOM-059 SCIENTIFIC NAME	CATEGORY NOM-059	CATEGORY RED LIST UICN
AMPHIBIANS				
Salamandra pigmea veracruzana	Veracruz Pigmy Salamander	*Thorius pennatulus*	En peligro de extinción (P)	EN- Endangered
BIRDS				
Gavilán bicolor	Bicolored Hawk	*Accipiter bicolor*	Amenazada (A)	LC- Least Concern
Aguililla negra menor	Common Black Hawk	*Buteogallus anthracinus*	Amenazada (A)	LC- Least Concern
Águila solitaria	Black Solitary Eagle	*Buteogallus solitarius*	En peligro de extinción (P)	NT- Near Threatened
Gavilán zancón	Crane Hawk	*Geranospiza caerulescens*	Amenazada (A)	LC- Least Concern
Águila arpía	Harpy eagle	*Harpia harpyja*	En peligro de extinción (P)	VU-Vulenrable
Águila albinegra	Black-and-white hawk-eagle	*Spizaetus melanoleucus*	En peligro de extinción (P)	LC- Least Concern
Águila elegante	Ornate hawk-eagle	*Spizaetus ornatus*	En peligro de extinción (P)	NT- Near Threatened
Águila tirana	Black hawk-eagle	*Spizaetus tyrannus*	En peligro de extinción (P)	LC- Least Concern
Pato real	Muscovy duck	*Cairina moschata*	En peligro de extinción (P)	LC- Least Concern
Carrao	limpkin	*Aramus guarauna*	Amenazada (A)	LC- Least Concern
Garza rojiza	Reddish egret	*Egretta rufescens*	En peligro de extinción (P)	NT- Near Threatened
Garza nocturna corona clara	Yellow-crowned night-heron	*Nyctanassa violacea*	Amenazada (A)	LC- Least Concern
Buco barbón	White-whiskered Puffbird	*Malacoptila panamensis*	Amenazada (A)	LC- Least Concern
Buco de collar	White-necked Puffbird	*Notharchus hyperrhynchus*	Amenazada (A)	LC- Least Concern
Zopilote rey	king vulture	*Sarcoramphus papa*	En peligro de extinción (P)	LC- Least Concern
Cotinga azuleja	Lovely cotinga	*Cotinga amabilis*	Amenazada (A)	LC- Least Concern
Pavón grande	Great curassow	*Crax rubra*	Amenazada (A)	VU-Vulenrable
Pava cojolita	Crested guan	*Penelope purpurascens*	Amenazada (A)	NT- Near Threatened
Pajuil	Highland guan	*Penelopina nigra*	En peligro de extinción (P)	VU-Vulenrable
Garrapatero pijuy	Groove-billed ani	*Crotophaga sulcirostris*	Probablemente extinta (E)	LC- Least Concern
Halcón pecho panela	Orange-breasted falcon	*Falco deiroleucus*	En peligro de extinción (P)	NT- Near Threatened
Halcón fajado	Aplomado falcon	*Falco femoralis*	Amenazada (A)	LC- Least Concern

