ASSESSMENT SUMMARIES AND MANAGEMENT PLANS FOR THE NPP

AGROACEITE, S.A.

2017

JANUARY

Contenido

1. COMPANY INFORMATION

The company started its activities in 2008, in the municipalities of Coatepeque and Génova, both in the department of Quetzaltenango, as well as in the municipalities of Pajapita and Tecún Umán in the department of San Marcos.

From its beginning it was an independent company, i.e. with no independent producing partners. The company has 6,658ha of which 5,298ha are cultivated with oil palm. Of these 2,980ha corresponded to land of their own and 3,678ha are rented.

Annually they produce 16,400 TM and have their own palm oil mill so that 100% of the fruit produced in the farms of the company is sent to the company's own mill, which has a Rainforest Alliance's Chain of Custody certified process.

The first extraction test in the palm oil mill was made at the end of 2012, which continued during the first months of 2013, and from April of that year when formal extraction of the fruit produced in their farms began.

The products that are generated are CPO, CPKO and palm kernel flour, this last one is marketed at the local level. Both oils are marketed crude, the company does not have a refinery.

At present we have a well-defined administrative organization in the field as well as in the palm oil mill, which has facilitated each one of the jobs and allowed the company's growth.

The growth goal of the plantations is 500 ha/year; in regard to independent producers, their incorporation to the company has not been considered yet.

There are 994 field workers and 46 employees in the palm oil mill.

1.1. MAP 1. LOCATION OF THE PROJECT

Location of farms Agroaceite S.A.
Departments: San Marcos,
Quetzaltenango y Retalhuleu.

Simbology
• Town
--- Streets and rural roads
— Water network
▩ Agroaceite's farm
⌐ Boundary Ramsar site Manchon Guamuchal
▨ System of protected areas

Water bodies
▬ Lakes
▬ Flood prone area
▭ Municipal division

Location Diagram

1:250.000

GTM Projection
Guatemala Transversal de Mercator
Central Meridian -90.5 / Scale Factor: 0.9998
Datum: D - WGS- 1984

Data source:
National Geographic Institute, Guatemala (IGN)
Ministry of Agriculture, Livestock and Food (MAGA)

Author:
BioTerra, Environmental Consultants
Cartographic elaboration:
Geog. Jonathan Arias Garro
Date: May 2016

Source: Bioterra

6

Mapa 2. New platantions map

Source: Bioterra

1.2. LAND TITLE REGISTERS

FARM	Registry	Page	Book	Departament	Owner
Maravillas	8378	374	17E	Retalhuleu	Agroaceite
Palmira	47989	96	242	San Marcos	Inversiones AGT
San Andres	59243	49	296	Quetzaltenango	María Josefa Bedoya Gonzalez
Santa Isabel	307	58	4	Retalhuleu	Inversiones AGT
Santa Isabel	7217	183	39	Retalhuleu	Inversiones AGT
Santa Isabel	7937	20	43	Retalhuleu	Inversiones AGT
Santa Isabel	9219	154	48	Retalhuleu	Inversiones AGT

2. ASSESSMENT PROCESS DATES

Chart1. ASSESSMENT PROCESS DATES

SCHEDULE OF ACTIVITIES
JANUARY, 2014
The first contact between Agroaceite and BIO TERRA took place, and they began negotiations to carry out the first phase of the HCV Assessment of their farms. A first meeting was held in Guatemala in order to analyze the approach to the HCV Assessment on the company's farms. Agroaceite sent the first information of its plantations and operations.
FEBRUARY 2014
The revision of the contract between the two companies began. The contract between Bio Terra and the Company was approved. BIO TERRA provided the guidelines for the work required for the development of the Rapid Ecological Assessment (REA) that had to be carried out by the counterparty consultant in Guatemala, to be hired by Agroaceite. Agroaceite started the elaboration of the REA on its farms.
MARCH, 2014
The company counterpart performed the REA in the farms.
MARCH - MAY 2014
Agroaceite sent the REA of its farms to Bio Terra.
JUNE, 2014
Bio Terra carried out an analysis of the location of the project at the regional and local level.
JULY, 2014
Agroaceite sent part of the information required by Bio Terra for conducting the HCV Assessment. The area to be evaluated was extended and modifications relevant to the original offer were carried out. Agroaceite sent the new shapes of the new area to be evaluated. BIO TERRA began coordinating the field work. BIO TERRA began selecting the control points to be corroborated in Agroaceite's farms, during Bio Terra's field work. An existing information bibliographic review of the area was performed.
AUGUST, 2014.
Field work was coordinated with the social actors. Agroaceite coordinated cartographic and geographic information necessary for the preparation of the HCV

Assessment. BIO TERRA carried out the field work from August 11 to 17. BIO TERRA made a general recognition of the area under study. Review of the company's documents. Meetings with social actors. Agroaceite sent part of the information required by Bio Terra to carry out the HCV Assessment. The HCV Assessment begins. Maps for the HCV Assessment were begun.
September, October, November and December 2014 and January, February and March 2015
Agroaceite sent part of the information required by Bio Terra to carry out the HCV Assessment. BIO TERRA performs a review of the information provided by the Company. The HCV Assessment began. Maps for the HCV Assessment were begun.
April, 2015
The first phase of the HCV Assessment was finished. The first drafts of the HCV maps were finished. Any doubts were answered.
May, 2015
Doubts were answered. The last details of the HCV maps were refined. The last details of the HCV Assessment were refined. The Final HCV Evaluation was delivered.
May, 2016
The information generated a year ago was updated, focusing only on the new plantation proposals.

2.1. SEIA

The Social and Environmental Studies were conducted between August and december 2016.

2.2. SOIL STUDY

The Soil Study was conducted were conducted between August and december 2016.

2.3. LUC

The LUC were conducted between August and September 2016.

Assessors

High conservation value assessment	Bioterra Marisol Zumbado Bustillos Biologist and environmental consultant Consultant for HCV network (license ALS 14004MZ). College of biologist No. 1436 Team leader accredited by the RSPO. Master in auditing and environmental management with specialization in management and conservation of natural resources.
Environmental Assessment	Ambiente y Desarrollo Consultores

	Fernando Luna Specialized in environmental management, natural resources and Water resources, including the application of remote sensors and information systems Geography for the management of natural resources and the environment.
Social Impact Study	Enlaces –Servicios Profecionales Integrados- Luis Adolfo González Morales
	Centrarse Janio Rosales, Gerente de Gestión Empresarial, tel: 2268-3714, jrosales@centrarse.org www.centrarse.org
Soil study	Ambiente y Desarrollo Consultores Fernando Luna Specialized in environmental management, natural resources and Water resources, including the application of remote sensors and information systems Geography for the management of natural resources and the environment.
Greenhouse gases Evaluation	Green Development Ing. Amilcar Ordoñez Certified to ISO 14064 standards . 2006 and DIN EN 16001 : 2009-08 (No. AI- Eesa - 002-11) and he has worked in the AENOR certifications and TÜV Rheinland.

Methods used for conducting assessments

2.4. HCV

HIGH CONSERVATION VALUES	METHODOLOGICAL PROCESS
HCV1: Diversity of species	-GIS Information ❖ Analysis of satellite and aerial imagery. ❖ ASP maps, land use maps, etc. -Secondary Information ❖ ASP Management plan review ❖ NGOs list. -Review of listed species on national and international

-HCV2: Ecosystems and mosaics at the landscape level.	agreements ❖ CITES. ❖ IUCN. ❖ Guatemalan legislation. ❖ Others. Rapid Ecological Assessment (REA) - Compilation of field information / field sampling ❖ Daytime terrestrial fauna ❖ Daytime flying fauna ❖ Flora
-HCV3: Rare, threatened or endangered ecosystems or habitats	- Consultation of social actors ❖ Independent owners. ❖ Community population. ❖ Community leaders. ❖ Company workers. ❖ Public officials
-HCV4: Ecosystem Services	-GIS Information ❖ Soil and vegetation maps. ❖ Hydrological and soil maps. ❖ Cartographic sheets.
-HCV5: Community needs	-Analysis of satellite and aerial imagery. -Government databases analysis.
-HCV6: Cultural Values	- Consultation of social actors -UNESCO

2.5. SOCIAL IMPACT ASSESSMENT

As could be seen in the data collected in the INE 2002 Census, the population of the municipality of Coatepeque consists of 94,186 people, of whom only the 0.73% belong to the hamlet La Democracia, this percentage is equal to 688 persons. There is current information on the presence of 130 families with an average number of 6 to 8 members per household in the hamlet and based on this data it was decided to develop the field work with a total sample of 9% of households in La Democracia , made by a total of 11 surveys, without taking into consideration semi-structured interviews.

Based on what has been previously submitted, the citizen participation plan became effective, and included the following:

- Interviews with representatives of organized civil society
- Interviews to municipality´s representatives
- Opinion survey to population and community leaders
- Focus group meeting
- Guided visit to Agroaceite's plant

3. LUCC

The development of the methodology of analysis of land use change, forest cover in the municipality 1) Coatepeque, Quetzaltenango, 2) Pajapita, San Marcos, 3) La Blanca, San Marcos, 4) Retalhuleu, Retalhuleu, of Guatemala Republic, has taken two main independent phases:
• Processes with satellite images, and
• Generation Analysis supervised Classification.

The processes of satellite imagery have been limited by failures in the satellite used historically in national projects (Landsat 7). This has forced evaluate methods of data repair, and use other satellites and other ranking methodologies.

Selecting Satellite Images
SPOT satellite data were used for the analysis of land use, which were developed and operated by Airbus Defense and Space (French Space Agency). The SPOT 1 Satellite has a resolution of 10 meters.

No.	NCOLS	NROWS	Date	Name	Resolution	Satelite
1	--	--	30/11/2006	055554745010_01	20	DigitalGlobe
2	--	--	25/11/2009	055554745020_01	20	DigitalGlobe
3	7490	7273	26/09/2007	DATA_N456.07_E158.40	10	Spot
4	7683	7263	20/11/2009	DATA_N456.09_E154.91	10	Spot
5	8764	7593	29/11/2005	DATA_N456.51_E158.16	10	Spot
6	7137	7163	26/12/2009	DATA_N471.29_E159.39	10	Spot
7	8320	7351	14/12/2007	DATA_N471.56_E155.82	10	Spot
8	8937	7458	15/11/2005	DATA_N471.71_E161.80	10	Spot
9	9	21	50	21/06/2014	30	LC8021502014172LGN00
10	10	21	50	08/04/2016	30	LC80210502016098LGN00

3.1. FPIC PROCESS

During the Social Impact Study, Agroaceite carried out the Prior Informed and Free Consent process; Having as active participation the main representatives of the neighboring communities to whom the project was made known before the development of palm oil; In order that the plantations do not adversely affect the area and have the consent of the communities.

3.2. SUMMARY OF FINDINGS

Activities	Positive effects	Negative effects
Superficial water	The river borders will be reforested.	They have heard that it attracts drought and flood.
Environment	Conduct environmental education programs, reforestation of community schools to strengthen their knowledge on the subject.	No significant negative environmental impacts are identified, the project will not perform any conversion of use, and is not going to remove forest cover or wetlands.
	Carry out planting and production plant tours so that they know how to operate and strengthen knowledge about environmental practices (wastewater, use of agrochemicals, compliance with the law and other sustainable practices with the environment).	
	The ditches have helped prevent floods from affecting the livestock.	
Oil palm crop	**These crops have flourished.**	**It is recommended that they meet legal and MARN requirements**
empty containers of agrochemicals	**The empty containers of agrochemicals will be delivery to Agrequima, which is an entity approved by the government to receive this material and recycle it.**	**They are concerned about the contamination of chemicals used on crops**

Applicable environmental laws and Environment Ministry Natural Resources –MARN-	
Decree No. 68-86	Law on Protection and Improvement of the Environment.
Government agreement No. 137- 2016	Evaluation Regulation, Control and Environmental Monitoring.
Government agreement No. 236- 2006	Regulation of discharge of waste water

HCV Assessment

DESCRIPTION OF THE AREAS AND PLANTING DATES OF EACH ONE OF THE FARMS UNDER STUDY

Planting Units	Total area of the farm	Area to be planted	Own or rented
San Andrés	394.9	375.2	Rented
Palmira	59.8	56.8	Own
Santa Isabel	285.4	271.1	Own (AGT investments)
Maravillas	92.3	87.7	Rented
TOTAL	**832.4**	**790.8**	

4. REGIONAL CONTEXT

The project is in the Pacific coastal savanna biome located on a vast plain of the Pacific Ocean with countless rivers that flow through alluvial deposition and volcanic soils, favoring the increase of the use as pasture for cattle foraging, which have allowed the permanence of some isolated trees (Villar, 2008).

The map of Guatemala's plant ecosystems prepared by INAB (2001) indicates that the Project is in the ecosystem of productive systems with no significant segments of natural forests of various monocultures.

TOPOGRAPHY

This region is characterized mainly by its flat topography with an average slope of 1%.

LAND USE

The study area is predominantly agricultural, where for years pastures, banana, sugar cane, cotton plantations, and more recently oil palm have prevailed. Also bananas, corn, sesame, rubber, as well as pastures for livestock can be seen.

CLIMATE

The annual rainfall is between 900 mm to 3000 mm. There is a well-defined summer and winter, on average the rainiest months are the following: June and August with precipitations higher than 450 mm/month. While the driest months are December to April.

5. PLANT COVERAGE

5.1. BIOLOGICAL DESCRIPTION OF THE FARMS UNDER STUDY

Planting Units	Biological Description
San Andrés	San Andrés is a grazing land, which borders mainly with pastures and other grazing lands. On the eastern border there are other crops such as corn and oil palm. The nearest village is located to the north of the property, Village La Democracia. In the farm there is a lowland or lagoon that remains humid even in the dry season, which is fed by the river Zin that flows through the property. The riparian forest of river Zin does not have a significant width and does not follow all the length of the river.
Maravillas	Las Maravillas is totally covered by banana cultivation, which has been gradually eliminated. It borders mainly with banana, oil palm crops and pastures. Oil palm plantations located in the east of the property belong to Agroaceite, S.A. since 2008 and 2009. To the west is the nearest village, the community Las Mercedes. The landscape in general shows an area being used mainly for agriculture and livestock raising, with very little forest cover and ecosystems under some degree of conservation.
Palmira	Palmira is a pasture that is bordered on the south by the Rio El Naranjo, to the north and west with an adult oil palm plantation (>20 years), and to the south-east and east with pastures. The vegetation of the Río El Naranjo is made up of weeds and some shrubs. Fields with no vegetation can be seen, on the other side of the river there are some trees of secondary succession species.
Santa Isabel	Santa Isabel is made up of two farms entirely covered by rubber, which has been gradually eliminated. This unit is mainly next to sugar cane plantations and pastures for livestock. They are located between two rivers, the Samalá on the eastern border and Ixpatz river on the northwest. The latter goes through one of the farms in the northwest sector. The Ixpatz riverbed has plant cover, where herbaceous vegetation predominates, some shrubs and secondary succession trees. With regard to the Rio Samalá, rubber plantation is located next to the river, however there are some shrubs and trees on the river banks and also sand banks can be seen on the shores.

6. HCV RESULTS

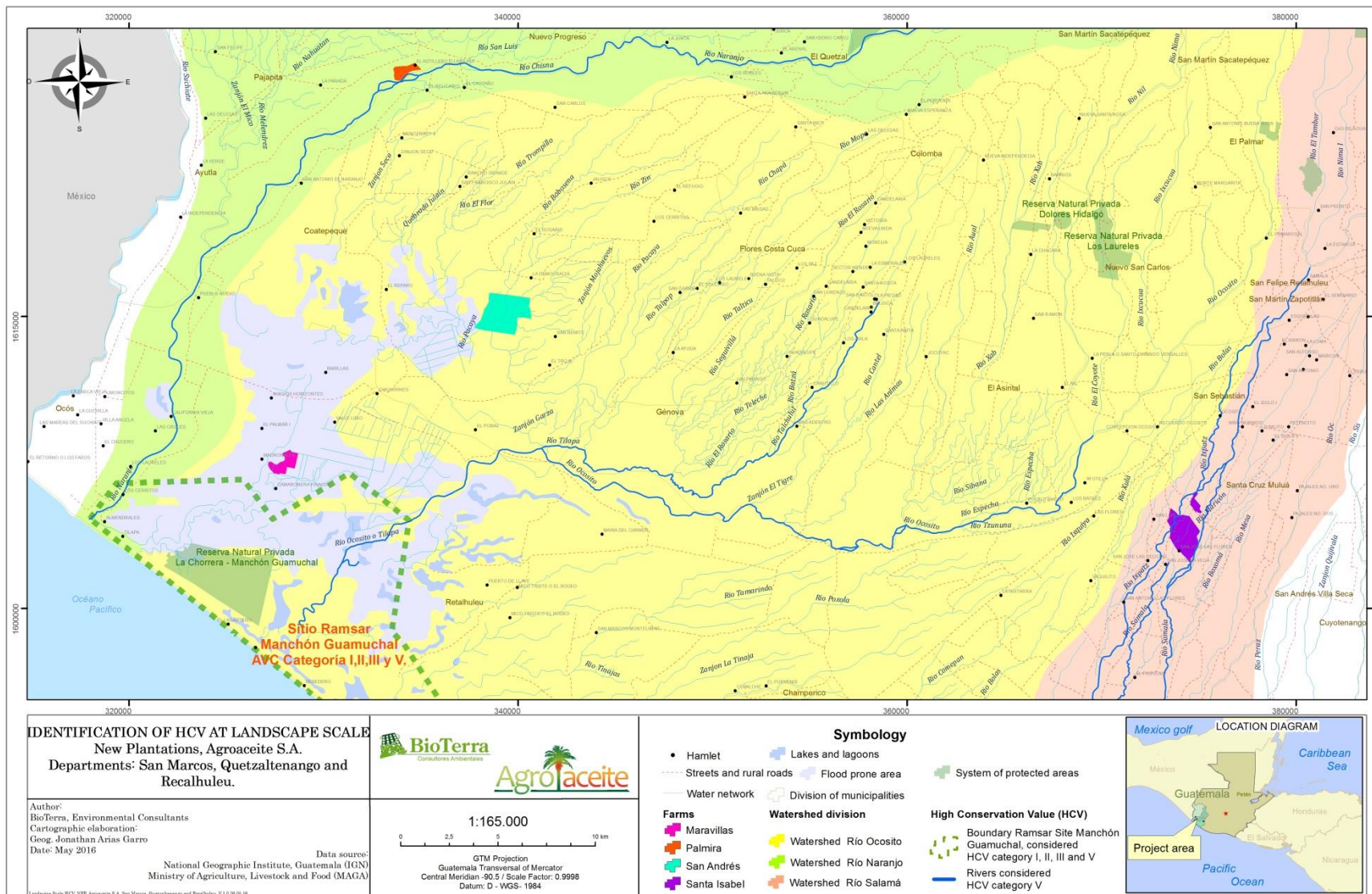| HCV	Description	Planting Unit	Present	PP	Absent	Observations
1	*Concentrations of biological diversity, which contain endemic or rare, threatened species, and that are of significant importance at the regional, national, or world level.*	Santa Isabel			▉	The few ecosystems that still persist both in this planting unit as its area of influence are altered habitats. Crop areas predominate, and in some cases patches of forest persist, but they have already been altered, and there is no good connection to other more healthy ecosystems. By the dimension and conditions of these patches of forest, it is not possible for them to shelter significant and stable RAP populations.
		San Andrés	▉			No HCV has been identified in these farms, however, their waters drain into the wetlands of the Manchón Guamuchal. This wetland is of significant importance as a site that hosts a large number of species of wild animals, many of which are protected species at the global level. A bad agricultural management in these farms could generate a negative impact on this HCV.
		Maravillas				
		Palmira				
2	*Landscape -scale ecosystems and mosaics of large size ecosystems important at the global, regional or national scale, which have viable populations of the vast majority of species present in a natural way under natural patterns of distribution and abundance.*	Santa Isabel			▉	As mentioned in advance, the few remaining natural ecosystems in this planting unit and/or in its areas of influence, belong to patches of isolated and much altered forest coverage that cannot have viable populations of the vast majority of species present there.
		San Andrés	▉			There are no HCVs in any of these farms, however, as already indicated their water drains to the Manchón Guamuchal wetland. This is the largest marine coastal wetland of the southern Pacific coast of Guatemala, and is of the last ones that still has these area proportions. This ecosystem has 25 thousand hectares of floodable area, of which 7,650 are covered by mangroves, and the extension proposed as protected area is
		Maravillas				
		Palmira				

HCV	Description	Planting Unit	Present	PP	Absent	Observations
			[red]			13,942 hectares. It should be noted that this type of ecosystem in the Central American context, is considered very significant and important at the regional level. A bad agricultural management in these farms could generate a negative impact on this HCV.
3	*Rare, threatened or endangered ecosystems, habitats or shelters.*	Santa Isabel			[green]	The mosaic landscape where this planting unit is located, is a region where an extensive use of land has been carried out for decades, degrading the natural ecosystems that once occupied the area. Because of this, there are no rare, threatened or ecosystems in danger in the farms or in their surrounding areas.
		San Andrés	[red]			No HCV has been identified in these farms, however, as it has been mentioned before, its waters drain into the wetlands of Manchón Guamuchal. The Manchón Guamuchal is one of the last largest marine coastal wetlands in the south Pacific coast of Guatemala, therefore it is considered a fragile and in danger ecosystem, besides the degradation of this type of ecosystem is generally faster than degradation in other ecosystems. A bad agricultural management in these farms could generate a negative impact on this HCV.
		Maravillas				
		Palmira				
4	*Basic services of an ecosystem in critical situations, such as the protection of water collection areas and control of soil erosion and vulnerable slopes.*	Santa Isabel			[green]	It has not been considered that the ecosystems give basic services during critical situations in the interest zone. This area does not have recurring fires, therefore no ecosystems have been identified to control this type of phenomena. The issue of flooding is common in these plains, however, it cannot be claimed that one of the remaining ecosystems mitigates this type of phenomena, since overflows are
		San Andrés				
		Maravillas				

HCV	Description	Planting Unit	Present	PP	Absent	Observations
		Palmira				scattered and not always at the same time. In relation to mudslides, the area of interest is quite flat, so that it is not an area prone to this type of phenomena. In regard to water catchment areas or fish ponds, no critical site for their protection has been identified, and there is no available scientific information related to these topics. However, the water and fishing issue is dealt with more extensively in the next HCV, which would be the resources that would be protected in the HCV5.
5	*Sites and vital resources to meet the basic needs of local communities, indigenous groups (for their livelihoods, health, nutrition, water, etc.), identified through dialog with those communities or indigenous people.*	Santa Isabel				In the area in general, there is vulnerability and problems related to the supply of water for domestic use and for crops in many of the communities inside and on the periphery of the multiple use UM. Many communities depend only on some stream, river, or groundwater source for its supply, and increasingly flows from these sources are smaller each time more, mainly in the dry season. The precautionary principle was adopted, since there was not enough scientific or social data, on the magnitude of the problem. Besides, the water network is very wide, and there is not enough information to know exactly what water bodies have flow problems, or what sources of water are used by the communities, their level of vulnerability, and/or protection, the level of actual dependency of the communities on each of these sources, etc. Because of this, a bad agricultural management in this planting unit could generate a negative impact on this HCV.

HCV	Description	Planting Unit	Present	PP	Absent	Observations
		San Andrés				No HCV has been identified in these farms, however, as it has been mentioned before, its waters drain into the wetlands of Manchón Guamuchal. On this wetland the direct dependence of at least 5 communities or hamlets (El Chico, El Bebedero, Tres Cruces La Barrita, El Lagartero, Tilapa) was clearly shown. The fundamental resource that these communities get from Manchón is fish, although there are other additional resources which they get such as building materials, firewood for cooking, meat by hunting, etc. Artisanal fishing in the area supplies this resource to the communities and is considered a primary livelihood for them. Communities also use this resource to sell in shops and in this way have money to meet the rest of their needs.
		Maravillas				According to this, a bad agricultural management in these farms could create a negative impact on this HCV.
		Palmira				**HCV under precautionary principle** In the area in general, there is vulnerability and problems related to the supply of water for domestic use and for crops in many of the communities in and on the periphery of the multiple use UM. Many communities strictly depend on some stream, river, or groundwater supply, and the flows from these sources are reduced over time, mainly in the dry season. The precautionary principle was adopted, since there was not enough scientific or social data, on the magnitude of the problem. In addition, the water network is very wide, and there is not enough information to know

HCV	Description	Planting Unit	Present	PP	Absent	Observations
			🟥	🟨		exactly what water bodies have flow problems, or what are the sources of water used by the communities, their level of vulnerability, and/or protection, the level of actual dependency of the communities on each of these sources, etc. Because of this, a bad agricultural management in this planting unit could generate a negative impact on this HCV.
6	*Significant sites, resources, habitats and landscapes for cultural, historical or archaeological reasons at the global or national scale, or of cultural, ecological, economic, or religious or sacred importance critical for the traditional culture of local communities or indigenous people.*	Santa Isabel San Andrés Maravillas Palmira			🟩	The existence of ruins, temples, or archeological sites of cultural importance of national or international nature has been ruled out in the area of interest. Nor are there in the area any world heritage, natural or cultural heritage sites according to UNESCO. Because of this, no resources, habitats, or landscapes, of historic, archaeological or cultural importance at the national or global scale, considered as HCV6 have been identified in the area.

6.1. LANDSCAPE LEVEL HCV ASSESSMENT MAP FOR ALL PLANTING UNITS

Source: Bioterra

6.2. HCV 1, 2 AND 3 ANALYSIS FROM THE WORK WITH THE SOCIAL ACTORS

In regard to these HCVs, it became clear that the area where the farms under study are, belongs to an area that has been overexploited for decades, mainly by agricultural activities, being subject to continuous land use change, which has eliminated nearly all the natural ecosystems, leaving only some small isolated patches of vegetation. Despite this, the existence and importance of the Manchón Guamuchal was pointed out, as an ecosystem where a great diversity of species many of them RAP species converge, in addition to being an ecosystem of considerable and significant dimensions at the regional level, and which houses one of the last coastal marine wetland environments of the Pacific Coast of Guatemala. Because of this information, this area is considered HCV 1, 2 and 3.

6.3. STAKEHOLDERS

Bio Terra Professionals Darien Zuniga and Jonathan Arias were in charge of tackling interviews and public consultations with various stakeholders, aiming not only to know the local perception of communities and institutions on the project, but also performing public inquiry to confirm or rule out the existence of HCV.

With regard to the concerns and/or recommendations of the social actors, the details stand out in the following table. The names, identity numbers and signatures of each of the social actors was included in the Annex section.

6.4. CONCERNS AND/OR RECOMMENDATIONS OF THE SOCIAL ACTORS

Name	Community leader / institution official	Observations of the social actors	Response of the consultant team
Cesar Joaquín Zacarías Coxic	INAB	Based on the work done with these social actors, pointed out his concern that it could eventually affect the Manchón Guamuchal, because of the importance of this site in environmental and social terms. It also points out that the waters of the new planting units with the exception of Santa Isabel, drain into this ecosystem, so bad agricultural management could eventually have an impact on the environmental conditions of the Manchón. In addition, the concern came up in relation to the issue of resources of water supply for some of the communities. It is mentioned that in	In relation to the concern about the Manchón Guamuchal, it was explained to the social actors that the objective of the study was to identify all those areas of importance and with a high conservation value to ensure their protection. It was explained that the study would create management measures and monitoring so that Agroceite would maximize its efforts in relation to the protection of the natural resources of this area. In regard to the problem of water resource, it was necessary to clarify that this subject lies mainly in a lack of government regulations to ensure rational and responsible water use. In the absence of this type of regulations, companies and individuals have free
Rudi Vásquez	Aldea Los Encuentros		
Felino Sandoval López	Comunidad Agraria Valle Lirio		
Dolores Corac Cifuentes Barrios	Aldea Los Ángeles Ayutla		
Enio Rondeli Ronquillo López	Caserío Tilapa, La Blanca		
América Martínez	MIDES Costa San		

Name	Community leader / institution official	Observations of the social actors	Response of the consultant team
	Marcos	the dry season the flow of rivers and wells drops significantly, and it is thought that this reduction in the flows lies in part by overexploitation of water resources carried out by large agricultural companies that are in the basin.	access to the resource and then there is overexploitation.
Darcila Ernestina Ramírez	Salinas I La Blanca		
Idalma Cifuentes	Casería San Luis		It was pointed out that the problem of general over-exploitation of water resources is not an issue that lies in Agroaceite, but that it is a sum of variables that finally cause lower flows and some of the communities suffer from water shortages.
Humberto Mendoza	Caserío Morenas		
Avan Guerrero	NA		

Note: It should be noted, that we are currently doing other HCV Assessments in the same region, so that we have fairly broad information on the topic of interviews and public consultation with different social actors or "stakeholders", so that together with the work done on this topic with Agroaceite, the results are enriched with information from the other experiences; without any prejudice to the confidential information of each company.

