

Ecuador Teak Project

Environmental and Social Impact Assessment
Information package

Document prepared on: 04 March 2022

Contents

1	Introduction	5
2	Legal and Governance framework	6
2.1	Environmental and forest production laws	6
2.1.1	Regulatory agencies	6
2.1.2	Laws governing environmental licensing	6
2.1.3	Laws governing forest management and harvesting	7
2.1.4	Land use and forest laws on private properties.....	7
2.2	Laws regulating labour and indigenous peoples	8
2.2.1	Labour protection and health and safety	8
2.2.2	Rights of indigenous peoples and ethnic minorities	8
2.2.3	Customary law.....	8
2.3	Protected areas.....	9
3	Project description	11
3.1	Objectives and justification	11
3.2	Location and area of influence	12
3.3	Potential expansion	14
3.4	Land use planning and silvicultural regime.....	14
3.5	Forest operations.....	15
3.6	Industrial operations.....	19
3.7	Nursery.....	19
4	Baseline description	20
4.1	Physical environment	20
4.2	Biological environment.....	25
4.3	Social environment	31
4.4	Cultural environment.....	38
5	Environmental and social impacts	42
5.1	Introduction	42
5.2	Positive impacts	42
5.3	Adverse environmental impacts	43
5.4	Adverse social impacts.....	50
5.5	Impacts on High Conservation Values	56
5.6	Summary.....	58
6	Environmental & Social audit.....	60
6.1	Laws and regulations	60
6.2	Workers rights	67
6.3	Health and Safety.....	67
6.4	Local people	68
6.5	Certification	69
6.6	Comments on Governance and final remarks	70
7	Management plan.....	71
7.1	Introduction	71
7.2	Policies and procedures.....	71
7.3	Safeguards during expansion.....	71
7.4	Roles and responsibilities	72

7.5	Environmental protection.....	72
7.6	Social engagement.....	72
7.7	Monitoring.....	73
8	Conclusion and recommendation	75
ANNEX 1	Laws and regulations	77
ANNEX 2	Stakeholder consultation.....	79
Annex 3.	institutions representing indigenous, Montubio and Afro-descendant peoples in Ecuador..	80
ANNEX 4	Rights and obligations of the parties involved in land tenure.....	82
	Forms of rural land ownership.....	82
	Rights 82	
	Obligations of the landowners.....	82
	Obligations of the State	83

Figures

Figure 1	Protected areas in Ecuador in relation to the project area.....	10
Figure 2	Project location in relation to provinces (left) and the physical environment (right)	12
Figure 3	Location of the four management units.....	13
Figure 4	Photography of drainage channels installed.....	16
Figure 5	Photography of pruning operations, note the Pueraria on the ground.....	18
Figure 6	Annual distribution of precipitation in the management units	20
Figure 7	Remaining natural forest in the project area in the 1990s (Sierra, 1999).....	22
Figure 8	Land use as classified by the Ecuadorian Military in 1982	23
Figure 9	Land use on Canchones	24
Figure 10	Land use on El Tigre.....	24
Figure 11	Land use on La Marina	25
Figure 12	Land use on La Selena	25
Figure 13	Satellite image of La Selena (north) and La Marina (south) and neighbours identified	33
Figure 14	Satellite image of El Tigre and neighbours identified	34
Figure 15	Satellite image of Canchones and the industry and neighbours identified	35
Figure 16	House of a cocoa producer neighbour of Canchones, surrounded by the Company property	36
Figure 17:	Photographs of the industry – internal transport of wood in the logyard (upper left), wood waste yard (upper right), processing (bottom left), aspiration system of particulates (bottom right) .	47
Figure 18:	Distribution of Canchones in the properties (“macrolotes”) for which the environmental permits were issued. NOTE: The red area (Ind. Forescan) is the industry on the property San Ramón.	61
Figure 19	Warning sign regarding snakes to inform the workers installed in the main houses of the management units (left), and (defficient) protective equipment of chainsaw operator (right)	68

Tables

Table 1:	Minimum buffer zones depending on water bodies.....	8
Table 2	Key data on silvicultural regime	15

Table 4 Rare, endangered and endemic species identified in the four management units during site visits between August 9-12 th 2021 and enriched by other observations made in recent years during other assessments.....	30
Table 5: Ethnicities represented in the localities (<i>cantones</i>) where the properties are located according to the Development Plan of the local Government (data from 2010)	39
Table 6 Significance of impacts	42
Table 7: List of pesticides, fertilizers and other chemical inputs used and restrictions imposed by national law, other countries (just for reference), and FSC	44
Table 8: Historical images analysed for the land use change assessment.....	49
Table 9: The six HCV and the assessment in the area of four targeted properties	56
Table 10: Environmental and forest harvesting permits reviewed during the audit.....	62
Table 11: Summary of non-compliance to laws	64
Table 12: Legal fines for infractions	64
Table 13 Level of compliance to best practices	65
Table 14 Environmental and social monitoring	73

Acronyms

DD	Due Diligence
EIA	Environmental Impact Assessment
ES	Environmental and Social
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
EU	European Union
FSC	Forest Stewardship Council
HCV	High Conservation Values
IFC	International Finance Corporation

1 INTRODUCTION

The Arbaro Fund seeks to purchase a forestry asset in Ecuador, consisting of teak plantations established by the Forescan Group (seller). Forescan Group is a teak plantation business in Ecuador established in the Guayas and Los Rios provinces founded in 1997. By August 2021, Forescan has established 950 ha of high-quality teak plantations distributed on four different management units located in the provinces of Guayas, Los Rios and Manabi.

In 2019, Forescan set-up a sawmill operation where smaller teak logs are processed into blocks and boards and 3rd party gmelina and pine into pallets for the local agro-industry. The timber produced is processed and exported through the port of Guayaquil (Ecuador's largest city).

The group has a strong emphasis on teak growth improvement measures, which led to the development of its own nursery which has been able to provide high quality planting material for its plantations since 2016.

Arbaro plans to purchase some of Forescan's assets (namely the existing teak plantations, the land they are on, the nursery and the sawmill) and expand the plantation operations, from the current 950 ha to about 1,500 ha. Operations will be conducted by a new management team under a new institutional setting.

The expansion is envisaged to take place in the vicinity of current plantations. As part of the investment process, the Arbaro Fund conducted a detailed Due Diligence (DD) on the investment opportunity, which included understanding of the potential impacts that the execution of a plantation forestry project could have on the environment and the local population. Assessments by both Arbaro staff and local and international experts involved site visits, documentation review, as well interviews with relevant stakeholders, including Company managers, workers, contractors, and neighbours.

The environmental and social (ES) assessment determined that the project corresponds to the risk category B. Based upon the characteristics of the project, the Fund commissioned the development of an environmental and social impact assessment and a baseline biodiversity assessment conducted with the support of an international consulting firm, national environmental engineers, biologists, anthropologists, and a law firm. This ESIA builds on the reports produced by this team of consultants.

2 LEGAL AND GOVERNANCE FRAMEWORK

2.1 Environmental and forest production laws

2.1.1 Regulatory agencies

The main institutions regulating the forest sector in are:

- The **Ministry of Agriculture** (MAG) was granted the powers of regulation of forest plantations and their sustainable management for commercial purposes, in coordination with the National Environmental authority (MAE; see below).
- The **Ministry of Environment, Water and Ecological Transition** (MAE), through the Sub-Secretary of Environmental Quality oversees the quality of water, climate, air, and soil, and preventing environmental degradation.

2.1.2 Laws governing environmental licensing

The MAE in its capacity as the National Environmental Authority regulates the environmental management of productive operations according to the Organic Code of the Environment (COA) in force since 04/2018, and the Regulation to the COA, issued on 06/ 2019. In this framework, the MAE issues three types of environmental permits determined according to the environmental impact of the project, operation or activity carried out. These are:

- Environmental Certificate - Of voluntary nature and applicable to operations of no significant impact
- Environmental Registration - Mandatory for low impact operations
- Environmental License - Mandatory for operations of medium and high impact

The MAE has developed a Catalog to determine the type of permit required according to the nature and scope of an activity or operation. This catalog can be viewed on the web platform of the Single Environmental Information System (SUIA). The operations conducted by seller are classified as follows:

- Forest plantations: Not subject to any specific environmental permit, although an environmental certificate is recommended and sometimes required by financial institutions to issue loans;
- Sawmilling: Requires an environmental registration;
- Construction or operation of a factory for wood products: Subject to an environmental license;
- Construction or operation of a factory for charcoal: Subject to an environmental registration.

As the forest industry includes several sub-activities subject to different environmental permits, these can be merged together into one project subject to the most stringent permit, the environmental license.

In addition to general environmental licenses for operations, project proponents are obliged to get other specific permits, such as:

- Permits to exploit and use water, according to the Law of water resources (Ley Orgánica de Recursos Hídricos, Uso y Aprovechamiento del Agua).
- Permits for the use of hazardous products such as pesticides, and the generation of hazardous waste, according to the Organic Environmental Code (Código orgánico del ambiente & AM O61)

2.1.3 Laws governing forest management and harvesting

The Organic Code of the Environment, in its Article 98 attributes the management of commercial forest plantations to the National Agriculture Authority (MAG). Within this scope, the MAG is responsible for the implementation and supervision of the technical norms established through the Ministerial Agreement No 095, published in the Official Gazette No 418 on March 25. This Agreement requires project proponents to comply with following requirements:

- **Forest registry:** Register plantation in the Forest Production System (hereinafter "SiPF"). This is an administrative process that involves several steps, including an assessment of the plantation to be registered by the Sub-Secretariat of Forest Production (dependency of MAG).
- **Harvesting Plan / Harvesting license:** Project proponents need to develop a harvesting plan subject to approval by the Direction of Forestry Development (dependency of MAG). This is the requirement to obtain the harvesting licenses, needed to legally transport and commercialize wood and timber.
- **Forest certificate:** A forest certificate is required to ensure the legal origin of wood and timber in cases of export.

2.1.4 Land use and forest laws on private properties

In 2008 the Ecuadorian people approved a constitution that was the first in the world to recognize the rights of nature. Forests were declared fragile ecosystems, requiring special treatment like moors, wetlands and mangroves.

The Forestry and Conservation of Natural Areas and Wildlife law "Ley forestal y de Conservación de Areas Naturales y Vida Silvestre", has been in effect since 1981 and was amended in 2002.

Furthermore, specific land use regulations that apply for the establishment of forest plantations on private land are provided by the Inter-Ministerial Agreement No 2 between MAGAP and MAE¹, as follows:

- Commercial forest plantations must be established outside of protected areas, areas that are comprised within the Governmental Program Socio-Bosque, natural forests and dense shrubs.
- Commercial forest plantations must be conducted on sites with slopes up to 50°. When established on steeper slopes, plantations must be established for protection purposes.
- Natural forests and native vegetation along permanent or intermittent water bodies must be maintained according to the minimum widths as shown in the Table below. When native vegetation does not exist, the law states that producers may plant on these buffer zones with a variety of native species for protection purposes.

¹ <http://ecuadorforestal.org/wp-content/uploads/2010/05/Normativa-para-la-zonificaci%C3%B3n-de-tierras-para-forestaci%C3%B3n-y-reforestaci%C3%B3n.pdf>

Table 1: Minimum buffer zones depending on water bodies

Water body	Minimum width of buffer zone (m)
Streams and rivers	According to width
Up to 3 m	5 m
3-10 m	10 m
10-30 m	15 m
Above 30 m	30 m
Lakes and lagoons	10 m
Springs	10 m

2.2 Laws regulating social relations

2.2.1 Labour protection and health and safety

The labour code establishes minimum protection for employers, such as minimum wage, minimum working age, and social security provisions.

Health and Safety Regulations for Workers D.E. No. 2393 defines obligatory health and safety provisions according to the risk of operations.

2.2.2 Rights of indigenous peoples and ethnic minorities

As of 2008, Ecuador, through its Constitution, declares itself an intercultural and plurinational State (Constitution of the Republic of Ecuador, 2008: Art. 1). Articles 562 and 57 of the Constitution, in the fourth Chapter guarantees collective rights for indigenous communities, the Afro-Ecuadorian and Montubio people and the communes. These rights include anti-discrimination and protection of ancestral property.

Ecuador has ratified the Convention 169 of the ILO concerning indigenous and tribal peoples, which sets forth the obligation of conducting consultation processes designed to foster participation of indigenous and tribal peoples regarding programs and projects that could have an impact on them. Free, Prior and Informed Consent (FPIC) is recognized in the Ecuadorian Constitution through Art. 57, numeral 9, as well as in the Law of Citizen Participation and Social Control, Art. 81 and 83. FPIC is particularly mentioned in the context of the prospection and exploitation of non-renewable resources on community land.

2.2.3 Customary law

Customary law are norms and provisions that have been handed down from generation to generation. This set of rules is an integral part of the social structure and culture. Customary law is important for Montubio and Afro-Ecuadorian communities present in the project region.

In the case of Montubio, there are norms regarding traditional conflict-mediation. In the case of the Afro-Ecuadorian people, in some regions Afro-Ecuadorian Councils have been created, which is the entity in charge of enforcing the rules that exist in the Afro-Ecuadorian communities that help the coexistence of citizens and avoid committing crimes. The Council is in charge of regulating conflicts related to marriages, custody, parental authority and productive activities.

2.2.4 Consultation

The law also sets forth the obligation of a so-called environmental consultation (Art. 398 of the Constitution), which corresponds to a consultation process in the context of potential environmental impact of a program or project to all potentially affected stakeholders (not restricted to indigenous or tribal peoples). According to the law, it is the obligation of the State to determine the need of consultation and to conduct the process if required. The State will take a decision on the environmental consultation prior to the approval of an EIA, which is required in case an environmental license is required. In the case of the project, the environmental license is only required for the industry operations (not for plantations), and hence the environmental consultation may become applicable if so decided by the state.

The law is not very specific on the project typology or impact that would trigger this need. During the due diligence process, no examples of such consultation have been identified in the context of similar projects. Since the sawmill does not currently have an environmental license, such license needs to be obtained once the new company takes over the project.

2.3 Protected areas

The plantations do not coincide with areas where commercial forest plantations should not be established, namely: 1) Areas under the Program Socio-Bosque; 2) Protected Areas; and, 3) Areas defined by law for natural forest aptitude (defined in the Annex of the Inter-Ministerial Decree Number 2).



Figure 1 Protected areas in Ecuador in relation to the project area

Source: <http://areasprotegidas.ambiente.gob.ec/mapa#provincia-galapagos>

3 PROJECT DESCRIPTION

3.1 Objectives and justification

Objectives

The main objective of the project is the establishment of plantations for the production of high-quality timber for export and timber products for local markets.

Specific objectives:

- Expand the current net production area of 950 ha of plantations in areas previously used for cattle and commercial agriculture by about 500 ha.
- Sequester carbon dioxide in the plantations and contribute to climate change mitigation.
- Protect natural forests and other sensitive areas within the project area and promote environmental awareness.
- Create employment opportunities for the local population.
- Foster socioeconomic development and create positive impacts in the local communities.
- Build a business model that can be replicated in the region.

Currently (03/2022), the assets or the seller are not certified according to any sustainability standard. However, a DD (Due Diligence) has been conducted to identify environmental and social risks of operations, rule out practices with high negative impact with irreversible effects, propose mitigation measures and appropriate governance structures to improve risk management. The mitigation measures described in this document, some of which have been applied by the current management will be put in place by the new management. The implementation is followed through an Environmental and Social Action Plan.

To ensure the implementation of best practices from a productive, environmental and social perspective, the new company will commit to developing an environmental and social management (ESMS) system which is in compliance with Arbaro ESMS, following ESG requirements of the Arbaro Fund. Among other, operations will be conducted in line with the following standards and principles:

- FSC principles and criteria – the aim is to reach certification in the upcoming 3 years
- IFC Performance Standards
- GCF policies
- National legislation
- Principles of good governance, transparency and disclosure
- Engagement with local and international stakeholders

Justification

The Ecuadorian coast has seen severe landscape changes over the past decades, undergoing rapid deforestation, particularly during the last century. The region has been traditionally exploited for cocoa, banana, and corn production, and features a deforested and partially degraded landscapes.

Teak is considered a noble species among plantation timber, highly regarded in the market for its quality. It is native to southeast Asia, but the region has increasingly turned to imports after the unsustainable swindling of the natural resource base.

Commercial teak plantations have been successfully established since the 1950s in Ecuador. The country shows no biophysical limitations for this species' development. Plantations reached an area of

about 50,000 ha in 2015, according to the Ministry of Agriculture. The Government seeks to increase plantation areas through an incentive program, however with limited impact to date. A large part of the timber produced is exported to India. Total timber exports in 2017 amount to 360,000 m³. Logs are the most exported timber commodity (mostly teak logs from plantations, often squared), accounting for 60 % of the export value, followed by sawnwood (23 %), and plywood and veneer (17 %). Export volumes of higher value-added products are still low².

There is great potential for expansion and value added. Right now, many teak plantations in the country are managed without an emphasis on quality. In this sense, Forescan is an outlier. Having invested into the improvement of planting material and a processing facility, and implemented best practices in terms of silviculture, the Company is ground-proofing an integrated value chain based on quality and research & development.