Trepatroncos pico cuña	Wedge-billed woodcreeper	*Glyphorynchus spirurus*	Amenazada (A)	LC- Least Concern
Hojarasquero oscuro	Scaly-throated leaftosser	*Sclerurus guatemalensis*	Amenazada (A)	LC- Least Concern
Jacamar cola canela	Rufous-tailed jacamar	*Galbula ruficauda*	Amenazada (A)	LC- Least Concern
Hormiguero cholino escamoso	Scaled antpitta	*Grallaria guatimalensis*	En peligro de extinción (P)	LC- Least Concern
Momoto pico quillado	Keel-billed motmot	*Electron carinatum*	En peligro de extinción (P)	VU-Vulenrable
Momoto enano	Tody motmot	*Hylomanes momotula*	Amenazada (A)	LC- Least Concern
Chipe lores negros	Macgillivray's warbler	*Geothlypis tolmiei*	Amenazada (A)	LC- Least Concern
Chipe rabadilla amarilla	Yellow-rumped warbler	*Setophaga coronata*	Amenazada (A)	LC- Least Concern
Loro cachetes amarillos	Red-lored parrot	*Amazona autumnalis*	Amenazada (A)	LC- Least Concern
Loro corona azul	Southern mealy parrot	*Amazona farinosa*	En peligro de extinción (P)	LC- Least Concern
Guacamaya roja	Scarlet macaw	*Ara macao*	En peligro de extinción (P)	LC- Least Concern
Loro corona blanca	White-crowned parrot	*Pionus senilis*	Amenazada (A)	LC- Least Concern
Loro cabeza oscura	Brown-hooded parrot	*Pyrilia haematotis*	En peligro de extinción (P)	LC- Least Concern
Rascón canelo	Uniform crake	*Amaurolimnas concolor*	Amenazada (A)	LC- Least Concern
Polluela negra	Black rail	*Laterallus jamaicensis*	En peligro de extinción (P)	EN- Endangered
Tucán pico canoa	Keel-billed toucan	*Ramphastos sulfuratus*	Amenazada (A)	NT- Near Threatened
Playero dorso rojo	Dunlin	*Calidris alpina*	Amenazada (A)	LC- Least Concern
Picopando canelo	Marbled godwit	*Limosa fedoa*	Amenazada (A)	LC- Least Concern
Tecolote llanero	Burrowing owl	*Athene cunicularia*	Amenazada (A)	LC- Least Concern
Búho barrado albinegro	Black-and-white owl	*Ciccaba nigrolineata*	Amenazada (A)	LC- Least Concern
Tecolote mesoamericano	Central american pygmy-owl	*Glaucidium griseiceps*	Amenazada (A)	LC- Least Concern
Búho cuernos blancos	Crested owl	*Lophostrix cristata*	Amenazada (A)	LC- Least Concern
Búho de anteojos	Spectacled owl	*Pulsatrix perspicillata*	Amenazada (A)	LC- Least Concern
Hormiguero sencillo	Plain antvireo	*Dysithamnus mentalis*	Amenazada (A)	LC- Least Concern
Batará canelo	Western russet antshrike	*Thamnistes anabatinus*	Amenazada (A)	LC- Least Concern
Tinamú jamuey	Slaty-breasted tinamou	*Crypturellus boucardi*	Amenazada (A)	VU-Vulenrable
Tinamú menor	Little tinamou	*Crypturellus soui*	Amenazada (A)	LC- Least Concern
Tinamú mayor	Great tinamou	*Tinamus major*	Amenazada (A)	LC- Least Concern
Colibrí hada enmascarada	Purple-crowned fairy	*Heliothryx barroti*	Amenazada (A)	LC- Least Concern
Coqueta cresta negra	Black-crested coquette	*Lophornis helenae*	Amenazada (A)	LC- Least Concern
Coa cola oscura	Slaty-tailed trogon	*Trogon massena*	Amenazada (A)	LC- Least Concern
Mosquero real	Nothern royal flycatcher	*Onychorhynchus coronatus*	En peligro de extinción (P)	LC- Least Concern