6.5. HCV MANAGEMENT AND MONITORING

In the case of the HCVs identified in the areas of influence, the threats would be largely indirect and potential, i.e. they would only occur in case of bad agricultural and environmental practices in the farms. It is also important to clarify, that as was confirmed in the course of this assessment, it is an agricultural area, so that the potential effects on the HCVs identified, could come from different sources, and they would not be necessarily impacts attributable to the company.

Threat assessment

Below, each of the potential impacts or threats has been given a value, using the Environmental Impact Importance Matrix (MIIA for its initials in Spanish) tool, which is widely used in Costa Rica, and was established by Executive Decree # 32966-MINAE.

CHART 2. IMPORTANCE MATRIX OF POTENTIAL IMPACTS AND/OR THREATS TO THE HCVS IDENTIFIED

#	Impact Description	Sign	Intensity	Extension	Time	Persistence	Reversibility	Recoverability	Synergy	Accumulation	Effect	Periodicity	Importance
		+,-	1-12	1-4	1-4	1-4	1-4	1-8	1-4	1-4	1-4	1-4	13-100
1	Elimination of plant coverage	-1	2	2	4	4	4	4	2	1	4	1	-34
2	Poaching	-1	2	2	4	3	2	4	2	1	4	4	-34
3	Reduction and disturbance of fauna	-1	2	2	4	3	2	4	2	1	4	4	-34
4	Poor management of solid waste	-1	4	4	4	3	2	4	2	2	4	4	-45
5	Poor management of agrochemicals	-1	4	4	4	3	2	4	2	2	4	4	-45
6	Erosion and Sedimentation	-1	4	4	4	4	2	4	2	2	4	4	-46
7	Soil degradation	-1	4	4	4	3	2	4	2	2	4	4	-45

Below are described each one of the potential threats to each of the HCVs identified in a broader manner, for the study area.

CHART 3. MAJOR THREATS TO THE HCV IN THE AREA UNDER STUDY

HIGH CONSERVATION VALUES	BRIEF DESCRIPTION OF THE HCV PRESENT	MAIN THREATS
HCV1	The Manchón Guamuchal has been identified as the only ecosystem in the MU with the potential to host significant concentrations of species of wild animals, including many RAP species. Because of this information, this ecosystem is considered an HCV1 ecosystem.	-Potential elimination of plant coverage, illegal logging, and the advance of the agricultural frontier, which would promote existing fragmentation even more, reducing the free transit area of the species that depend on the Manchón even more .
HCV2	In addition, in the context in which the new planting units are located, and taking into consideration the conditions of the region as such, the dimension of this wetland, is definitely believed to be significant at the landscape level as to be catalogued as an HCV2.	-Poaching and illegal extraction of flora and fauna. -Decrease and/or disturbance of fauna - Possible affectation on the bodies of water, which would generate changes in the physical
HCV3	This ecosystem mostly belongs to	conditions of the water bodies

HIGH CONSERVATION VALUES	BRIEF DESCRIPTION OF THE HCV PRESENT	MAIN THREATS
	a mangrove wetland, even considered a RAMSAR and AICA site, not to mention the fact that it is an extremely scarce ecosystem in Guatemala's pacific coast. All of the above makes it a very vulnerable ecosystem, and because of the land's vocation in the region, this ecosystem is also under great threat. According to this information, this site is considered an HCV3.	associated with the farms. These effects could eventually have an impact harming populations of species of fauna associated to Manchón Guamuchal. The scale of the effect would depend on the degree of impact that may be caused. This type of contamination could be caused by: • Poor management of solid waste • Poor management of agrochemicals • Erosion and Sedimentation - Degradation of soils by the loss of plant cover, soil compaction caused by passing bovine species, use of fertilizers and pesticides that change the chemical soil conditions, etc.
HCV5	In the same way as for the HCV described above, in the MU area, only the Manchón Guamuchal was classified as an HCV5. The people who live in its margins and in the Manchón, depend to a large extent on fishing to supply their diet. They also get firewood, and meat through hunting. In addition, some communities use the Manchón to navigate and move from one place to another because they don't have a road network. The water network of the basin was also identified as a HCV5 under the Precautionary Principle, being that it is essential and fundamental for the water supply of some of the communities. There has yet to be the necessary technical studies to identify with certainty what are the critical rivers regarding this matter, and why was the Precautionary Principle adopted.	**Threats to the water resource supply** - Resources overexploitation by big companies. - Lack of government regulation to ensure a rational and responsible use of the water resource.

Management and Monitoring

With the purpose of preserving the HCV identified, as well as the areas that even though they were not classified as HCV they still have a potential for medium conservation, the following table shows the details of the environmental measures which should be respected. It is important to explain that neither threats nor measures were divided by HCV in this case, because the HCVs identified are all related to the same ecosystem (Manchón Guamuchal), so that both the threats and the measures are applicable to each of the HCV identified. The only HCV found outside the Manchón Guamuchal was the HCV5 related to the water resources of the area, and in this case it a separation of the threats and the corresponding measures was made.

Chart4. RECOMMENDATIONS FOR HCV MANAGEMENT AND MONITORING

HCV	THREATS	MANAGEMENT RECOMMENDATIONS	MONITORING RECOMMENDATIONS
HCV1 -2-3 -4-5	-Potential elimination of plant coverage, illegal logging, and the advance of the agricultural frontier, which would promote existing fragmentation even more, reducing the free transit area of the species that depend on the Manchón, even more. -Poaching and illegal extraction of flora and fauna. -Decrease and/or disturbance of fauna - Possible affectation on the bodies of water, which would generate changes in the physical conditions of the water bodies associated with the farms. These effects could eventually have an impact harming populations of species of fauna associated to Manchón Guamuchal. The scale of the effect would depend on the degree of impact that may be caused. This type of contamination could be caused by: • Poor management of solid waste • Poor management of agrochemicals • Erosion and Sedimentation - Degradation of soils by the loss of plant cover, soil compaction caused by	• Keep strict erosion and sedimentation control practices, mainly with regard to surface runoff water that drains into the water bodies associated with the farms. • Ensure that the water bodies associated with the farms are not contaminated with agrochemicals. There must be a management plan for agrochemicals. • To fully respect the protection areas of the water bodies. • Promote plant recovery plans in the protection areas of the water bodies. • Keep signs indicating the prohibition of littering, or pollution of the water bodies in the planting units. • Actively participate in local and regional programs for the conservation of biodiversity in Protected Areas nearby. • Establish contact with local institutions, NGO's or government entities, in order to publish the conservation and management policies and actions that should be implemented. • Create links with NGOs, government agencies or community groups that work toward the conservation of the wetlands to determine potential partnerships and focus efforts strategically targeted to the management and protection of the wetland. • Economic or in kind contribution for the handling and management of the Manchón Guamuchal. • Avoid felling native trees in the planting units. • Prohibit taking out wild species and poaching in the planting units, and establish internal regulations to punish any employee who	• Perform sampling of flora and fauna to monitor the presence of RAP species, as well as their rates of biodiversity and abundance. • Monitor the behavior and dynamics of the protection areas of the water bodies (increase or decrease). • Monitor the behavior and dynamics of the forests remnants or wetlands in the farms (increase or decrease of regeneration areas). • Periodically monitor the plant recovery plans that will be implemented in the farms, through the application of the survival rates. • Carry strict records of each workshop, training, induction training materials that will be created, in relation to the fulfilment of the measures detailed here. • Have periodical photographic records (when applicable) to illustrate compliance with the measures detailed here. • Perform physical-chemical water body analysis of those associated with the planting units to monitor the degree of sedimentation and potential sources of contamination.

	passing bovine species, use of fertilizers and pesticides that change the chemical soil conditions, etc.	ignores this prohibition. • Keep signaling indicating the ban on hunting, and the removal of wildlife and flora. • If any burrows, shelters or nests of any wildlife species are identified in the farms that required relocation in the planting units, the State offices concerned shall be notified for their relocation. • Place signs, stating rare, endemic, threatened or endangered species identified in the farms that must be protected to help raise awareness of their ecological value. • Once the activities of new plantations begin, an assessment of the employees should be undertaken with the purpose of determining the level of awareness that they have on the ecological values of the area, and be able to strengthen these values. • Take a firm stand and inform the communities on the policies and actions that will be taken by the Company in the environmental field. With the objective of setting a precedent for the protection of the environment in the area. • Identify recurrent socio-cultural behaviors among employees, such as the pollution of water bodies, collecting firewood, and poaching, among others, which eventually may affect areas of ecological importance in the farms or in their surroundings. To formulate relevant solutions. • Collaborate strategically with environmental education and awareness, both the workforce as well as the people of the surrounding communities. • Identify internal Company problems, in regard to the management of the plantations that could eventually affect important ecological	• Take annual water samples of the water bodies for the group of macro-benthic invertebrates (biological indicators).

		areas close to the farms.	
		• Identify at the landscape level, those sites with potential for connecting the remnants of forest areas and promote such connection to favor the establishment of biological corridors.	
		• Assess populations of wild, threatened or endangered species that are using the remnant plants still present in the plantations, with the object to determine their population status.	
		• Once the plantations have been established, determine their use by the wildlife species identified, as transit and travel routes toward better established areas.	
		• Develop a plantation management plan taking into consideration the environmental impact.	
		• Implement landscape management tools (biological corridors, living fences, fragments or patches of native forests, wetland enrichment and isolation) that ensure the diversity and configuration of the natural landscape.	
		• Design and implement a local system of ecological connectivity that is integrated to the main ecological structure of the region.	
		• The regional oil palm agro-system should not be continuous, and a separation or isolation of the farms of at least 5 kilometers must be sought, in order to promote a diverse landscape.	
		• During the planning of each productive activity, a management plan must be designed and implemented for the landscape that favors heterogeneity of the area and connectivity between relics of ecosystems and the permanence of associated biodiversity. The plan should be based on the	

		implementation of landscape management tools (LMT), such as agroforestry systems, replanting of native species, protection of forest fragments and wetlands, implementation of biological corridors, reconnection of riparian forests, and others. **Recommendations for water shortage in some communities** • Create a joint commission between the company and leaders of the communities that are being affected to generate solutions to the water shortage problem they are going through. • Perform a technical study to identify exactly what communities located downstream of Agroaceite's outlets have shortage problems. • Determine the demand for the Company's resource, and the demand of the resource of the communities that are being affected, vs the existing flow in these rivers. • Guarantee that the company is not going to place its needs above those of the communities being affected.	
	Threats to the water resource supply - Resources overexploitation by big companies. - Lack of government regulation to ensure a rational and responsible use of the water resource.		**In relation to shortages:** A periodic poll must be carried out with communities to determine the extent of the problem and the effectiveness of the solutions that are being put into practice and be able to keep a close follow-up of the evolution of this topic.

WORK WITH SOCIAL ACTORS AND FIELD ROUTES

Signature Record of the work with stakeholders.

PROYECTO: AGROACEITE S.A.   CONSTANCIA DE REGISTRO DE ENTREVISTAS Y CONSULTAS PÚBLICAS   FECHA: AGOSTO, 2014
PRINCIPIO 5, CRITERIO 5.2 / ALTOS VALORES DE CONSERVACIÓN 4 -5- 6

NOMBRE	NÚMERO DE IDENTIDAD	COMUNIDAD	OCUPACIÓN - CARGO	FIRMA
Cesar Jeqin Lacario Cose	1906850941401		INAB/Encargado de mangle	
Rudi Vásquez D.	1897 84481 0920	Aldea los Encuentros	Secretario Cocode	
Felino Sandoval	1843935581977	Comunida Agraria valle Lirio	Presidente Tricinio suroccidente	
Dolores corac Cifuentes	1612353981217	Aldea Los Angeles	vecino	Dolon oc Cfl
Enio Ronguille lopez	2239896251218	Caserio Tilapa, la Blanca sm	de las personas Registrador Civil	
America Martinez	2592757000503	Mides Code San Marcos	Delegada Regional	
Daisita E. Ramirez	1939914501218	Salinas I La Blanca	MEPU docente	
Idalma Cifuentes		Caserio San Luis	presidente de cocode	Idalma Cifuentes
Hmmm jioi	2428725570924	Caserio modenas.	Presidente cocode	
Alvai Guerrero	2359123011101		Director Regional Conap Costa Sur	

6.6. HCV Assessment Map, for the planting units, San Andrés and Maravillas
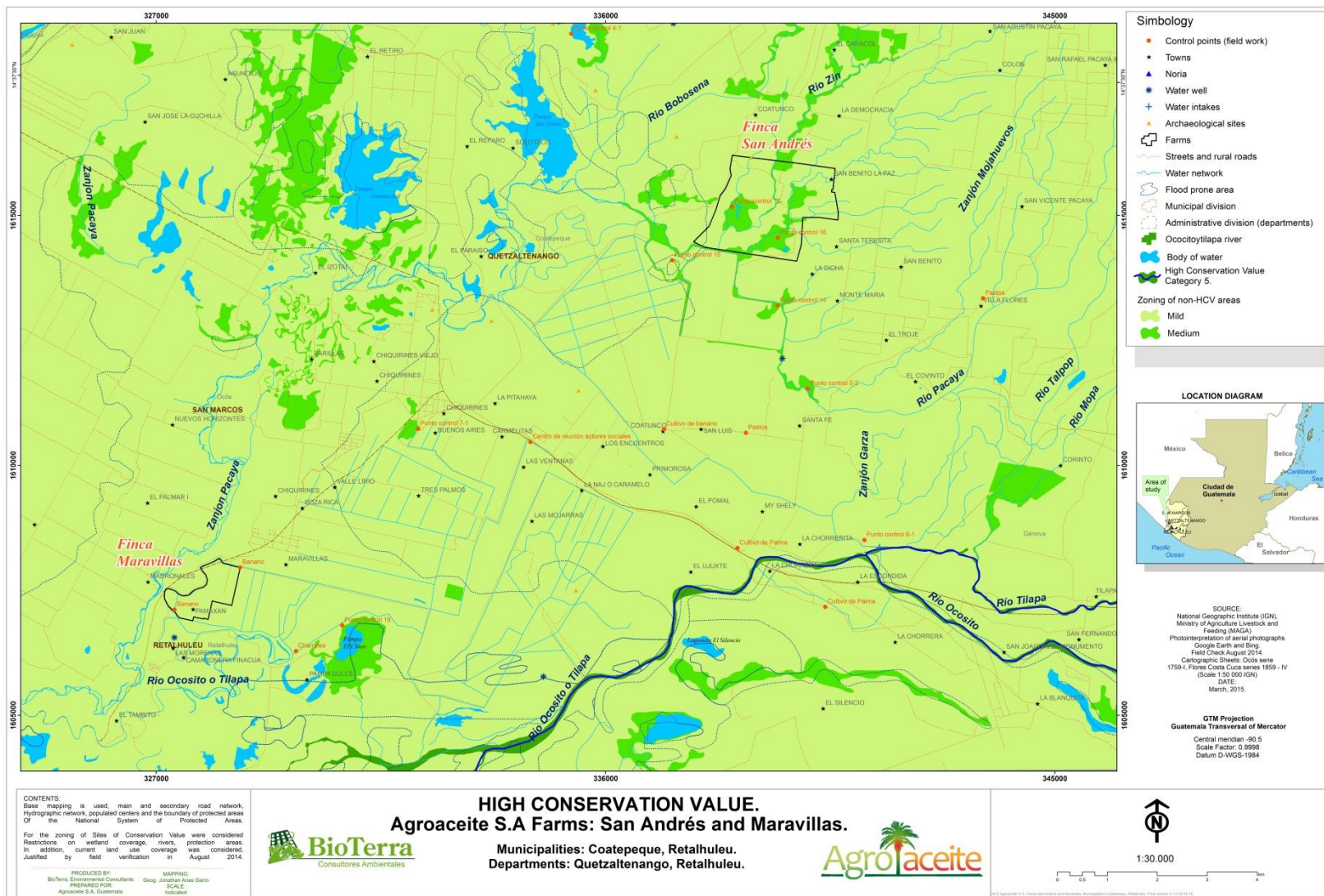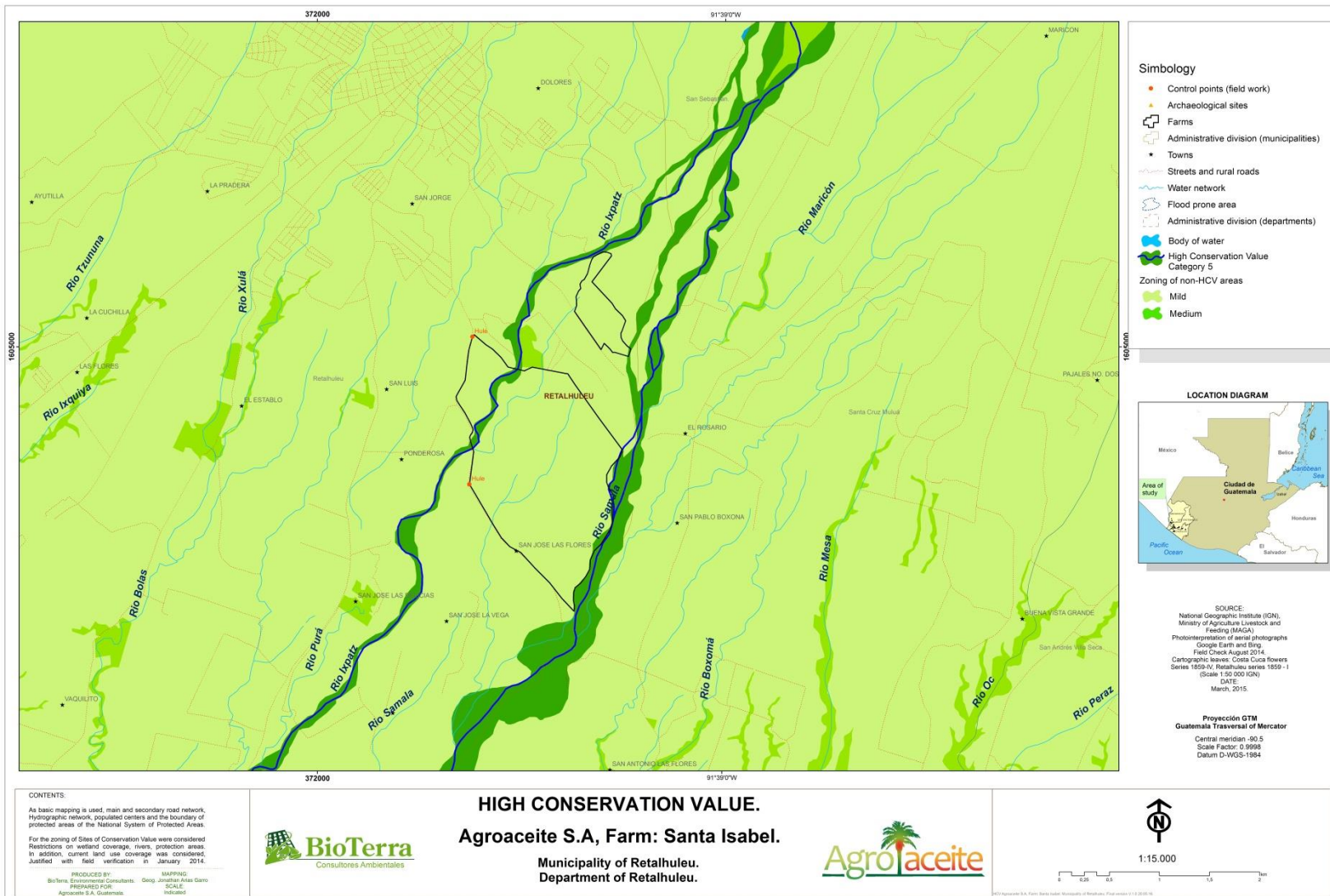

Source: Bioterra

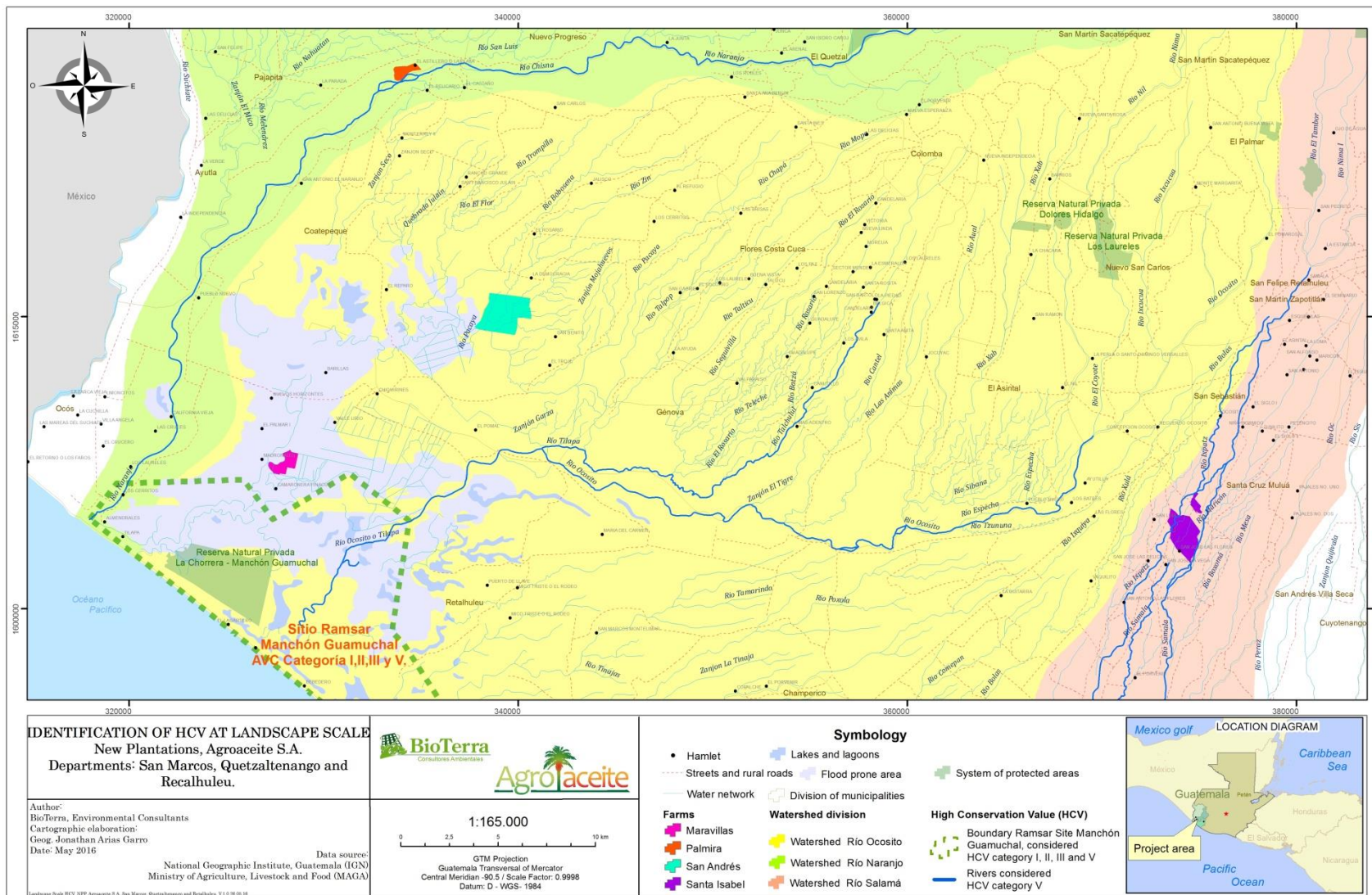## 6.7.   HCV Assessment Map for the planting unit Palmira
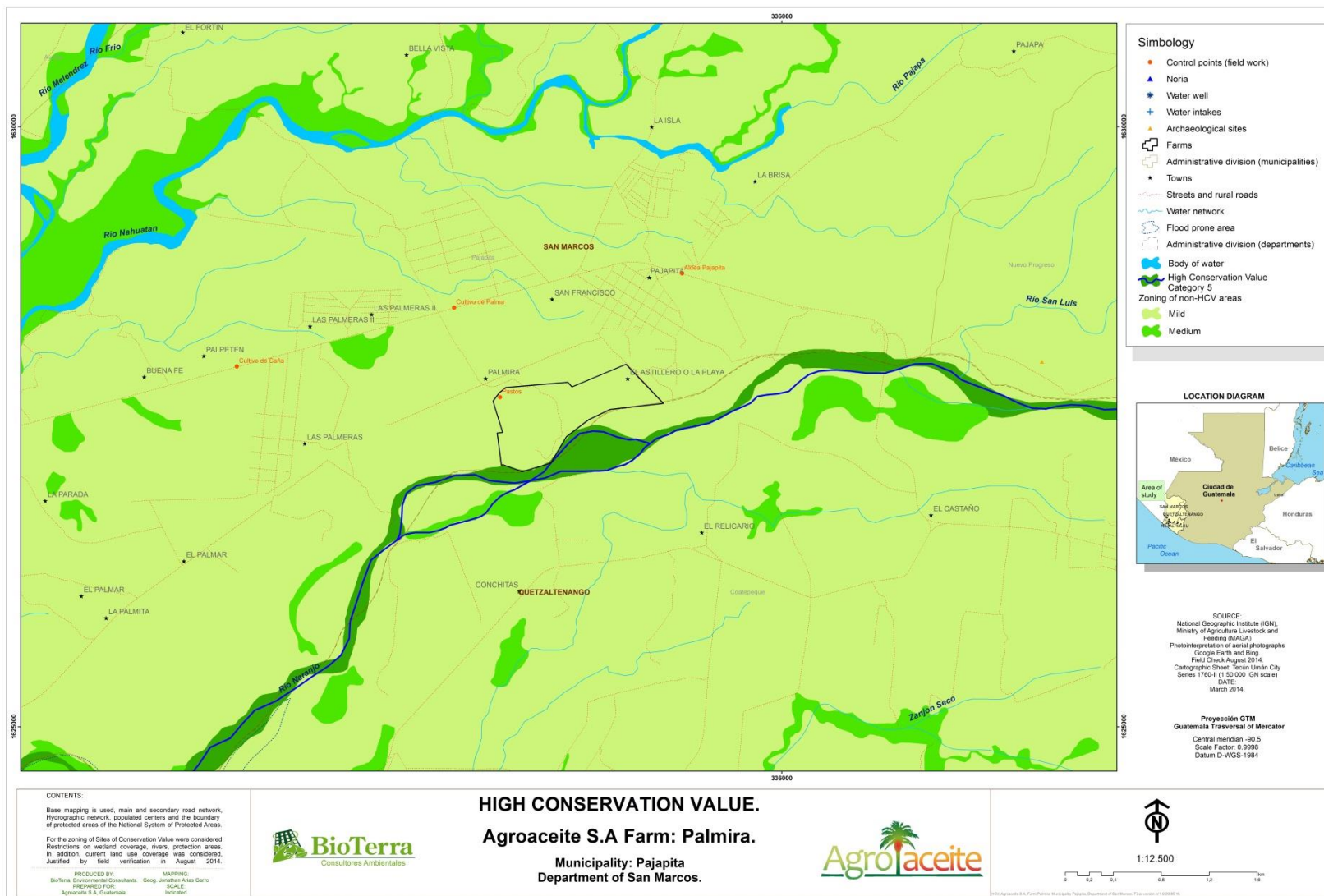
Source: Bioterra

6.8. HCV Assessment Map for the planting unit Santa Isabel

Source: Bioterra

6.9. LANDSCAPE LEVEL HCV ASSESSMENT MAP FOR ALL PLANTING UNITS.

Source: Bioterra

6. INTERNAL RESPONSIBILITY

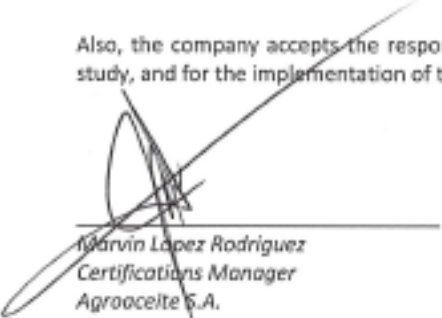### 6.1. DECLARATION OF ACCEPTANCE OF RESPONSIBILITY FOR THE PREPARATION OF THE HCV ASSESSMENT

Through this declaration, I assume full responsibility for the content of what is stated in the present document.