Arbaro seeks to acquire the seller’s assets, develop a sustainable expansion, increase its socio-economic and environmental positive impact, and strengthen its environmental and social performance.

3.2 Location and area of influence

The project is located in the limits of the provinces Guayas, Los Ríos, and Manabi, in the Ecuadorian coastal region, about 200 km northwest from Guayaquil, Ecuador’s largest city (see Figure 2). The production area is located in the river basin of the Guayas river.

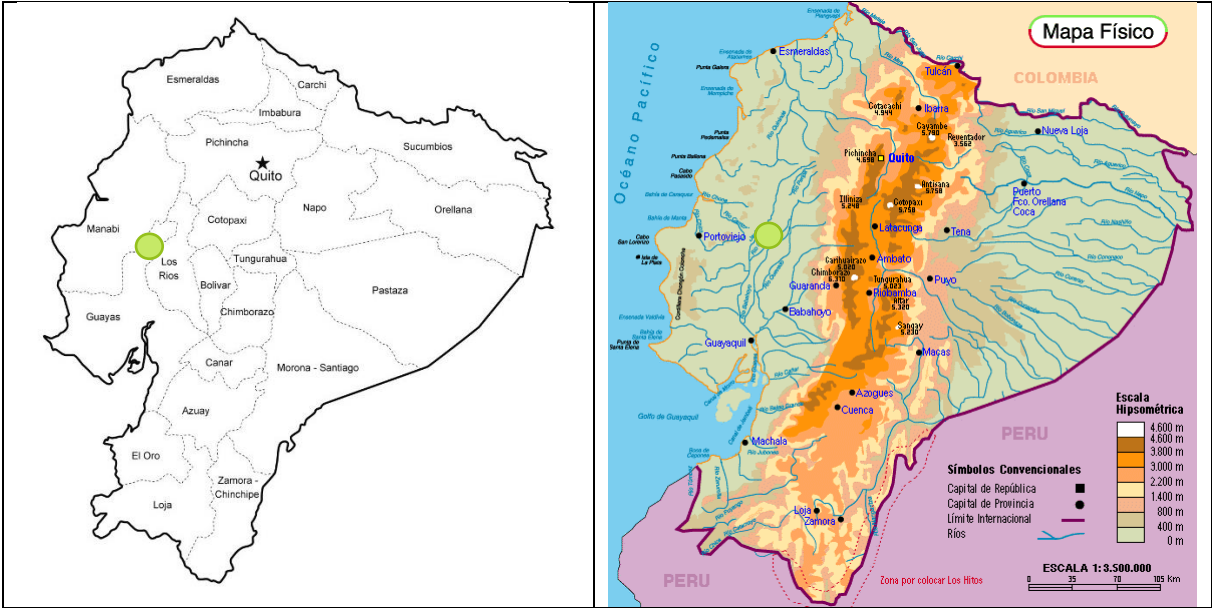


Figure 2 Project location in relation to provinces (left) and the physical environment (right)
 Source: <https://www.imagui.com/a/dibujo-para-pintar-del-mapa-politico-del-ecuador-TbKaGaKAE>

The depression of the Guayas-river basin is limited to the east by the Andes mountain range, to the west by the Chongón and Colonche mountain range or coastal mountain range, a mountainous massif that reaches maximum altitudes of 800 to 1,000 m.a.s.l. Towards the north, where the project area is located, a slightly hilly terrain begins that corresponds to the headwaters of the Guayas basin on the Ecuadorian coast. In general, the altitudes of the area vary between 20 and 200 m.a.s.l. This hilly topography alternates with plains associated with rivers of varying size, generating two different types

² <https://www.timbertradeportal.com/countries/ecuador/>

of ecological systems: the higher, hilly areas covered by forests, and the lower areas prone to flooding covered by natural grassland.

The current project area consists of four separate management units that are located at about 30 km distance between them, known as:

- **Canchones:** Located in the west of the province Los Rios, it is the largest management unit with an area of 574 ha. It is also the oldest production site, composed of a number of different land titles that the Company has been acquiring from different owners over the years, starting in the late 90s. The industry is located in this management unit.
- **La Selena:** Located at the eastern border of the province Manabi, with a total occupied area of 80 ha.
- **La Marina:** Located in the north of Guayas, with a total occupied area of 280 ha. This unit also encompasses the nursery.
- **El Tigre:** Located in the north of Guayas, with a total occupied area of 146 ha.



Figure 3 Location of the four management units

Source: *Biodiversity baseline*

The area of influence is considered the area surrounding the project properties in a radius of 50 km and includes all neighbours adjacent to the project area. This radius covers timber transport from the properties to the Company's sawmill, and the closely located local government dependencies and local organizations.

3.3 Potential expansion

As a result of the investment, the project may be expanded to include about 500 ha of additional plantations. The expansion is envisaged to occur in the surroundings of current plantations. For the purpose of this document, a potential expansion radius of 50 km from current sites is considered. The environmental and social conditions within this radius are equal to baseline descriptions presented throughout the document. In addition, the characteristics of the production systems and management systems applied on the expansion will be equal to the current system.

3.4 Land use planning and silvicultural regime

Land use planning and site and species selection

The principle that determines the success of plantations is the choice of a species adapted to each site. For this reason, results of soil studies, complemented by climatic data and past experiences with reforestation in the region have to be considered when selecting species to be planted.

Before acquiring any new site for expansion, the new company will follow its land acquisition approach which is developed to be part of its environmental and social management system (and will follow the principles of the Arbaro ESMS). This includes various steps from legal and on the ground checks and baseline assessments as well as classification of the land area based on habitat type (modified, natural, critical) as well as the assessment of ecosystem services and their importance to local stakeholders.

The new company will also conduct soil analysis and determine plantation sites according to land use, soil depth, fertility, and topography.

These processes will lead to final classification of the land areas and identification of set-aside areas such as protection areas, buffer zones etc.

As there were no professional nurseries producing high quality planting material when the seller established its first plantations, the material was imported from Costa Rica. In 2016 the seller established its own nursery where genetic improvement³ is conducted. Material from the best trees is collected and later used for plant production. Plants produced in the nursery are re-planted on the project's production areas.

Silvicultural regime

All forest operations are planned and conducted according to the following principles:

- Site species market approach
- Best quality silviculture and planting materials
- Towards achievement of FSC certification

The new company will be aligned with all Arbaro's ESMS requirements and restrictions. There will be an expansion of additional 500 ha of Teak over the next years for the production of high-quality logs in its own processing facility.

Table 2 summarizes the main features of the applied silvicultural regime.

³ Genetic improvement is based upon seedling and clonal material, unrelated to GMO.

Table 2 Key data on silvicultural regime

Source: *UNIQUE forestry and land use*

Parameter	Description
Planting density	Initial: Mainly 555 trees/ha, but also 625, 833 and 1,111 trees/ha Final: 110-130 trees/ha
Spacing	6 m x 3 m, 3 m x 3 m, 4.5 m x 4 m, 3.5 m x 3.5 m, 6.3 x 3.9 m, 4 m x 4 m
Species	Teak. Genetic material was originally imported from Costa Rica. Best trees were selected for seedling and in-house clone production.
Rotation	15 - 16 years
Pruning schedule	Up to at least 9 m in at least 9 pruning interventions in years 1 to 9
Thinning schedule	10 thinning interventions, yearly between ages 4 to 13
Commercial MAI	5.9 to 13.0 m ³ /ha/year

3.5 Forest operations

Site and soil preparation

First, shrubby vegetation is eliminated, including fallen tree residues and trunks. Areas with crops or pastures do not require site preparation. Depending on the type of vegetation and the topography of the terrain, the initial cleaning can be done manually (machete), mechanically or chemically, or a combination of all three.

The soil preparation process is carried out with a subsoiler coupled to a tractor, to break the hard superficial layer of the soil up to a depth of 80 cm to 90 cm.

For second cycle plantations, stumps left from final harvest are chemically controlled by applying Triclopyr with iron oxide with a brush. Tree tops, branches and other debris left on site are accumulated in stripes and are burned.

The soil preparation practices will be reviewed in detail by the new company, ensuring adherence to best forestry practices and complying with national and international regulations as well as FSC principles.

Installation of drainage channels

In areas subject to potential flooding or where water may accumulate in some areas, superficial drainage channels in V-form are installed. Drainage channels are classified according to their depth in primary (width < 2m, depth < 1.5 m), secondary (width < 70 cm, depth < 75 cm) or tertiary channels (depth < 30 cm).



Figure 4 Photography of drainage channels installed

Fertilization and planting

After having marked plantation points according to the desired density, an area of 60 cm around the area where planting will take place is cleaned.

Before planting, a chemical control of weeds is conducted using glyphosate on the planting site, normally 15 days after the first rains. Application is conducted with a motor pump.

The hole for planting is opened manually at a depth up to 25 to 30 cm and a diameter of 20 cm. Biochar is applied in the hole with the dose depending on soil fertility (usually 1-2 litres mixed with earth). After planting, chemical fertilizer is applied at a dose of 55 to 60 grams per plant. In addition, an insecticide is applied to plant roots to avoid worms that attack roots (*Phyllophaga* sp).

Planting of *Pueraria Phaseoloides*

Pueraria phaseoloides tropica is a herbaceous or woody vine (family Leguminosae) with trifoliolate leaves and long narrow seeded pods native to Southeast Asia. It is commonly used for ground cover and animal feed. This species resists periods of drought and brings about a number of benefits, such as maintaining humidity during the dry period, controlling weeds and therefore reducing the need of chemical control, controlling erosion and fixing nitrogen. According to the seller's experience, this legume is capable of fixing up to 254 kg / ha / year of nitrogen to the soil. As *Pueraria* only thrives on sunny sites, its invasive potential is low.

The plant is established in association with teak trees, leaving the ground fully covered throughout the production cycle. Seeds are harvested from the sites, treated, and sown on new sites to be established. Planting is conducted at the same time as tree planting on fully prepared soil, on which weeds have been controlled. Before planting, seeds are scarified (a mechanical treatment to reduce hardness and accelerate germination), hydrated and chemically cured to increase competitiveness. Manual control of weeds is necessary during the first year until the plants covers the ground. Afterwards, chemical control of specific plants that compete with *Pueraria* is punctually conducted.

Maintenance

For the maintenance of the plantations, several measures are foreseen:

- Mechanical and chemical control of weeds is conducted, with emphasis in the first year before the *Pueraria* has fully covered the ground.
- Application of insecticides for pest control if needed. Usually, after a few years, this is minimal.
- General maintenance: cleaning of debris, fire control, maintenance of drainges.

Pruning and sealing of the pruning scar

Pruning is the removal of branches up to a certain height to create a clean stem. The objective is to only have a long and straight stem, as well as to avoid the appearance of knots that diminish the value of the stem wood. Moreover, pruned trees are better protected against surface fires, due to the absence of fuel close to the ground.

Pruning is conducted manually over several interventions during the first nine years, up to a total height of 9 meters. After pruning, the scar left on the bark is sealed applying a mixture of copper sulfate with a brush. This is to help the recovery process and avoid fungus and bacteria attacks.



Figure 5 Photography of pruning operations, note the Pueraria on the ground

Thinning and final cut

Thinning refers to the removal of trees to manage competition between the trees. Trees with best performance are selected and given more space to favour their development, while trees with poor development and competitors are removed. Thinning interventions are light but frequent, resulting in 10 thinning interventions, yearly between ages 4 to 13

Harvesting operations are conducted manually by chainsaw operators, while hauling of harvested logs is done with machinery. Loading of trucks is still conducted manually, however if operations expand, machinery may be employed in the future. In case the logs stay on site for a long time (more than 15 days), they are treated with insecticides to protect them from pests.

3.6 Industrial operations

The purpose of the sawmill is the production of blocks and boards from the teak harvest, and the acquisition of Pine and Gmelina logs from third party producers for the production of pallets.

The sawmill process is divided into:

- **Timber supply and sanitation:** Arrival of trucks from plantations with logs for processing. The logs are stored and fumigated with insecticides for wood preservation;
- **Storage in the logyard and internal transport:** Wood and timber is stored separated according to supplier and species. Logs are driven to the assembly line once the order is given to start with a particular lot;
- **Processing:** Logs follow the assembly line, where they are cut into boards through several stages using several machines (TVS machine, SVS machine, HR 700 machine) until the wood block is obtained; and,
- **Termination:** The block is sanded and left smooth on the edges;
- **Drying:** Once the blocks have been obtained, they are introduced to drying chambers to ensure a stable product with low moisture. This is done at a temperature of 56 degrees for approximately 30 minutes. In the case of the boards, they enter the same drying chamber, but they remain in it for 6 to 8 days. The objective is the control and prevention of pests in the final product, and wood stability. The drying chambers work using firewood from the rejection of the industry, as a source of combustion. To reduce the humidity of the blocks, a sealant is also applied, so that the blocks do not crack. The application of this product is done manually with a torch.

3.7 Nursery

The nursery is established in the management unit La Marina. There, plants that will be later planted in the field are produced. The nursery seeks to develop and improve the planting material based upon the selection of the best performing trees.

Seedlings are produced from mother plants that go through several stages and acclimation processes, starting in a very humid greenhouse with frequent watering through automatic water sprinklers. Subsequently, the plants are slowly acclimated to normal ambient conditions. Substrate, biochar, fertilizers and fungicides are applied throughout the process, which takes about 8 weeks before seedlings can be taken to the field for planting.

4 BASELINE DESCRIPTION

4.1 Physical environment

Climate

The climate of the area is tropical and is influenced by the incidence of the marine currents and the winds that come from the Pacific Ocean, mainly the cold Humboldt current that generates a dry climate due to the scarce evaporation it generates. When this current weakens, the warm waters of the El Niño current move south and evaporation turns into clouds that precipitate in the area, once they have passed the coastal mountain range. For this reason, the higher areas tend to be more humid than the lower areas. This is the reason why the management units La Marina and La Selena, located on higher terrain in the northwest feature higher precipitation compared to Canchones and El Tigre. Overall, the properties feature annual precipitations of about 1,800 to 2,300 mm annually.

In general, two climatic seasons are recorded: winter during the months of December to May often-times with precipitations higher than 400 millimeters per month, and the summer from June to November in which precipitation is generally less than 30 millimeters of rain (Figure 6).

The average temperature maintained throughout the year is of about 25 degrees Celsius and decreases slightly during the winter.

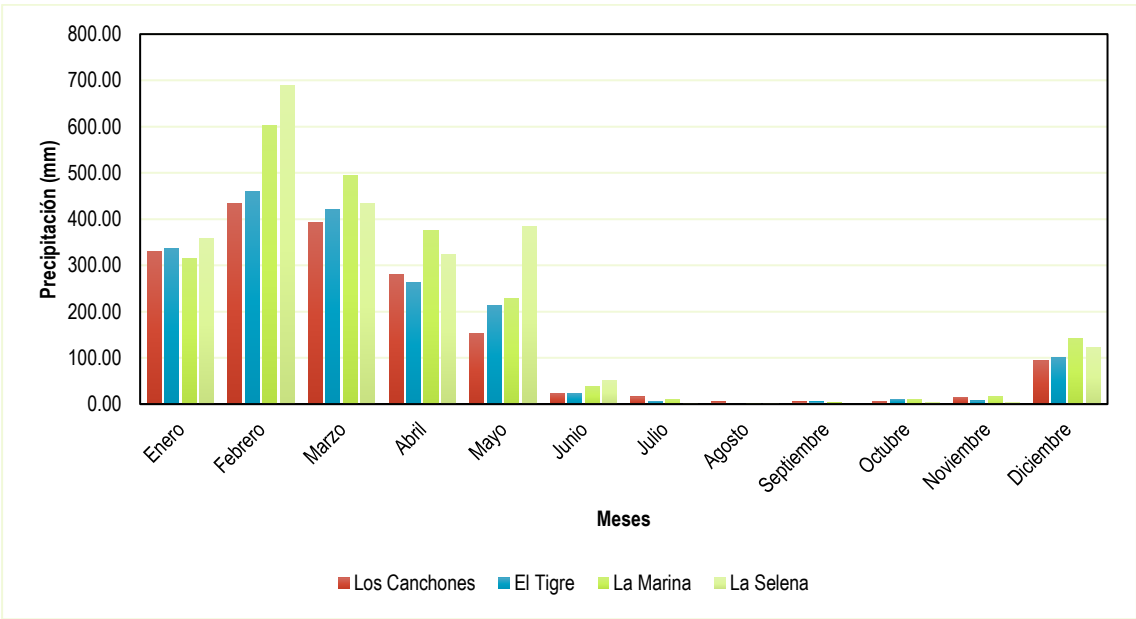


Figure 6 Annual distribution of precipitation in the management units
Source: Environmental Diagnostic (2021) based on puvimetric data of Forescan

Extreme events: Flooding, earthquakes, and fires

Flooding events in the area have been of variable intensity but relatively controlled in recent decades, mainly due to infrastructure that has channeled water courses during the rainy seasons. However, a few decades ago the area registered serious flood events and large losses in agricultural production, infrastructure and human lives. These events, mainly associated with the El Niño phenomenon, were particularly important in the years 1997-1998 and 1982-1983, in which tens of thousands of people were affected.