Vireo ojos blancos	White-eyed vireo	*Vireo griseus*	Amenazada (A)	LC- Least Concern
Vireón esmeralda	Green shrike-vireo	*Vireolanius pulchellus*	Amenazada (A)	LC- Least Concern
MAMMALS				
Mono aullador negro	Yucatán black howler monkey	*Alouatta villosa*	En peligro de extinción (P)	EN- Endangered
Mono araña centroamericano	Geoffroy's Spider Monkey	*Ateles geoffroyi*	En peligro de extinción (P)	EN- Endangered
Rata arrocera de agua	Coue's rice rat	*Oryzomys couesi*	Amenazada (A)	LC- Least Concern
Ratón de patas blancas	white-footed mouse	*Peromyscus leucopus*	Amenazada (A)	LC- Least Concern
Ratón norteamericano	North American Deermouse	*Peromyscus maniculatus*	Amenazada (A)	LC- Least Concern
Ratón cosechero delgado	Slender harvest mouse	*Reithrodontomys gracilis*	Amenazada (A)	LC- Least Concern
Hormiguero enano	Silky anteater	*Cyclopes didactylus*	En peligro de extinción (P)	LC- Least Concern
Armadillo de cola desnuda	Northern naked-tail armadillo	*Cabassous centralis*	En peligro de extinción (P)	DD-Data Deficient
Tlacuache dorado	Central American Woolly Opossum	*Caluromys derbianus*	Amenazada (A)	LC- Least Concern
Tlacuache acuático	Water opossum	*Chironectes minimus*	En peligro de extinción (P)	LC- Least Concern
Tlacuache cuatro ojos	Brown four-eyed opossum	*Metachirus nudicaudatus*	Amenazada (A)	LC- Least Concern
puercoespín tropical	Porcupine	*Coendou mexicanus*	Amenazada (A)	LC- Least Concern
Yaguarundí	Jaguarundi	*Herpailurus yagouaroundi*	Amenazada (A)	LC- Least Concern
Ocelote	Ocelot	*Leopardus pardalis*	En peligro de extinción (P)	LC- Least Concern
Tigrillo	Margay	*Leopardus wiedii*	En peligro de extinción (P)	NT- Near Threatened
Jaguar	Jaguar	*Panthera onca*	En peligro de extinción (P)	NT- Near Threatened
Murciélago lomo pelón mayor	Big naked-backed bat	*Pteronotus gymnonotus*	Amenazada (A)	LC- Least Concern
Viejo de monte	Tayra	*Eira barbara*	En peligro de extinción (P)	LC- Least Concern
Grisón	Greater Grison	*Galictis vittata*	Amenazada (A)	LC- Least Concern
Nutria de río	Southern river otter	*Lontra longicaudis*	Amenazada (A)	NT- Near Threatened
Tamandúa norteño	Northern tamandua	*Tamandua mexicana*	En peligro de extinción (P)	LC- Least Concern
Vampiro falso lanudo	Woolly False Vampire Bat	*Chrotopterus auritus*	Amenazada (A)	LC- Least Concern
Murciélago orejón de garganta amarilla	Yellow-throated bat	*Lampronycteris brachyotis*	Amenazada (A)	LC- Least Concern
Murciélago nariz de espada	Tomas long-eared bat	*Lonchorhina aurita*	Amenazada (A)	LC- Least Concern

Murciélago oreja redonda brasileño	Pygmy round-eared bat	*Lophostoma brasiliense*	Amenazada (A)	LC- Least Concern
Murciélago oreja redonda mesoamericano	Davi´s round-eared bat	*Lophostoma evotis*	Amenazada (A)	LC- Least Concern
Murciélago patas largas	Long-legged bat	*Macrophyllum macrophyllum*	Amenazada (A)	LC- Least Concern
Murciélago lanza de Cozumel	Cozumel spear-nose bat	*Mimon cozumelae*	Amenazada (A)	LC- Least Concern
Murciélago lanza norteño	Pale-faced bat	*Phylloderma stenops*	Amenazada (A)	LC- Least Concern
Murciélago cara rayada de orejas redondas	Stripe-headed round-eared bat	*Tonatia saurophila*	Amenazada (A)	LC- Least Concern
Murciélago labio verrugoso	Fringe-lipped bat	*Trachops cirrhosus*	Amenazada (A)	LC- Least Concern
Coatí	White-nosed coati	*Nasua narica*	Amenazada (A)	LC- Least Concern
Mapache	Northern Raccoon	*Procyon lotor*	En peligro de extinción (P)	LC- Least Concern
Tapir centroamericano	Danta or baird's tapir	*Tapirus bairdii*	En peligro de extinción (P)	EN- Endangered
Pecarí de labios blancos	white-lipped peccary	*Tayassu pecari*	En peligro de extinción (P)	VU-Vulenrable
FISH				
Bagre de Chiapas	Chiapas Catfish	*Lacantunia enigmatica*	En peligro de extinción (P)	VU-Vulenrable
PLANTAS				
Palo blanco	Canacoite	*Bravaisia integerrima*	Amenazada (A)	LC- Least Concern
Amargoso	Gateado	*Astronium graveolens*	Amenazada (A)	LC- Least Concern
Palo de zope	Candelero	*Guatteria anomala*	Amenazada (A)	VU-Vulenrable
Guaya de cerro	Camedor tepejilote	*Chamaedorea alternans*	Amenazada (A)	LC- Least Concern
Yuca epífita	Quim	*Yucca lacandonica*	Amenazada (A)	EN- Endangered
Brasil	Jacareuba	*Calophyllum brasiliense*	Amenazada (A)	LC- Least Concern
Amargoso	Amargoso	*Vatairea lundellii*	En peligro de extinción (P)	VU-Vulenrable
Palmita chiapaneca	Ceratozamia matudae	*Ceratozamia matudae*	En peligro de extinción (P)	EN- Endangered
Palmita	Palmita	*Ceratozamia miqueliana*	En peligro de extinción (P)	EN- Endangered
Palma de camote	Ceratozamia robusta	*Ceratozamia robusta*	Amenazada (A)	EN- Endangered
Cícada	Zamia katzeriana	*Zamia katzeriana*	En peligro de extinción (P)	CE- Critically Endangered
Cícada	Zamia purpurea	*Zamia purpurea*	En peligro de extinción (P)	CE- Critically Endangered
REPTILES				
Mazacuata	Red-tailed Boa	*Boa constrictor*	Amenazada (A)	LC- Least Concern