With nothing further to add,

Biologist Marisol Zumbado Bustillos, MSc
HCV Environmental Consultant and Adviser
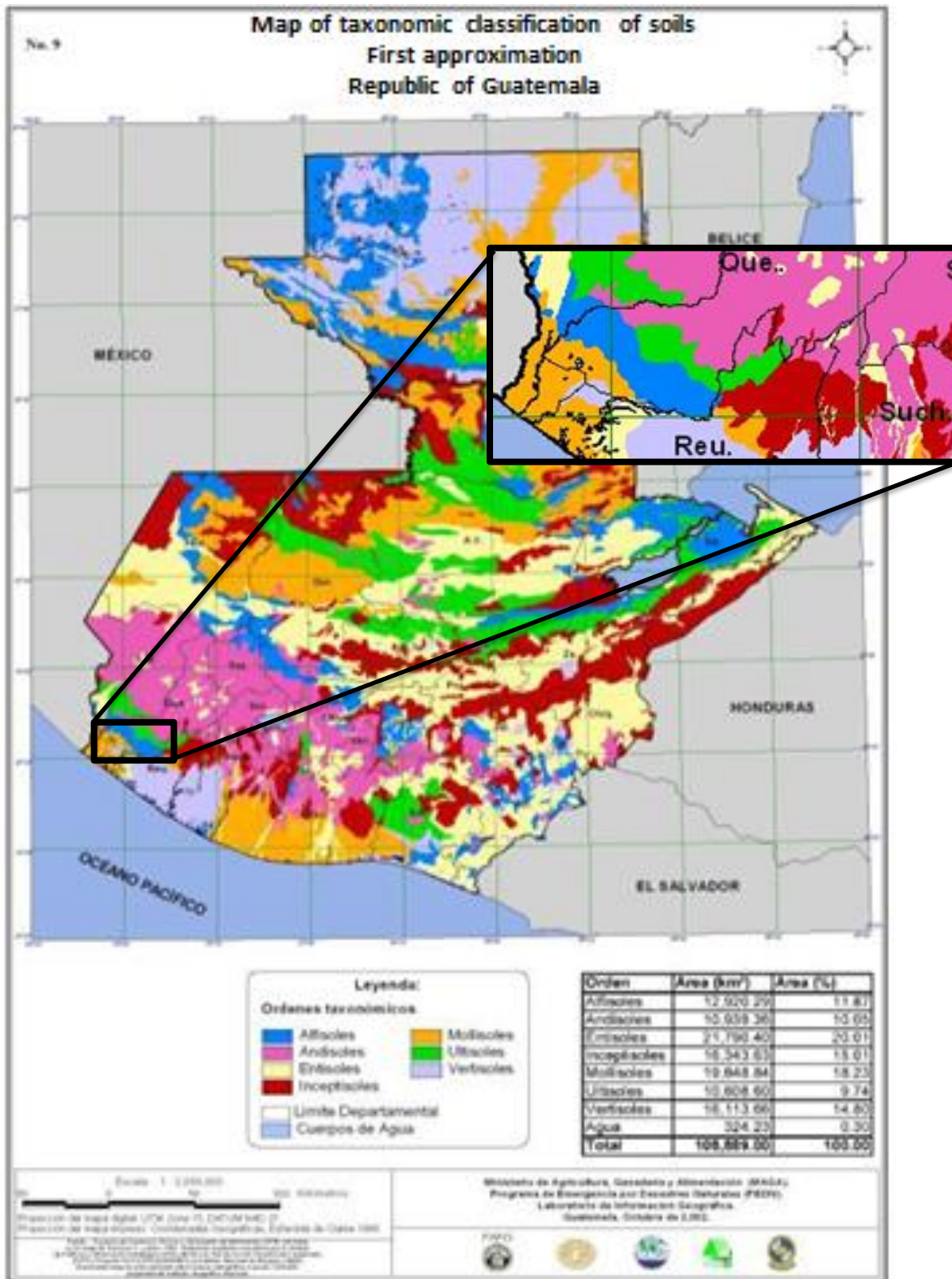*Bio Terra Consultores Ambientales*

Also, the company accepts the responsibility for the HCV Assessment made on the farms under study, and for the implementation of the Management and Monitoring Plan proposed.

Marvin López Rodriguez
Certifications Manager
Agroaceite S.A.

DATE: JUNE 13, 2016

6.10. SOIL AND TOPOGRAPHY

Soils predominate Alfisoles and mollisoles, The structures of conservation are dead barriers and vegetal cover.

LUC ANALYSIS

The methodology that was used for the development of the study of land use change of the company Agroaceite, SA, in the framework of the remediation and compensation studies of the RSPO, consisted in the application of remote sensors of medium and high resolution , Which with the application of specific tools allowed to determine the different uses of the land for the target classes of interest. The following is a description of the methodology used:

Selection of Satellite Images
SPOT satellite data were used for the analysis of land use, which were developed and operated by Airbus Defense and Space (French Space Agency). The SPOT 1 Satellite has a resolution of 10 meters.

In order to obtain the images, it was necessary to review the available material from GEO-information division of Airbus Defense and Space, which is the worldwide distribution company for the commercialization of images of the globe. The best images of the years of interest were acquired.

The criteria for selecting the images were, contain the least number of clouds or contain no clouds, no more than 6 months before or after the required date.

Images of the LadSat 8 satellite were also used for the years 2014 and 2016. These images have a resolution of 30X30 meters and are provided by NASA through the USGS.

The selected images were as follows:

No.	NCOLS	NROWS	Date	Name	Resolution	Satelite
1	--	--	30/11/2006	055554745010_01	20	DigitalGlobe
2	--	--	25/11/2009	055554745020_01	20	DigitalGlobe
3	7490	7273	26/09/2007	DATA_N456.07_E158.40	10	Spot
4	7683	7263	20/11/2009	DATA_N456.09_E154.91	10	Spot
5	8764	7593	29/11/2005	DATA_N456.51_E158.16	10	Spot
6	7137	7163	26/12/2009	DATA_N471.29_E159.39	10	Spot
7	8320	7351	14/12/2007	DATA_N471.56_E155.82	10	Spot
8	8937	7458	15/11/2005	DATA_N471.71_E161.80	10	Spot
9	9	21	50	21/06/2014	30	LC8021502014172LGN00
10	10	21	50	08/04/2016	30	LC80210502016098LGN00

Cutting areas to work

In order to have a better analysis of the areas to be analyzed, a cut of the image was made in the area of interest, aiming to reduce the range of the color histogram and achieve a better class separation at the time of the unsupervised classification . For the cuts were used polygons that delimit the different areas of cultivation with a buffer zone in average of 300 meters.

The name of each of the resulting images was assigned the name of the block it represents and the year of origin of the image.
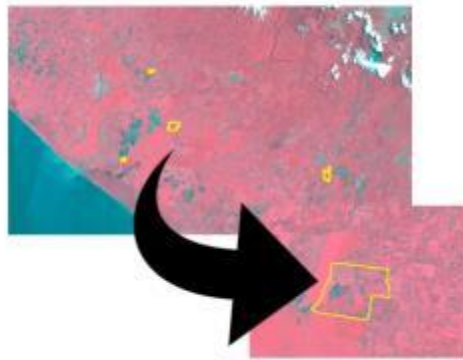

Image Cut Example

Unsupervised Classification

The unsupervised classifications are those in which the classifier algorithm does not need more information than the scene to classify and some parameters that limit the number of classes. These classification mechanisms base their effect on the search for classes with sufficient spectral separability to be able to differentiate some uses from others.

The unsupervised classification (ISODATA) of the image cuts was performed using the software ERDAS IMAGINE, the process, is to group pixels with similar characteristics in terms of color, so that the parameters indicated to the software will result in the separation of Between 20 and 30 target classes, thus achieving a satisfactory result, in terms of the separation of land uses.
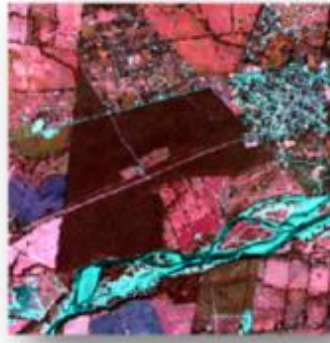
The target classes were:
• Coefficient 1.0: Structurally complex forests (including primary forests) regenerating forests, selectively felled with high forest canopy elements.
• Coefficient 0.7: Structurally degraded but ecologically functional natural forests
• Coefficient 0.4: Agroforestry of multiple species. (For example, coffee with shade, cardamom with shade or cocoa with shade, not identified in the areas analyzed).
• Coefficient 0: Monoculture trees and non-forest plantations; Other permanently cultivated, developed or degraded open lands.

In addition, the classification of water 04 was generated to identify rivers and other bodies of water, as well as classification of clouds and cloud shadow 05, when it was not possible to clean the cloud area.
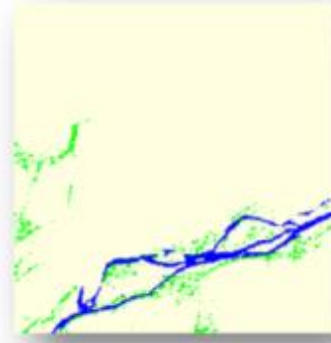
Contrasting the satellite image and the isodata, and based on complementary information (field experience, photographs, orthophotos, etc.), each class of the isodata was assigned a value according to the target classes.
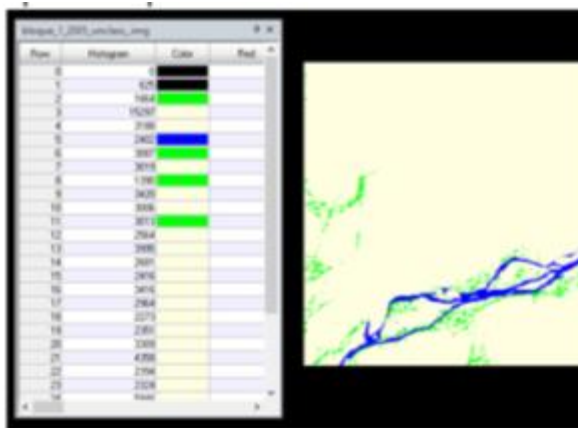

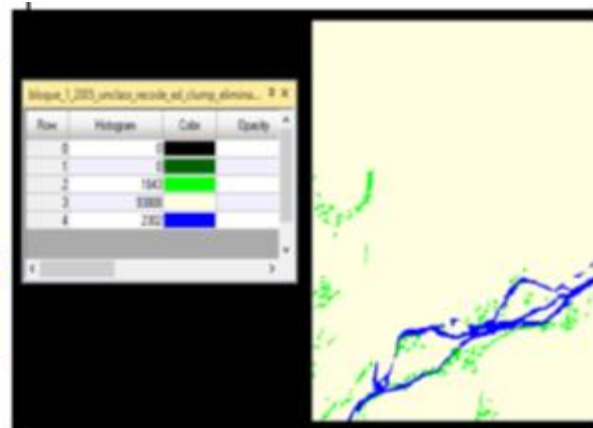Spot Original   Isodata 30 Clases   Clases meta

Reclassification
Each of the classes after the visual analysis already performed with one of the defined target classes, a reclassification of the target target classes was performed. This applies ERDAS reclassification process.

Clases meta   Reclasificación

Manual editions
The unsupervised classification process (Isodata) separates quite well the different tonalities in Landsat images, there are some uses that are "confused" mainly those associated with shadows with water, or clouds with areas of bare soil "among others. It is necessary to make manual editions to these classes, placing them manually in the correct class.

This process requires experience in the visualization of the different uses of the soil in the area and the tonalities associated with them, since otherwise there is a risk of confusing different categories. At this point, constant verification of land uses in different sources of information, such as Google Earth displays, check with orthophotographs available in 2006 and the land use map (GIMBOT, 2014) was necessary.

The results of land uses for the years analyzed
Results of land use by analyzed block and Management Unit for the year 2005

farm	2005				Total
	water	Primary Forest	Secondary Forest	Agriculture	
San Andrés	0.00	0.00	31.58	363.31	0.00
Palmira	0.00	0.00	0.00	59.83	0.00
Santa Isabel	7.11	0.00	0.81	277.38	7.11
Maravillas	0.00	0.00	0.00	57.04	0.00
Grand Total	7.11	0.00	32.39	757.56	7.11

Results of land use by analyzed block and Management Unit for the year 2007.

farm	2007				Total
	water	Primary Forest	Secondary Forest	Agriculture	
San Andrés	0.00	0.00	21.41	373.47	394.89
Palmira	0.00	0.00	0.00	59.83	59.83
Santa Isabel	3.15	0.00	0.00	282.15	285.30
Maravillas	0.00	0.00	0.27	56.77	57.04
Grand Total	3.15	0.00	21.68	772.23	797.06

Results of land use by analyzed block and Management Unit for the year 2009.

farm	2009				Total
	water	Primary Forest	Secondary Forest	Agriculture	
Palmira	0.00	0.00	13.32	381.57	394.89
Maravillas	0.00	0.00	0.00	59.83	59.83

farm	2009				Total
Santa Isabel	5.13	0.00	0.00	280.17	**285.30**
San Andrés	0.00	0.00	0.00	57.04	**57.04**
Grand Total	**5.13**	**0.00**	**13.32**	**778.62**	**797.06**

Results of land use by analyzed block and Management Unit for the year 2014

farm	2014				Total
	water	*Primary Forest*	*Secondary Forest*	*Agriculture*	
San Andrés	0.00	0.00	9.19	386.37	**395.56**
Palmira	0.00	0.00	0.00	59.56	**59.56**
Santa Isabel	3.60	0.00	0.00	281.66	**285.27**
Maravillas	0.00	0.00	0.00	56.68	**56.68**
Grand Total	**3.60**	**0.00**	**9.19**	**784.26**	**797.06**

Results of land use by analyzed block and Management Unit for the year 2016.

farm	2016				Total
	water	*Primary Forest*	*Secondary Forest*	*Agriculture*	
San Andrés	0.00	0.00	8.56	387.00	**395.56**
Palmira	0.00	0.00	0.00	59.56	**59.56**
Santa Isabel	8.20	0.00	0.00	277.07	**285.27**
Maravillas	0.00	0.00	0.00	56.68	**56.68**
Grand Total	**8.20**	**0.00**	**8.56**	**780.30**	**797.06**

*Units in hectares

Change in land use
Land use change from year 2005 to year 2007 (negative values correspond to loss and positive values to gain in relation to the same category).

2005-2007	2005				
	Agriculture	*Primary Forest*	*Secundary Forest*	*Water*	*Grand Total*
Agriculture-Agriculture	757.95				**757.95**
Agriculture-Primary Forest	0.00				**0.00**
Agriculture-Secundary Forest	0.18				**0.18**
Agriculture-Water	0.00				**0.00**
Primary Forest –Agriculture		0.00			**0.00**
Primary Forest - Primary Forest		0.00			**0.00**

43

2005-2007	2005				
	Agriculture	Primary Forest	Secundary Forest	Water	Grand Total
Primary Forest - Secondary Forest		0.00			0.00
Primary Forest – Water		0.00			0.00
Secundary Forest – Agriculture			11.15		11.15
Secundary Forest - Primary Forest			0.00		0.00
Secundary Forest - Secondary Forest			20.95		20.95
Secundary Forest – Water			0.00		0.00
Water – Agriculte				3.69	3.69
Water - Primary Forest				0.00	0.00
Water - Secondary Forest				0.00	0.00
Water - Water				3.15	3.15
Grand Total	758.13	0.00	32.09	6.83	797.06

Change in land use from 2007 to 2009 (negative values correspond to loss and positive values to gain in relation to the same category).

2007-2009	2005				
	Agriculture	Primary Forest	Secundary Forest	Water	Grand Total
Agriculture-Agriculture	756.33	0.00	11.06	3.06	770.45
Agriculture-Primary Forest	0.00	0.00	0.00	0.00	0.00
Agriculture-Secundary Forest	0.36	0.00	0.00	0.00	0.36
Agriculture-Water	1.26	0.09	0.00	0.63	1.98
Primary Forest -Agriculture	0.00	0.00	0.00	0.00	0.00
Primary Forest - Primary Forest	0.00	0.00	0.00	0.00	0.00
Primary Forest - Secundary Forest	0.00	0.00	0.00	0.00	0.00
Primary Forest - Water	0.00	0.00	0.00	0.00	0.00
Secundary Forest - Agriculture	0.18	0.00	8.45	0.00	8.63
Secundary Forest - Primary Forest	0.00	0.00	0.00	0.00	0.00
Secundary Forest - Secundary Forest	0.00	0.00	12.50	0.00	12.50
Secundary Forest - Water	0.00	0.00	0.00	0.00	0.00
Water - Agriculte	0.00	0.00	0.00	0.00	0.00
Water - Primary Forest	0.00	0.00	0.00	0.00	0.00
Water - Secundary Forest	0.00	0.00	0.00	0.00	0.00
Water - Water	0.00	0.00	0.00	3.15	3.15
Grand Total	758.13	0.09	32.00	6.83	797.06

Change of land use from year 2009 to 2014 (negative values correspond to loss and positive values to gain relative to the same category).

2009-2014	2005				
	Agriculture	Primary Forest	Secundary Forest	Water	Grand Total
Agriculture-Agriculture	756.16	0.00	19.51	2.97	778.63
Agriculture-Primary Forest	0.00	0.00	0.00	0.00	0.00
Agriculture-Secundary Forest	0.36	0.00	0.00	0.00	0.36
Agriculture-Water	0.00	0.00	0.00	0.09	0.09
Primary Forest -Agriculture	0.00	0.00	0.00	0.00	0.00
Primary Forest - Primary Forest	0.00	0.00	0.00	0.00	0.00
Primary Forest - Secundary Forest	0.00	0.00	0.00	0.00	0.00
Primary Forest - Water	0.00	0.00	0.00	0.00	0.00
Secundary Forest - Agriculture	0.09	0.00	3.96	0.00	4.05
Secundary Forest - Primary Forest	0.00	0.00	0.00	0.00	0.00
Secundary Forest - Secundary Forest	0.27	0.00	8.54	0.00	8.81
Secundary Forest - Water	0.00	0.00	0.00	0.00	0.00
Water - Agriculte	0.36	0.00	0.00	1.17	1.53
Water - Primary Forest	0.00	0.00	0.00	0.00	0.00
Water - Secundary Forest	0.00	0.00	0.00	0.00	0.00
Water - Water	0.90	0.00	0.09	2.61	3.60
Grand Total	758.13	0.00	32.09	6.83	797.06

Change of land use from 2014 to 2016 (negative values correspond to loss and positive values to gain relative to the same category)

2014-2016	2005				
	Agriculture	Primary Forest	Secundary Forest	Water	Grand Total
Agriculture-Agriculture	753.62	0.00	23.34	2.25	779.22
Agriculture-Primary Forest	0.00	0.00	0.00	0.00	0.00
Agriculture-Secundary Forest	0.09	0.27	0.00	0.00	0.36
Agriculture-Water	2.97	0.00	0.00	1.80	4.78
Primary Forest -Agriculture	0.00	0.00	0.00	0.00	0.00
Primary Forest - Primary Forest	0.00	0.00	0.00	0.00	0.00
Primary Forest - Secundary Forest	0.00	0.00	0.00	0.00	0.00
Primary Forest - Water	0.00	0.00	0.00	0.00	0.00
Secundary Forest - Agriculture	0.36	0.00	0.63	0.00	0.99
Secundary Forest - Primary Forest	0.00	0.00	0.00	0.00	0.00
Secundary Forest - Secundary Forest	0.27	0.00	7.93	0.00	8.20
Secundary Forest - Water	0.00	0.00	0.00	0.00	0.00
Water - Agriculte	0.00	0.00	0.00	0.00	0.00
Water - Primary Forest	0.00	0.00	0.00	0.00	0.00
Water - Secundary Forest	0.00	0.00	0.00	0.00	0.00
Water - Water	0.81	0.00	0.09	2.61	3.51
Grand Total	758.13	0.27	31.99	6.67	797.06

*Units in hectares

6.11. SUMMARY OF AREA TO BE COMPENSATED
The table below presents the summary of the area to be compensated

Change	2005 2007			2007 2009			2009 20014			2014 20016			Gran Total
	Factor	Ha	Comp.	Factor	Ha	Comp.	Factor	Ha	Comp.	Factor	Ha	Comp.	
Agriculture-Primary Forest	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Agriculture-Secundary Forest	0.00	11.15	0.00	0.70	8.63	6.04	0.70	4.05	5.66	0.70	0.99	1.39	13.09
Sist. Agrof. – Agriculture	0.00	0.00	0.00	0.40		0.00	0.40	0.00	0.00	0.40	0.00	0.00	0.00
Agriculture-Agriculture	0.00	785.91	0.00	0.00	788.43	0.00	0.00	793.01	0.00	0.00	796.07	0.00	0.00

*Units in hectares

The land use change study was developed by the company Ambiente y Desarrollo Consultores, SA, specialized in environmental management, natural resources and water resources, including the application of remote sensors and geographic information systems for the management of resources Natural and the environment. The team was led by Engineer Manuel Fernando Luna Lemus, who has more than 10 years experience in the application of satellite image analysis, land use studies and the development of Geographic Information Systems (GIS). From the year 2015 he is professor of the course of Introduction to the Cartography and the Systems of Geographical Information in the Master of Geomatics of the School of Postgraduate of the Faculty of Engineering of the University of San Carlos of Guatemala.

ABSTRACT OF THE DYNAMIC OF LAND USE

Abstract of changes in land use

Change	2005-2007	2007-2009	2009-2014	2014-2016	Compensation
Primary forest – Agriculture	**0**	**0**	**0**	**0**	**0**
Secondary forest – Agriculture	11.15	8.63	4.05	0.99	0
Agrof. Sis. – Agriculture	0	0	0	0	0
Others Mono crops - Agriculture	785.91	788.43	793.01	796.07	0
Total	797.06	797.06	797.06	797.06	0

In the analyzed area was not identified primary forest and neither in the high values of conservation study were not identified places with high values of conservation therefore **DO NOT EXIST COMPENSATION.** The project do not hast to compensate any area, because it is stablished in areas with agricultural use.

7. FPIC PROCESS

The meeting minutes were written in the books of minutes of each community where a record of the meeting was left.

7.1. GENERAL INFORMATION

Date	September 2016
FPIC Process Facilitators	- Corporative Director Agroaceite, S.A. - Administrators - Corporate Social Responsibility - Corporate Business Coordinator - Manager of Environment and Certifications - Green Development
Contact Information	Mariana de la Peña Corporate Business Agroamerica mdelapena@agroaceite.com (502) 4218-9895
Evaluation Area	Total Area: 823.4 Ha Area to develop: 797.13
Use of Land	Current use: Shrubbery, banana and rubber crops Proposed Use: Palm Oil

Objective

Respect the right of FPIC for the implementations of new plantings applicable in the estates of Palmira, Maravillas, San Andrés y Santa Isabel that belong to Agroaceite to comply with the RSPO requirements.

Context

RSPO Requirements for FPIC

According to the Free, Prior and Informed Consent Guide for the RSPO members the flow diagram imply that the first step is to identify the prior rights of the land use and the existence of nearby communities that may be using the land.

Legal compliance requisites applicable

General Property Requisite in Guatemala
The project can be applicable to two different requisites the General Registration of the Central one in the City of Guatemala and the Registry of Property in the department of Quetzaltenango.

Free, Prior and Informed Consent - (FPIC).

Cadastral Information Registry (CIR)
Establishes, maintains and updates the national cadaster to constitute a public registry that is oriented to the juridical safety of land tenure and land use. This registry operates under the coordination of the General Property Registry.
Political Constitution of the Republic of Guatemala
Article 39: Private Property
Guaranties that private property is a right of that people have. Any person can freely dispose of their assets according to the law.
Article 67: Protection to indigenous land and cooperatives
Indigenous community land and/or other form of agricultural collective tenure like popular housing or family heritage with have protection from the State.

Agreement 169 of ILT
All indigenous communities must be consult before the acceptance of any hydroelectric or mining license to consult for laws or norms inside their territory. Guatemala ratified the agreement in July 5th of 1996 to recognize the indigenous land tenure.
Civil Code
According to this code, private property assets that belong to individuals should have a legal title.

Generalities regarding the influenced estates
It is considered that proposed project has a low scale and intensity because only four units of crops will be implemented. The palm cultivation will be taking place in areas that currently possess shrubbery and are not in environmentally fragile areas.
The area studied is located inside a rural area were agriculture and cattle raising function as the local economic motors.

Estate	Communities with direct influence
Maravillas	Morenas Palmar II Valle Lirio
San Andrés	Democracia
Palmira	Cantón Ferrocarril Cantón la Playa

Free, Prior and Informed Consent - (FPIC).

Estate	Communities with direct influence
Santa Isabel	Vista Hermosa Villa Flores Tableros

(AGROACEITE, 2016)

Free, Prior and Informed Consent (FPIC)

Since there is no prior subsistence method or informal right for indigenous people or communities in the areas of the new plantings (all according to the HCVA and SIS), there is no need to develop an obligatory FPIC for the plantations. Nevertheless, it is important to mention that the FPIC can be considered with the sustainability aspect of new developments, thus the free, prior and informed consent will be developed.

Land Tenure

The land tenure aspect of the projects runs within the compliance that has already been established with the legal normative applicable for the area and RSPO requisites. Each estate possesses a lease agreement for the land and has been signed up to have an estate number, folio and book in the property registry to validate the new plantings in the area. One of the purposes of signing up the different land extensions is to assure no nearby community will be affected by the proposed project.

Prior and Informed Process

The communities were previously informed by different activities that were developed with the accompaniment of the Agroaceite staff to inform the development of the project. The development of the project will not interrupt or affect and nearby community in any way. The staff of Agroaceite accompanied the people of the community during every step of the prior and informed process.
The activities performed with the communities as part of the prior and informed process includes:

a) Participatory mapping with the influenced communities:
A participatory mapping was done with the communities that could be affected by the proposed project of new plantations. The mapping allowed Agroaceite to have the boundary limits of the estates, clusters and attributes.

Free, Prior and Informed Consent - (FPIC).

One of the aspects that presents more susceptibility in the project might be the right-of-way from one estate to another. Although there are public ways that enable the free transfer for

communities. The public travel ways are out of the limits of the new plantings so there is no negative effect in the plantings or the nearby communities.

b) Focus Groups with interested people:

A dynamic opinion group activity was done to have different points of view about the new plantings development. During this activity, the following information was given: general information about the company (Agroaceite), business model, agricultural activities and resources that are involved in the cultivation of palm oil, legal aspects of land tenure focusing on boundaries for new crops, possible positive and negative impacts regarding the project implementation and the principles and criteria of the RSPO. The given information was assessed and review by the interested people.

c) Revision of the Free, Prior and Informed Consent and Principle 7. Responsible Development of New Plantings RSPO 2013.