Earthquakes are frequent in Ecuador due to tectonic processes of the wide subduction zones along the Pacific Ocean coasts. The last large earthquake in the coastal area was in 2016, with a magnitude of 7,8 Mw, resulting in 673 victims. Other recent earthquakes have been less hazardous. While these earthquakes were felt in the project region, their epicenters were far away, and they have not affected people, plantations or associated infrastructure.

In general, fire risk in the Ecuadorian territory is classified as moderate to low in most regions. In 2020, around 20,000 ha of vegetation were affected⁴. Some authors describe the use of fire by local small-holders in Ecuador in teak plantations as they believe it gives the heart of the trunk—the only valuable part of this wood—a better colour⁵. Also, large forest plantations may increase the risk of hazardous fires due to the large amount of fuel they provide, which also depends upon their management and the environmental context they are set in. However, according to field observations and interviews, fire prevention and control is practiced by the seller.

Soils

In general, the altitudes of the area vary between 20 and 200 meters above sea level. The north of the study area features a slightly hilly terrain that corresponds to the headwaters of the Guayas basin. The properties La Selena, La Marina, and El Tigre feature slopes of degrees up to 60 %, whereas Canchones is mainly flat.

The project region is located in Ecuador's coastal floodplain with good soils for agricultural use. Two main type of soil formations can be identified in the project region: a) Soils from the old coastal plain that received volcanic ash deposition, and b) Alluvial soils developed over recent sedimentary material located along streams and rivers.

According to Moreno et al. (2018)⁶, the thickness of soils that received volcanic ash deposition decreases as they get away from the Andes. Ash particles were brought by the wind and rapidly weathered into homogeneous, loamy profiles. Accordingly, the types of soil that predominate in the properties located in the northwestern section of the project area (El Tigre, La Marina and Selena) are loamy to clay-loamy in texture. In Canchones, they have a silty clay texture.

Soils in the project area are identified as Inceptisoles and Alfisoles. Inceptisols are loamy to clay-loamy soils in the upper horizon, and clayey in the subsoil, with black colors above, and brown below. Alfisols are very similar soils, distinguished by the reddish color of the sub-soil and the more clayey texture of the B horizons.

While soils generally feature good fertility, they may show limitations in terms of surface stones or sandy texture, water excess (hydromorphic) and clayey texture limiting drainage. The presence of poorly drained microsites and an impermeable layer at a depth of 50 cm is found on some sites, particularly in El Tigre and Canchones.

⁴ https://www.gestionderiesgos.gob.ec/wp-content/uploads/2020/11/Informe-de-Situacion-No-005-Incendios-Forestales-08112020_17h00.pdf

⁵ <https://wrm.org.uy/articles-from-the-wrm-bulletin/section1/industrial-teak-tree-plantations-in-ecuador-occupying-and-destroying-fertile-lands-and-water-sources/>

⁶https://books.google.com.py/books?id=pnQ7DwAAQBAJ&pg=PA27&lpg=PA27&dq=alluvial+soils+coast+ecuador&source=bl&ots=ekbEWv9Uoj&sig=ACfU3U3ShPM-Osc50iC_3NXSaQ9NrPVHtw&hl=de&sa=X&ved=2ahUKewizsqfRw-fLyAhW5qJUCHc9sAp0Q6AF6BAGKEAM#v=onepage&q=alluvial%20soils%20coast%20ecuador&f=false

Land use

The Ecuadorian coast, since colonial times, has undergone significant change, mainly due to agricultural development. Land use change intensified in the last century when most of the natural vegetation cover was replaced by agricultural crops or pastures for livestock. The gradual conversion of forests into crops like corn, banana, cocoa, and pasture resulted in the loss of over 75 % of the natural vegetation in the Ecuadorian coast. In some localities, vegetation loss reaches a dramatic 95 % (Peralvo et al. 2008).

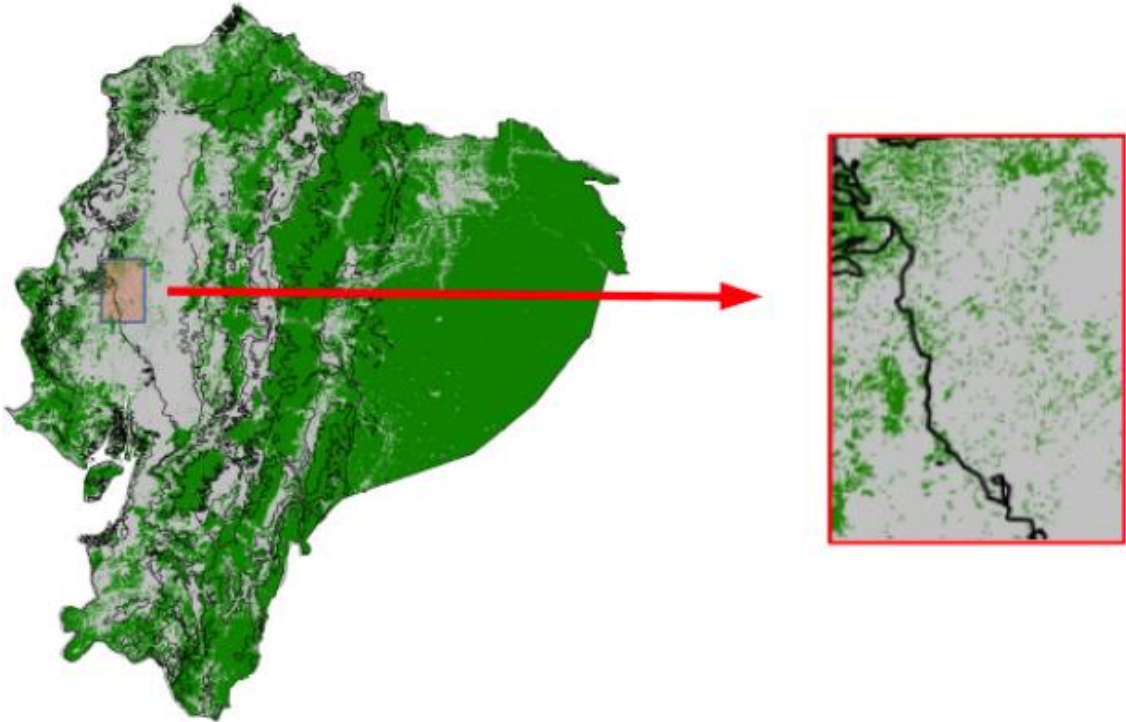


Figure 7 Remaining natural forest in the project area in the 1990s (Sierra, 1999)

As shown in the Figure below, already in 1982 the project region was covered by permanent crops and pastures, according to the historic shapefiles of the Ecuadorian Military. Only the northern tip of El Tigre was covered by a mosaic of natural vegetation.

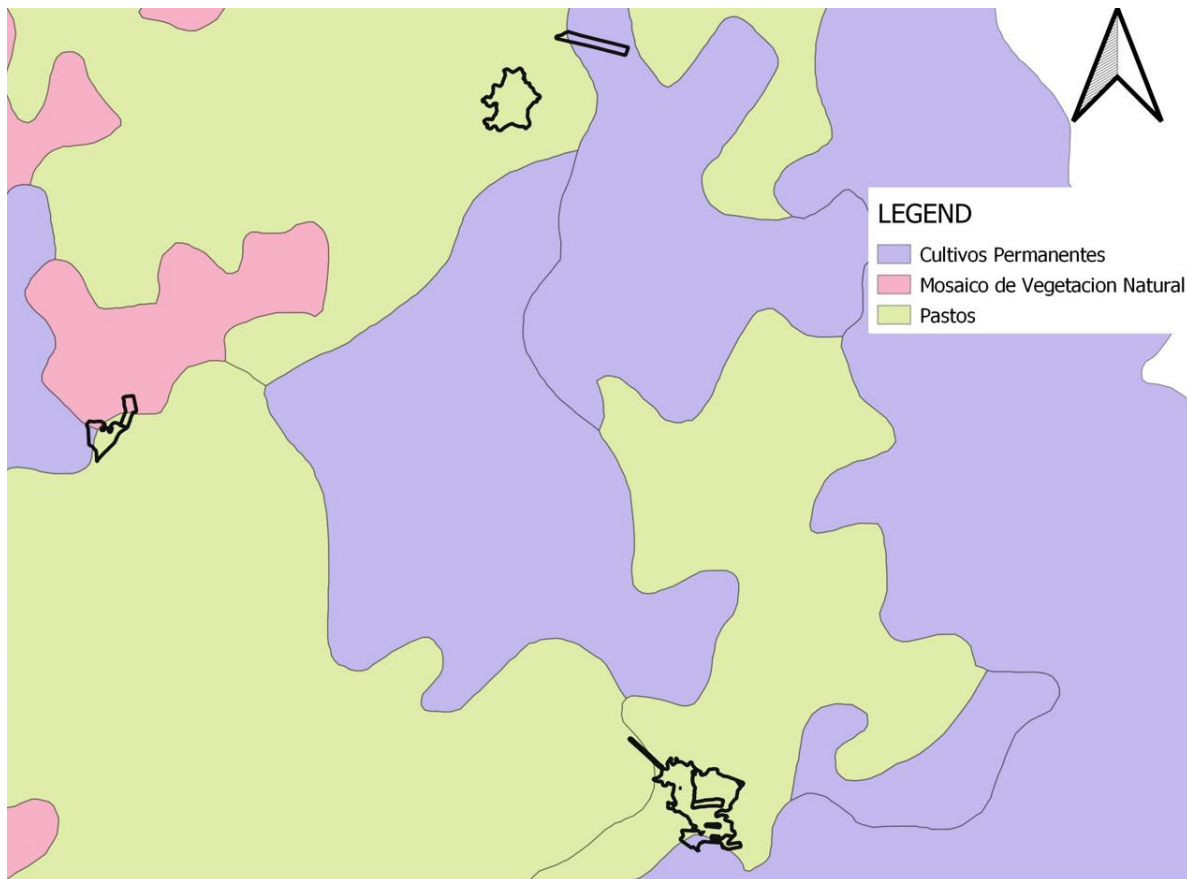


Figure 8 Land use as classified by the Ecuadorian Military in 1982

Currently, the four management units feature teak plantations, covering 88 % of the surface of the four properties. The remaining surface is distributed among fragments of natural or semi-natural sites and infrastructure. Hilly topography alternates with plains associated with rivers of varying size, generating two different types of ecological systems according to flooding: a hilly one in which there are mainly forest habitats and lowlands associated to water bodies or temporal flooding. These have been characterized in broad categories in the mapping exercise, as follows:

- Lowlands/riparian vegetation: comprises streams or natural drainage systems and their associated buffer vegetation (riparian forests), herbaceous grasslands subject to flooding, and, exceptionally, also slopes with rocky surface.
- Degraded secondary forest: Comprises secondary natural forest on well drained sites.

In addition, infrastructure comprises internal roads, housing and storage facilities, the nursery and the industry. The Figures below show the current land use of the management units.

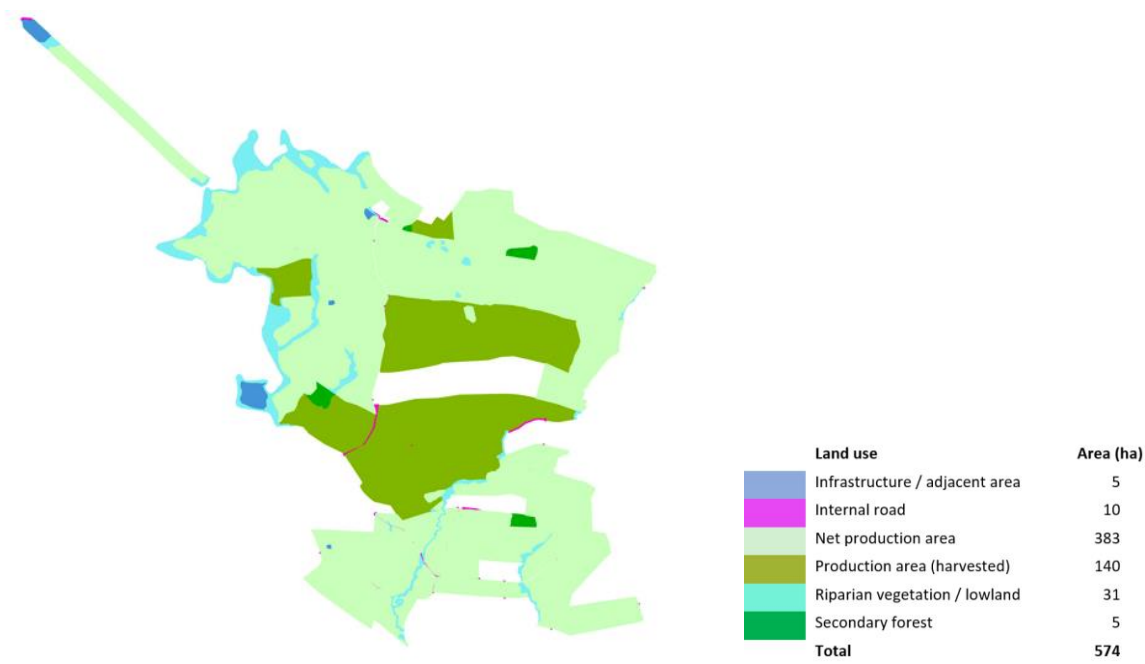


Figure 9 Land use on Canchones

Source: UNIQUE forestry and land use based on Forescan shapefiles

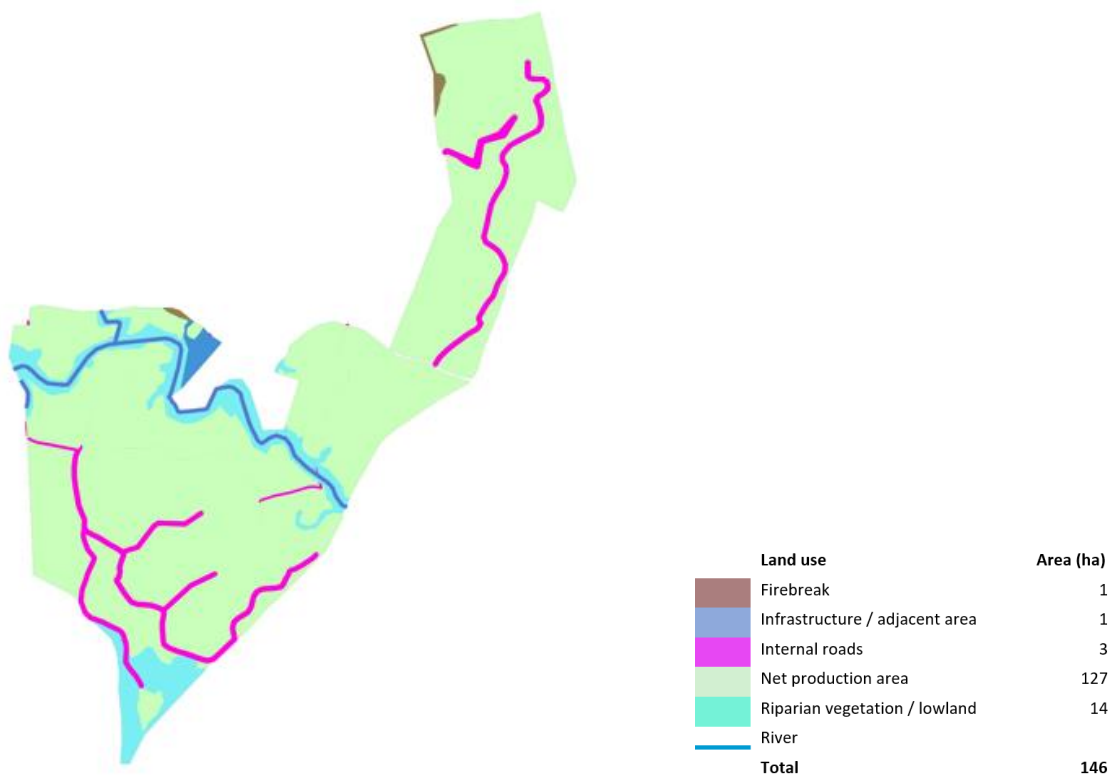


Figure 10 Land use on El Tigre

Source: UNIQUE forestry and land use based on Forescan shapefiles

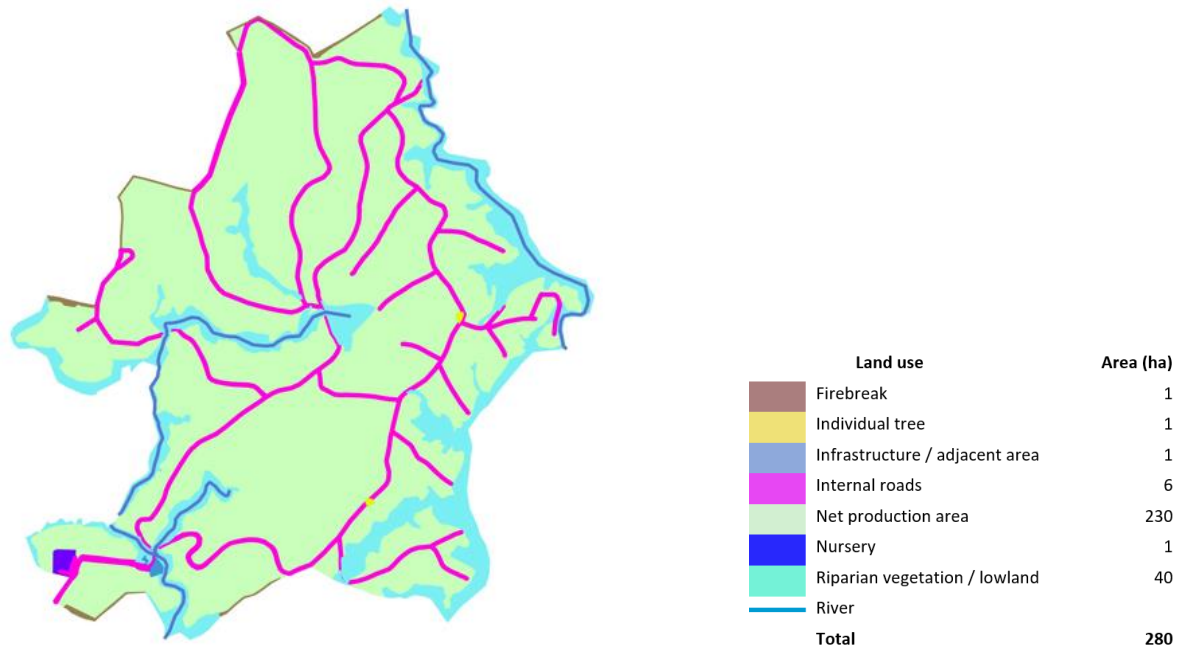


Figure 11 Land use on La Marina
 Source: UNIQUE forestry and land use



Figure 12 Land use on La Selena
 Source: UNIQUE forestry and land use

4.2 Biological environment

The four management units are located in the north of the Guayas river basin. From an ecological point of view, the area corresponds to a transition between two forest ecosystems, composed of species characteristic of both humid areas (Chocó Tropical Humid Forest) and dry areas (Deciduous Forest of

the Coast). This ecotone or transition ecosystem is called Lowland Semi-deciduous Forest of the Ecuadorian Coast (Sierra et al. 1999).