Falsa coralillo real oriental estadounidense	Eastern Milksnake	*Lampropeltis triangulum*	Amenazada (A)	LC- Least Concern
Culebra perico mexicana	Mexican Parrot Snake	*Leptophis mexicanus*	Amenazada (A)	LC- Least Concern
Geco yucateco de bandas	Yucatan Banded Gecko	*Coleonyx elegans*	Amenazada (A)	LC- Least Concern
Iguana negra de cola espinosa	Common Spiny-tailed Iguana	*Ctenosaura similis*	Amenazada (A)	LC- Least Concern
Culebra acuática centroamericana	Western ribbon snake	*Thamnophis proximus*	Amenazada (A)	LC- Least Concern
Lagartija espinosa azul	Yucatecan rough-scaled lizard	*Sceloporus serrifer*	Amenazada (A)	LC- Least Concern
Guao tres lomos	Guao	*Staurotypus triporcatus*	Amenazada (A)	NT- Near Threatened
Nauyaca de árbol manchas amarillas	Yellow-blotched Palm Pit Viper	*Bothriechis aurifer*	Amenazada (A)	VU-Vulenrable

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Annexes:
Appendix 1: Supplementary tables

Supplementary Table 1 – field plots in La Corona

Plots	AGB (2006) Mg ha^{-1}	AGB (2013) Mg ha^{-1}	Carbon stock, including belowground, 2006 Mg C ha^{-1}	Carbon stock, including belowground, 2013 Mg C ha^{-1}
Cor-01	143.7	197.8	89.8	123.7
Cor-04	107.9	146.3	67.5	91.4
Cor-07	162.5	248.4	101.6	155.3
Cor-12	71.9	157.9	44.9	98.7
Cor-14	133.8	240.5	83.6	150.3
Cor-17	95.2	127.5	59.5	79.7
Cor-18	47.3	98.9	29.5	61.8
Cor-23	255.5	388.0	159.7	242.5
Cor-31	130.4	182.9	81.5	114.3
Cor-33	80.7	80.7	50.5	50.5
Cor-34	123.9	132.2	77.4	82.6
Cor-40	104.1	140.1	65.1	87.5
Overall mean	**121.41**	**178.45**	**75.88**	**111.53**

Supplementary Table 2 – field plots in Reforma Agraria

Plots	AGB (2006) Mg ha^{-1}	AGB (2013) Mg ha^{-1}	Carbon stock, including belowground, 2006 Mg C ha^{-1}	Carbon stock, including belowground, 2013 Mg C ha^{-1}
Ref-08	53.7	176.2	33.6	110.1
Ref-12	421.5	369.8	263.4	231.1
Ref-24	238.6	301.6	149.1	188.5
Ref-25	410.5	547.3	256.6	342.1
Ref-30	249.4	582.6	155.9	364.1
Ref-31	279.3	279.3	174.6	174.6
Ref-38	73.1	153.4	45.7	95.8
Ref-42	115.9	164.5	72.4	102.8
Ref-43	320.3	422.7	200.2	264.2
Ref-49	318.3	417.3	199.0	260.8
Ref-51	433.3	433.3	270.8	270.8
Ref-54	133.5	279.7	83.4	174.8
Overall mean	**253.94**	**343.96**	**158.71**	**214.98**

Supplementary Table 3 – field plots in San Isidro

Plots	AGB (2011) Mg ha^{-1}	Carbon stock, including belowground, 2011 Mg C ha^{-1}
SanI-1	44.9	28.1
SanI-2	38.3	23.9
SanI-3	272.1	170.1
SanI-4	101.0	63.1
SanI-5	79.4	49.6
SanI-6	414.8	259.2
SanI-7	61.0	38.1
SanI-8	67.2	42.0
SanI-9	46.8	29.2
SanI-10	80.2	50.1
Overall mean	**120.57**	**75.36**