The RSPO Principles and Criteria were presented, as well as the Agroaceite sustainable development of palm oil commitment. Principle 7 "Responsible Development of New Plantings" was discussed to communicate the definition of Free, Prior and Informed Consent as well as the RSPO standard requisites. During this revision, the new plantings project was presented with the estate names, boundaries, clusters and attributions. Within this information was included the legal aspects of land tenure to revise that the estates of the new development present no legal problems or lease contract setbacks.

d) Visits to plantations and palm oil mill with community representatives.

As an additional activity, the communities visited the installations of the palm oil mil and palm oil plantings. The production process, resources, positive and negative impacts were given to them.

Conclusion

The legal tenure of land was proven because of satisfactory dialogue and investigation process done by Agroaceite. The land does not interfere in the areas used by nearby communities.

The communities expressed their openness to the implementation of new plantings in the estates of Palmira, San Andrés, Santa Isabel and Maravillas. With this said, it can be determined that the free, prior and informed consent has a positive outcome for the next sustainable establishment of new plantings.

7.2. COMMUNITIES MAP
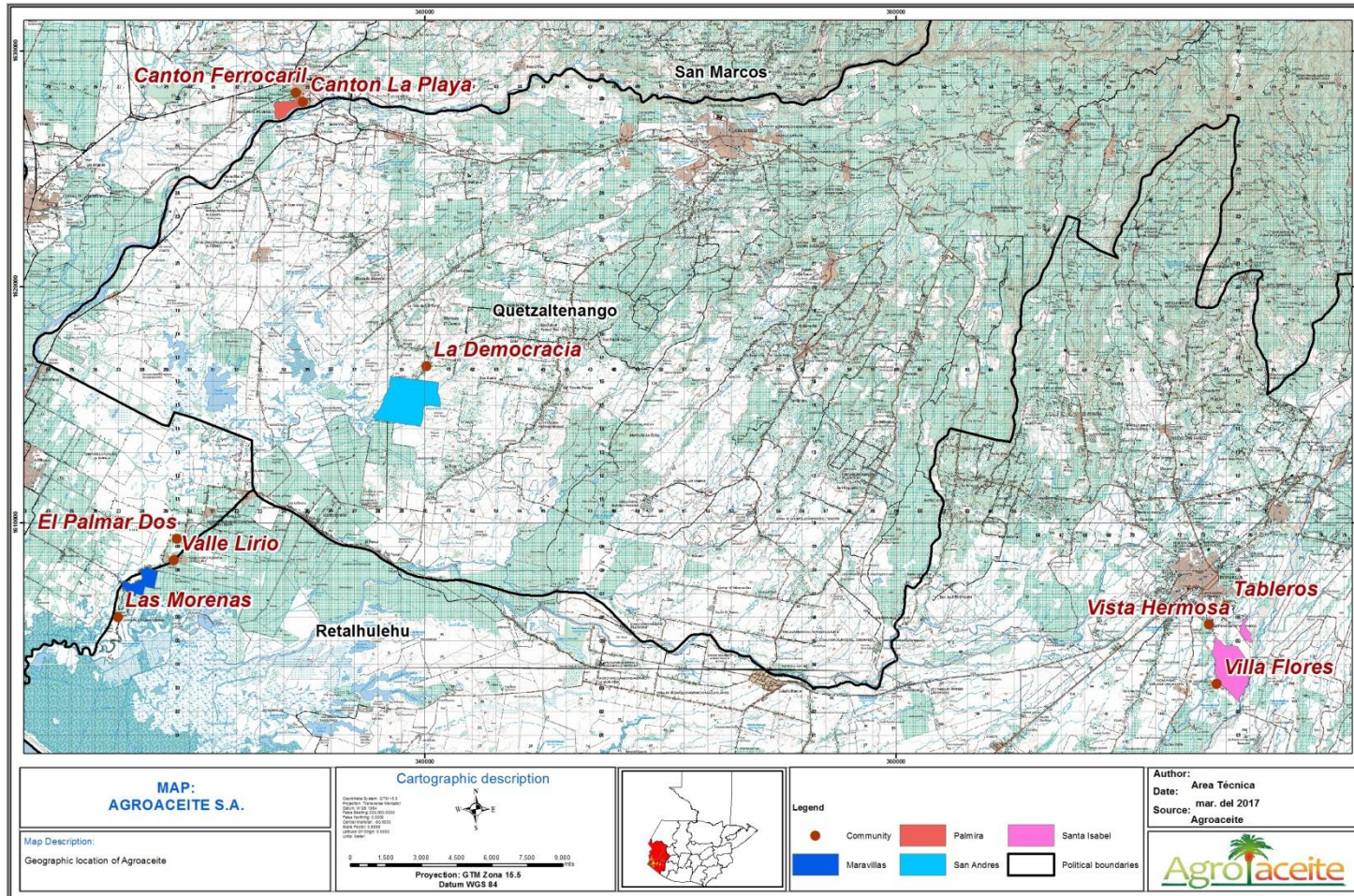
Source: Agroaceite, 2016.

Social Impact Assessment

The AGROACEITE Social Impact Assessment (EIS) is a requirement contained in the RSPO in its Principle 6, Criterion 6.1, Indicators 6.1.1 and 6.1.2, and develops some particular guidance in the Guide to the application of Criterion 6.1. It is also a platform for the identification of operating conditions with a corporate social responsibility approach (CSR) on a vision of sustainability and construction of added values for the business.

While the Social Impact Study was being developed, Agroaceite carried out a prior, free and informed consent process, with the active participation of the main representatives of the neighboring communities to whom the palm oil development project was made known, so that the plantations do not affect the area negatively and have the consent of the communities.

Agroaceite has identified the communities surrounding the operations of the company and has mapped them according to how close they are to the farms. The lands that Agroaceite acquired were privately owned and have previously been used for agriculture and / or livestock; so, no clearing has been carried out and no communities have been displaced.

In order to obtain prior, free and informed consent, a dialogue was held with the communities in which the development of the palm oil crop was discussed and the main impacts of its cultivation were determined and the community was consulted as to if they would agree with the project. It was concluded that the participants did consent to the development of the crop, and recommendations were made to establish a driving and mitigation plan that will promote community self-management programs for the environment, health, education and infrastructure areas.

Prior Informed Consent process was carried out by Agroaceite's staff:
• Corporate director has coordinated all the process
• Managers of new Agroaceite's farms, who explained the different agricultural and environmental practices involved in cultivating palm oil
• Person responsible for Corporate Social Responsibility and Coordinator of Corporate Affairs who gave a presentation on Agroaceite and its social and work practices.

Maravillas farm

Palmira farm

Santa Isabel Farm

San Andres Farm

8. SUMMARY OF MANAGEMENT PLANS

8.1. TEAM RESPONSIBLE FOR DEVELOPING MANAGEMENT PLANS
- Responsable team of the preparation of plans

High conservation value assessment	Bioterra Marisol Zumbado Bustillos
Environmental Assessment	Ambiente y Desarrollo Consultores Fernando Luna
Social Impact Study	Centrarse
Greenhouse gases Evaluation	Green Development Ing. Amilcar Ordoñez

Responsible team of the plans monitoring.

The team responsible for monitoring the plans, is the team of the company Agroaceite, S.A., of different departments within the company and that their work is related to the plans of new plantings.

- Production manager
- Manager of the environment department and certifications.
- Environmental management inspector.
- Head of Department of Community Relations.
- Manager of the Engineering Department.
- Occupational Safety Officer
- HR department
- All employees

9. SOIL

9.1. CAPACITY LAND USE
The land use capacity map of the National Forest Institute (INAB), which presents 7 categories of capacity for use, was used, Table 1 shows the categories and their respective score, based on the capacity of the land for the development of the palm culture, within the context of the principles of sustainability of the crop in time and space.
Chart 1. Scoring assigned to the use categories for the factor aggregation process.

No.	Categories of Capacity land use	Score
1	Agriculture without limitations (A)	1.00
2	Agriculture with improvements (Am)	0.95
3	Agroforestry with annual crops (Aa)	0.90

4	Silvopastoral systems (Ss)	0.75
5	Agroforestry with permanent crops (Ap)	0.85
6	Forest land for production (F)	0.50
7	Forest Protected Lands (Fp)	0.20

Source: Ambiente y Desarrollo Consultores, 2016.

Soil slope

The slope of the soil is an important factor for the development of the crop, since for its efficient management in plantation is required of soils with soft slopes, the slope table of the Soil Survey Manual, 1993 is used. Slope ranges used in the classification of slope map attributes and their corresponding score applied to the model.

Chart 2. Score assigned to slope categories for factor aggregation process.

No.	*Category of slope*	*Rank of slope*	*Score*
1	Almost at Level	0-2%	1.00
2	Soft slope	2-5%	1.00
3	Moderate slope	5 - 12%	0.95
4	Moderately steep	12-25%	0.85
5	Steep	25-45%	0.50
6	Very steep	> 45%	0.20

Source: Ambiente y Desarrollo Consultores, 2016.

Height above sea level

For this factor the digital elevation model with cells at 20 meters (MAGA, 2007). According to the preferences of height above sea level that reports the texts on the cultivation of oil palm (IPNI AND IPI, 2003; INFOAGRO, 2016). Chart 3 shows the description of the height attribute to use and its respective preference score assignment.

Chart 3. Score assigned to the height categories of the contour curves for the factor aggregation process.

No.	*Curves to level (on msnm)*	*Score*
1	Less than 200	1.00
2	200 to 300	0.95
3	300 to 400	0.90
4	400 to 500	0.85

5	500 to 600	0.50
6	Higher than 600	0.20

Source: Ambiente y Desarrollo Consultores, 2016.

Temperature

The temperature factor, as reported by the palm cultivation literature, with respect to optimum temperatures within which the development and productivity of a palm plantation represent the best characteristics for commercial palm oil cultivation. For the temperature factor, the average temperature map of Guatemala (INSIVUMEH, 2012).

Chart 4 shows the distribution and characteristics of the temperature component as a characteristic of the temperature map.

Scoring assigned to the categories of Temperature, for the factor aggregation process.

No.	*Ranks of temperature*	*Score*
1	26 to 28 oC	1.00
2	22 to 26 oC	0.90
3	14 to 22 oC	0.50
4	8 to 14 oC	0.20

Source: Ambiente y Desarrollo Consultores, 2016.

Precipitation

Rainfall is of importance for the definition of suitable areas for the development of oil palm cultivation. The rainfall classification was based on Guatemala's average rainfall map from 1.965 to 2011 (INSIVUMEH, 2012). Chart 5 shows the ranges of areas between isoetes and their respective preference score to be used for the process of landslide model.

Chart 5. Scoring assigned to Rainfall categories, for factor aggregation process.

No.	*Map of precipitation areas*	*Score*
1	Higher than 3000 mm	0.90
2	1800 to 3000 mm	1.00
3	1000 to 1800 mm	0.90
4	Less than 1000 mm	0.60

Source: Ambiente   y   Desarrollo   Consultores,   2016.

9.2. **MAP OF CAPACITY OF LAND USE**

9.3. **SAN ANDRES**
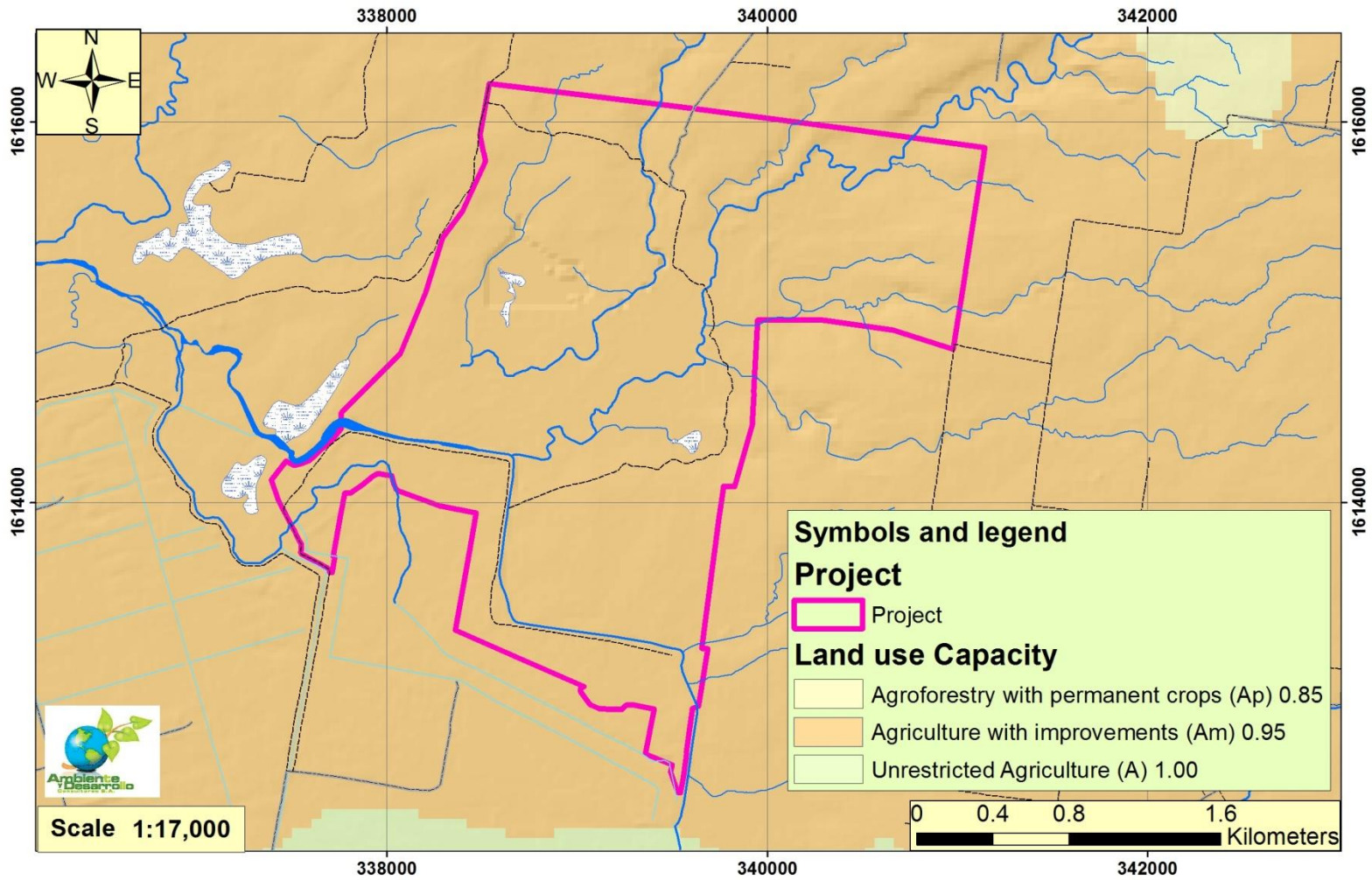
Source: Ambiente y Desarrollo Consultores, 2016.

Map of soil slopes
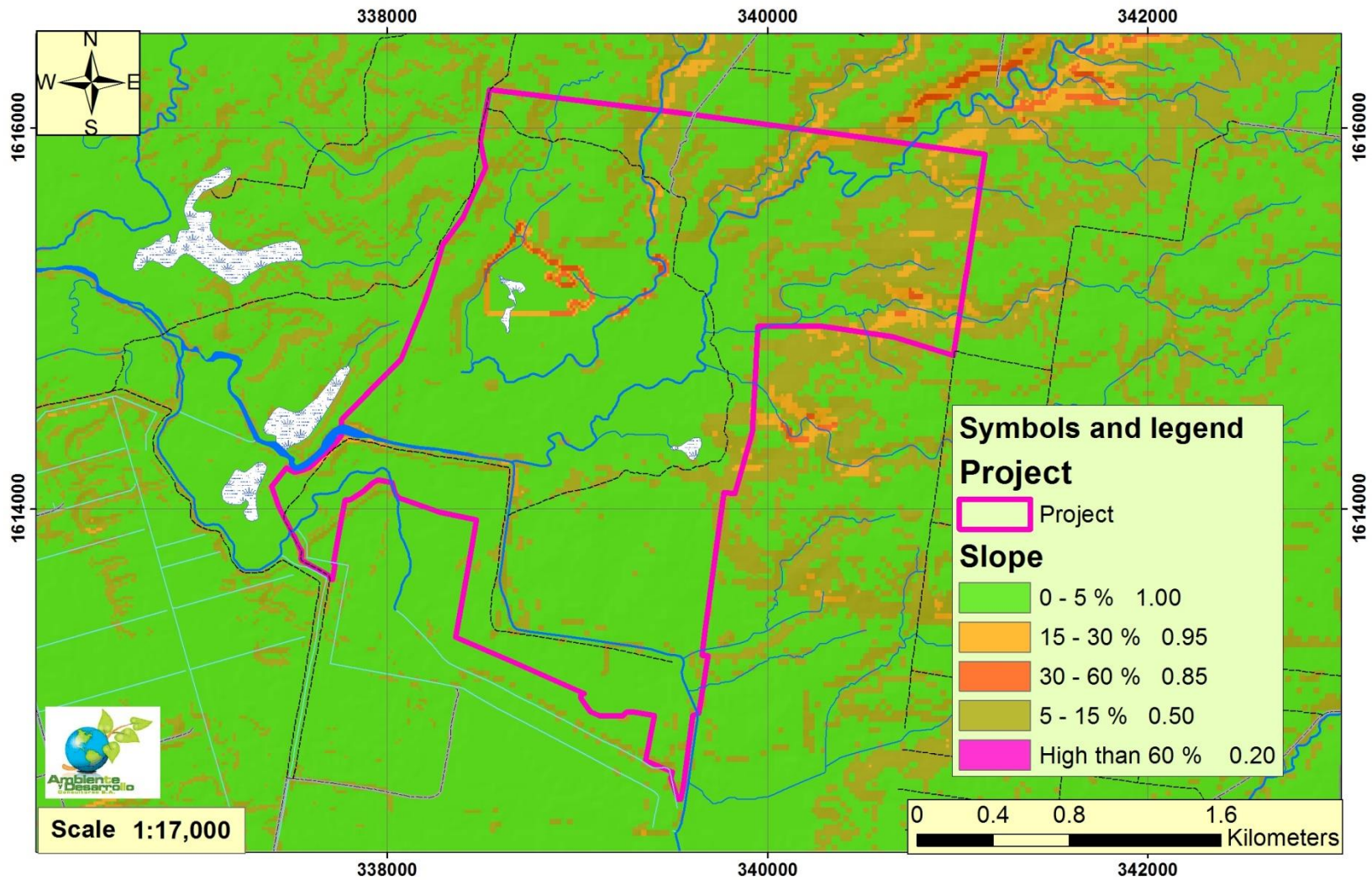
Source: Ambiente y Desarrollo Consultores, 2016.

Map of height above sea level.
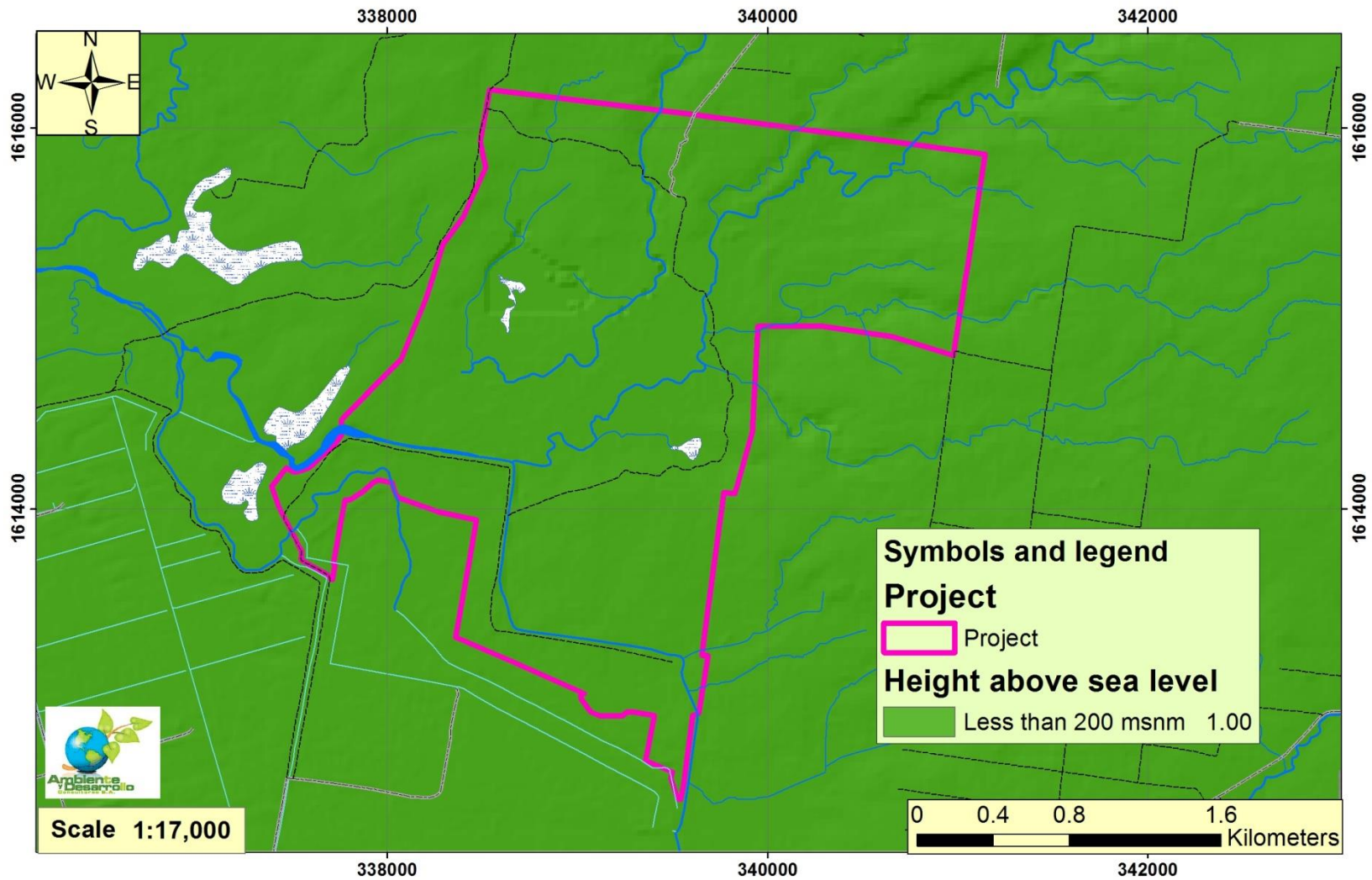
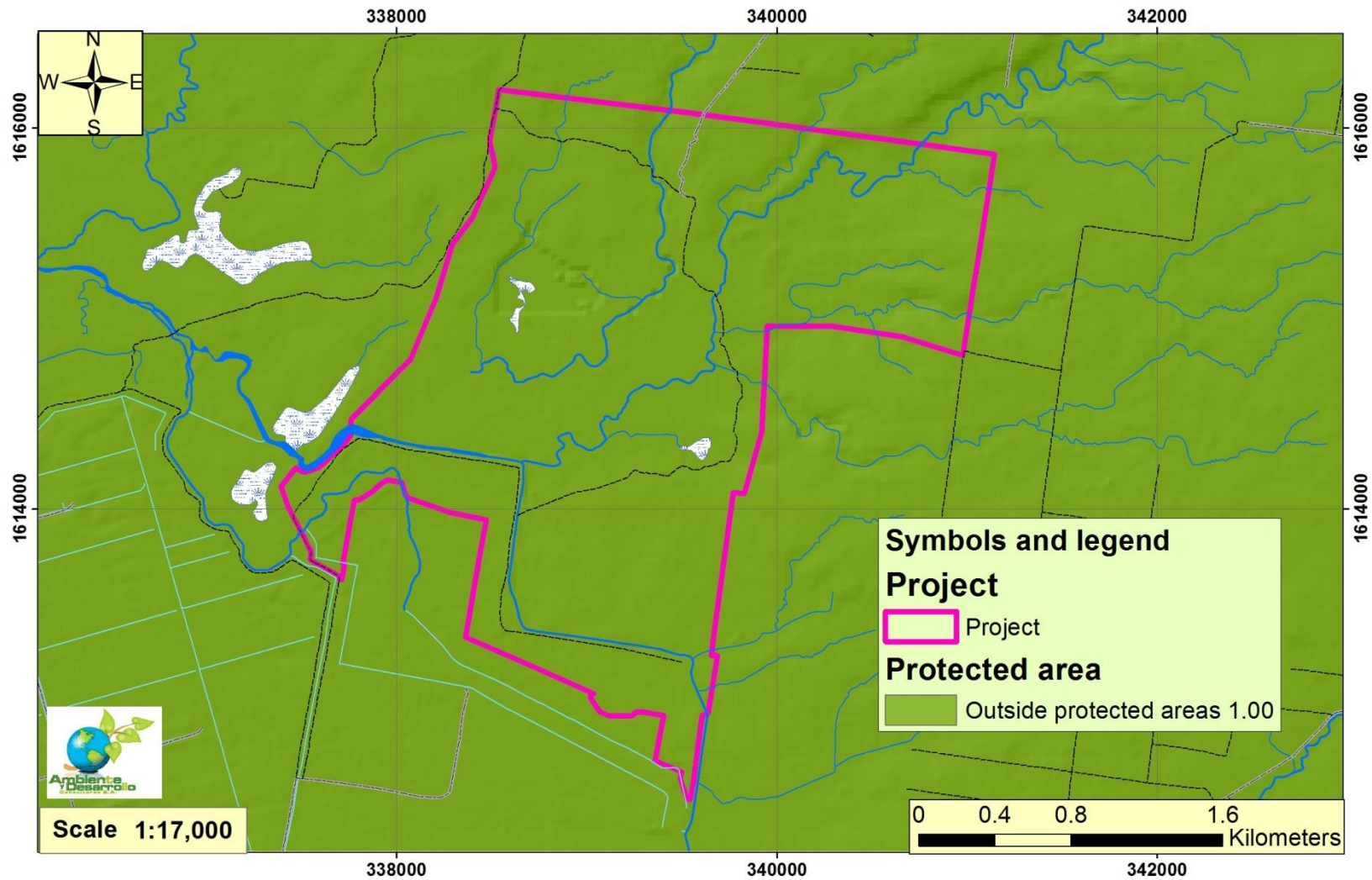Source: Ambiente y Desarrollo Consultores, 2016.