Semi-deciduous forest formerly covered extensive areas of the central coastal plain in western Ecuador. This ecosystem is mainly defined by its moisture gradient. With an annual rainfall from 1,500 to 2,500 mm and a dry season of about three months; it is intermediate between the dry deciduous forest in southwestern Ecuador, and lowland rain forest in the northwest. This vegetation type corresponds approximately to "Tropical Moist Forest" in the Holdridge system (Holdridge, 1967; Cañadas, 1983).

Some of the canopy tree species shed their leaves during the dry season while others retain them; among common species of the former group are *Centrolobium ochroxylum*, *Erythrina poeppigiana*, *Gallesia integrifolia*, *Castilla elastica*, and *Pseudobombax millei*; among the latter group of canopy trees are *Brosimum alicastrum*, *Poulsenia armata*, and species of *Ficus*. The canopy palm *Attalea colenda* and the understory palm *Phytelephas aequatorialis* are ubiquitous in the semi-deciduous forest. Both these palms are economically important, and in large areas of coastal Ecuador where this forest type has been cleared, they are virtually the only tree species left standing in pastures and agricultural plots.

In the Guayas River basin, with its fertile soils, the original forest was almost entirely cleared for agriculture, a process that was essentially completed during the 1950s and 1960s (Dodson & Gentry, 1991). Deforestation in the region has resulted in a dramatic loss of biodiversity in certain areas, spurring local extinction processes, however, the available information is inconclusive in terms of the magnitude of the problem.

Biodiversity baseline

An experienced biologist with over 20 years of experience was hired to conduct a biodiversity baseline of the properties (included as a separate annex to this ESIA). Observations are based on field visits and also include species observed in the project region and included in different databases. A brief summary of the state of the biodiversity found within the natural environments shown in the maps above is presented here. As a general remark, the extension of the natural area is quite low, and most of the better conserved sites are on slopy terrain, which are hard to access, or associated to lowlands subject to flooding, not used for production.

Habitat description

Teak plantation

The biodiversity value of the teak plantation is relatively low, mostly due to its limited species diversity, the lack of wood decomposition in the area (which is taken from site after harvesting), and the lack of fruit trees. However, the association with *Pueraria* brings about some benefits for biodiversity, particularly due to the retention of humidity during the dry season.

Animals in the low stratum benefit from shade, cover and increased soil moisture, mainly during the dry season. This stratum is composed of herbivorous insects and leaf decomposers and constitutes a structured food chain in which predatory insects, frogs, lizards and snakes are observed; and above them mammals like armadillos and marsupials.

The upper layer of the forest is mainly a foraging area for some species of opportunistic insectivorous birds that hunt insects that sporadically occupy this environment. Other birds with generalists' habits occupy the forest mainly to roost at night. One of the most important records achieved in this type of ecosystem is the Peruvian white-tailed deer (*Odocoileus virginianus*), a recently differentiated species that is currently threatened with extinction due to hunting. These animals were not observed, however their presence was consistently reported by a number of local people, both workers of the Company

and residents close to the place, so the report is believed to be accurate. Undoubtedly, the species occupies the plantation site as a refuge area.

Secondary semi-deciduous forests

These forests used to dominate the region. These forests are made up mainly of trees that shed their leaves during one of the annual seasons. However, mixed with evergreen species, which are associated with the humid forests of the north. These forests develop mainly, but not exclusively, in non-flooded areas. In the management units, all natural forests observed had a high level of intervention. Most of the vegetation belongs to a regeneration process that ranges between 10 and 20 years; they were not forests but possibly orchards, cocoa fields or even livestock lands that were later abandoned and subject to natural regeneration. Nowadays, very small patches (< 5 ha) of secondary forests are found on La Marina and El Tigre.

Undoubtedly the most valuable natural forest patch from a biological point of view is located in the southern tip of El Tigre. The forest is located on a steep slope and owes its conservation to the difficult access. This forest shows a greater plant diversity than similar ones in other management units. The forest is part of a larger patch that stretches out to the neighbouring property, totalling about 5 ha. It has a relatively high canopy of more than 20 meters, a great abundance of palms and other fruit trees, evident succession processes through old fallen trees and growing seedlings, possibly moderate water sources due to runoff, traces of other larger animals such as the Central American agoutis (*Dasyprocta punctata*) and armadillos (*Dasyurus novencinctus*), and notorious diversity of birds. It possibly also constitutes a refuge for other larger species, such as the Peruvian white-tailed deer, ocelots (*Felis pardalis*) and the Tayra (*Eira barbara*). In this area, black howler monkeys *Alouatta palliata* were found, a species considered on the national red list as "Endangered" and which was visually and audibly registered in the area.

Lowlands/ Riparian forests and pastures associated to water

Among all the natural environments found on the farms, riparian vegetation, which also includes floodplain areas that appear as forests or grasslands, are the most abundant and practically extend throughout all bodies of water, from small streams to rivers of considerable size of approximately 30 meters wide, such as the Daule River or the Macul River. These strips of vegetation appear as corridors between 3 and 20 meters wide, generally on both sides of bodies of water. They alternate diverse types of vegetation that mainly have relation with the topography. There are deciduous forests in hilly places and swamps and grassland in flatter areas. Therefore, the difference in the type of vegetation is largely defined by the adaptations of the plants to the different flood regimes. Among the most prominent habitats are reed beds or guadúa (bamboo) cane forests, flooded grasslands and mainly stubble and shore forests, some of which show traces of flooding. In general, these ecosystems, but mainly those of La Marina and El Tigre, are in a fairly acceptable state of conservation. This is shown by the diversity of organisms associated to water, which is an indicator of the health of the aquatic ecosystems. In these cases, and despite the rather limited sampling time, several groups of species that are significantly important were recorded, among them more than 18 species of amphibians, 6-8 species of odonatan, and at least 15 species of aquatic invertebrates, among which the river shrimp, molluscs and freshwater bivalves, and among insects several species of Ephemeroptera, Trichoptera, Hemiptera and Coleoptera, in addition to at least 8 fish.

Species found

A summary of species identified per group is presented as follows:

- **Insects:** Insects are by far the most important group in terms of diversity and abundance found in almost any terrestrial ecosystem on the planet, much more in tropical regions, where

temperature plays a major role in the life cycle of these species. A total of 325 records correspond to the project region, distributed in 11 orders of the possibly 25 known orders that could be found in the study area (44 % of potential orders of insects were registered). This could be related to the limited sampling efforts but also to the loss of habitat for some insects that are adapted to life in close forests.

Among the orders found, most records correspond to Lepidoptera (moths and butterflies) with 37 %, followed by Coleoptera (beetles) and Hemiptera (bugs and cicadas), both with 17 %. In a more natural environment, the population of beetles would be expected to outnumber butterflies. The relative large number of butterflies in relation to beetles is related to open spaces (deforested landscape), where they are easily spotted as they are attracted to light during the night, but also due to the lack of woody material in decomposition, flowers and fruits, which are habitats for beetles. In addition, a relative low number of wasps and bees, flies and mosquitoes were found when compared to natural conditions. On the other hand, the presence of herbaceous plants favours grasshoppers and bugs, while dragonflies owe their presence to the aquatic environments.

- **Amphibians:** This group was well represented. In the buffer zones related to water bodies, 16 species were found distributed in 4 orders. This corresponds to 57 % of the potential species found in this category. Thereof, 5 species are listed as rare or threatened according to national red lists, and one of these is listed in IUCN's global list. Also, the structure of these species and orders was similar to the expected structure in natural conditions. While water bodies were found to have good quality, evidenced also by the high presence of amphibians, none of the species found were tree frogs. The absence of tree frogs may be an indicator that the buffer zone maintained may not be sufficient to provide a micro-climate similar to natural conditions.
- **Reptiles:** 17 species were identified (27 % of potential known species in a natural scenario), mostly generalists associated to open spaces. Two snakes and one aquatic turtle with more specialized habits were the exception to this. The low diversity of reptiles is associated partially to the difficulty of spotting these animals, but also habitat loss.
- **Birds:** 57 species of birds were found, 18 % of known bird species in the region. Among the birds found, most are insectivorous or aquatic, with a notorious absence of the group that eats fruits.
- **Mammals:** 17 species were found, and 16 more recorded through accounts of local people, which together represent 44 % of known mammals in the region. Of the potential 75 species, 5 are very likely to be locally extinct, as they haven't been recorded for decades and young local people do not recognize them (among them the jaguar and cappuccino monkey). Of the 17 species found, 5 have been locally listed as rare or threatened, and one at a global level. Among the notorious mammals found are the white-tailed deer.

Notorious species recorded were:

1. White tailed deer, which is found in forest remains but apparently is also found in the plantations foraging on herbs. This species is endangered by hunters, however no evidence of hunting was found during the study. This means the region could be a refuge for the animal.
2. Mantled Howler Monkey: The species is listed nationally as well as globally. Due to its low requirements of space and its diet (leaves), it survives well in small forest fragments. However, fragmentation is affecting the species genetic pool.
3. Central American woolly opossum: This species is threatened by habitat loss, mainly due to its dietary habits, which is more fruity compared to other opossums. However, it may also feed on certain crops. The presence of dogs is a threat to this species.
4. Lowland paca: It is one of the biggest rodents in the world, home to tropical forests in central and south America. Although not yet threatened, the population is in decline due to habitat loss and hunting.
5. Crab-eating raccoon: The crab-eating raccoon is widely distributed in south America, however less common than the north american raccoon. It has nocturnal habits and lives close

to aquatic ecosystems where it feeds of crabs and fish. The animal is common in the region associated to rice production.

The species with conservation status according to the Ecuadorian red list and the IUCN are presented in the Table 3 below. Please note that this list is not exhaustive, as more species could be present that were not recorded to date. In addition, it should be noted that the IUCN red list is considered less adequate in terms of featuring the conservation status than the Ecuadorian list. The latter better represents the actual local state of conservation.

Table 3 Rare, endangered and endemic species identified in the four management units during site visits between August 9-12th 2021 and enriched by other observations made in recent years during other assessments

Source: Biodiversity baseline (Felipe Campos, 2021)

Species	English common name	Environment	National red list (IUCN)*	International red list (IUCN)
Birds				
<i>Onychorhynchus coronatus</i>	Amazonian Roya Flycatcher	Forest	NT	LC
<i>Campephilus gayaquilensis</i>	Guayaquil Woodpecker	Forest	VU	NT
<i>Pteroglossus torquatus</i>	Collared Araçari	Forest	NT	LC
<i>Trogon mesurus</i>	Ecuadorian Trogon	Forest	VU	LC
Mammals				
<i>Odocoileus peruvianus</i>	White-tailed deer	Forest	EN	nd**
<i>Leopardus pardalis</i>	Ocelot	Forest	NT	LC
<i>Caluromys derbianus</i>	Central American Wolly Opossum	Forest	VU	LC
<i>Alouatta palliata</i>	Mantled Howler Monkey	Forest	EN	VU
<i>Cuniculus paca</i>	Agouti / Lowland paca	Forest	NT	LC
Amphibians				
<i>Hyloxalus awa</i>	Frog (no specific name)	Forest (lowlands)	VU	LC
<i>Epipedobates machalilla</i>	Frog (no specific name)	Forest (lowlands)	NT	LC
<i>Hyloxalus infraguttatus</i>	Frog (no specific name)	Forest	VU	NT
<i>Rana bwana</i>	Rio Chipillico Frog	Forest (lowlands)	NT	LC
<i>Lithobates vaillanti</i>	Vaillant's frog	Forest (lowlands)	NT	LC
Reptiles				
<i>Coniophanes dromiciformis</i>	Peter's running snake	Forest	VU	VU

*Made up of different local lists and endorsed by IUCN / **the species *Odocoileus peruvianus* was separated as being an own species, previously known as *O. virginianus*. The species *Odocoileus virginianus* was listed as LC in the global IUCN list, whereas *O. peruvianus* was not found.

4.3 Social environment

Neighbours and local people

The properties are located in three different localities (cantones) in three provinces, namely the north of Guayas (locality Palenque), eastern border of Manabi (locality Pichincha), and western border of Los Ríos (locality Balzar). An overview of the socio-economic condition of these localities is provided in this section, based on the official local development plans (2014-2019)⁷, which mainly use data from the latest census, conducted in 2010. This is quite outdated, however it is the last dataset available, as Ecuador did not conduct the latest census scheduled for 2020 yet, due to the pandemic.

The population in these localities in 2010 was predominantly rural, with around 70-80 % of people living in rural areas, except for Balzar, which featured a rural population of about 50 %. The most widespread economic activity is agriculture, followed by commerce and services. The local development plan of Palenque recorded relatively high levels of migration in rural areas (disproportionally affecting women), which according to anecdotal evidence and interviews, seems to be an ongoing trend until this date in the project region, at least in the immediate vicinity of the project. According to interviews conducted, it is easy to find rural properties on sale due to the migration of the rural population to urban centers, particularly young people. Oftentimes, older people are not able to continue working their land and seek alternatives with easier accessibility. According to the local development plan of Palenque, many producers face difficult condition due to low yields and lack of access to financing to improve their production. Back in 2010, in Palenque, 44 % of the economically active population was employed as daily labourer, while 22 % were working their own land.

Poverty rates measured according to the indicator of multi-dimensional poverty affected between 67 and 90 % of the population in 2010. For comparative purposes, poverty affected 71 % of the rural population on the national level in 2019.

None of the properties directly borders communities but rather individual producers. The project area is surrounded by small and medium private properties (5-300 ha) used to cultivate cocoa and corn or breed and fatten livestock. These crops are characterized as follows:

- **Cacao:** Cacao is the most important cash crop in the region, mostly exported. Most of the cacao is rainfed and produced by smallholders with plots < 10 ha, sold to intermediaries. The cacao sector is growing, and the value chain of great importance for smallholders in Ecuador. In 2018, cacao was produced by an estimated 189,000 producers, of which 84 % on areas smaller than 5 ha (INEC,

⁷ Palenque Development Plan 2015-2019: http://app.sni.gob.ec/sni-link/sni/PORTAL_SNI/data_sigad_plus/sigadplusdiagnostico/1260001700001_DIAGNOSTICO%20SITUACIONAL%20DEL%20CANT%3%93N%20PALENQUE_13-01-2015_16-27-56.pdf

Balzar Development Plan 2014-2020: http://app.sni.gob.ec/sni-link/sni/PORTAL_SNI/data_sigad_plus/sigadplusdocumentofinal/0960000300001_Plan%20de%20Desarrollo%20y%20Ordenamiento%20Territorial%20del%20cant%3%B3n%20Balzar_14-04-2016_16-22-28.pdf

Pichincha Development Plan 2014-2019: http://app.sni.gob.ec/sni-link/sni/PORTAL_SNI/data_sigad_plus/sigadplusdocumentofinal/1360001870001_PDOT%20Pichincha%202016_14-04-2016_15-56-48.pdf

2018)⁸. About 70 % of producers in the whole country sell their cacao to intermediaries. The average age of cacao producers is of 57 years of age, and most producers have little education.

- **Corn:** Corn production plots are small, normally below 10 ha, used for on-farm consumption and local markets. Production is simple without many inputs or technology.
- **Cattle:** Extensive cattle production on natural grasses mainly for beef production sold at the local market. As can be noted in the project region, cattle is mostly held by producers with larger properties.