Map of precipitation
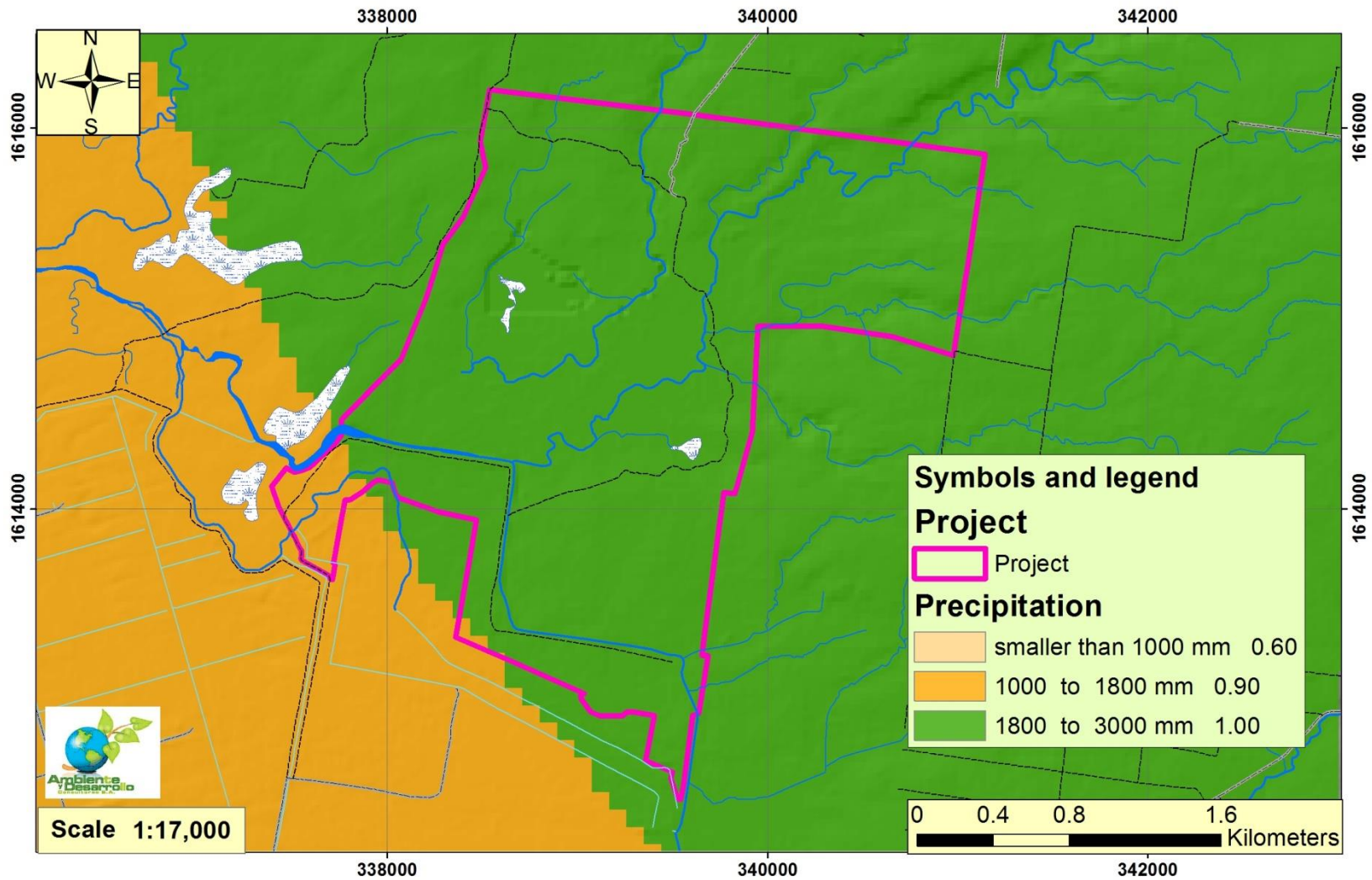
Source: Ambiente y Desarrollo Consultores, 2016.

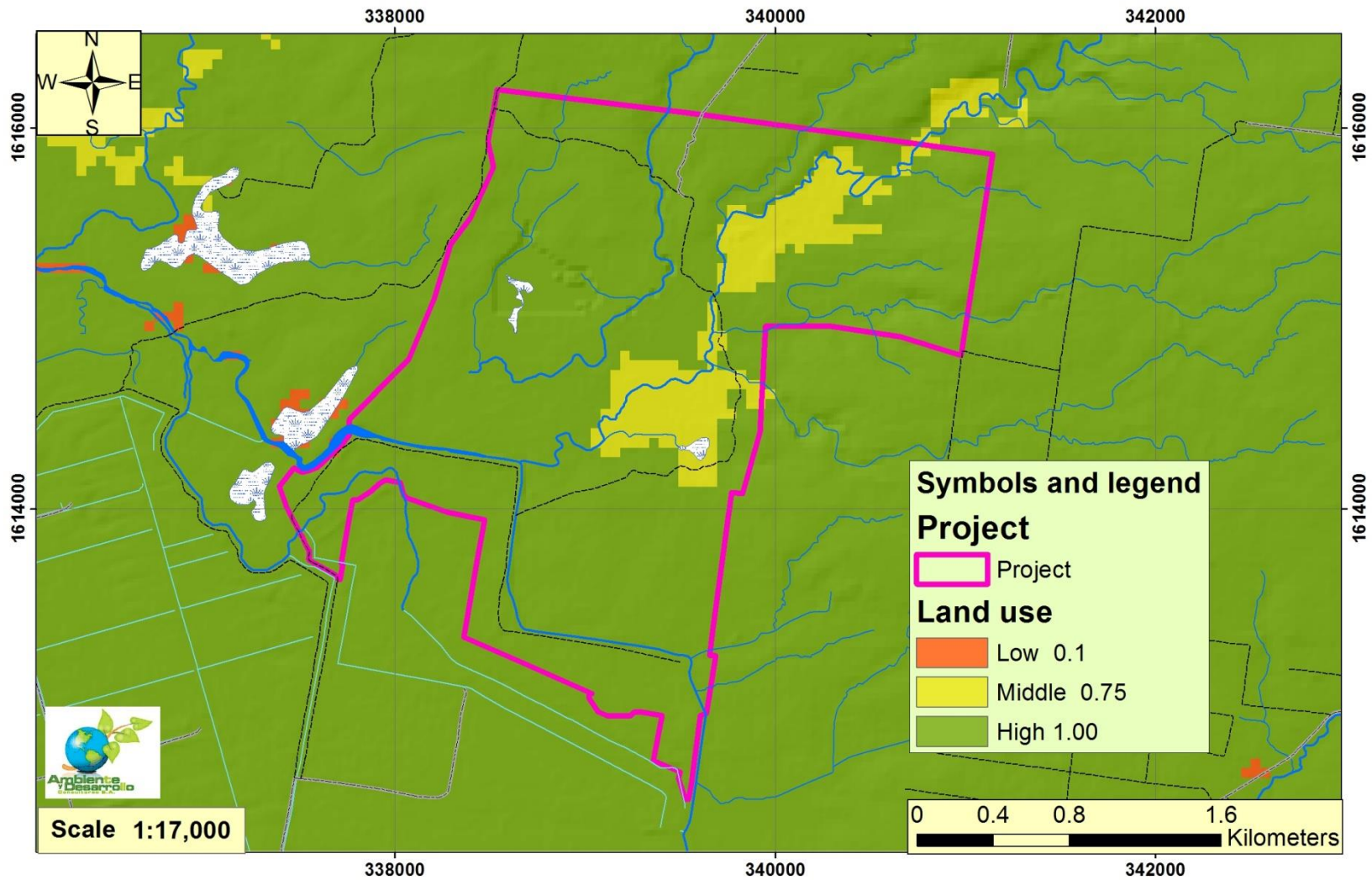*Map of physical characteristics of soil*
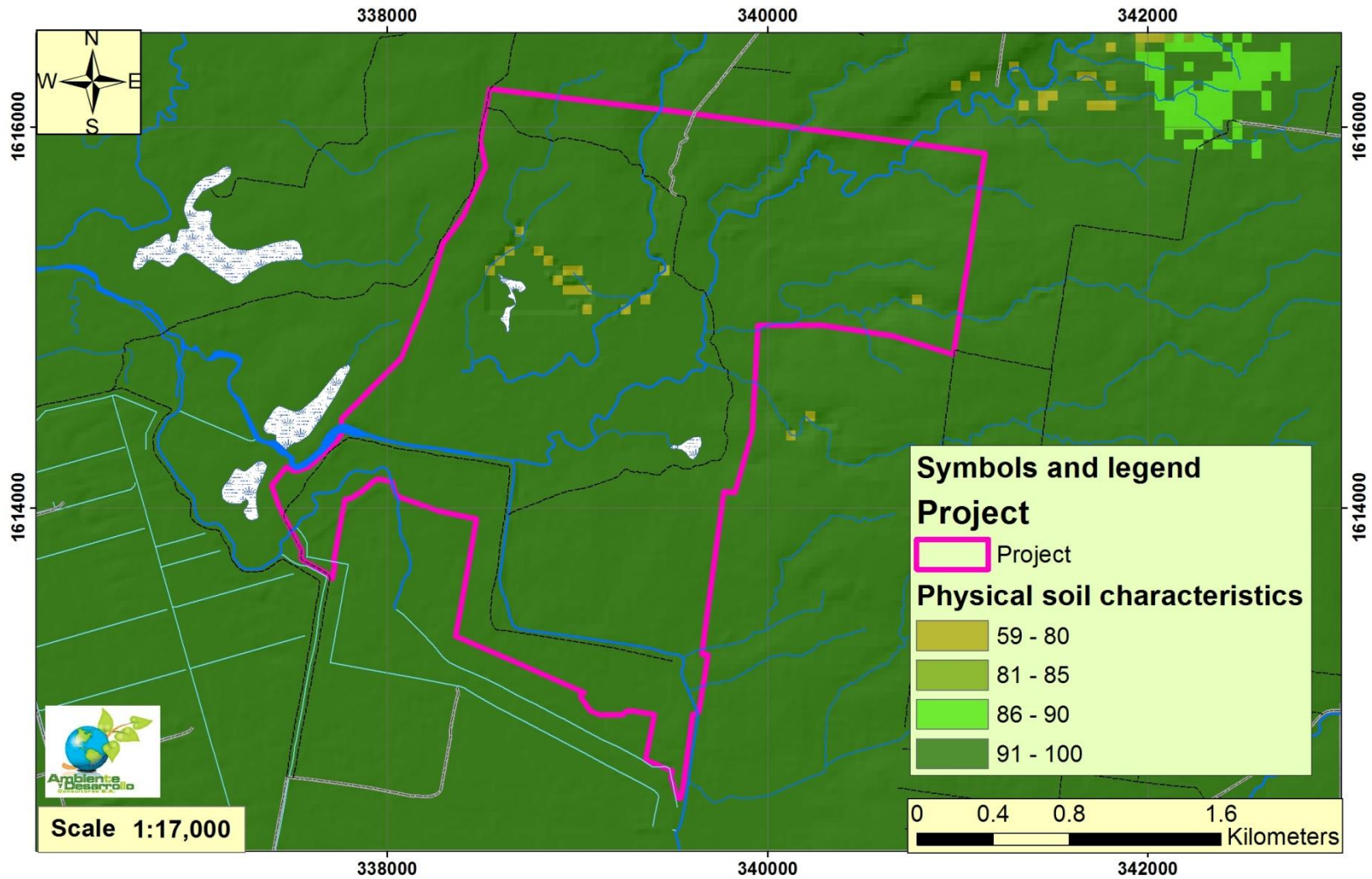
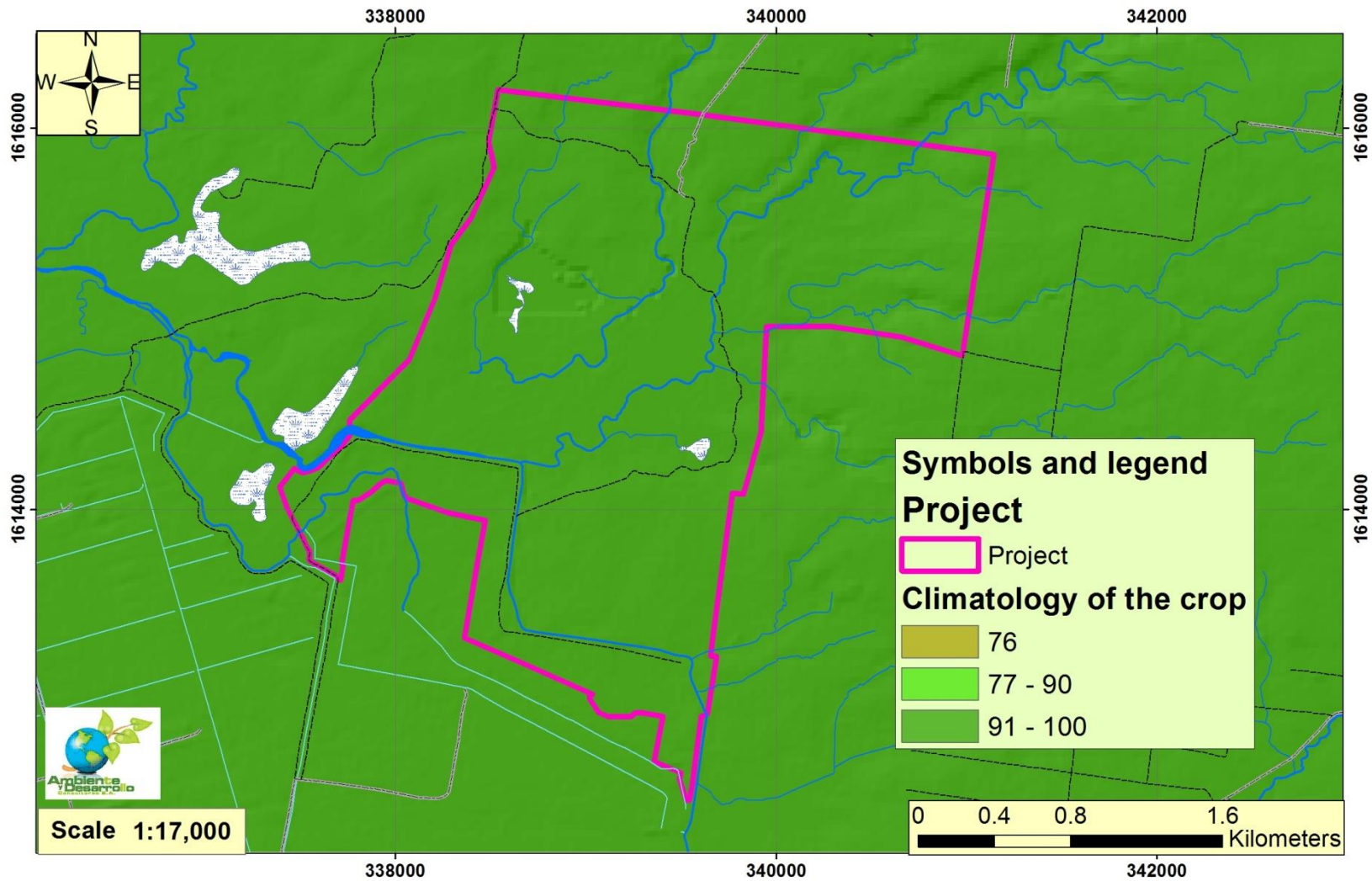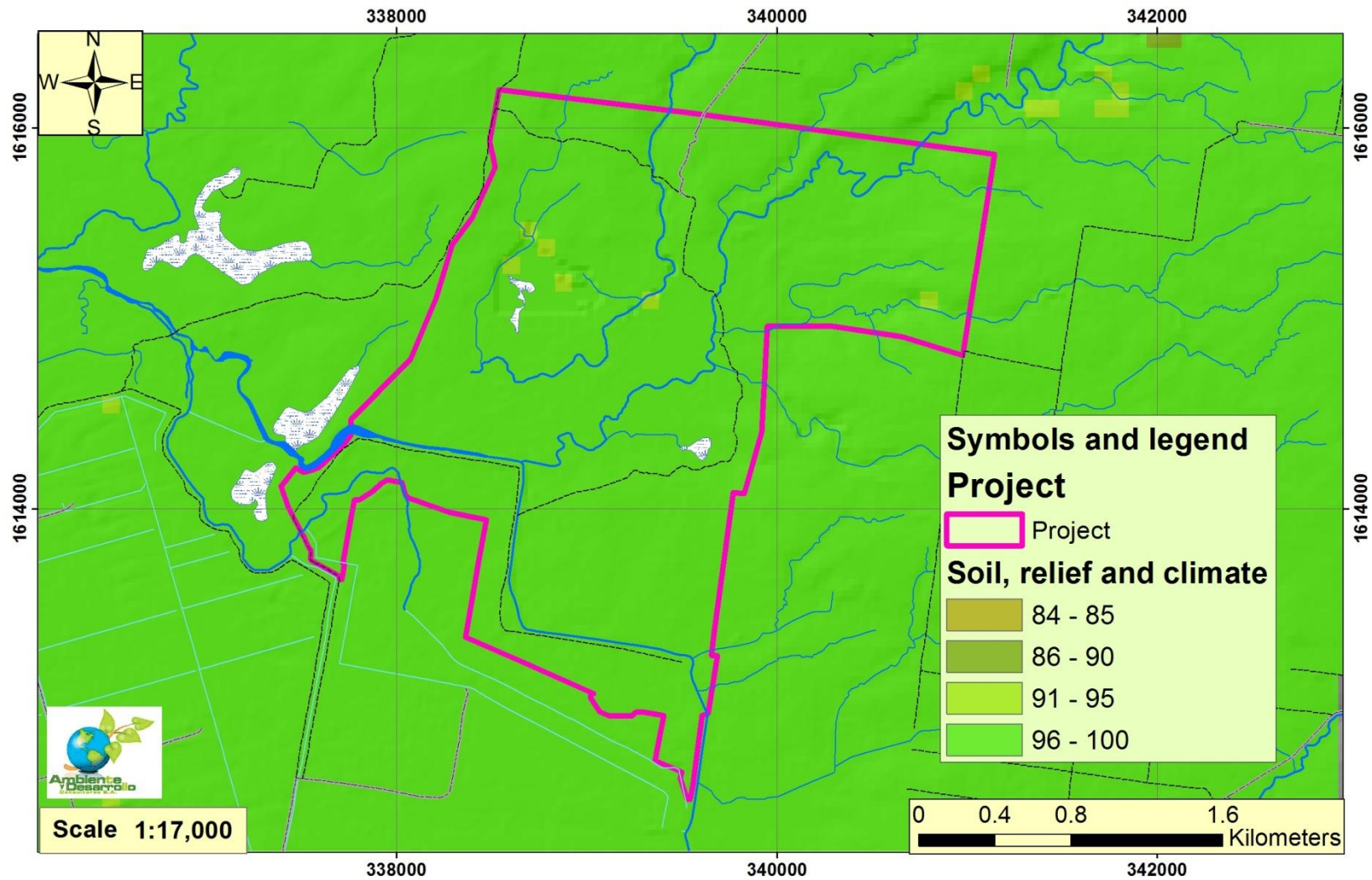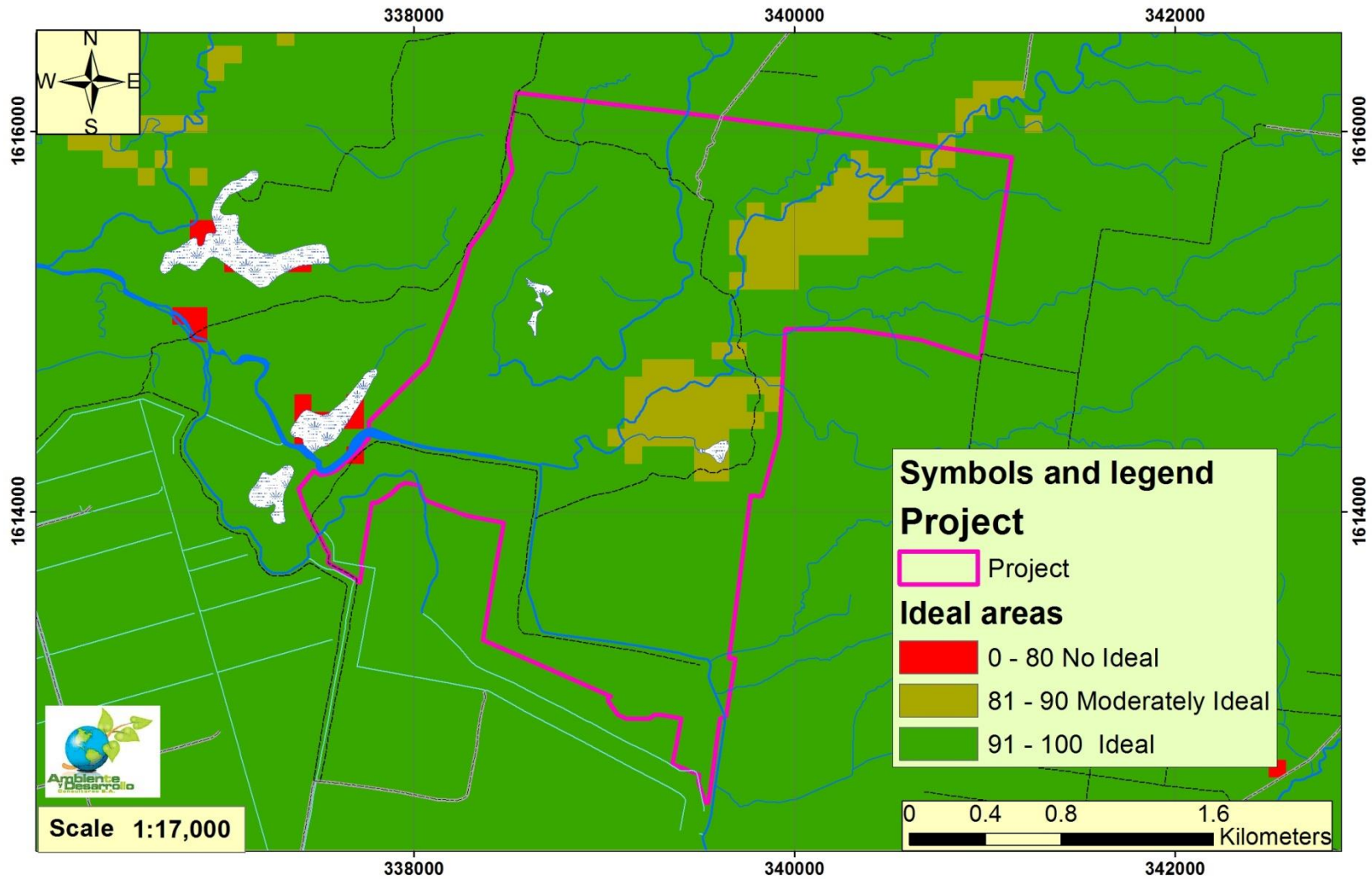Source: Ambiente y Desarrollo Consultores, 2016.

Map of protected areas

Symbols and legend

Project

☐ Project

Protected area

☐ Outside protected areas 1.00

Scale 1:17,000

0   0.4   0.8   1.6
Kilometers

Source: Ambiente y Desarrollo Consultores, 2016.

Map of current land use

Source: Ambiente y Desarrollo Consultores, 2016.

Map Climatology of crop

Source: Ambiente y Desarrollo Consultores, 2016.

Map of Soil, relief and weather

Source: Ambiente y Desarrollo Consultores, 2016.

Map of Ideal áreas

Source: Ambiente y Desarrollo Consultores, 2016.

9.4. CONCLUSIONS AND RECOMMENDATIONS

According to the analysis made based on the proposed model, it is concluded that the project is located in an area "totally suitable".

10. GHG

AGROACEITE is a company that dedicates its work to the production of palm oil (CPO and PKO). The company wants to extend their growing area to produce sustainable palm oil in its effort to diminish and recognize the impact caused to the environment due to its activities. The growing area will be extended according to the Principle 7 of the Procedure of New Plantations (PNP) according to the certification of Roundtable on Sustainable Palm Oil (RSPO), which indicates that the members that wish to increase their properties in an area greater than 500 hectares a year must comply with this principle.

In the following report, one of the five requisites for the PNP can be found. This requisite consists in the Greenhouse Gas Assessment, which includes: a) the identification and estimation of carbon reserves; b) the identification of the potential emission sources in the area of proposed development; and c) a plan to minimize the net GHG emissions. The study was done during a period of three months (August to October 2016).

In the developing process of the Greenhouse Gas Assessment, there has been an accompaniment by Green Development, company of environmental consulting and generator of business models using environmental tools.

Green Development developed this report according to the specifications in the Procedure of New Plantations (PNP) of RSPO Version 4.3 of July 2015, carrying out a field visit were the sources of emission were identified and they also made sure that the area destined for the new plantations did not contain any high value of conservation (HVC).

10.1. OBJETIVES

A. General
Develop the Greenhouse Gas Assessment according to the RSPO Procedure for New Plantings (NPP) for the company AGROACEITE.

B. Specific
⮚ Identify and estimate the current carbon reservoirs in the areas where the new plantings of AGROACEITE will be established.

⮚ Identify and quantify the potential emission sources of the Greenhouse Gases (GHG) in the area of proposed development for the new plantings of AGROACEITE.

⮚ Develop a plan that consists in the management and mitigation of the carbon reservoirs and emissions produced by Greenhouse Gases (GHG).

GREENHOUSE GAS (GHG) ASSESSMENT IN AGROACEITE

AGROACEITE is a company that possesses 4,817 hectares of palm cultivations, generating over 1,000 direct job offers. It also counts with a mill that has a current capacity of 20 T/hour. The company got certified with Rainforest Alliance in 2013 and Kosher and Identity Preservation –IP- of Rainforest Alliance in extracting plant on 2014. Also, it possesses with and approved audit of SEDEX Social Responsibility Program for the year 2014. The plantations are in the southwest area of Guatemala, in the departments of San Marcos, Quetzaltenango and Retalhuleu.

It has been contemplated for the years of 2017 the sow of new plantings. The RSPO New Plantings Procedure is being followed and the commencement of the new plantings will be afterwards RSPO has approved it. Said procedure applies to projects that began its development after January of 2010. The purpose of this is to comply with the requirement of said certification that states the development of a Greenhouse Gas Assessment that includes:

Identification and estimation of carbon reservoirs;

Identification of potential GHG emissions on the area of proposed development; and

Plan for the management and mitigation of carbon reservoirs and GHG emissions.

METHODOLOGY

For the estimation of carbon stocks, maps of soil coverage stratification were considered for the following estates: San Andrés, Maravillas, Santa Isabel y Palmira. This maps were done using the soil coverage of the year 2016 as a base and were developed in a Geographic Information System using satellite images that are already there. The maps were provided by the company AGROACEITE, verified with the study of High Conservation Values (HCV) and a field visit, based on said maps the estimation of carbon stocks in hectares was performed.

An investigation was carried out to determine the quantity each hectare could stock after obtaining the maps that detailed the different soil coverage stratifications that existed in the area destined for the new plantings.

It is worthy to mention that the of calculation carbon reservoirs include the calculation of both above-ground biomass and below-ground biomass as dictated on the requisites of the RSPO Procedure of New Plantings.

No estimation of peat soils was developed due to the fact that the Ministry of Agriculture, Cattle and Alimentation (MAGA, 2000) states that Guatemala has 7 types of soil which are: Alfisols, Andisoles, Entisols, Inceptisoles, Mollisols, Utisols and Vertisols. This indicates that in Guatemala there are no peat soils due because It belongs to the stratification of Histosols.

Methodology of the Greenhouse Gas (GHG) Assessment

For the quantification of the carbon footprint of the new planting project of AGROACEITE the PALM-GHG Calculator Version 2.0.1 was utilized. This tool was developed by the work group of the Greenhouse Gases (GHG) of the Roundtable of Sustainable Pal Oil (RSPO).

An estimation of the net emissions of GHG associated to the production of palm oil was done by quantifying the main sources of emission and the capture of GHG considering procedures from the fabrication until the supply base. The emissions are presented in tons
of equivalent carbon dioxide (tCO2e) per unit of product (CPO PK).

TEAM RESPONSIBLE FOR DEVELOPING MITIGATION PLAN

The team responsible for implementation of the measures adopted to maintain and improve the carbon stocks of the new plantings is the team of the company AGROACEITE, of different departments in the company.

MEASUREMENT	RESPONSIBLE
Maintenance and preservation of forests	Marvin López Manager of Certifications and Environment
Use of tensiometers, freatometer and pluviometer	David Sánchez Head of Technical Department
Preventive maintenance for irrigation motors	Luis Bonifassi Irrigation attendant
Monitoring Plan	Marvin López Manager of Certifications and Environment
Responsible for compliance	All employees

The importance of carbon stocks

Currently, climate change is a severe problem that affects the population worldwide and is a result of and excessive increase on the amount of Greenhouse (GHG). According to the Intragovernmental Panel of Climate Change (IPCC, 2007), climate change has caused a huge impact in ecosystems and humans in all continents and oceans. The increase in temperature has consequently caused the alteration of disease distribution, melting glaciers, extinction of species due to habitat change and other phenomena like heat waves, draughts, cyclones and forest fires in a more frequent manner.

Although Guatemala represents a very low percentage of the worldwide emissions – representing only a 0.03%, as reported by the Ministry of Environment and Natural Resources (MARN) -, it can be recognized that because the country has an increasing development it can continue to contribute and increase its emissions. The emissions of the country have been increasing since 1994 with increments in emissions from the sectors of energy, industrial processes and agriculture as stated in the National Inventory of Greenhouse Gases – INGEI -.
Facing the problematic of the increase in emissions, it is worthy to mention that the company of AGROACEITE has adopted different practices that allow them to mitigate the effect of climate change,

preservation of forests and provide means of subsistence for nearby communities that absorb a significant percentage of the company´s emissions. It has been registers globally that forests can absorb around a tenth of global carbon emissions in its biomass, soil and products which makes its conservation extremely important (FAO, 2010).

Calculation of the carbon stocks on AGROACEITE
A carbon reservoirs is defined as a system with the capacity to accumulate carbon. There are seven types of carbon stocks: above ground biomass, above ground (tree) biomass, below ground (root) biomass, vegetable tissue in the process of decomposition, carbon in the soil, wood products and wood (VCS, 2009).
In the case of AGROACEITE, the carbon stocks will be calculated for the following systems:
Above ground (tree) biomass: includes trees that can have 5 cm of diameter and 1.30 meters high (VCS, 2009).

Below ground (root) biomass: includes all the biomass of live roots. Thin roots can generally be of 2mm and are excluded because of the difficulty to distinguish them from other organic matter. (VCS, 2009).

Localization and description of carbon stocks in AGROACEITE
As mentioned before, the company AGROACEITE will count with new plantings in four different estates. The area of the new plantings ascends to 766.71 hectares, distributed in the following way: in Estate San Andrés 380 ha; Estate Palmira 53.77 ha; Estate Maravillas 57 ha; and Estate Santa Isabel 275.94 ha.
Also, there are 30.50 hectares destined to the conservation of forests distributed in the following way: 9.5 Ha for Estate Santa Isabel; 6 Ha for Estate Palmira; and 15 Ha for the Estate San Andrés. The map below specifies the localization of the four estates:

Figure 1. Map for the localization of estates (carbon stocks) of the New Plantings of AGROACEITE
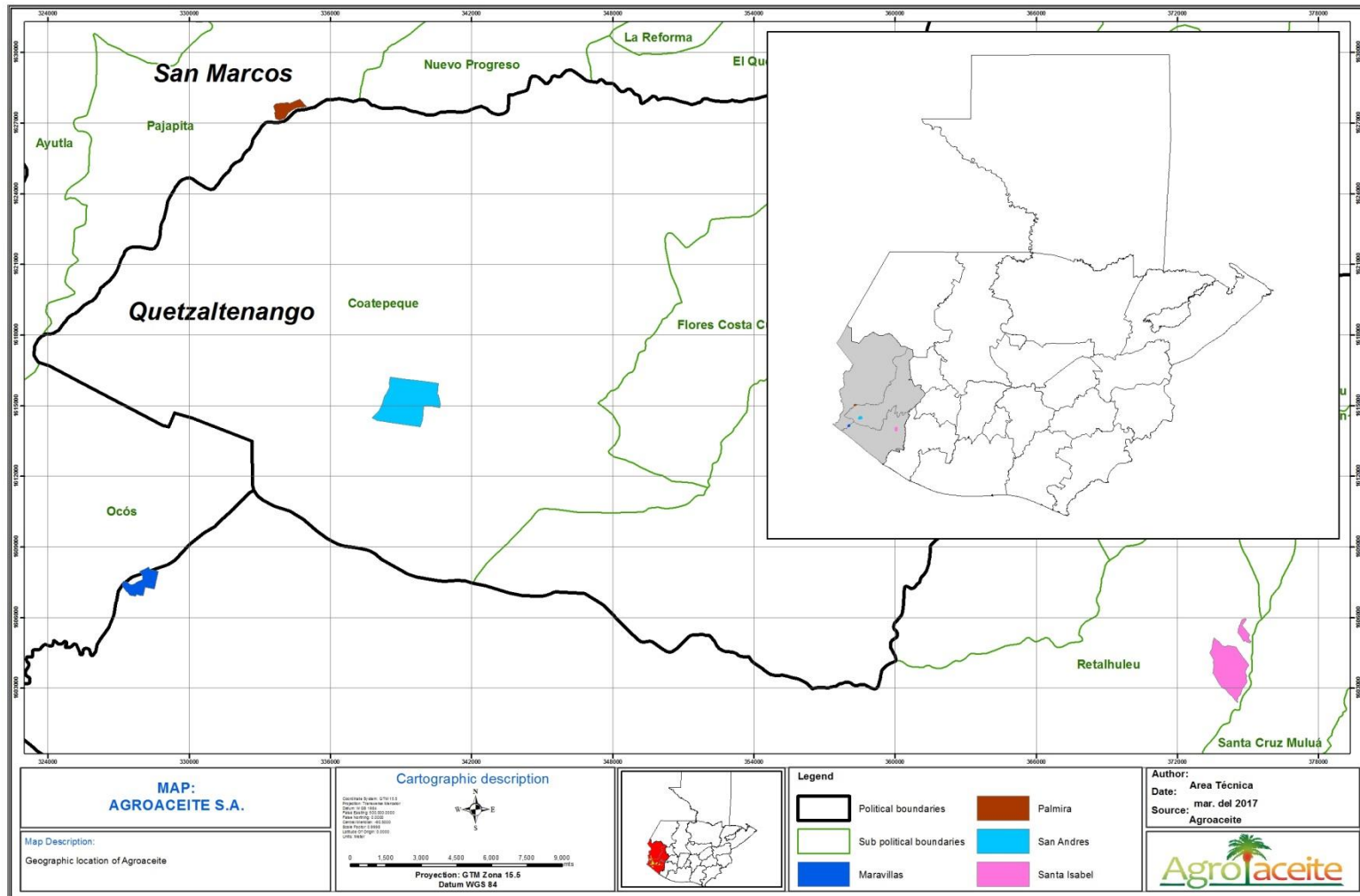
Source: Agroaceite, 2016.

A description of each carbon stock found in the areas destined for new plantings in the company of AGROACEITE:

a) *Secondary forest:* area of natural forest with disturbances in the ecosystem caused or originated naturally or by manmade work. In this case the forest is a gallery and it is directly linked to a hydrological entity.

b) *Grasslands*: vegetable communities were grasslands with very few trees and shrubbery are predominant.

c) Perennial crops (banana and rubber): crops planted for the production of over two years.

It is important to mention that the area of forests will not be modified at the time of the planting of palm oil, the area destine for planting will be the grassland; banana (Estate Maravillas) and rubber (Estate Santa Isabel).

Stratification and estimation of carbon stocks on AGROACEITE
The stratification of the land coverage for the area of the new plantings was done by a Geographical Information System, in the following maps it can be observe the detail of each stratus:

Stratification of soil coverage for Estates San Andrés and Maravillas, AGROACEITE
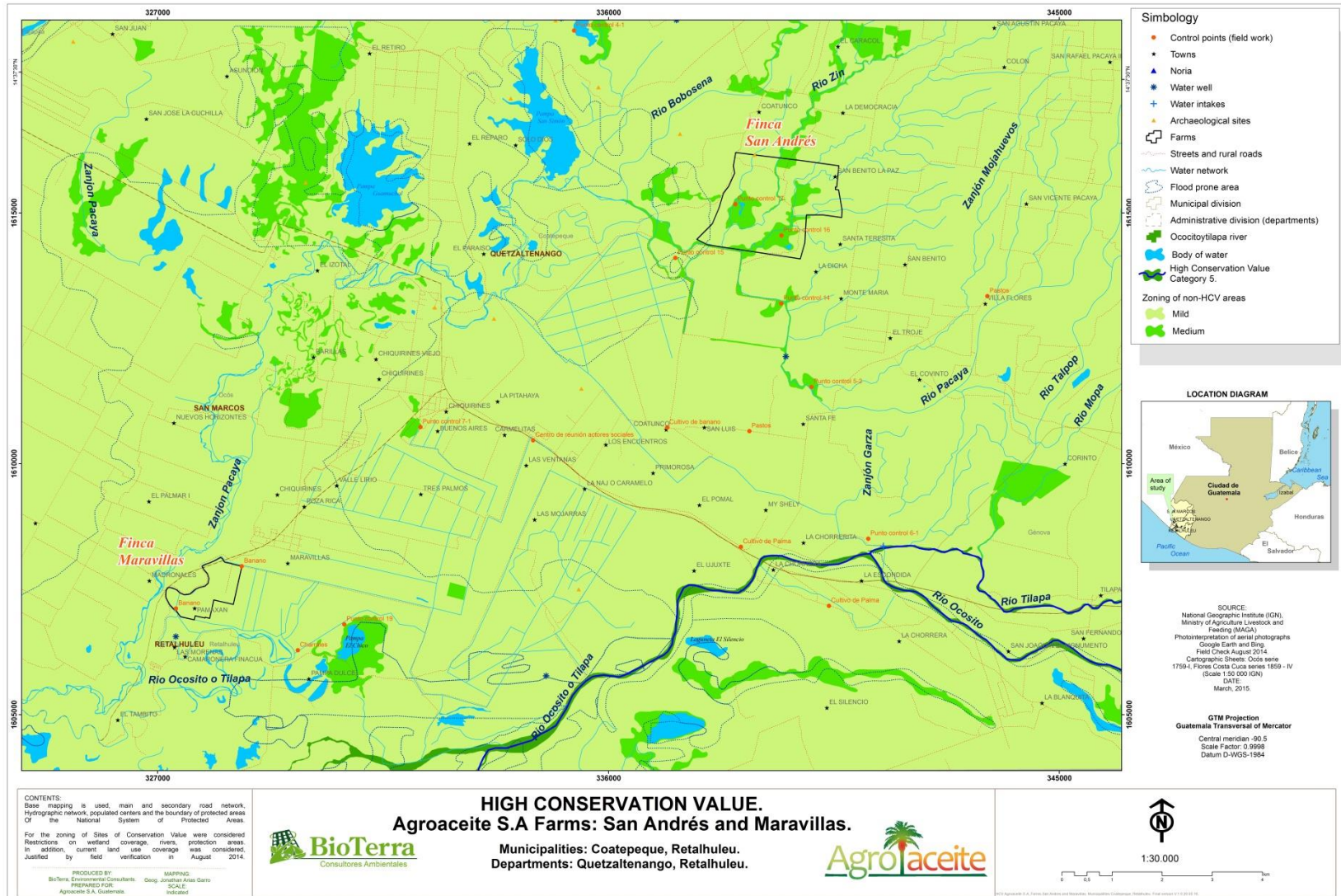
Source: Agroaceite, 2016.

Stratification of soil coverage for Estate Palmira, AGROACEITE
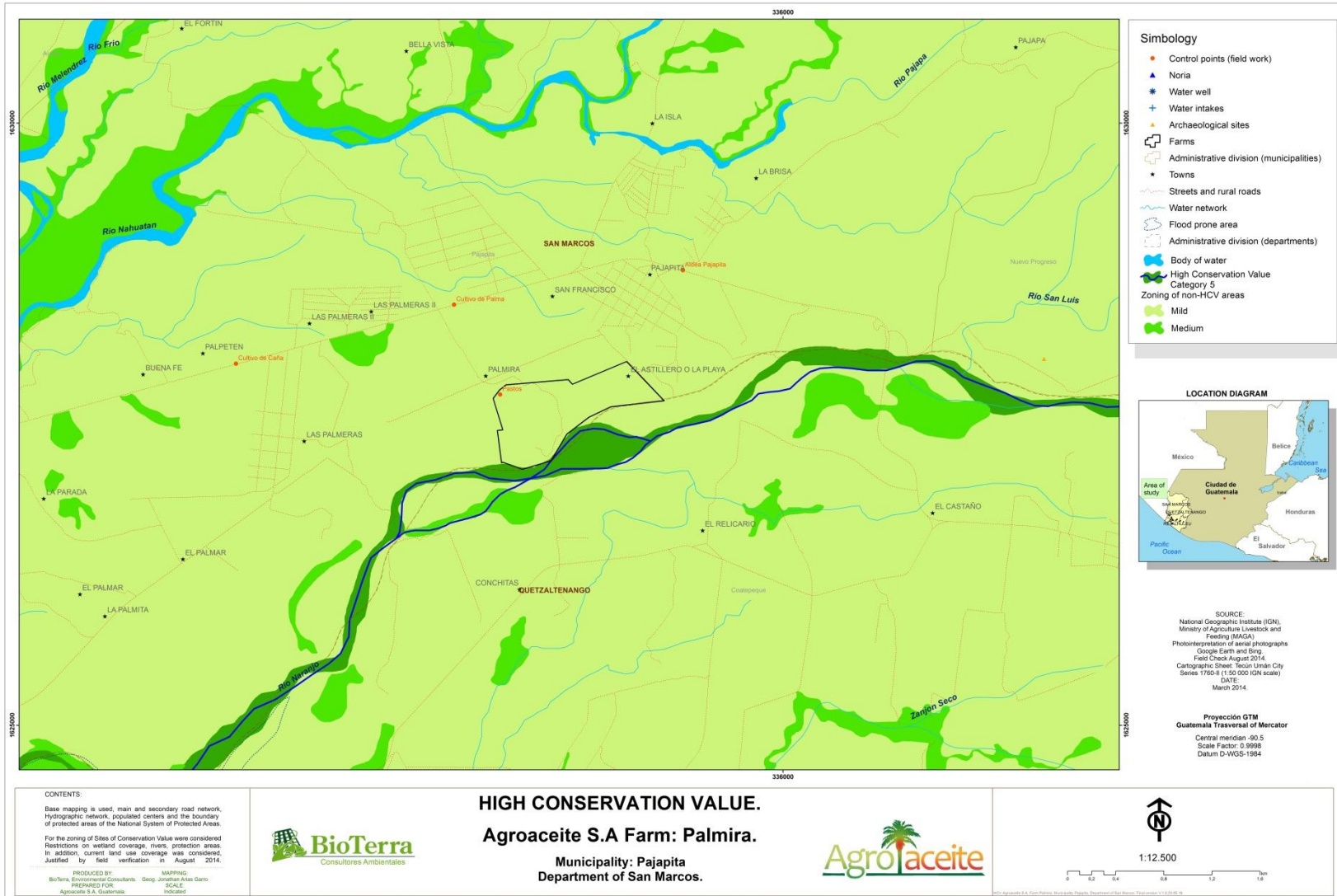
Source: Agroaceite, 2016.

Stratification of soil coverage for Estate Santa Isabel, AGROACEITE
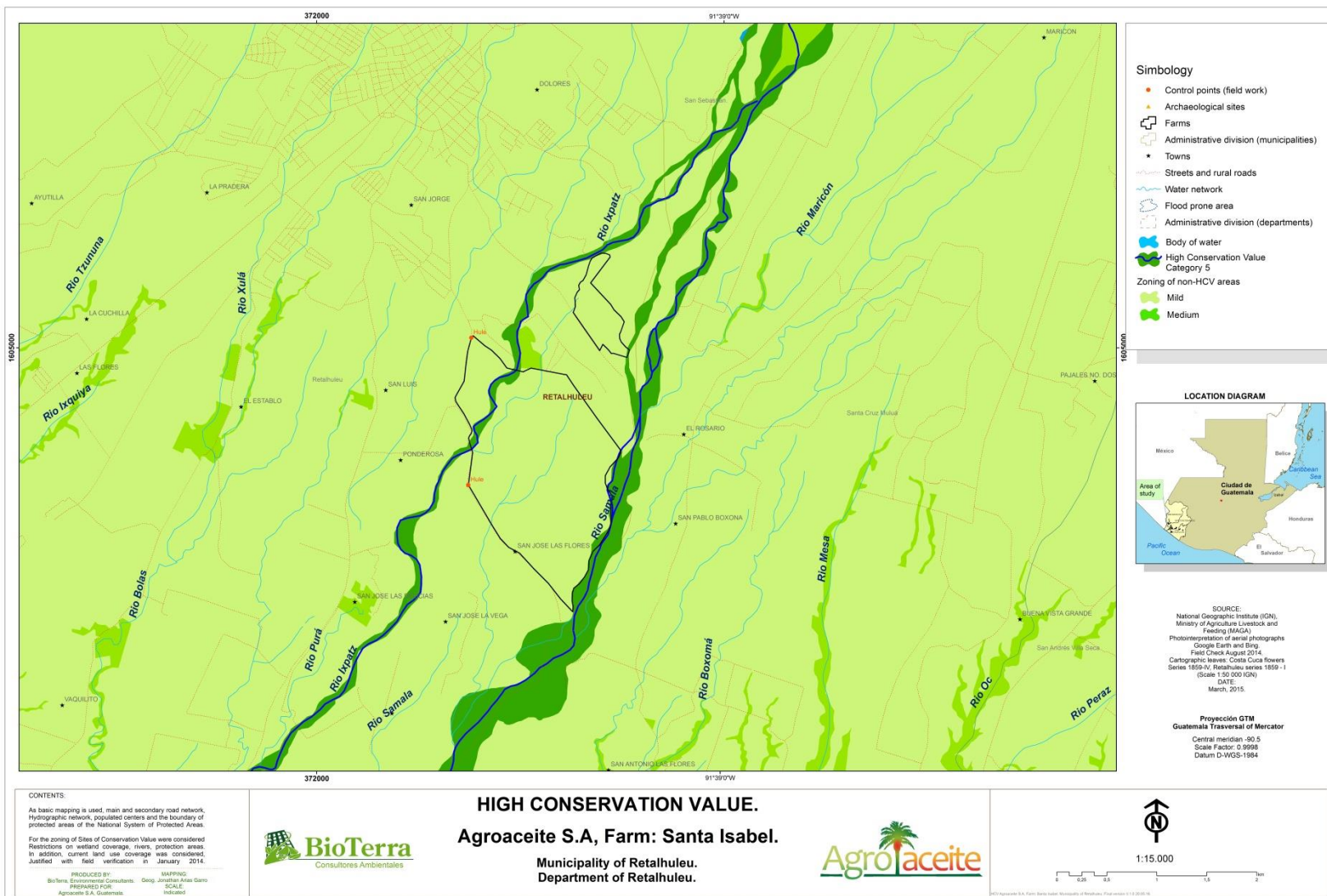
Source: Agroaceite, 2016.

For the estimation of carbon stock, RSPO establishes that predetermined values can be utilized by the PalmGHG or others more specific for each country. In the case of AGROACEITE, for the estimation of the carbon sequestration in the area of planting of palm oil, that is currently covered by grasslands, the predetermined values by the PalmGHG Calculator establish that 5 tons of carbon are stored per hectare. (tC/Ha); in banana crops (Estate Maravillas) there are 8.5 tC/Ha accumulated and in rubber crops (Estate Santa Isabel) 75 tC/Ha are accumulated.

On the other hand, the calculation of carbon in forests utilized the national source because it has studies of this type in the country and the values within it have more precision. The results utilized come from a study performed by World Resources Institute (WRI), CARE y WINROCK International (2000), which determine that each hectare of secondary forest in the southwest area of Guatemala can stock 29.17 tons of carbon (considering the above-ground and below-ground biomass).

Considering solely the stratification of the area of new plantings of AGROACEITE (areas outlined red on the maps of vegetable coverage), the following table details the quantity of carbon stocked:

Table 1. Estimation of carbon stock in the different stratums of AGROACEITE

Land Use Category	Area (ha)	Estimated carbon (tC/ha)	Carbon dioxide stocked (tCO₂/ha)	Total Carbon (tC) Stocked	Total Carbon dioxide stocked (tCO₂)
Secondary forest	30.50	29.17	107.05	889.69	3,265.14
Grasslands	433.77	5	18.33	2,168.85	7,951.00
Banana	57.00	8.5	31.17	484.50	1,776.69
Rubber	275.94	75	275.00	20,695.50	75,883.50
Totales	797.21	117.67	431.55	24,238.54	88,876.34

Source: Green Development 2,016.

It is important to mention that a verification of the stratification in the areas of new plantings was done and can be observed in the following images of the field visit:

Area for the new plantings on Estate Palmira

Source: Green Development, 2016.

Area for the new plantings in Estate Palmira

Source: Green Development, 2016.

Area for the new plantings in Estate San Andrés

Source: Green Development, 2016.

Area for new plantings in Estate San Andrés

Source: Green Development, 2016.

Area for new plantings in Estate Maravillas

Source: Green Development, 2016.

Area for new plantings in Estate Maravillas

Source: Green Development, 2016.

Area for new plantings in Estate Santa Isabel

Source: Green Development, 2016.

Area for new plantings in Estate Santa Isabel

Source: Green Development, 2016.

IDENTIFICATION OF THE POTENTIAL EMISSION SOURCES ON THE PROPOSED AREA OF DEVELOPMENT FOR AGROACEITE

The carbon footprint is the most efficient tool to measure the impact or the mark a person, industry or activity makes to the planet with a recount of emissions of carbon dioxide (CO_2) liberated to the atmosphere. Therefore, the carbon footprint is the measurement of the impact induced by the activities of the human towards the environment and it is determined according to the amount of GHG produced, measured in the unit of equivalent carbon dioxide.

Carbon Footprint Results, New Plantings, AGROACEITE
The results obtained in the quantification of the Carbon Footprint in the New Plantings on AGROACEITE are presented in the following table. The calculation was done with a tool developed by RSPO called GHG Calculator.
Table 2. Summary of emissions per product, New Plantings –AGROACEITE –

Summary Emission	
Product	tCO_2e/t product
CPO	-22.21
PK	-22.21
PKO	0.00
PKE	0.00

Source: Green Development, 2016.

It can be observed in table 2 that in AGROACEITE the emissions from Palm Oil (CPO) and Palm Kernel Oil (PK) correspond to **-22.21 tCO₂e/t of product**. It is important to mention that the sign is negative because the company will have a greater absorption in net carbon emissions.

**Figure 13. Distribution of emissions, New Plantings – AGROACEITE –**
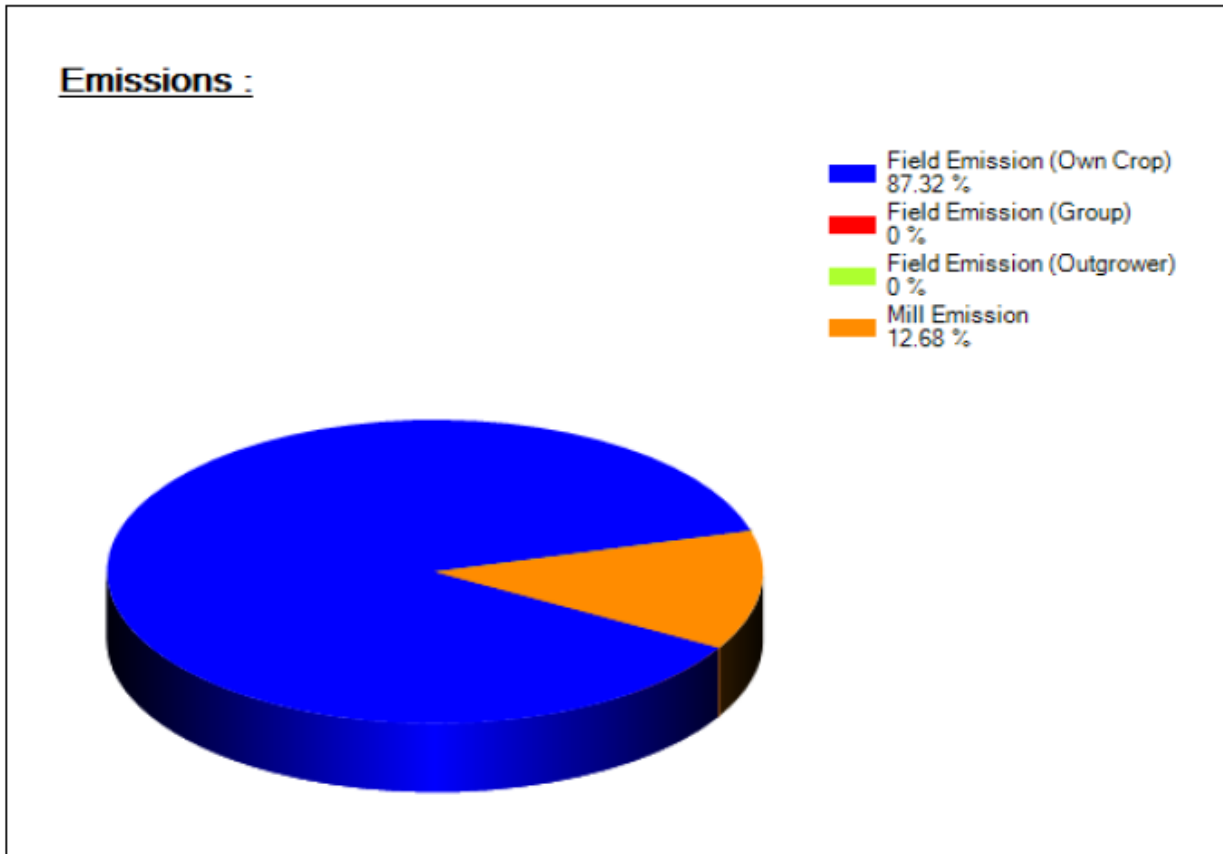
Source: Green Development, 2016.

Figure 13 shows the distribution of emissions in the new plantings of AGROACEITE. The emissions of the field represent the 87.32%, while the emissions from the mil represent a 12.68%.
The breakdown of emissions of the mill for the new plantings of AGROACEITE can be seen below:

Figure 14. Mill emission sources (tCO₂e), New Plantings – AGROACEITE –
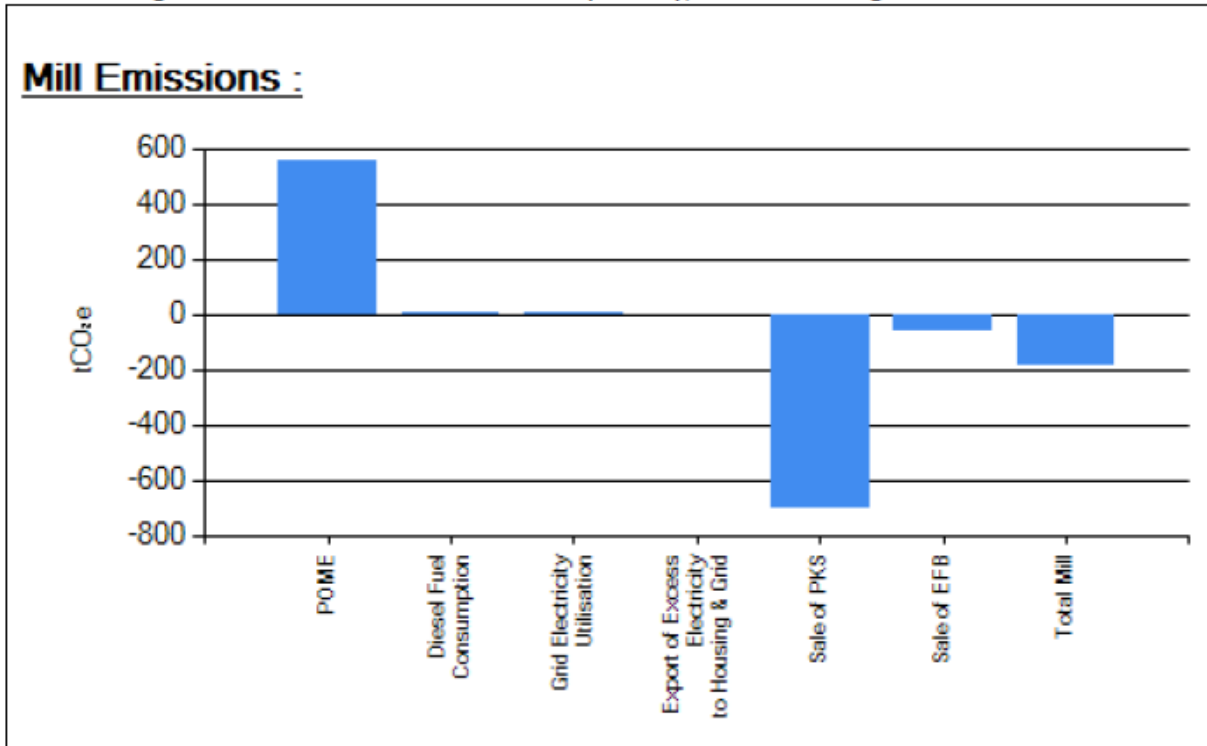
Source: Green Development, 2016.