During Due Diligence, 27 neighbours of the four properties were identified, all of them dedicated to either one or a combination of the crops described. Six neighbours were interviewed and asked about their relationship with the seller and other neighbours, which was judged as positive and peaceful. Neighbours interviewed settled there several decades ago, meaning they were already there when the seller established itself.

⁸ <https://novasinerгия.unach.edu.ec/index.php/novasinerгия/article/view/261/253>

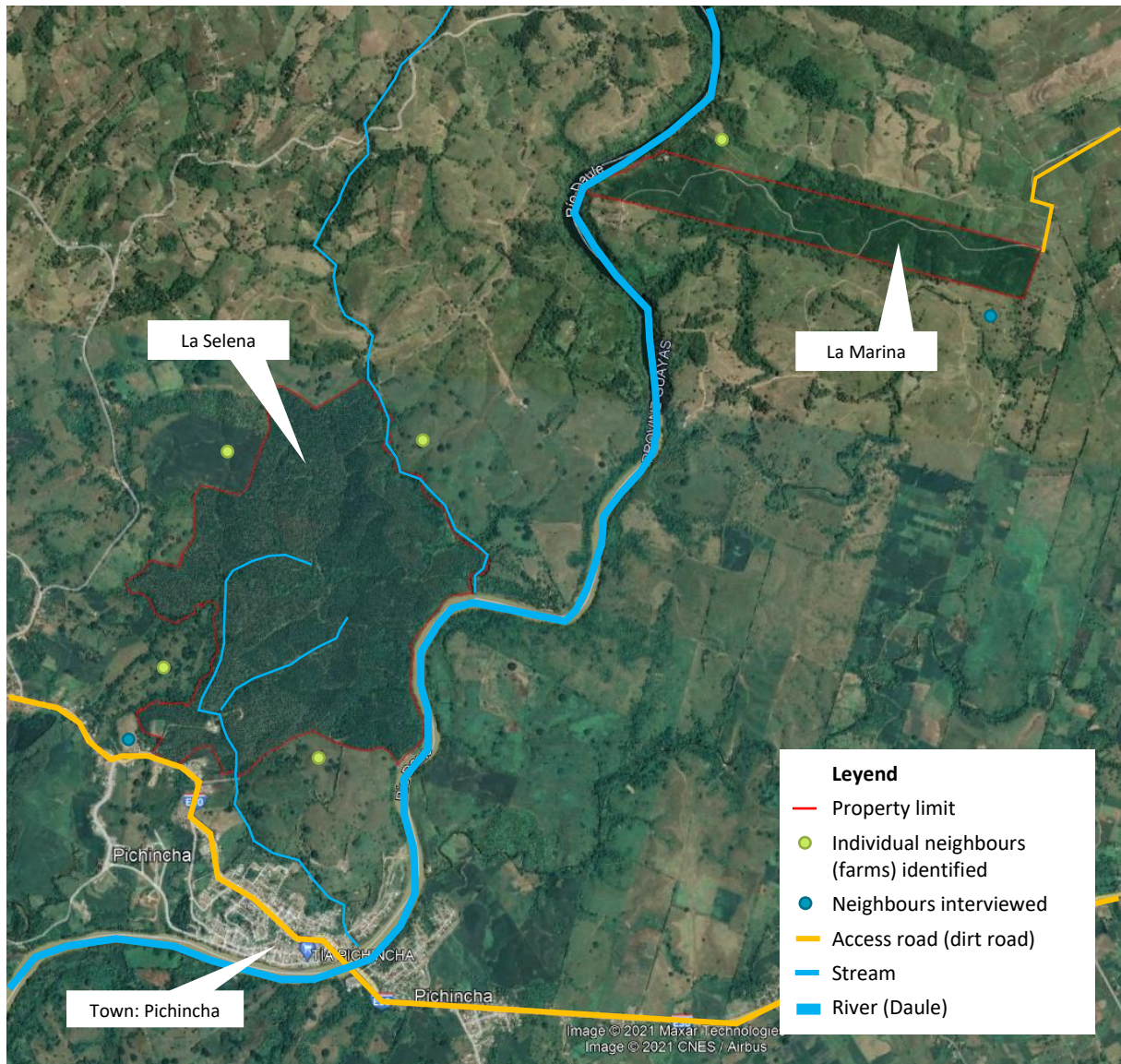


Figure 13 Satellite image of La Selena (north) and La Marina (south) and neighbours identified
 Source: Google Earth

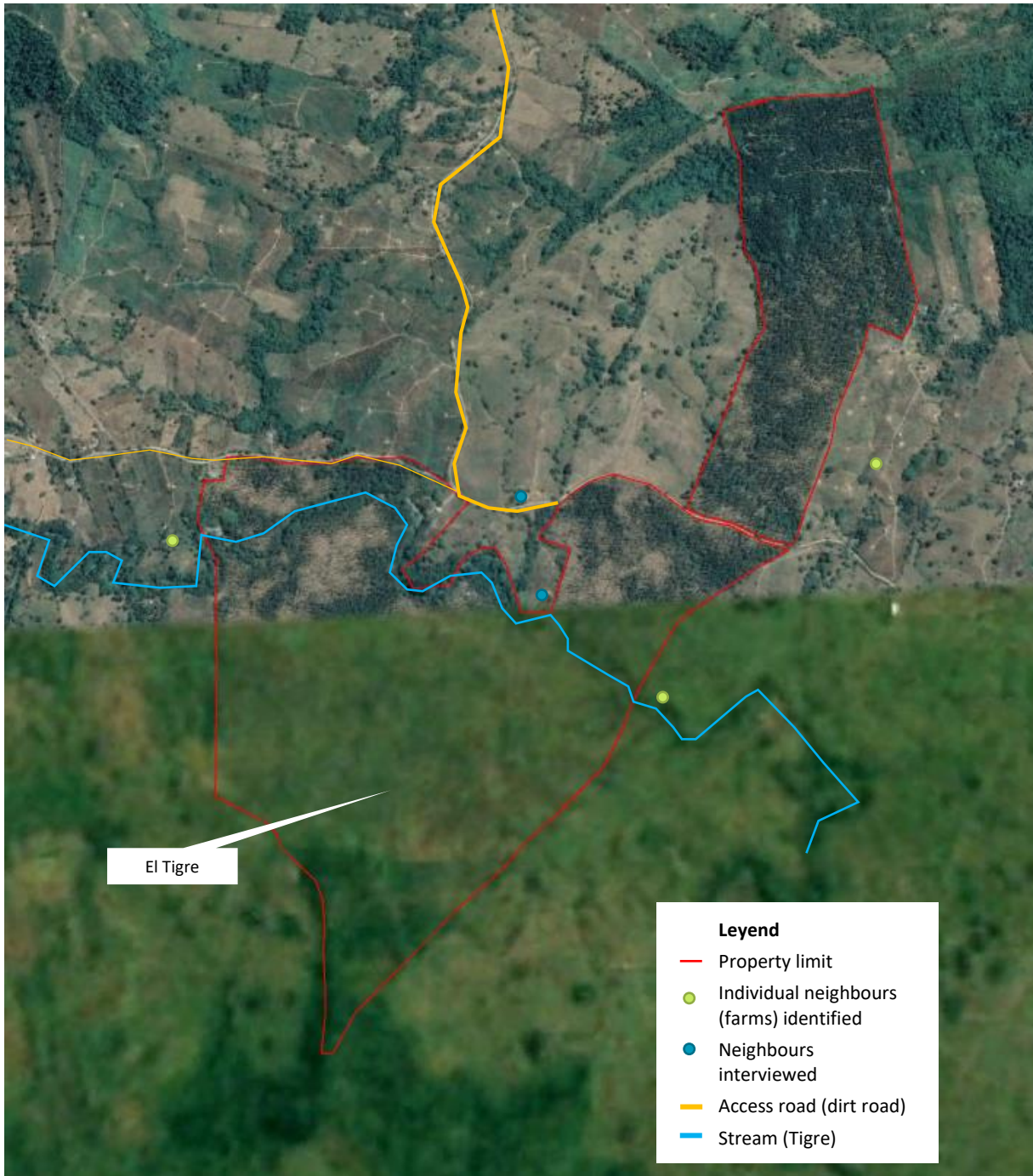


Figure 14 Satellite image of El Tigre and neighbours identified
 Source: Google Earth

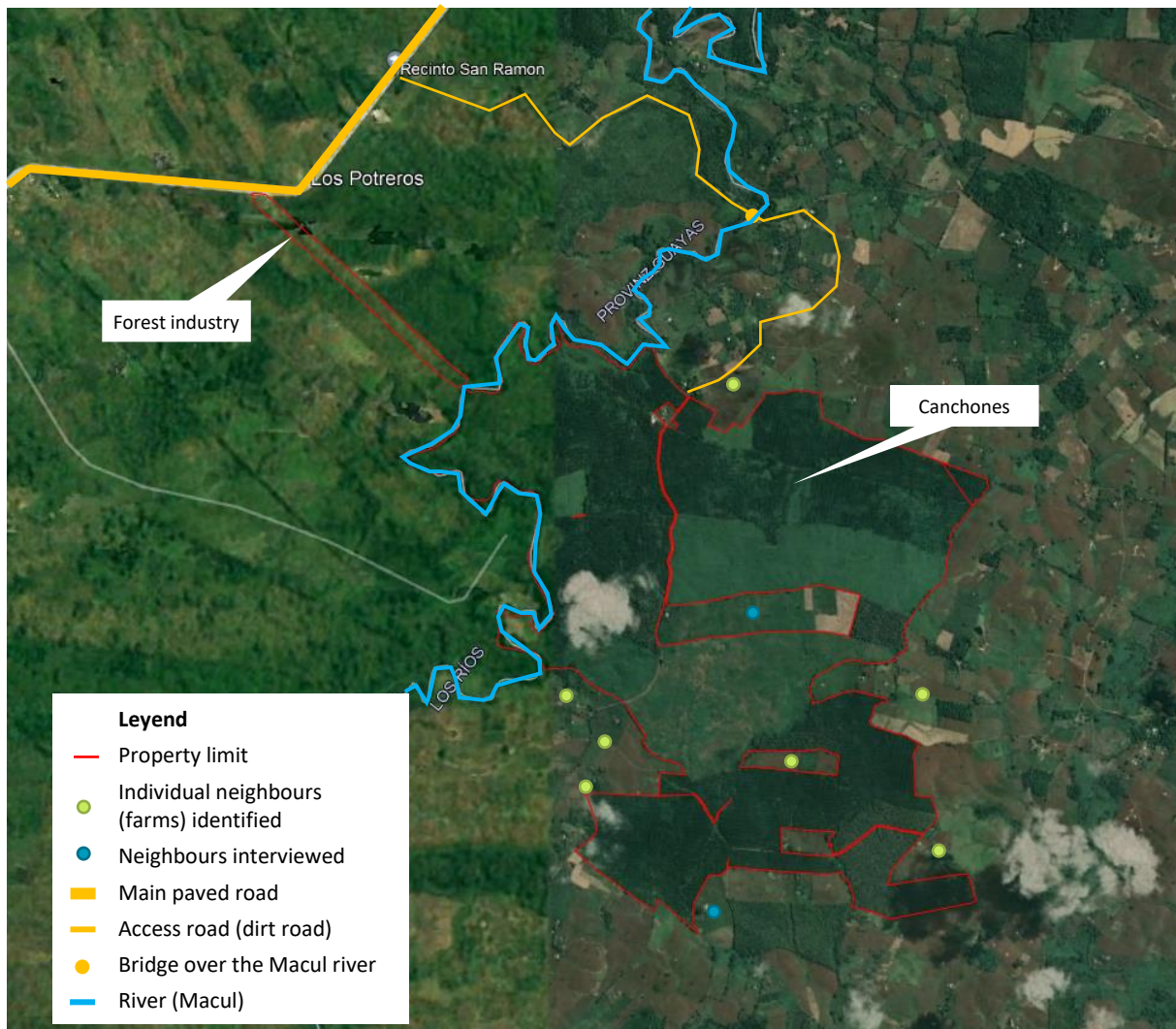


Figure 15 Satellite image of Canchones and the industry and neighbours identified

Source: Google Earth

The physical distance and inter-connectedness with neighbours is closest in Canchones, since this management unit is composed by a number of smaller properties that the Company has been acquiring since the 90s. During this process, two neighbours have remained on site, and their properties are now surrounded by the seller's property.

The Company staff was in some cases very much embedded in the region. For instance, in the property El Tigre, the Company administrator comes from the neighbouring town. A number of the neighbouring properties were his close relatives. In Canchones, the high inter-connectedness leads to frequent encounters and the sharing of access roads, which also requires management and communication.



Figure 16 House of a cocoa producer neighbour of Canchones, surrounded by the Company property

Land tenure

As in many other countries in the region, there are structural inequalities regarding access to land inherited from colonial times. Ecuador has been implementing a series of reforms to democratize access to land since the early 20th century.

In 1908, laws were put in place to fraction and distribute properties belonging to the church. Later in the 1950s and 1960s, the Government conducted agrarian reforms with the aim of a more equal land distribution. However, because of the inconsistencies in the policies on agrarian reforms, problems in land registration and land titling, these reforms had limited impact (Haga et al., 1995⁹). About 10 years ago (2008), the Ministry of Agriculture issued two public policies: One that should spur land redistribution, and another one to increase the legal security of peasants over their land.

Results of the agropecuarian census in 2012 show that, in Coastal Ecuador, large producers (with > 50 ha) represent 7 % of the productive units but concentrate 54 % of arable land. Medium producers (10-50 ha) represent 26 % of the productive units and own 40 % of the land, while smallholders (< 10 ha), represent 67 % of the productive units and hold only 6 % of the land. According to FIAN (2017), land concentration in the coastal region has experienced little change between 200 and 2012¹⁰, with a GINI coefficient of close to 0.80.

⁹ https://www.researchgate.net/publication/329071210_Land_Tenure_Security_and_Reform_in_Ecuador

¹⁰ <https://biblio.flacsoandes.edu.ec/libros/digital/56690.pdf>

When looking at the local Development Plans of the localities in which the properties are located, the rural population owning their own land reached 70 % in Pichincha, 57 % in Palenque, and only 38 % in Balzar (based on 2010 data). An associated problem is the lack of access to loans by farmers that cannot show legal ownership.

Through an analysis of social conflicts and unrest over access to land and resources, several cases of eviction from land were found to have occurred in the region:

- 3 publications about one case where a number of families had been evicted from their land in the locality of La Yuca, Canton of Palenque, in 2006¹¹.
- 3 publications (2007, 2011, 2017) regarding what is perceived as the worrisome expansion of monocrops, among them the African palm, teak, and banana in detriment of local people's access to land and food security¹².
- 1 publication about the precarisation of labour brought by the banana sector¹³.

While these cases have not been found to be linked to the seller, such incidents show there is a risk of conflicts about land when expanding operations. In addition, during due diligence, 11 files of court cases raised against the seller in 2014 in the jurisdiction of Balzar were found through public information, identified in the registry as "violent dispossession". However, further investigation revealed all cases were related to labour issues, that were abandoned by the complainant.

The seller has acquired their land from local farmers and clustered them into larger management units. This process is most evident in Canchones, the largest management unit where seller started operations in the late 90s. Canchones was made up of many small properties that have been gradually acquired by the seller. The other management units have been composed of only one to two separate ownerships before purchase.

As the seller's previous operations have concentrated land, it is important to ensure that their land purchases have been voluntary, willing buyer-willing seller -basis, and without coercion or abusive conditions. Through stakeholder interviews, there was no evidence pointing in this direction. Also, no issues related to encroachment, occupation or displacement have been identified in the project area and its surroundings.

According to the legal DD conducted by a local law firm, property titles of the Company are in order and duly registered. Minor inconsistencies between occupied land and legal documents were detected, but these are related to administrative processes and do not translate into land disputes on the ground.

¹¹ <https://www.eluniverso.com/2006/06/24/0001/12/EBE4232910954AF9A2B5C0DD2778078E.html/>,
https://www.biodiversidadla.org/Noticias/Ecuador_situacion_de_campesinos_tras_violento_de-salojo_en_La_Yuca_Palenque, <http://www.llacta.org/organiz/coms/2006/com0394.htm>,
https://www.fian.org/fileadmin/media/publications_2015/0614ECU-La_Yuca-s01.pdf

¹² <https://lahora.com.ec/noticia/580090/agricultores-de-la-zona-buscan-alternativas>, <https://revistas.flacsoandes.edu.ec/eutopia/article/view/1031/951>
https://www.flacsoandes.edu.ec/sites/default/files/agora/files/1297107613.el_silencioso_y_enmascarado_avance_de_la_palma_africana_en_la_cuenca_media_del_rio_guayas_en_ecuador.pdf,
<https://wrm.org.uy/es/articulos-del-boletin-wrm/seccion1/plantaciones-industriales-del-arbol-de-teca-en-ecuador-ocupando-y-devastando-tierras-fertiles-y-fuentes-de-agua/>

¹³ <https://revistadigital.uce.edu.ec/index.php/ECONOMIA/article/view/2004/1871>

Labour conditions

Labour issues in Ecuador are governed by the Labour Code of 2005¹⁴, through the Ministry of Labour. Furthermore, Ecuador has ratified all fundamental ILO conventions¹⁵.