Table 3. Mill emission sources and credit detail, New Plantings –AGROACEITE-

Mill Emissions and Credits		
	tCO₂e	tCO₂e/t FFB
Emissions Sources		
POME	559.76	0.18
Fuel Consumption	9.36	0.00
Grid Electricity Utilisation	5.14	0.00
Credits		
Export of Excess Electricity to Housing & Grid	0	0
Sale of PKS	-701.80	-0.22
Sale of EFB	-58.74	-0.02
Total	**-186.28**	**-0.06**

Source: Green Development, 2016.

The emissions derived from the mill (Figure 14 and Table 3) ascend to **574.26 tCO2e**, and **559.76 tCO2e** come from the palm oil mil effluent -POME-, which represents **0.18 tCO2e/t FFB**. In respect to the fuel consumption for the functionality of the plant it constitutes of **9.36 tCO2e**. The remaining **5.14 tCO2e** are due to emissions from the use of energy in the network.

On the other hand, the credits correspond to emissions that come from the avoidance of biomass in the generation of energy, generation of energy by methane of sewage water, sale of palm kernel shell and empty fruit bunches. In the case of AGROACEITE, the biomass will be utilized for the generation of a percentage of energy in the plant, if any type of fossil fuel should be utilized it would release **760.54 tCO2e**, which represents **0.24 tCO2e/t FFB**. The credits have a negative sign because they represent the absorption and this is subtracted from the total emissions of the plant. As seen above, the detail of emissions and credits of the extracting plant ascend to a total of **-186.28 tCO2e** net emissions.

It can be observed below the detail for the new emission sources of AGROACEITE:

Figure 15. Field emission sources (tCO$_2$e), New Plantings –AGROACEITE–
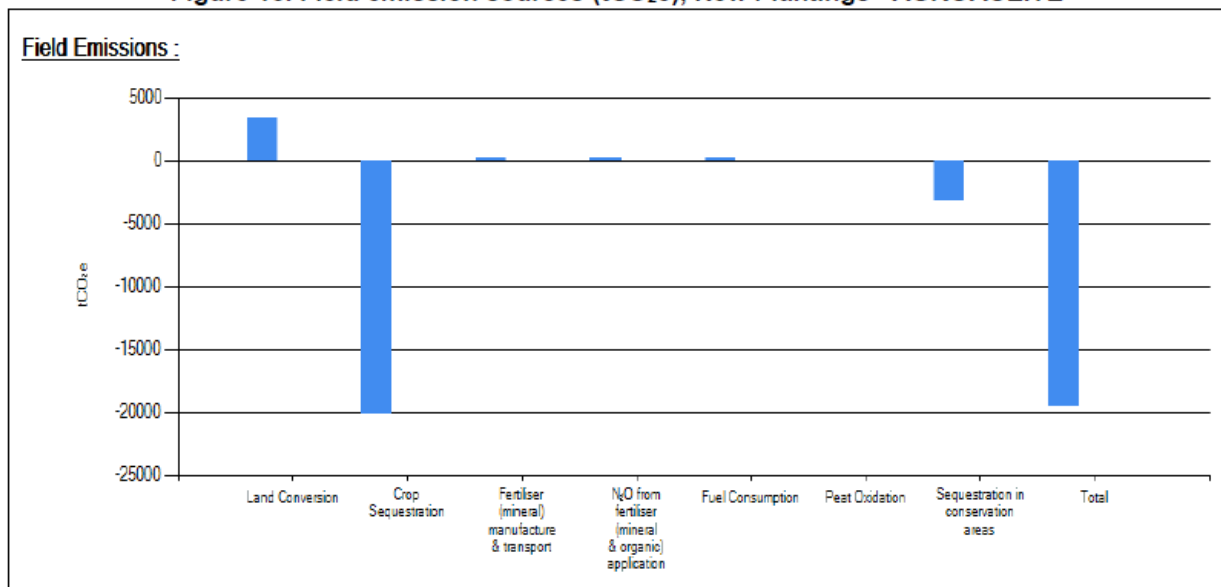
Source: Green Development, 2016.

Table 4. Detail of field emissions and sinks, New Plantings – AGROACEITE –

Plantation/field emissions and sinks

	Own Crop		
	tCO_2e	tCO_2e/ha	tCO_2e/t FFB
Emissions Sources			
Land Conversion	3424.50	4.47	1.07
Fertiliser (mineral) manufacture & transport	145.68	0.19	0.05
N_2O from fertiliser (mineral & organic) application	156.88	0.20	0.05
Fuel Consumption	228.29	0.30	0.07
Peat Oxidation	0	0	0
Sinks			
Crop Sequestration	-20183.51	-26.32	-6.33
Sequestration in conservation areas	-3265.02	-4.26	-1.02
Total	**-19493.18**	**-25.42**	**-6.11**

Source: Green Development, 2016.

Field emissions (Figure 15 and Table 4), ascend to **3,955.35 tCO2e**, were: **3,424.50 tCO2e** correspond to the change in soil use, representing **4.47 tCO2e/ha**; **145.68 tCO2e** derive from manufacturing and transport of fertilizer, which represent **0.19 tCO2e/ha**; **156.88 tCO2e** come from nitrogen oxide (N2O) that is released when fertilizer is applied, constituting **0.20 tCO2e/ha**; and the remaining **228.29 tCO2e** derive from fuel consumption for the use of field machinery which **0.30 tCO2e/ha**.

In the new plantings of AGROACEITE there will be carbon sinks in the field, this this represents the total of emissions absorbed by the palm to be planted and the conserved forest, these are subtracted from the field emissions. The carbon capture derived from the palm planting ascends to **20,183.51 tCO2e**, which represents an absorption of **-26.32 tCO2e/ha**; on its behalf, the areas of conservation (gallery forests) have a carbon capture of **3,265.02 tCO2e**, absorbing **-4.26 tCO2e/ha**. As seen above on the net emissions and sinks detail of the new plantings in the field which ascend to **-19,493.18 tCO_2e**, they are presented with a negative sign because the absorptions are greater than the emissions.

In figure 16 it can be observed the detail of the emission and sink sources for the company AGROACEITE, in the field as well as in the mill, have net emissions that can ascend to **-19,679.46 tCO₂ₑ**, the sign is negative because it indicates that in the total balance of total emissions/sinks, the absorptions are greater.

Figure 16. Emission and sink sources (tCO₂e) New Plantings, AGROACEITE
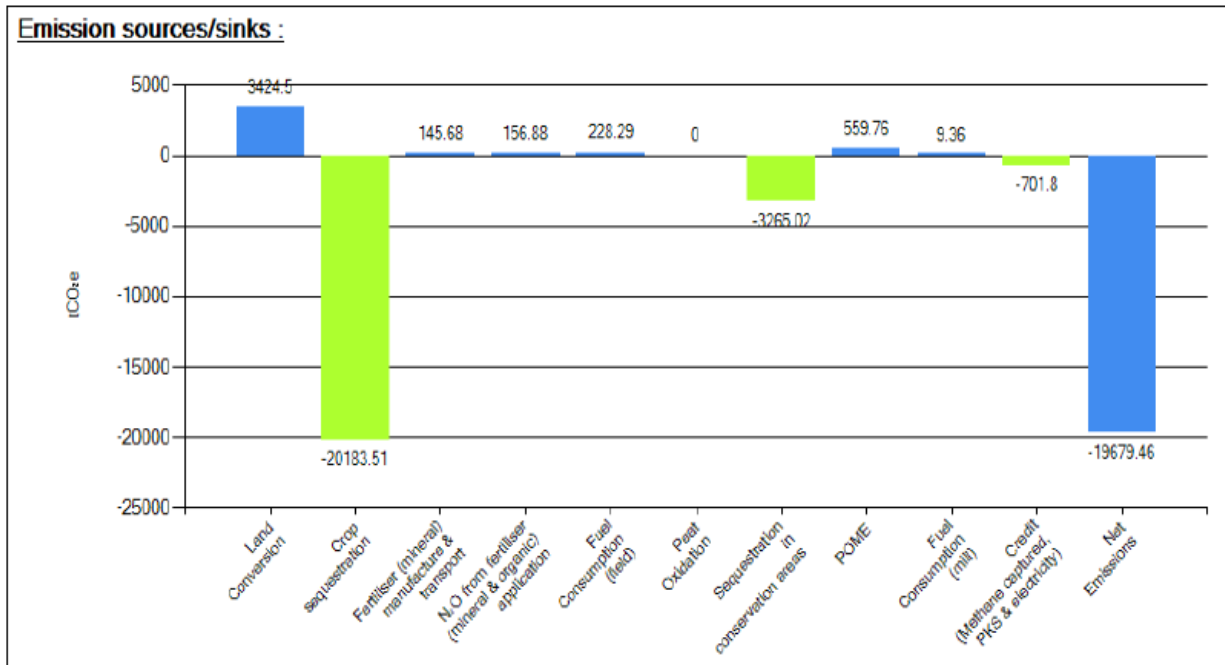
Source: Green Development, 2016

MANAGEMENT AND MITIGATION PLANS FOR CARBON STOCKS AND GREENHOUSE GAS EMISSIONS

Plan that indicates the carbon stocks and the presence of the peat soils were the new project will be developed and conserved
During the development of the new plantings in AGROACEITE the planified planting has 766.71 hectares of palm oil and the preservation of 30.50 hectares of secondary forest. It is worthy to mention that the natural forest won´t be removed, it will be maintained after the planting of palm.

The carbon stocks present right now are the following: secondary forest or gallery (it will be maintained after the planting, 30.50 Ha); the area of grassland and banana and rubber crops (were palm oil will be planted, 766.71 Ha). Since palm oil absorbs more carbon than the grasslands, banana and even rubber cultivations through its whole cycle, it is expected that once the project of new plantings is implemented, the carbon stocks will rise.

Regarding the peat soils, it is important to mention that since Guatemala does not have any, they were not identified as mentioned in the methodology (in the identification by MAGA for Guatemala there are no Histosols).

GHG emissions scenarios

Three different scenarios of Greenhouse Gas emissions have been developed for the company AGROACEITE. The results and the scenarios are presented below in the model:

Figure 17. Scenarios for the development of New Plantings, AGROACEITE
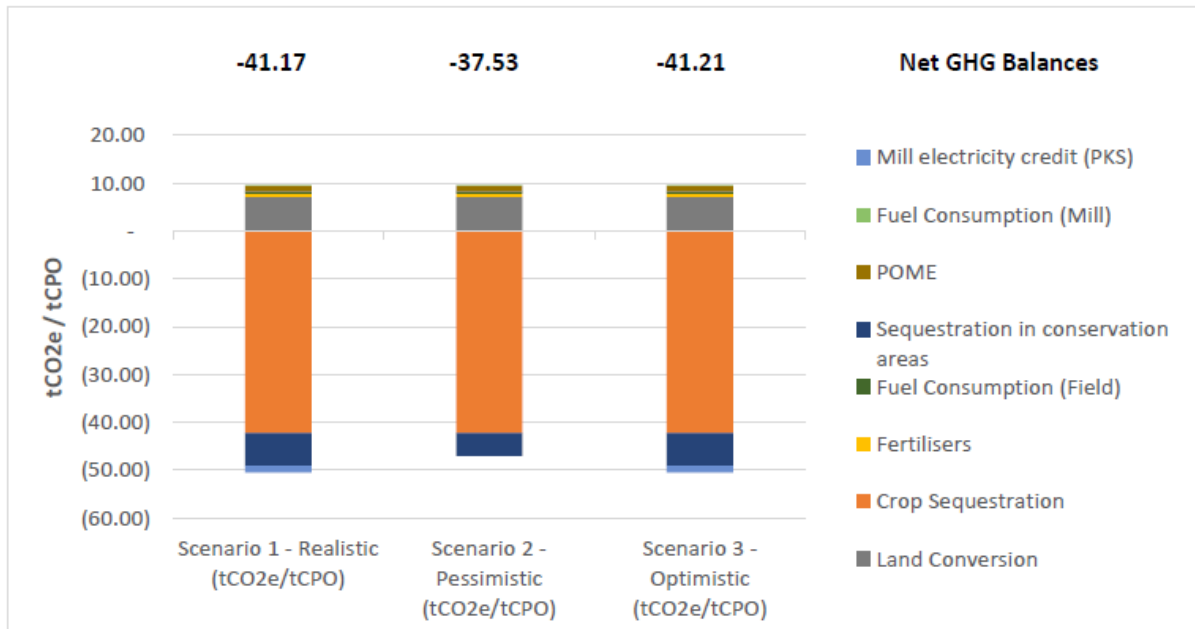
Source: Green Development, 2016.

Table 5. Description of GHG emission scenarios, New Plantings –AGROACEITE-

Type of scenario	Description of scenario
Scenario 1 (Realistic)	The cleared areas for the planting of palm oil in the four estates (Palmira, Santa Isabel, San Andrés y Maravillas) do not include secondary forest, areas of High Conservation Values (HCV) or community areas. It is expected that the forest areas that stock carbon are preserved due to personal safety measures that the company possesses and the No Deforestation Policy. To reduce the emissions due to energy consumption it is planned to utilize 100% of the palm kernel Shell and 30% of empty fruit bunches (EFB) that result as a product of oil extraction for the generation of energy. Total area for planting = 766.71 Hectares (96%) Total area of conservation = 30.50 Hectares (4%)
Scenario 2 (Pessimistic)	The vegetable coverage removed by the planting of palm will the one that currently has solely grassland, banana and rubber crops. This scenario considers the possibility of a forest fire in the natural forest reserves. The fire can be produced by natural causes of provoked by nearby communities, the clearance of 30% of the same areas that would diminish the carbon absorption significantly. Under the conditions that this scenery does not utilize palm kernel shells (PKS) and empty fruit bunches (EFB) for the generation of electric energy, the demand could be covered by the production the company currently has. Total area for planting= 766.71 Hectares (96%) Total area of conservation = 21.35 Hectares (3%) Area cleared by fires = 9.15 Hectares (1%)

		The cleared areas for palm oil planting do not include secondary forest, areas with High Conservation Values (HCV) or areas of the community.
Scenario 3 (Optimistic)		Under the conditions of this scenario it is expected that the forest areas meant to stock carbon will be preserved completely due to personal safety measures that the company possesses and the No Deforestation Policy
		To reduce emissions due to the consumption of electric energy, this scenery will continue to utilize 100% of PKS and there could be a possible augmentation of the utilization of EFB to a 50% for the generation of energy.
		Total area of planting= 766.71 Hectares (96%) Total area of conservation = 30.50 Hectares (4%)

		Scenario 1 (tCO$_{2e}$/tCPO)	Scenario 2 (tCO$_{2e}$/tCPO)	Scenario 3 (tCO$_{2e}$/tCPO)
Cleared Area	Grassland	433.77 Hectares (54%)	433.77 Hectares (54%)	433.77 Hectares (54%)
	Banana crop	57 Hectares (7%)	57 Hectares (7%)	57 Hectares (7%)
	Rubber crop	275.94 Hectares (35%)	275.94 Hectares (35%)	275.94 Hectares (35%)
	Forest, by fire or wood exploitation		9.15 Hectares (1%)	
Conserved Area	Secondary forest	30.50 Hectares (4%)	21.35 Hectares (3%)	30.50 Hectares (4%)
POME Treatment	Treated effluent	100%	100%	100%

GHG Balance (tCO$_{2e}$/tCPO)		- 41.17	- 37.53	- 41.21

Source: Green Development, 2016.

Table 6. Summary of the GHG emission scenarios, New Plantings –AGROACEITE-

Emission sources/sinks	Scenario 1 - Realistic (tCO$_{2e}$/tCPO)	Scenario 2 - Pessimistic (tCO$_{2e}$/tCPO)	Scenario 3 - Optimistic (tCO$_{2e}$/tCPO)
Land Conversion	7.16	7.16	7.16
Crop Sequestration	- 42.22	- 42.22	- 42.22
Fertilizers	0.63	0.63	0.63
Fuel Consumption (Field)	0.48	0.48	0.48
Sequestration in conservation areas	- 6.83	- 4.78	- 6.83
POME	1.17	1.17	1.17
Electricity Consumption	0.01	0.01	0.01
Fuel Consumption (Mill)	0.02	0.02	0.02
Mill electricity credit (PKS)	- 1.47		1.47
Mill electricity credit (EFB)	- 0.12		- 0.16
Net GHG Balances	**- 41.17**	**- 37.53**	**- 41.21**

Source: Green Development, 2016.

Optimal scenario explanation

Considering the results of the scenarios obtained, scenario 1 was chosen as the optimal one for the development of new plantings of AGROACEITE. The explanation below details how the scenario was chosen:

The areas that are foreseen to plant palm oil have currently grasslands, banana and rubber crops. There will be no clearances in the forest area, zones with high conservation values or places that can affect the connectivity between nearby communities.

Currently, the company treats 100% of the mill effluent. This composting system will have the capacity to treat the mill effluent of the new plantings because its design and capacity contemplated the potential growth of the company. Therefore, although production can rise, the treatment of the effluent will continue to be the same.

Secondary forests take up to 30.50 hectares and there is no plan to extend the area because there is no other place to develop more forest in the new plantings. Also, the company will develop a plan to maintain the totality of the forest area to guarantee it as a carbon stock. Said plan will emphasize in the awareness of diminishing wood exploitation and training of nearby communities to maintain the forest.

The fuel consumption of the field and the mill is expected to stay the same as in this scenario because it has a directly proportional relationship to the projected production. Regarding fertilizers, the use was calculated per hectare and there is no rise in consumption expected. Finally, it is important to mention that 100% of palm kernel Shell and 30% of empty fruit bunches will result from the production for the generation of electric energy.

Measures adopted to maintain and improve the carbon stocks of the new plantings

In the Identification and Estimation of Carbon Stocks section it was established that the existing areas of development are composed of grasslands, banana and rubber crops with an area of 30.50 hectares of forest distributed in the different estates. Given that the new palm plantings will only be on the grasslands and bananas, the forest areas will not be touched. Measurements that will be implemented on how to maintain it are listed below:

MEASUREMENT 1	Maintenance and preservation of forests
ACTING AREA	Conservation areas (Secondary forest / Gallery forest)
DEPARTAMENT IN CHARGE	Environmental Management
TERM	Short
OBJECTIVE	Maintain and improve the areas of conservation in the new project of new plantings.
DESCRIPTION	AGROACEITE has 30.50 hectares destined for the conservation of forests in the area of new plantings. The following actions will be taken to conserve said forests: • No activities should take place in forests. • Continuous monitoring by the forest ranger of the company • There should be a plan to reforest with native species to maintain the forest in case of any invasion or fire. • Develop a no Wood exploitation awareness with nearby communities.

Adapted measurements to mitigate net GHG emissions associated with the cultivation and processing of palm oil

The company AGROACEITE has the objective to reduce its emission and has decided to implement different measurements to have a more efficient fuel consumption for the machinery; preventive maintenance of the machinery and motors. Measurement to mitigate emissions are detailed below:

MEASUREMENT 1	Use of tensiometers, freatometer and pluviometer
ACTING AREA	Risk
DEPARTAMENT IN CHARGE	Engineering
TERM	Short
OBJECTIVE	Reduce emissions that come from irrigation motors to guarantee the rational use of water.
DESCRIPTION	With the finality of reducing the use of fossil fuels, the irrigation system will be automatic by the installation of the following equipment: Tensiometers: they indicate the humidity level inside the soil. Two tensiometers are installed to guarantee the adequate level of humidity inside the radicular area of the palm oil. A tensiometers is installed 6 inches deep (15.24 cm) and the second tensiometers is installed 12 inches (30.48 cm) deep. Tensiometers are calibrated at 0 - 95 Kpa. The equipment begins to register numbers away from 0 Kpa to signal the lack of humidity in the soil. The tensiometers at 6 inches indicates when the irrigation process starts or Permanent Wilting Point (30 Kp) and the tensiometers at 12 inches indicates when the irrigation needs to stop meaning it should be at Field Capacity (0 Kp). Approximately 15 liters were used for irrigation and the process should be done again in 10-11 days. The data of motor 51 is extrapolated to the rest of the estate because the soil formation happens in large extensions and there is very little variability. Freatometer: they indicate the water level inside the soil. During winter, it reports the excess in precipitation and in summer the excess in irrigation. During summer time the data generated should be nonexistent if tensiometers are managed adequately. Pluviometer: during winter time it indicates precipitation and during summer time it indicates the irrigation applied.

MEAUREMENT 2	Preventive maintenance for irrigation motors
ACTING AREA	Irrigation
DEPARTAMENT IN CHARGE	Engineering
TERM	Short
OBJECTIVE	Give maintenance to irrigation motors to help mitigate greenhouse gas emissions that derive from the poor functionality of said motors.
DESCRIPTION	AGROACEITE is aware that the maintenance of irrigation motors is important to guarantee their efficiency. To reduce emissions the following actions will be taken: • Frequent revision of oil levels to ensure that the measurement dipstick is always at maximum level to avoid motor damage. • Revision and tension of the girdles: the girdle tensor should always be firm. Tests will be done to check on it in a frequent manner. • Revision of fuel level and plug: check that the plug has not been altered. • Revision of cooling and plug: check that the cooling system is at least ½ inch from the neck of the radiator.
	• Revision of the tachometer to work with the required revolutions. • Revision of the odometer functionality. • Battery revision: the battery shouldn´t have any tartar. • Verification of blowout, radiator and filter. • Verification of the greasing in the centrifuge pump. • Murphy Sistema revision: indicators of oil pressure and temperature in the motor.

Monitoring plan for the implementation of the scenario chosen for the new development. The scenario should include measurements to improve the carbon stocks and reduce GHG emissions to a minimum.

The surveillance of the fulfillment of the emission mitigation measures, the preservation of the carbon stocks and the implementation of the scenario selected for the new development will take place once the new plantings project of AGROACEITE begins.

Objectives:

◻ Maintain a fulfillment control of all the GHG emission mitigation measures, preservation of carbon stocks and the development of the expected scenario for the new plantings project of AGROACEITE.

Type of measurements:

Follow up and control

A monitoring plan is presented below for the implementation of the optimal scenario, the conservation of the carbon stocks and the reduction of GHG emissions in the new plantings of AGROACEITE:

Table 7. Monitoring Plan, New Plantings–AGROACEITE-

Measurement	Way of monitoring	Frequency of monitoring
Electricity generation through empty fruit bunches and palm kernel shells	There will be a control on the percentage of fiber destined to electricity generation.	Monthly
POME fuel consumption	A preventive monitoring maintenance will be done to improve its efficiency.	Quarterly
Preservation of conservation areas (forests).	The forest areas will be monitored to determine there is no deterioration or damage.	Annualy
Preventive machinery maintenance	A preventive maintenance will be done to machinery to make the fuel consumption efficient.	Quarterly
Efficient fuel use on irrigation systems and motors	The automatization of the irrigation motors will be revised.	Monthly

Source: Green Development, 2016.

WORK TIMELINE

ACTIVITY	AUGUST				SEPTEMBER				OCTOBER			
	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4
Initial meeting		X										
Visit to the project area			X									
Selection of methodology for calculating carbon stocks				X								
Identification of emission sources					X							
Calculation of potential emission sources						X	X	X				
Quantification of carbon footprint								X				
Calculation of carbon stocks								X				
Analysis of results of carbon stocks and carbon footprint								X				
Preparation of preliminary report									X			
Review of report by Agroaceite										X		
Making corrections											X	
Submission of final report												X

INTERNAL RESPONSIBILITY

ACCEPTANCE OR RESPONSIBILITY BY THE COMPANY THAT DEVELOP GHG ASSESSMENT
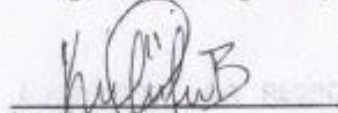
Green Developtment Company, dedicated to environmental consulting and generating business models from environmental tools, led by Mr. Amilcar Ordoñez who is certified to ISO 14064:2006 standards and DIN EN 16001: 2009-08 (No. AI-EESA-002-11) and has worked on certifications for AENOY and TUV Rheinland, takes full responsibility for the content of this report.

Ing. Amilcar Ordoñez
Green Development

ACCEPTANCE OF RESPONSIBILITY FOR ASSESSMENT AND MANAGEMENT AND MITIGATIN PLANS

By this declaration, I take full responsibility of the content of this report, that includes the management and mitigations plans.

Ing. Karen Barrera
Green Development assessor

ACCEPTANCE OF RESPONSIBILITY BY THE COMPANY

By the company Agroaceite, S.A. I take responsibility for this report.

Ing. Marvin López
Head of Certifications
Agroaceite, S.A.