While the Ecuadorian law introduces appropriate safeguards and benefits for workers, informal labour is high, particularly in the rural setting. This is further accentuated in case seasonal work is required, commonly employed for activities such as planting. Also, outsourcing labour in rural settings is very common. According to recent estimations, around 50 % of the employed population works informally¹⁶. This figure rises to 80-85 % when only considering rural labour¹⁷. In 2010, 82.52 % of the population in the locality of Pichincha did not have any form of social security. In Palenque, of the total working population, only 39.7 % were affiliated to the Ecuadorian institute of social security.

The economically active population in the localities where the project is located was of about 40 % in 2010. As in many rural areas in Latin America, sub-employment is common among people that are working. In 2010, it was as high as 85 % in the locality Palenque.

Regarding worse forms of labour, child labour and forced labour occur in some sectors and affect particularly migrant and indigenous peoples. In 2018, there were 4.9 % of children aged 5-14 working, thereof around 80 % in the agricultural sector. Indigenous and migrants are more vulnerable to trafficking and child labour. In rural areas, children often face barriers to access education, increasing their vulnerability to child labour. Children may be subject to exploitative practices in the fishing sector in the coast, mining in the south, or domestic servitude. Forced labour associated to migration under false promises is linked to sexual exploitation, street work or banana farms¹⁸. The forest sector is not specifically associated to child labour to date.

The seller employs about 21 permanent workers. Thereof, 11 workers are contracted according to the provisions of the law and 10 have service provision contracts. The remaining workforce is sub-contracted or daily labourers, summing up to about 40 people depending on time of year. The new company will organise its labour force following the requirements of the Arbaro ESMS and local law..

4.4 Cultural environment

Indigenous peoples

According to the National Institute of Statistics and Census, 1.1 million from the country's total 14.5 million inhabitants are indigenous. They belong to 14 indigenous nationalities and are organized at different levels. The vast majority of the indigenous population inhabits mountainous regions (68 %), followed by the Amazon region (24 %), while the remaining population inhabits the coastal region and the Galapagos islands (8 %)¹⁹.

The indigenous population in the Coastal region includes the Awá, Chachis, Épera, and Tsa'chila nationalities which are distributed in the provinces of Esmeralda, Carchi, Imbabura, and Santo Domingo

¹⁴ <https://www.trabajo.gob.ec/wp-content/uploads/downloads/2012/11/C%C3%B3digo-de-Tabajo-PDF.pdf>

¹⁵ https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11200:0::NO::P11200_COUNTRY_ID:102616

¹⁶ <https://www.primicias.ec/noticias/economia/persons-empleo-informalidad-ecuador/>

¹⁷ https://www.ilo.org/wcmsp5/groups/public/---americas/---ro-lima/documents/publication/wcms_795313.pdf

¹⁸ <https://www.state.gov/reports/2019-trafficking-in-persons-report-2/ecuador/>

¹⁹ <https://iwgja.org/es/ecuador/4132-mi-2021-ecuador.html>

de los Tsa'chila²⁰. The same region also features two indigenous peoples (Manta and Huancavilca). The latter are different to indigenous nationalities as they have been through wider assimilation processes and speak Spanish. These localities are located far away from the project region (150-200 km).

Montubio peoples

In addition to indigenous peoples, afro-descendants and Montubios are recognized as ethnic minorities. The latter have been recognized as a distinctive group fairly recently (2001). As such, they are protected by Ecuador's 2008 Constitution.

The origin of the Montubio dates back to colonial times as a result of the mixture between indigenous people, Spanish whites and African blacks. However, in the subsequent mestizaje process, immigrants of other nationalities such as Italians, English, French, Czechs, Yugoslavs, Lebanese and Palestinians were united. The term Montubio alludes to the mountain as a place of birth (montu), to the rivers (fluvius) and to man or life (bio). The first to describe the Montubio people was the English traveler William Bennet Stevenson in his book Historical and descriptive narration of twenty years of residence in South America (1825). For the Organization of the Montubio People of Ecuador, the constitution of the Montubios "is the result of a complex historical process of adaptation and interregional ethnic transformation that took place on the coast where Indians, whites and blacks merged". Paredes (2005) shows records of Montubio cultural manifestations since the 16th century, mainly in the provinces of Guayas, Manabí, Los Ríos, El Oro and the southern part of Esmeraldas.

Montubios strongly identify with rural life. Most information available makes reference to their customs and traditions, such as rodeos, Panama hats, the use of the machete, horseback riding, and working with agriculture and cattle. However, different to indigenous groups, Montubios do not have any distinguished land use system (communal ownership of ancestral land, for instance). Some publications show Montubios as disadvantaged regarding other groups. Vulnerability is related to discrimination and socio-economic indicators that overlap with the profile of rural poor.

The share of the population that self-identifies as Montubio has been recorded for the first time in the 2010 census of Ecuador, when about 1 million people self-identified as being part of this group, about 7 % of the population. Montubios are widespread in Ecuador's coastal region, particularly in Guayas and Manabi. In the 2010 census, about 58 % and 31 % of people self-identified as Montubios in the localities of Pichincha and Balzar. When analyzing the number of people self-identifying as Montubio in the project region in the lowest regional administrative units possible, the share is quite high, with 50-70 % of the population in these localities self-identifying as Montubios.

Table 4: Ethnicities represented in the localities (*cantones*) where the properties are located according to the Development Plan of the local Government (data from 2010)

Locality	Seller property in each locality	Mestizo	Montubio	Afro-descendant	White	Indigenous	Other
Parish El Rosario, Canton el Empalme, Guayas Province	La Selena	51%	38%	6%	3%	0.05%	0.23%
Canton Pichincha, Manabi Province	La Marina	36%	59%	2%	2%	0.1%	0.1%

²⁰ <https://www.care.org.ec/wp-content/uploads/2016/02/Modulo-2.pdf>

Locality	Seller property in each locality	Mestizo	Montubio	Afro-descendant	White	Indigenous	Other
Parish San Sebastian, Canton Pichincha, Manabi Province	El Tigre (north)	56%	41%	2%	1%	0.04%	0.06%
Rural population of Balzar Canton, Guayas Province	El Tigre (sur) & Canchones (north)	46%	47%	4%	3%	0.04%	0.12%
Rural population of Palenque Canton, Los Rios Province	Canchones (south)	17%	77%	4%	2%	0.12%	0.21%

According to seller, a number of their workers and direct neighbours identify as Montubio, especially those living further away from larger towns. The local perception among Company management and workers on Montubios is related to people that take pride in the rural lifestyle, particularly the work with animals and festivities like rodeos.

The recognition of the Montubio people in Ecuador as a subject of collective rights was made possible through a struggle led by various organizations on the coast of Ecuador. The struggle has been linked to processes of peasant defense and, subsequently, to the recognition of cultural manifestations that distinguish them from other groups in the country. According to Paulina Ormaza, an Ecuadorian sociologist with long standing experience in the country, the recent Montubio movement has its origin in the revindication of rural *campesinos* to their right to social protection, that emerged in the last century. This movement resulted in the creation of the *campesino* social security scheme, designed for self-employed people in their own farms. In this sense, their differentiation and recognition by the state has been discussed by several authors as a political tool to access benefits.

In March 2001, through Executive Decree 1394, the Ecuadorian State legally recognized "the need to organize the Montubio people under an entity that plans, designs and executes plans, programs and projects for socio-economic, cultural and productive development with self-management criteria, with the participation of men, women and families, with the purpose of improving their standard of living" (Registro Oficial, April 2001). Under this mandate, the Council for the Development of the Montubio Peoples was created. Later with the approval of the 2008 Political Constitution, the Montubio group acquired the same protected status as indigenous peoples.

The safeguards attributed to Montubio in the Constitution are equal to the ones granted to indigenous peoples. As such, an emphasis is placed on the protection of communal and ancestral land, which is very much designed for indigenous peoples and less so for Montubio, as they usually own private

property. To date, the rights granted to Montubios have not been exercised, and there is a lack of guidelines, by-laws or regulations guiding this process.

Information BOX on the rights granted to Montubios by the Ecuadorian Constitution

Article 57 of the Constitution: The following collective rights shall be recognized and guaranteed to indigenous communes, communities, peoples and nationalities, in accordance with the Constitution and the covenants, conventions, declarations and other international human rights instruments:

- To retain the imprescriptible ownership of their communal lands, which shall be inalienable, unseizable and indivisible. These lands shall be exempt from the payment of fees and taxes.
- Maintain possession of the ancestral lands and territories and obtain their free adjudication.
- Free, prior and informed consultation, within a reasonable period of time, on plans and programs for prospecting, exploitation and commercialization of non-renewable resources found on their lands that may affect them environmentally or culturally; to participate in the benefits of these projects and to receive compensation for the social, cultural and environmental damage they cause. The consultation to be carried out by the competent authorities shall be mandatory and timely. If the consent of the consulted community is not obtained, it shall proceed in accordance with the Constitution and the law.
- Not to be displaced from their ancestral lands.
- To maintain, protect and develop their collective knowledge; their ancestral sciences, technologies and knowledge; the genetic resources containing biological diversity and agrobiodiversity; their medicines and traditional medicine practices, including the right to recover, promote and protect ritual and sacred places, as well as plants, animals, minerals and ecosystems within their territories; and the knowledge of the resources and properties of fauna and flora.

Article 59 of the Constitution: "The collective rights of the Montubio peoples are recognized to guarantee their integral, sustainable and sustainable human development process, the policies and strategies for their progress and their forms of associative administration, based on the knowledge of their reality and respect for their culture, identity and own vision, in accordance with the law".

Under Annex 3 a number of umbrella organizations representing Montubio peoples are featured. According to the Organization of the Montubio People of Ecuador, one of the most important active organizations representing 1,417 Montubio communities nationwide - the forms of administration and organization are through local, parish, cantonal and provincial councils. The National and Government Council is the highest authority of the organization and is presided over by a national president, democratically elected every 4 years applying alternation processes.

5 ENVIRONMENTAL AND SOCIAL IMPACTS

5.1 Introduction

Potential impacts are assessed in terms of their significance, assigning one of the following four categories: low, moderate, high or extreme.

Significance is initially determined as a combination of likelihood and severity (see Table 5). Additional aspects such as duration, permanency and scale are considered to determine the final significance of the impact.

Table 5 Significance of impacts

Source: Arbaro and UNIQUE forestry and land use

Likelihood / Severity	Negligible	Marginal	Critical	Catastrophic
Certain	High	High	Extreme	Extreme
Likely	Moderate	High	High	Extreme
Possible	Low	Moderate	High	Extreme
Unlikely	Low	Low	Moderate	Extreme
Rare	Low	Low	Moderate	High

In the following sub-sections relevant impacts are described and assessed; a detailed matrix is presented at the end of the chapter. Furthermore, mitigation measures are proposed to reduce the significance to acceptable levels.

5.2 Positive impacts

Creation of employment and socioeconomic development

Description

The seller currently provides direct labour to about 60 people. The group has formally employed 11 people, in addition to 10 service providers that organize the remaining workforce.

The new company can strengthen socio-economic impact in the region, particularly through the plans of increasing forest plantations and industrial operations. It is estimated that the project will support 62 FTE direct jobs, plus an additional 93 FTE indirect jobs along the value chain, assuming an intermediate level of mechanisation (as per Arbaro's methodology).

Local population and service providers will benefit from fair labour conditions, creation of qualified jobs and development of skills. This will in turn contribute to revenue diversification and enhanced resilience of households. Given the high poverty and migration rates, particularly of women looking for labour elsewhere, and the presence of Montubio and Afro-descendants groups in the region, the project may contribute to providing employment for traditionally disadvantaged groups, such as women, Montubio peoples, or people from Afro-Ecuadorian descent through targeted employment strategies.

In addition, the introduction of an industry focused on the enhancement of quality, genetic development in the nursery, best silvicultural practices and FSC certification will have a positive impact in terms of the sector development and professionalization.

Significance: High

ESIA Ecuador Teak Project, March 2022)

Carbon sequestration and nature protection

Description

The new company will establish additional 500 ha of timber plantations on areas dominated by agriculture and pastures. This will substantially contribute to the sequestration of carbon from the atmosphere. Once fully established and sustainably managed, it is estimated that the project will create and maintain a permanent carbon stock of 200,000 tCO₂ (as per Arbaro's methodology).

In addition, project operations will contribute to the recovery of soils and protection of natural forest patches and natural habitats within the project area, which will result in the protection of the environmental services these provide.

The project will have additional positive impacts on the environment by establishing teak-*Pueraria* plantations in a region dominated by agriculture and subject to strong deforestation in the past. Impacts include soil protection, protection of water courses, and reduced pollution through responsible use of chemical products.

Significance: High

5.3 Adverse environmental impacts

Pollution due to the use of chemicals

Description

Use of pesticides and other chemical products:

- **Plantation forestry:** Products are used during planting and the first years, among them herbicides, fungicides, and insecticides. The use of herbicides is concentrated in the first year, decreasing as the trees grow. Fungicides are used seal tree injuries after pruning, cure *Pueraria* seeds, and insecticides to protect wood in case it stays a relatively long time in field. It should be noticed that the Company establishes the plantations in association with the cover crop *Pueraria*, which acts as weed control and therefore reduces the need for inputs.
- **Nursery:** Fungicides, insecticides, and foliar herbicides are applied to the plants in the nursery.
- **Industry:** Products for wood conservation are used for wood export.

According to field observations and interviews with workers, chemicals are used in a specific manner. Storage facilities in the field are adequate for the number of products at hand. However, to date, better monitoring of product use and storage is needed to verify the stringent handling of these products and correct disposal, and fully comply to local legislation.

While the project employs relatively low quantities of products given its size, some of the products used are classified as hazardous and subject to bans in certain countries or contexts. Among all the products that could be recorded during field work, one is currently banned in FSC certified enterprises (Thiodicarb). This product is used to cure *Pueraria* seeds.

Table 6: List of pesticides, fertilizers and other chemical inputs used and restrictions imposed by national law, other countries (just for reference), and FSC

Commercial name	Active ingredient	Function	Unit	Annual use	National ban*	International bans or restrictions**	FSC list***
Plantations							
Rambo	Triclopyr	Systemic selective herbicide to avoid re-sprouting of stems	<i>l</i>	40	-		-
Glifopac	Glifosato	Systemic herbicide used when planting <i>Pueraria</i>	<i>l</i>	200	-	3 countries	Restricted
Clorpirifos	Clorpirifos	Insecticide / Control of defoliating pests	<i>kg</i>	50	-	Eu states + 8 countries	Very restricted
Sulfato de Cobre	Copper Sulfate Pentahydrate	Fungicide used on the scars after pruning	<i>kg</i>	100	-		Very restricted
Verdit	Haloxypop-R Metil éster	Selective herbicide that controls weeds that compete with <i>Pueraria</i>	<i>l</i>	75	-	1 country	Restricted
Cosmo In D	Alcohol etoxilado. Polyoxithylene	Coadjuvant	<i>l</i>	15	-		-
Cosmo Aguas	Citratos reguladores de PH	Ph regulator to improve product efficacy	<i>kg</i>	15	-		-
Semevin	Thiodicarb	Insecticide used for the treatment of <i>Pueraria</i> seeds	<i>l</i>	1	-	EU states + 4 countries	Prohibited
Cyperpac	Cypermethrin	Insecticide used to protect wood left on site for more than 15 days	<i>l</i>	20	-	EU states + 1 country	Very restricted
Aliado	Metsulfuron-Metilo (Malathion)	Insecticide used to protect wood left on site for more than 15 days	<i>l</i>	10	-		-
Nursery							
PHOS- AL	Fosetyl Aluminium	Fungicide	<i>kg</i>	3	-		-
Orthocide	Captan	Fungicide	<i>kg</i>	5	-		Restricted
AMISTAR	Azoxystrobin - Defenocazole	Fungicide	<i>l</i>	2	-		-
SKULL	Copper Sulfate Pentahydrate	Fungicide	<i>l</i>	2	-		Very restricted

Commercial name	Active ingredient	Function	Unit	Annual use	National ban*	International bans or restrictions**	FSC list***
PROTON	Propamocarb Hydrochlorine	Fungicide	<i>l</i>	2	-		
Curan	Mancozeb – Cymoxanil	Fungicide	<i>kg</i>	2	-	EU States + 2 countries (only Mancozeb)	Restricted (only Mancozeb)
Imidalaq	Imidacloprid	Fungicide	<i>l</i>	1	-	Not approved in EU and UK (not banned anywhere)	Restricted
Acetalaq	Acetamiprid	Insecticide	<i>l</i>	0.5	-		Restricted
Metalosato de Calcio	Calcio	Foliar fertilizer	<i>l</i>	3	-		
Metalosato multiminerale	Calcio 1.0%; Magnesio 10%, Hierro 0,5%, Cobre 0,5%, Manganeso 0,5%	Foliar fertilizer	<i>l</i>	3	-		
Metalosato completo N,P,K	Nitrogeno 4%, Fosforo 17%, Potasio 17%	Foliar fertilizer	<i>l</i>	3	-		
Super Nitro	Nitrogeno 30%	Foliar fertilizer	<i>l</i>	4	-		
Proroot	Nitrogeno 11%, Fosforo 55%	Foliar fertilizer	<i>kg</i>	3	-		
Industry							
Aliado	Malathion	Protection of wood and timber		nd	-	EU + 5 countries	Very restricted
Lorsban/ Clorpilaq 48	Clorpirifos	Protection of wood and timber		nd	-	See above	Very restricted
Maderboro	Boron salts	Protection of wood and timber		nd	-		n.d.

*<https://www.agrocalidad.gob.ec/wp-content/uploads/2020/05/Plaguicidas-prohibidos-en-Ecuador-1.pdf>

**According to the 2021 compiled list of the Pesticide Action Network International <https://pan-international.org/pan-international-consolidated-list-of-banned-pesticides>

***Latest FSC list of chemical pesticides that meet the indicators and thresholds set out in Annex 1 of FSC-POL-30-001 V3-0 FSC Pesticides Policy

Significance of risk: Moderate

Mitigation measures

- Comply with Ecuadorian regulations on the safe use and management of chemicals, including the registry and reporting of these before environmental authorities.
- Formulate and implement procedures for the safe use and handling of chemicals, including application, storage and disposition.
- Implement monitoring of key aspects such as use of products, use of protective equipment, training, safe storage and disposition.
- Improve the infrastructure and implement procedures for storing and disposal of hazardous waste.
- Use pesticides, herbicides and other inputs specifically and according to the instructions of the producer.
- Train workers conducting the application of pesticides and herbicides and record trainings.
- Seek to replace hazardous products by more ecological alternatives when these are available. In particular, discontinue the use of products banned by FSC and seek viable alternatives, to comply with FSC Principles and Criteria.

Industry pollution due to emissions, waste and dust

Pollution due to emissions consist mainly of the vapor from the boiler used during drying, combustion gases from machinery and transport, and dust particles in the industry.

- **Emissions of particulate material:** Particulate material is generated by the wood sawing processes. The seller installed an aspiration and condensation system to collect these materials. Through a pneumatic automatic belt, these are then transported to the final disposal site. There, the material is arranged in a place without the necessary characteristics to avoid them being spread through wind or water. Solution is sought to solve this issue. The favoured solution is to introduce a chipper to chip all the larger material, collect all material and sell it.
- **Solid waste of different categories:** The waste from the maintenance of equipment and machinery includes solvents and greases, used oils and contaminated cleaning elements, in addition to pesticide packaging.
 - a- For non-hazardous waste, the company has installed waste bins classified by paper, plastic, and organic in the working area. This waste is delivered to the municipal system.
 - b- For wood waste, rubble, and hazardous chemical waste that results from the wood preservation chemicals, appropriate waste deposits are lacking. Risks and impacts are related to this material being washed by the rain to percolate into the ground water, as well as affecting health and safety of staff. For instance, oxidized metal could hurt someone if not properly disposed. Hazardous waste from pesticide packaging must be disposed through triple washing and recycled by an accredited company, or other alternatives if these exist according to national regulation.
- **Liquid waste:** By the time of the visit, wood preservation chemicals were not used in pools or immersion structures. In case wood treatments (such as anti-spot) generate toxic wastewater in the future, they must be disposed in a safe installation avoiding percolation separated from common wastewater.
- **Vapor emissions from the boiler:** Vapour emissions from boiler were appropriately channelled through a chimney.

Significance of risk: Moderate

Mitigation measures

- Comply with Ecuadorian regulations on environmental impact assessment and the safe use and management of chemicals, including the registry and reporting of these before environmental authorities.
- Install appropriate waste deposit areas for rubble and wood waste.
- Install appropriate systems to ensure the safe deposit of particulate material during storing and/or transport (if this is recycled by a third party).
- Recycle wood waste and wood particulates.
- Comply to national standards regarding emission parameters and report upon these.



Figure 17: Photographs of the industry – internal transport of wood in the logyard (upper left), wood waste yard (upper right), processing (bottom left), aspiration system of particulates (bottom right)

Habitat destruction and health hazards due to fires

Description

The project region features two seasons: one called winter during the months of December to May in which more than 400 millimeters of rain are often recorded, and a season called summer that extends between the months of June to November and in the which precipitation values are generally below 30 millimeters. It's during the dry summers that the risk of fire is highest, since the peasants neighboring the teak plantations use fire to renew their pastures or crops. Therefore, the risk of fire is assumed as highest in those management units close to local farmers or population. According to the seller's fire prevention plan, the risk of fire has been determined as highest in the property Canchones and moderate in the other properties. As a strategy for fire prevention, Company staff described actively approaching neighbors to support them to use fire in a controlled manner. This information was validated through interviews with neighboring farmers.

The fire prevention plan sets forth the installation of fire breaks of 3-m width in strategic areas (in areas bordering neighboring properties or next to natural forests). In addition, internal roads are also used as fire breaks. While these breaks seem quite modest given their limited width, seller's staff and local people interviewed (neighbors) did not remember large fire events in recent years. Smaller events did take place and were controlled. However, the details of the incidents were not recorded.

Significance of risk: Moderate

Mitigation measures

- Strengthen and expand the fire prevention strategy also to future plantation sites in case of an expansion.
- Record fire events and resulting damages, as well as communication with neighbours and measures implemented as a fire prevention strategy.
- Acquire and maintain appropriate tools, equipment and infrastructure for firefighting and provide regular trainings to employees.

Negative impacts on soil and water

Description

The selection of sites that are suited for plantation forestry and the use of species whose requirements are met by site conditions is of utmost importance to avoid adverse impacts on the physical environment, particularly on soil fertility and erosion.

When established on appropriate sites and well managed, teak plantations should not negatively affect soils. In a study conducted in Guatemala comparing soil characteristics under teak, adjacent sites, and extensive cattle, Rodas-Castellano (2006) found no differences between the chemical properties of the soil, whereas morphological properties structure, consistency, porosity, compaction) were found to be more favorable under teak. On the other hand, several studies related soil erosion under teak plantations to the lack of an adequate understory coupled with steep slopes (CATIE, 2013).

Some of the plantation sites are established on relatively steep slopes, particularly in El Tigre and La Selena. The forage plant pueraria established in association with Teak brings about benefits for soil conservation, as it fixates nitrogen, maintains soil humidity, and protects against erosion.

Fertilization is conducted using a novel combination of biochar with commercial fertilizers. The fertilization scheme was developed using the results of soil analysis and applying fertilizers according to site and plantation age.

Management was found to be compatible with soil conservation. Therefore, significant risks in this regard are considered unlikely.

Significance of risk: Moderate

Mitigation measures

- Conduct site demarcation and site-species match consistently in all plantation sites, based on soil analysis, and do adequate use of fertilization.
- Use techniques that minimize soil disturbance and biomass removal and limit the use of heavy machinery as much as possible.
- Ensure that roads are properly maintained and do erosion control.
- Ensure that machinery is well maintained.
- Identify buffer zones of water sources during land demarcation and ensure their protection.

Adverse impacts on natural ecosystems, biodiversity, and HCV

Description

The plantations were established, and any expansions would be established on areas previously used for agriculture and as pastureland, which are highly modified ecosystems.

As part of the study conducted, the land uses prior to the start of project were assessed in the project area, using multitemporal satellite imagery analysis, interviews, and historical shapefiles by the Ecuadorian Military Geographic Institute. It could be verified that all management units have been converted a few decades ago, at least about 10 years prior to plantation establishment and in some cases several decades ago. The assessment shows that deforestation did not take place as a result of teak plantation establishment. Nevertheless, individual trees were cut, as well shrubland cleared. In this case, baseline refers to the year prior to the first plantations established by the seller in each management unit.

According to the interviews conducted with project staff and neighbours, the properties La Marina and La Selena were largely covered by pasture and used for cattle prior to project initiation, while Canchones and El Tigre were mainly used for corn and cocoa production. This is coherent with the historical imagery. These land uses are still traditional in the area, as can be observed in the area surrounding the properties.

Cattle fields consist of implanted pasture and extensive cattle grazing. Corn production is conventional, in short-rotation, while conventional Cocoa are annual harvests of cocoa trees with a lifecycle of 20-30 years. The latter is the smallholder cash-crop, usually covering small patches (as it requires more investment) on the best sites. In general, agricultural production is conducted on small farms (5 – 20 ha), while cattle production oftentimes takes place on larger properties (> 100 ha).

Table 7: Historical images analysed for the land use change assessment

Property	Baseline year of analysis	Source	Image
La Selena	2016	Google Earth	Sentinel
La Marina	2012	Google Earth	Sentinel
El Tigre	2010/2011	Landsat 2	Sentinel
Canchones	1993	Landsat 5	Sentinel

According to the biodiversity baseline study conducted, the teak-*pueraria* association does offer some benefits for biodiversity, although modest when compared to more diverse systems. While the biodiversity found there cannot be compared to a natural forest, the moisture brought about by *Pueraria* and the structure of trees provides shelter to some species.

Teak was introduced to Ecuador 50 years ago in the experimental station Pichilingue. With temperatures between 22° and 28° C, a defined dry season of 3-6 months, and altitudes between 0-1,000 m.a.s.l., biophysical conditions have shown to be optimal for species development²¹. While some groups have characterized teak as invasive, there are no scientific accounts or reports of teak posing a threat to native ecosystems. Seller plants mostly cloned material, which seems to have very limited seeding and spreading capability. Nevertheless, it is important to ensure best practices are followed when planting, respect of protection and buffer areas, and ensure genetic diversity.

Significance of risk: Moderate

Mitigation measures

- When expanding, plantations should be established only on areas previously used for cattle and agriculture, observing minimum buffer areas and springs. In general, the biodiversity value is lowest in systems with short rotations such as annual crops.
- Protected areas should include all areas protected by law, natural forests, buffer zones, and buffer zones of rivers, streams, and springs identified.
- Ensure the maintenance of protection and buffer areas and monitor the development of environments adjacent to plantations.
- Ensure sufficient level of genetic diversification and apply integrated pest and disease management techniques.

5.4 Adverse social impacts

Non-conformity to minimum labour conditions

Description

Since informality is very common in the project region, workers are at risk of being denied access to their rights, such as minimum wage, vacations, compensation, and social security. This risk is greater among temporal workers or sub-contracted personnel.

Significance of risk: Low

Mitigation measures

- Ensure all labour is formal and all benefits according to law are applied.
- Introduce the standards that are aligned with the environmental and social management system in service provision contracts and assist service providers with their implementation through clear procedures, training and easily accessible information.
- Implement a sex-, age- and ethnicity disaggregated monitoring program for employees and subcontracted workers that covers child labour and labour conditions: wage levels, age of employees, social security obligations and other.

²¹ https://www.unibe.edu.ec/wp-content/uploads/2017/08/7.1_Modelo_negocios.pdf

- Conduct awareness raising on the standards followed by the new company and the labour law among the field staff, the contractors and subcontracted personnel.
- Install an easily accessible and culturally appropriate grievance mechanism for workers.

Health and safety risks and accidents

Description

Occupational health and safety is an important issue in forest operations. Plantation forestry operations observed are manual, with machinery being used only for soil preparation (mainly tractor). Workers are exposed to health and safety risks from the use of equipment and machinery for operations, particularly during harvesting and industrial operations, as well to risks inherent to land operations, such as animal and insect bites.

In addition, risks are to be considered carefully for the application of inputs (particularly hazardous pesticides) and in the event of a fire, as discussed in previous sections.

The Ecuadorian laws establish minimum conditions for health and safety. Also, international standards for health and safety in forestry operations are known, and other companies implement them. Therefore, the risk is considered manageable. FSC certification may provide an additional safeguard to ensure health and safety standards are consistently implemented.

Significance of risk: Moderate

Mitigation measures:

- Introduce the standards that are aligned with the environmental and social management system in service provision contracts and assist service providers with their implementation through clear procedures, training and easily accessible information.
- Develop BOP procedures for operations and conduct training to employees with focus on health and safety aspects.
- Require and monitor the use of protective equipment for each job profile, appropriate and commensurate to the risk imposed by the nature of the activities. This should also cover subcontracted workers.
- Do appropriate signalisation of dangers, particularly in risky areas, such as storing room of chemicals.
- Provide housing and sanitary facilities according to minimum national standards.
- Provide first aid trainings and first aid kits in appropriate places, including mobile first aid kits for working groups.
- Keep a record of accidents including date, cause, description, and remedies implemented.

Impact on traditional land rights, occupation and production systems

Description

As management units consist of land that have been under private property for a long time, and neighbouring smallholders work on their own land, the risk of restricting or limiting access of local people to natural resources on current sites is low.

In the management unit El Tigre, one situation has been identified in which one neighbour provides water to the seller's properties and other neighbours for consumption, through the connection of a spring on his property. However, this is a voluntary agreement among neighbours.

It should be noticed that the new company may still expand by purchasing properties from local people. In case of power asymmetries, it is important these purchases are conducted based on fair agreements and transparent communication. Land purchase from local people could affect current productive and cultural land use, access to natural resources or other ecosystem services on which communities depend on, land rights, gender equity and empowerment of women as decision makers in household financial assets.

Significance of risk: Moderate

Mitigation measures:

- Develop and implement a land acquisition policy and procedure which is compliant with the Arbaro ESMS.
- Always conduct due diligence when acquiring property, including the legal rightful owners, any customary rights, and current uses and/or claims on the land.
- Identify, through engagement with local people, any areas of significance for local people when expanding plantations.
- Observe the Organic Law of Rural Lands and Ancestral Territories of Ecuador (Annex 4).
- Install a grievance mechanism and foster fluid communication to ensure any potential situation may be detected.
- Identify and disaggregate particular impacts on the Montubio population through consultation in case of an expansion.
- Avoid displacement of people from the land. When applicable, people affected by the project should receive adequate compensation (including covering replacement costs and livelihood restoration where appropriate).
- Investigate how land ownership is structured and whether there are any communal lands in the potential expansion areas. This data is available on file with the Ministry of Agriculture and Livestock.
- Prevent the purchase of land from generating processes of uprooting of the inhabitants, especially of Montubio peoples.
- Avoid coercive purchase processes, for instance through land purchase mechanisms with the participation of local and traditional authorities and heads of household.
- Generate land purchase processes that take into account the different traditional decision-making bodies. According to interviews with local people, in well-organized precincts "when someone wants to sell their piece of land they communicate to the community that they are going to sell. Priority is given to people from the community to buy. When there are interventions from outside the community, generally what should be done is to ask the precinct assembly. When there is an external sale, the sale is negotiated so that there is no harm to the community, that is, so that there is no harm in terms of water, use of roads and use of pesticides. In this sense, for the purchase it is important to have the permission of the Assembly of the site.
- For purchase processes where there are married couples, it is important to have the permission of both the male and female heads of household, since in many cases the decision is made unilaterally, affecting the female population.

Risks related to increased traffic

Description

Typical possible impacts on community members bordering a forestry company are increased noise, dust and risk of accidents due to transport of wood and inputs. When talking to the neighbours of the

management units, they had no grievance or comments about the use and maintenance of roads and the circulation of the Company's trucks.

In Canchones, the seller's trucks need to cross the Macul river to enter the property. Since the bridge does not support heavy loads (of more than 25 tons), neighbours are opposed to the Company transporting wood using this bridge. Therefore, the Company crosses the river through an alternative route when this is the case. However, the current arrangement is accepted by neighbours. This should be taken into account by the future management team under the new structure and evaluated for future operations.

Significance of risk: Low

Mitigation measures

- Continue identifying areas where heavy transit is opposed by local communities and agree on alternative routes or appropriate mitigation measures, through stakeholder engagement.
- Implement rules for safe driving and use the roads on appropriate times.
- Whenever Company-associated transit negatively impacts the state of roads significantly, assist the local Government and local people affected with road maintenance.
- Implement mitigation measures for potential heavy traffic on the roads passing through communities, such as installing hedgerows at the front of the houses bordering the roads.
- Install a grievance mechanism for local people.
- Evaluate the current situation crossing the Macul river, on the one hand to avoid any conflicts, but also to minimize potential sedimentation/erosion when crossing the riverbed.

Discrimination of indigenous peoples and ethnic minorities

Description

As described above, indigenous communities are not present in the project region. The presence of Afro-Ecuadorian peoples is relatively low, however the Montubio population is high. The Montubio population in the region has similar lifestyle to local farmers (they own property and conduct agriculture and cattle activities). In addition, they do not occupy or live in the management units where the project is conducted. Therefore, the materiality of possible impacts is largely covered by general safeguards discussed in other sections of this report. Nevertheless, the new company should actively seek to avoid any form of discrimination to foster positive impacts on Montubio people by providing jobs. In general, stakeholders belonging to this group should be identified by the new company and better understood in the future, as to identify possibilities for positive impacts.

Significance of risk: Moderate

Mitigation measures

- Include Montubio representatives in the stakeholder engagement plan.
- Introduce ethnicity in the social monitoring system (for instance, of workers), to account for their participation.
- Provide fair and appropriate employment opportunities to Montubio people.

Adverse impact on local institutions

Description

Adverse impacts on communal organizations and local structures could be a result of a change in dynamics in case a company or organization changes power dynamics or bypasses traditional local structures.