ORGANISATIONAL INFORMATION AND CONTACT PERSONS

Company	AGROACEITE
Project Name	Greenhouse Gas Assessment
Legal Representative	Gerardo Asturias
Email	gasturias@agroamerica.com
RSPO manager	Marvin López
Email	marvinlopez@agroaceite.com
Company address	Vía 5 5-34 zone 4, Centro Financiero Building, Tower III, level 11. Guatemala, Guatemala
Company phone number	(502) 2420-9600

CARBONO STOCK MAPS (SOURCE: GREEN DEVELOPTMENT, 2017**)**
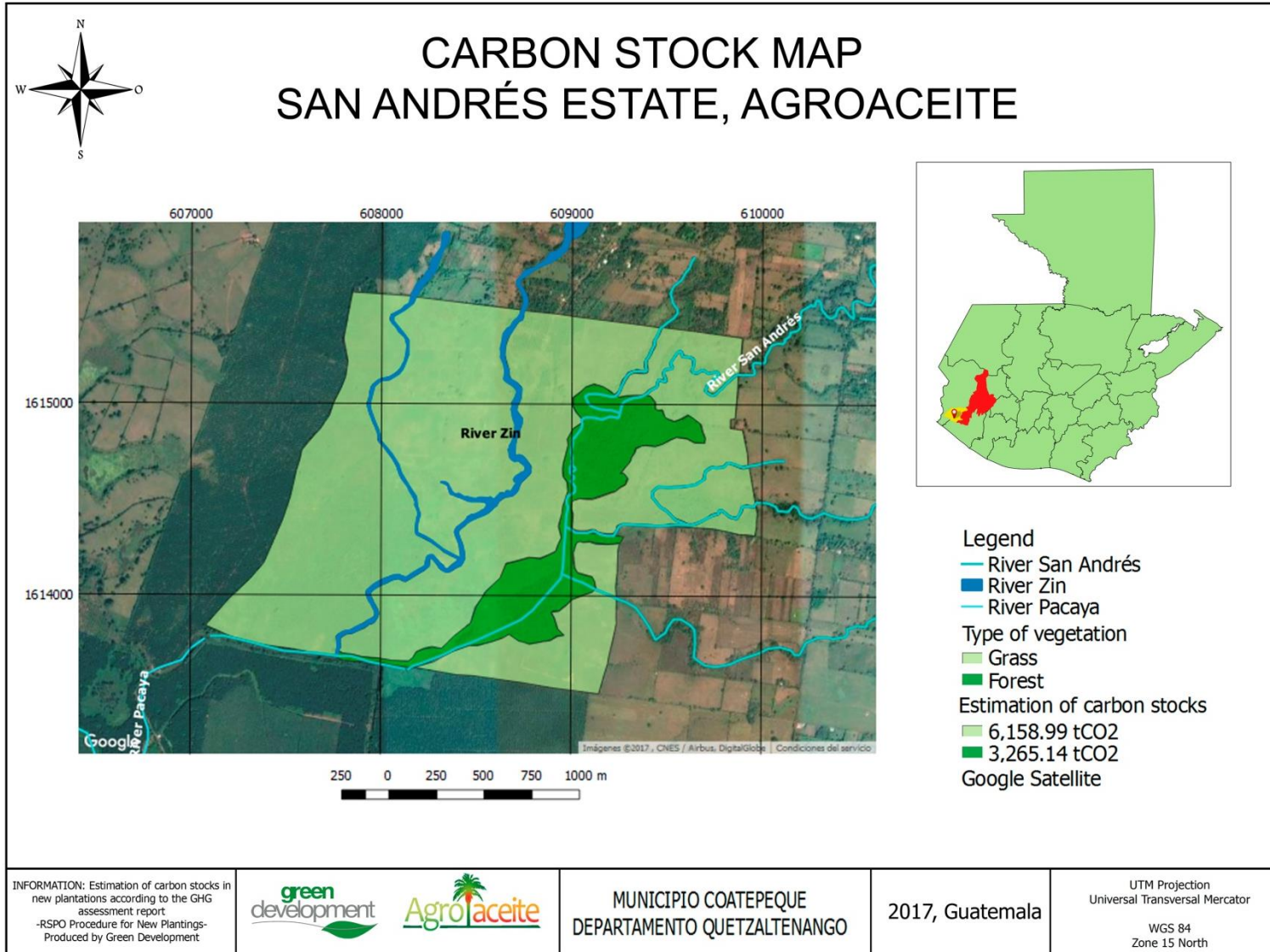
CARBON STOCK MAP
SANTA ISABEL ESTATE, AGROACEITE
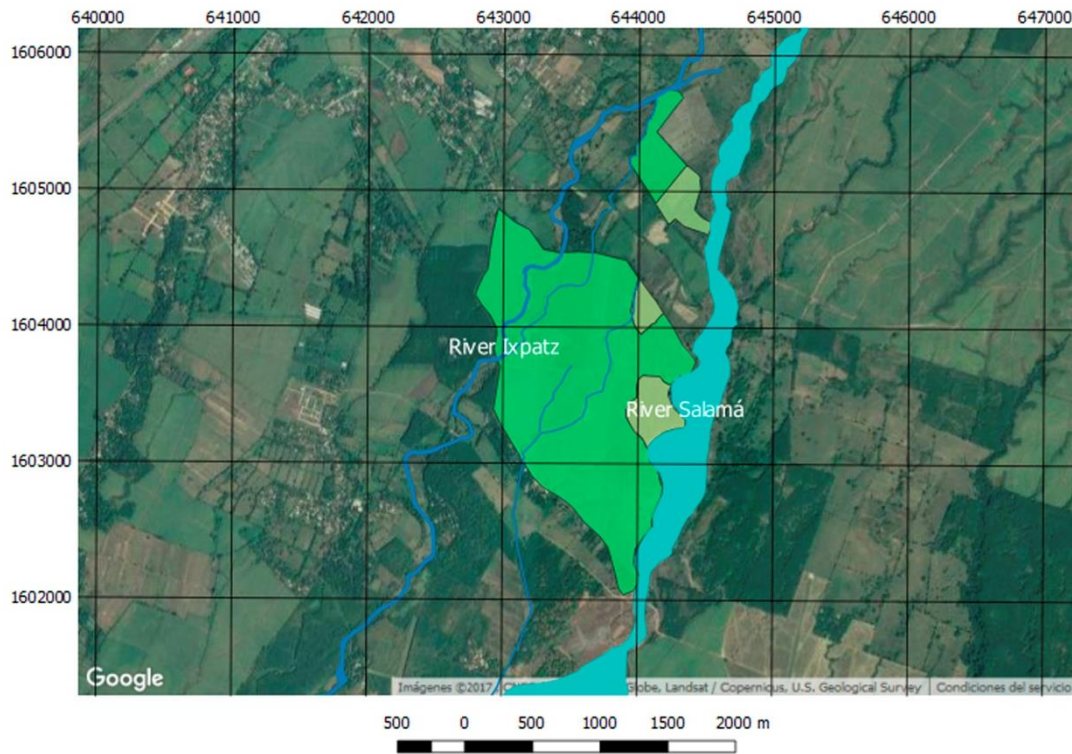
Legend
River Salamá
River Ixpatz.
Type of vegetation
Rubber cultivation
Grass
Estimation of carbon stocks
75,883.50 tCO2
634.27 tCO2
Google Satellite

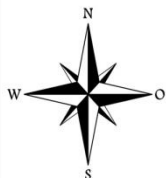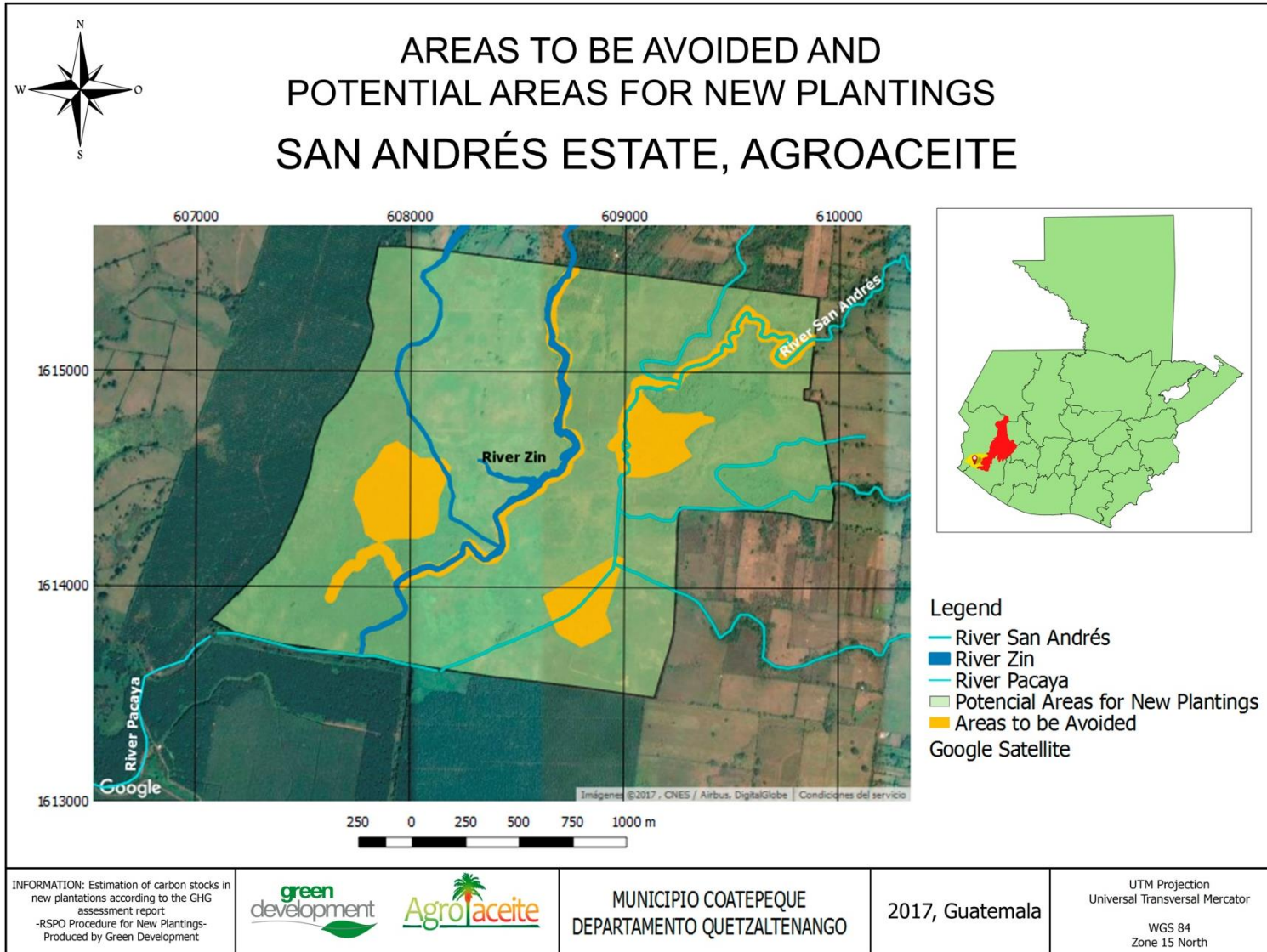| INFORMATION: Estimation of carbon stocks in new plantations according to the GHG assessment report -RSPO Procedure for New Plantings- Produced by Green Development | green development | AgroAceite | MUNICIPICIO DE RETALHULEU DEPARTAMENTO DE RETALHULEU | 2017, Guatemala | UTM Projection Universal Transversal Mercator WGS 84 Zone 15 North |

CARBON STOCK MAP
PALMIRA ESTATE, AGROACEITE
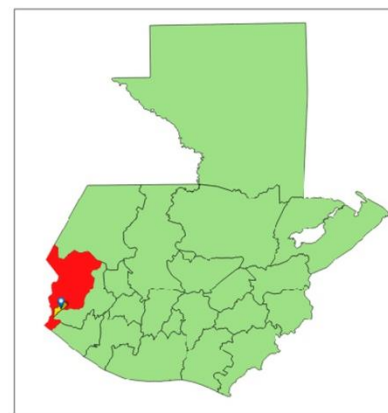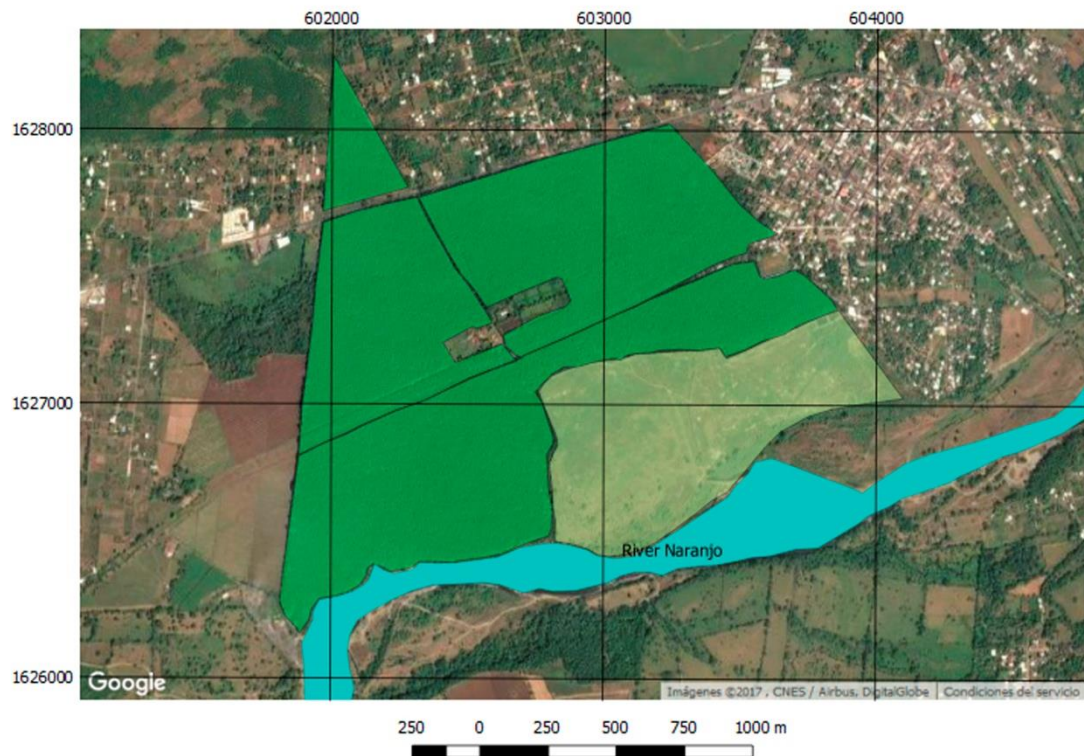
Legend
River Naranio
Type of vegetation
Grass
Cultivation of Palm
Estimation of carbon stocks
1,157.74 tCO2
Google Satellite

INFORMATION: Estimation of carbon stocks in new plantations according to the GHG assessment report
-RSPO Procedure for New Plantings-
Produced by Green Development

green development

AgroAceite

MUNICIPIO DE PAJAPITA
DEPARTAMENTO DE SAN MARCOS

2017, Guatemala

UTM Projection
Universal Transversal Mercator

WGS 84
Zone 15 North

CARBON STOCK MAP
LAS MARAVILLAS ESTATE, AGROACEITE
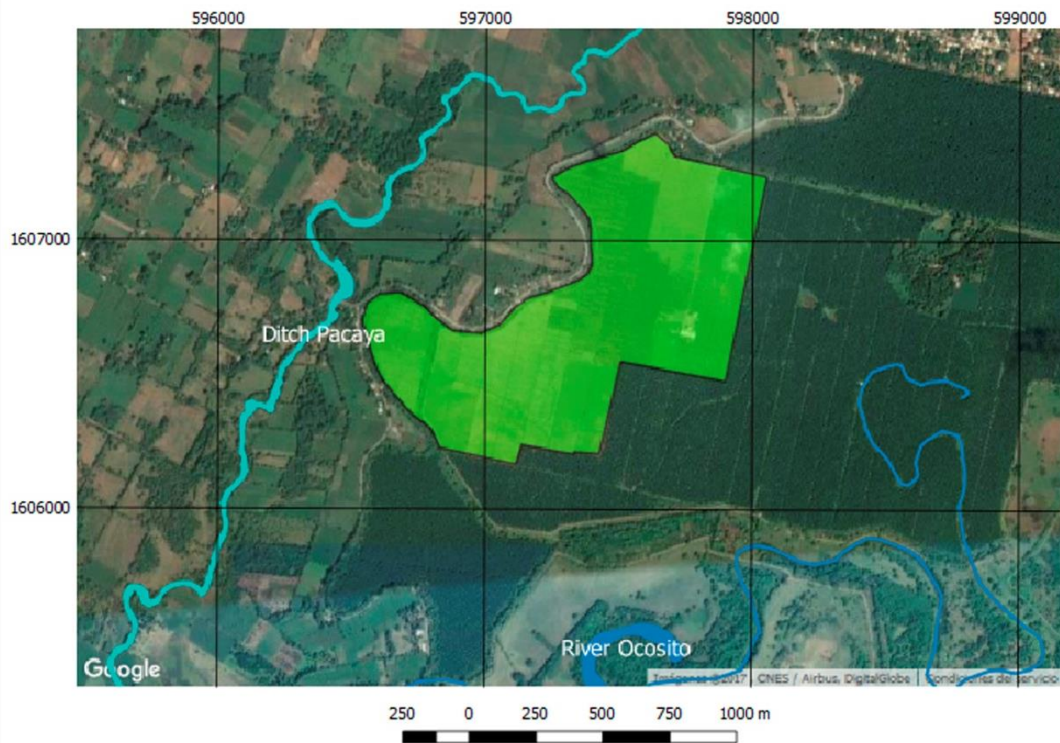
Legend
Ditch Pacaya
River Ocosito
Type of vegetation
Banana cultivation
Estimation of carbon stocks
1.776.69 tCO2
Google Satellite

INFORMATION: Estimation of carbon stocks in new plantations according to the GHG assessment report -RSPO Procedure for New Plantings- Produced by Green Development
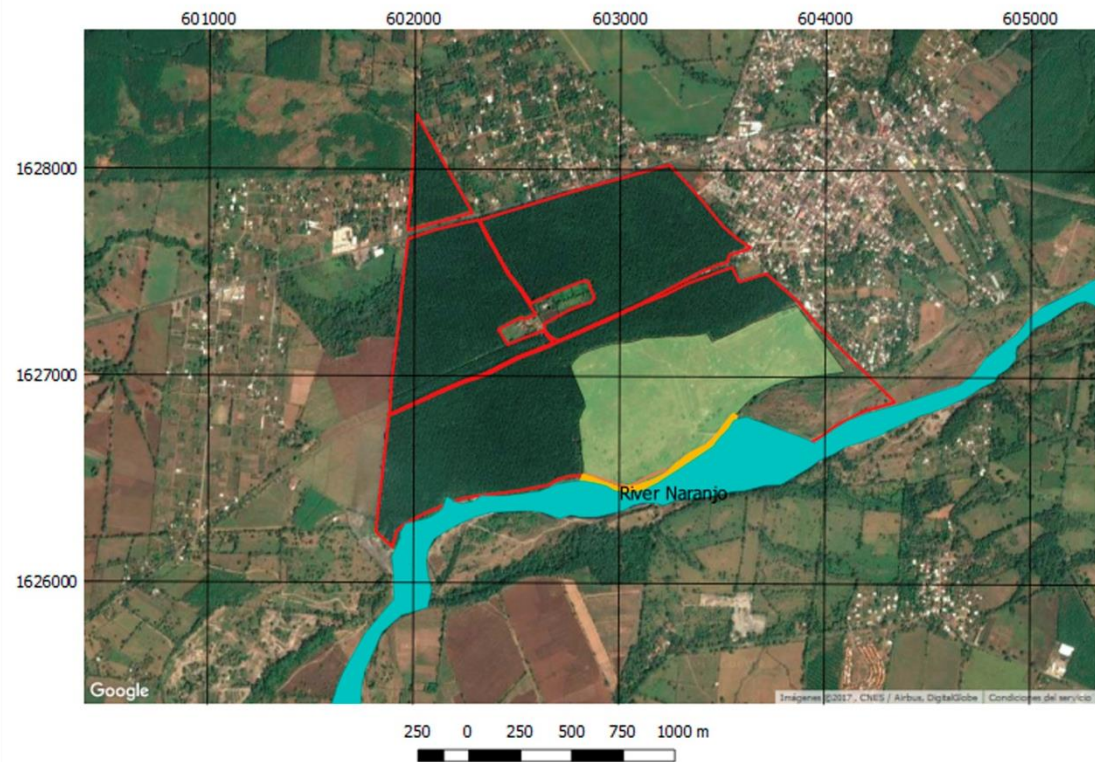
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AgroAceite

MUNICIPICIO DE RETALHULEU
DEPARTAMENTO DE RETALHULEU

2017, Guatemala

UTM Projection
Universal Transversal Mercator

WGS 84
Zone 15 North

AREAS TO BE AVOIDED AND
POTENTIAL AREAS FOR NEW PLANTINGS

SANTA ISABEL ESTATE, AGROACEITE
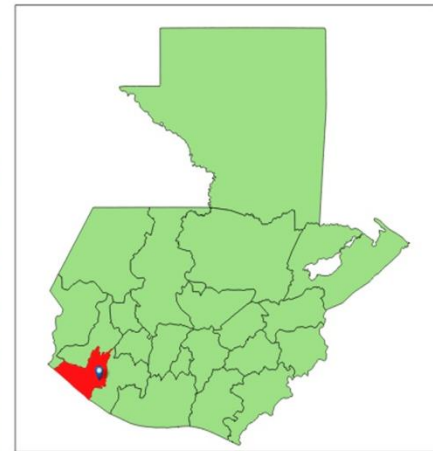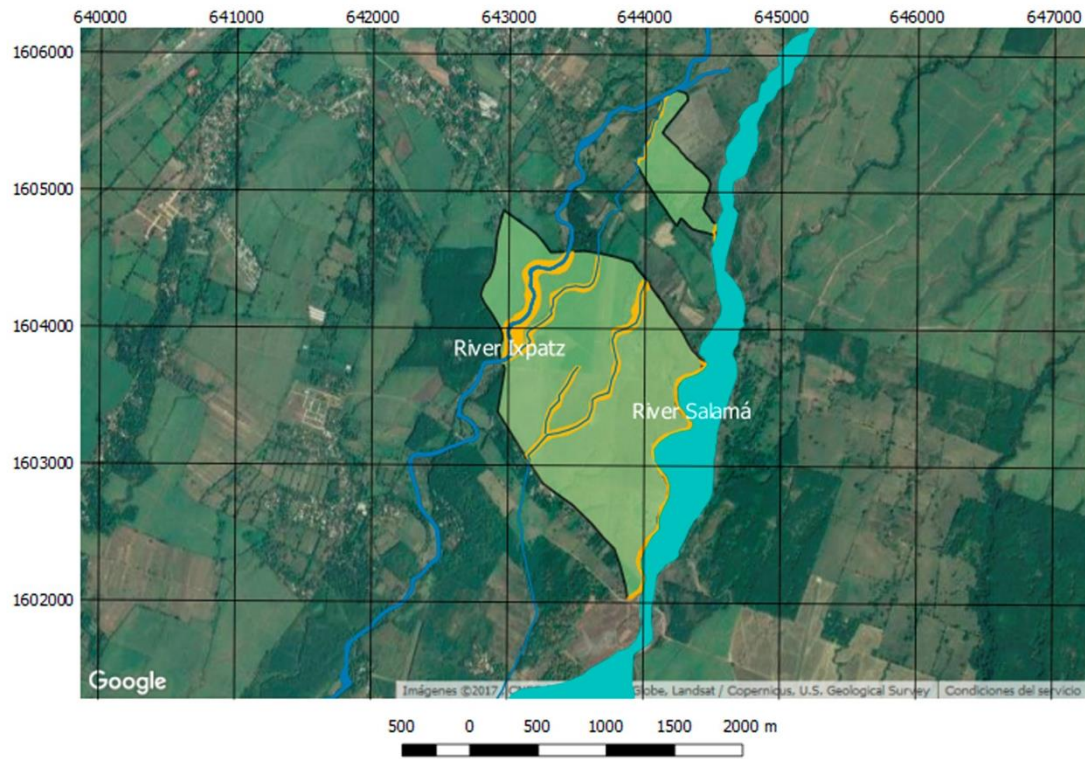
Legend
River Salamá
River Ixpatz
Areas to be Avoided
Potencial Areas for New Plantings
Google Satellite

INFORMATION: Estimation of carbon stocks in new plantations according to the GHG assessment report -RSPO Procedure for New Plantings- Produced by Green Development

green development

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MUNICIPICIO DE RETALHULEU
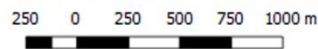DEPARTAMENTO DE RETALHULEU

2017, Guatemala

UTM Projection
Universal Transversal Mercator

WGS 84
Zone 15 North

AREAS TO BE AVOIDED AND
POTENTIAL AREAS FOR NEW PLANTINGS

PALMIRA ESTATE, AGROACEITE

Legend
- Palmira
- River Naranjo
- Potencial Areas for New Plantings
- Areas to be Avoided

Google Satellite

INFORMATION: Estimation of carbon stocks in new plantations according to the GHG assessment report -RSPO Procedure for New Plantings- Produced by Green Development
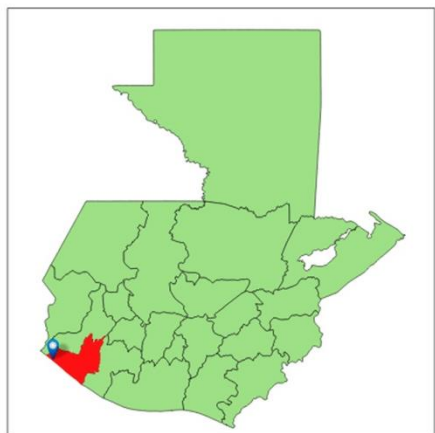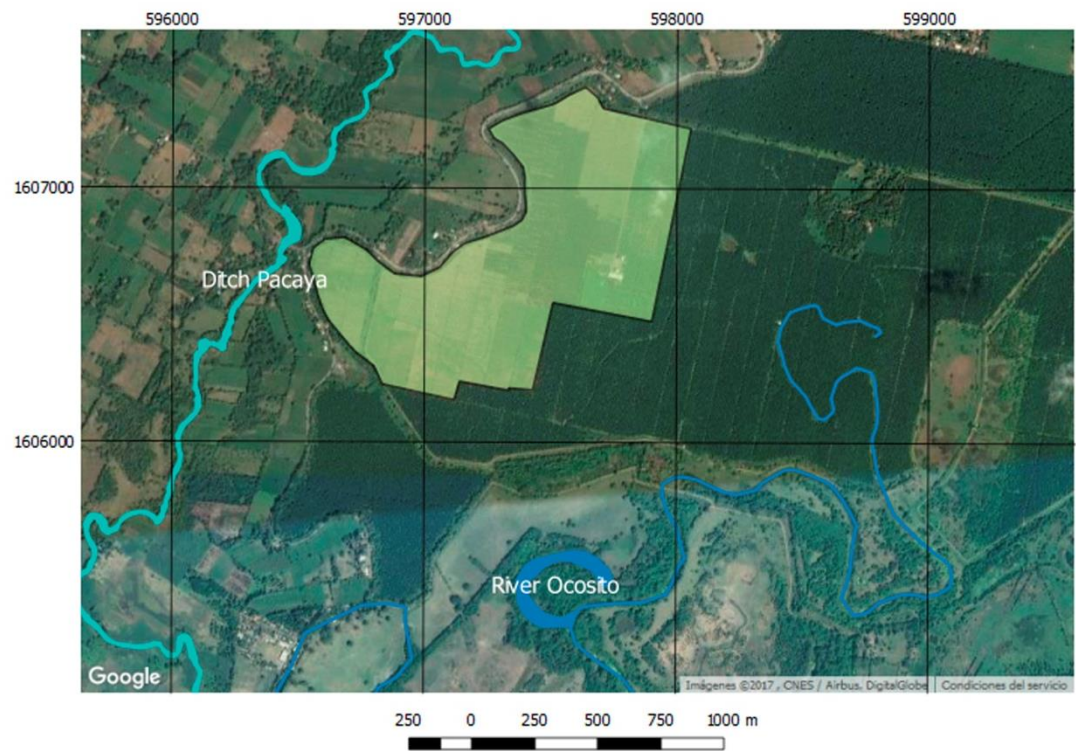
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DEPARTAMENTO DE SAN MARCOS

2017, Guatemala

UTM Projection
Universal Transversal Mercator

WGS 84
Zone 15 North

104

AREAS TO BE AVOIDED AND
POTENTIAL AREAS FOR NEW PLANTINGS

LAS MARAVILLAS ESTATE, AGROACEITE

Legend
- Ditch Pacaya
- River Ocosito
- Potencial Areas for New Plantings
- Areas to be Avoided

Google Satellite

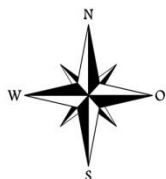| INFORMATION: Estimation of carbon stocks in new plantations according to the GHG assessment report -RSPO Procedure for New Plantings- Produced by Green Development | green development | Agro aceite | MUNICIPICIO DE RETALHULEU DEPARTAMENTO DE RETALHULEU | 2017, Guatemala | UTM Projection Universal Transversal Mercator WGS 84 Zone 15 North |

CONCLUSIONS

To begin the process of RSPO new palm plantings certification, a Greenhouse Gas Assessment must be done. Said evaluation was done and the results are presented below.

a. The Greenhouse Gas Assessment was completed by Green Development, a company of environmental consulting; who has developed, embodied and communicated in this manner.

b. The Greenhouse Gas Assessment was done according to the RSPO New Plantings Procedure (NPP), Version 4.3 July 2015.

c. It has been estimated that the amount of carbon stocked by the forest reservoirs of the new plantings ascends to a total of 88,876.34 tCO2.

d. The emission and sink sources of Greenhouse Gases were estimated for the new plantings project. In the sources, the following can be found: Change in use of soil, fertilizers, fuel consumption on the field and mill, mill effluent, conservation areas and palm cultivation carbon sequestration.

e. It has been determined that the greatest emission source for the new plantings project is the change in use of soil with 3,424.50 and the greatest sink will be palm cultivation with 20,183.51 tCO2.

f. A management plan was developed for the carbon stocks and GHG emissions. It was determined that the optimal scenario is Scenario 1 (Realistic) because it adapts to the current development conditions of AGROACEITE.

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