Significance of risk: Low

Mitigation measures:

- Generate participatory processes to detect impacts on local authorities, representatives of community organizations and non-governmental organizations.
- Hire local personnel to act as community mediators, as a link between the company and the community.
- Generate communication processes in which the objectives of the project, operations, positive and potential negative impacts and mitigation measures are communicated.

Negative perception of the impact of teak on the environment

Description

Several municipalities in the region show concern about the advance of teak in their territory, which can be verified through publicly available information (land use plans). The concern is shared by environmental groups at regional and national level.

For example, the land use plan of the locality of Balzar (2014) states: “teak increases the dryness of neighbouring properties, with a marginal benefit in the local timber market”. The land use plan of the canton of Empalme (2015) mentions: “...biodiversity has been affected, especially by the owners of large estates that have converted the land to timber plantations such as teak and balsa, and other species such as African palm, cacao and banana”.

The low level of awareness of project impacts (and lack of familiarity with similar projects) among local communities may lead to a poor appreciation of the potential severity of changes in local circumstances, or to unrealistic expectations about the benefits of the project.

Significance: Moderate

Mitigation measures:

- Enhance public understanding about teak plantations benefits and impacts.
- Actively seek to benefit local communities through employment and social projects.
- Engage local stakeholders and actively communicate the company's policies regarding environmental protection and mitigation measures in place.

Potential impacts on intangible cultural heritage

Description

The project regions is inhabited by Montubio and Afro-Ecuadorian population with ancestral cultural traditions, which may be affected by the sale of their properties. The intangible cultural tradition in the area are oral tradition, ancestral practices linked to the land, traditional construction, and ancestral

food practices. Within the intangible cultural heritage located near the project areas, the municipality of the Pichincha canton has held several activities that are considered Intangible heritage, such as the elaboration of panela in trapiche, cassava milling, starch extraction, elaboration of clay handicrafts, patron saint festivities of San Andrés Borroque, Muerta que penaba con una vela, imaginary around the balserito de Pichincha (PDOT Pichincha, 2019; 127).

It is also important to note that since the late sixteenth century the name of Balzar already appears in colonial documents, either for its aboriginal people of the Chonos or Chonanas, as for its status as a strategic site within the trading system between the outer coast, the Gulf of Guayaquil and the highlands.

Significance of risk: Low

Mitigation measures:

- Detect intangible cultural practices that may be affected by the land sale process and seek to avoid or minimize such impacts.
- Promote projects and activities with employees and local communities (with emphasis on Montubio) that strengthen their cultural practices, such as amorfinos, ancestral food practices and traditional forms of construction.

Potential impacts on tangible cultural heritage

Description

In the case of project expansion, sites with archaeological, historical, religious, spiritual or cultural structures and value should be protected. The Land Use Plan for the canton of Pichincha registers 5 archeological sites.

Significance of risk: Moderate

Mitigation measures:

- Avoid operating on such sites
- If avoidance is not possible, avoid any negative impacts on archaeological sites detected by the Municipality of Pichincha through expansion. In the case of expansion being conducted on a property with such site, a Cultural Property Management Plan with local and traditional authorities should be developed.

Potential impacts on food sovereignty of the population

Description

According to the Integrated Context Analysis (ICA), the project region is at high risk of food insecurity due to climate change. The Balzar canton (Hda. Canchones and Hda. El Tigre) is prone to droughts, floods and landslides, considered of medium risk of exposure to disasters and low risk of food insecurity. On the other hand, the cantons of Empalme, Pichincha and Palenque feature low risk of natural disasters but high risk of food insecurity, with landslides and drought being the main risks.

Significance of risk: Moderate

Mitigation measures:

- Promote, in accordance with Article 9 of the Organic Law of the Food Sovereignty Regime of Ecuador, respect for the right of communities, indigenous peoples and nationalities to conserve and promote their biodiversity management practices and their natural environment, guaranteeing the necessary conditions for them to maintain, protect and develop their collective knowledge, sciences, technologies, ancestral knowledge and genetic resources containing biological diversity and agrobiodiversity.
- Detect possible impacts of the project expansion on the self-sufficiency of healthy, nutritious and culturally appropriate food on a permanent basis.
- Consider the combination of teak plantation with food production under agroforestry or silvopastoral systems.
- Foster projects with local communities and employees for local sustainable food production.

5.5 Impacts on High Conservation Values

The High Conservation Value approach is used by FSC and other certification agencies as a framework to ensure productive projects do not cause harm to biological, ecological, social or cultural values of outstanding significance at the national, regional or global level or of critical importance at the local level. To do so, the approach proposes six HCV (see Table 8). In the case of Ecuador, one national HCV study has been found²² dated 2005. While it helps for orientation, it is outdated with regard to dynamic parameters, such as threatened species.

In the context of a productive project, the HCV approach must bring about benefits for these values, and therefore, the presence of an exceptional attribute is not enough. The attribute is considered HCV when it may be threatened by a project or activity in a context where national law or local mechanisms aren't good enough to protect them. In the case of the project, based upon the baseline studies and the company's management, HCVs are not found. However, all remaining natural sites and rare and threatened species are considered valuable and will be protected by the Company.

While HCVs are not expected to be affected, the Company will be encouraged to increase restoration efforts to foster positive impacts on HCVs and biodiversity.

Table 8: The six HCV and the assessment in the area of four targeted properties

HCV	Indicator	Assessment
Species diversity	Concentrations of biological diversity including endemic species, and rare, threatened or endangered species, that are significant at global, regional or national levels.	The area harbors a number of rare and threatened species. These mostly depend upon the conservation of natural sites still present in the properties, which will be protected. The area is too small to ensure viable populations of these species, which is why it cannot be considered a HCV on its own, however all areas supporting the presence of rare and threatened species will be protected.
Landscape level ecosystem	Large landscape-level ecosystems and ecosystem mosaics that are significant at global, regional or national levels, and that contain viable populations of the great	The project is located in a severely degraded landscape. However, it does contain buffer zones that are important corridors for the remaining species. These will be

²² <https://hcvnetwork.org/wp-content/uploads/2018/05/2005-GUIA-BAVC-Ecuador.pdf>

HCV	Indicator	Assessment
	majority of the naturally occurring species in natural patterns of distribution and abundance.	maintained and negative impacts are not expected.
Ecosystem and habitats	Rare, threatened, or endangered ecosystems, habitats or refugia.	The natural forest in the region is threatened, and, in this sense, any remaining fragment is considered important to protect. Remaining fragments are very small patches of secondary forest, which will be protected.
Ecosystem services	Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.	The project does include some sites with steep slopes and a few springs. These areas are managed according to their vulnerability and protected.
Community needs	Sites and resources fundamental for satisfying the basic necessities of local communities or indigenous peoples (for livelihoods, health, nutrition, water, etc...), identified through engagement with these communities or indigenous peoples.	The project is conducted on private properties in an area with long-standing tradition of agricultural production. Neighbors are farmers and do not depend upon the resources on the properties.
Cultural values	Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or indigenous peoples, identified through engagement with these local communities or indigenous peoples.	This attribute is not present in current sites.

5.6 Summary

The following presents an overview of the assessment of adverse impacts:

Impact	Component	Project phase	Likelihood*	Severity*	Scale*	Duration*	Significance*	Risk**
Pollution due to the use of chemicals	Industry/ forest production	Construction and operation	2	2	2	2	8	Moderate
Pollution due to emissions	Industry	Construction and operation	2	2	2	2	8	Moderate
Pollution due to waste and dust	Industry/ forest production	Construction and operation	2	2	2	2	8	Moderate
Habitat destruction and health hazards due to fires	Forest production	Operation	2	3	2	3	10	Moderate
Negative impacts on soil and water	Industry/ forest production	Construction and operation	1	3	2	2	8	Moderate
Adverse impacts on natural ecosystems and biodiversity	Forest production	Construction and operation	1	3	2	3	9	Moderate
Non-conformity to minimum labour conditions	Industry/ forest production	Construction and operation	3	2	1	1	7	Low
Health and safety risks and accidents	Industry/ forest production	Construction and operation	2	3	1	1	7	Low
Impact on traditional land rights, occupation and production systems	Forest production	Construction and operation	1	3	2	3	9	Moderate

Impact	Component	Project phase	Likelihood*	Severity*	Scale*	Duration*	Significance*	Risk**
Risks related to increased traffic	Industry/ forest production	Construction and operation	3	2	1	2	8	Moderate
Discrimination of indigenous peoples and ethnic minorities	Industry/ forest production	Construction and operation	2	3	2	1	8	Moderate
Adverse impact on local institutions	Industry/ forest production	Construction and operation	1	3	2	1	7	Low
Negative perception of the impact of teak on the environment	Industry/ forest production	Construction and operation	3	2	2	1	8	Moderate
Potential impacts on intangible cultural heritage	Forest production	Construction and operation	1	1	1	2	5	Low
Adverse impacts on tangible cultural heritage	Industry/Forest production	Construction	1	3	1	3	8	Moderate
Potential impacts on food sovereignty of the population	Forest production	Construction and operation	2	3	2	2	9	Moderate

*Scale used: Likelihood – Highly unlikely (1), unlikely (2), likely (3), and very likely (4); Severity – minor/non-significant (1), low (2), moderate (3), and high (4); Scale – project area (1), local (2), and regional (3); and, Duration – Project lifetime (1), medium term (2), long term (3). / **Risk: results from the sum of the Likelihood + Severity + Scale + Duration. The categorization is as follows: < 8 = low; 8-10 = moderate; and >10 = high.

Note: The scale is determined already considering the feasibility and implementation of appropriate mitigation measures.

6 ENVIRONMENTAL & SOCIAL AUDIT

6.1 Laws and regulations

Summary of applicable laws

The most important regulations that set forth the environmental and forest management permits required for the targeted operations are presented in the Section 2.2. As presented, operations in Ecuador are subject to different type of environmental permits. According to the scope and potential negative impact of an activity, following permits may apply: a) Environmental Certificate of voluntary nature and applicable to operations of no significant impact; b) Environmental Registration - Mandatory for low impact operations; and, c) Environmental License - Mandatory for operations of medium and high impact

The MAE has developed a Catalog to determine the type of permit required according to the nature and scope of an activity or operation. This catalog can be viewed on the web platform of the Single Environmental Information System (SUIA). The operations conducted by Seller are classified as follows:

- Plantation and forest management: Is not subject to any specific environmental permit, although an environmental certificate is recommended and sometimes required by financial institutions to issue loans;
- Sawmilling: Requires an environmental registration;
- Construction or operation of a factory for wood products: Subject to an environmental license;
- Construction or operation of a factory for charcoal: Subject to an environmental registration;

As the forest industry includes several sub-activities subject to different environmental processes, these can be merged together into one project subject to the most stringent permit, which would be the environmental license.

In addition to general environmental permits for operations, project proponents are obliged to get other specific permits, such as:

- Permits to exploit and use water from sources such as wells, according to the Law of water resources (Ley Orgánica de Recursos Hídricos, Uso y Aprovechamiento del Agua).
- Permits for the use of hazardous products such as pesticides, and the generation of hazardous waste, according to the Organic Environmental Code (Código orgánico del ambiente & AM O61)

Regarding forestry licenses, commercial plantations are required to be registered in the Forest Production System (hereinafter "SiPF"). This is an administrative process that involves several steps, including an assessment of the plantation to be registered by the Sub-Secretariat of Forest Production (dependency of MAG).

Project proponents need to develop a harvesting plan subject to approval by the Direction of Forestry Development (dependency of MAG). This is the requirement to obtain the harvesting licenses, needed to legally transport and commercialize wood and timber.

Compliance

The seller's forest and industry project is conducted on 11 separate properties. Thereof, eight belong to one entity and the remaining three to another. Canchones is composed of seven different properties, which for simplicity are distributed among five lots (called "*macrolotes*"). The environmental and forest permits in the name of the seller have been issued within the scope of each property.

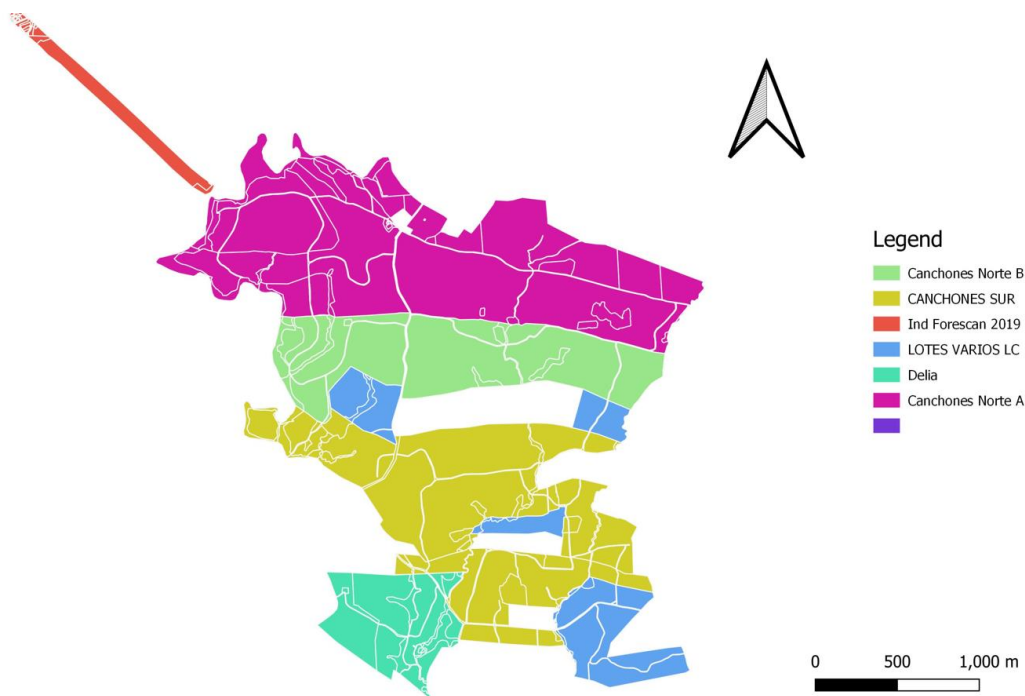


Figure 18: Distribution of Canchones in the properties (“macrolotes”) for which the environmental permits were issued. NOTE: The red area (Ind. Forescan) is the industry on the property San Ramón.

An overview of the environmental permits and harvesting licenses reviewed is provided in Table 9. Based on this, following conclusions regarding compliance can be taken:

- Almost all of the seller’s properties have an environmental certificate (besides some parts of Canchones). The certificate is of voluntary nature and adequate permit for all properties where only forest plantation and management is conducted. An environmental certificate ensures that the project is not conducted in a protected area. In addition, it requires project proponents to comply with standard best practices.
- The seller has valid forest harvesting licenses for the properties subject to harvesting in 2021. The volumes for which these licenses were granted are plausible with the production recorded on these sites. Only the license for La Selena is granted for a volume considered low for the area to be harvested, but this could be related to a delay in harvesting operations.
- Water sources detected in the seller’s grounds, such as dwells, have been duly registered and are granted a permit for the water supply.
- The seller does not have an adequate environmental permit for the forest industry (located in the property San Ramón). On this property, besides establishing and managing plantations, the seller operates an industry which is subject to an environmental license. The seller does not have a valid environmental license.
- The seller did not register their use and storage of hazardous products (used in forest plantations and the industry) according to the requirements by law. The law requires users of such products to monitor and submit their product use to the authority and establishes the rules for product management.
- Despite several provisions taken by the seller in terms of health and safety, and the alleged low accident rate, the seller does not comply with the national health and safety provisions.
- In the property La Selena, teak has been planted within the 30-m buffer zone. This area will be subject to natural forest restoration by the future management team.

Table 9: Environmental and forest harvesting permits reviewed during the audit

No.	Property	Owner	Area (ha)	Activity	Environmental permit	Forest permit	Permits for legal transport of wood
1	Canchones-Canchones Norte A	Forescan	206.32	Plantation & timber production	Environmental certificate No. MAAE-SUIA-DZDG-2021-CA-0405 Date: July 21st 2021 Authority: Zonal Direction Palenque	MAG Forest harvesting licence Code 69553T49627 Harvest volume: harvest 500 m ³ Area: 187 ha Duration: 365 days since issuance Date of issuance: 19/05/2021	10 permits for the legal transport of wood (guías) from Canchones to the Forescan industry where presented. These were conducted between June 14th-18th, encompassing loads between 5-12 m ³ , making up a total of 93 m ³ .
2	Canchones-Canchones Norte B	Rioforest	96.83	Plantation & timber production	Environmental certificate No. MAAE-SUIA-DZDG-2020-CA-0014 Date: August 24 th , 2020 Authority: Zonal Direction Palenque Attached non intersection certificate		
3	Canchones-Canchones Sur	Forescan	154.30	Plantation & timber production	Environmental certificate No. MAAE-SUIA-DZDG-2021-CA-0404 Date: July 21st, 2021 Authority: Zonal Direction Palenque		
4	Canchones La Delia/Delia 1	Forescan	43.44	Plantation & timber production	Environmental certificate No. GPR-SUIA-2020-CA-0017 Date: August 24 th , 2020 Authority: Zonal Direction Palenque Attached non intersection certificate		
5	Canchones – Lotes Varios (composed of 3 properties)	Forescan	49.70	Plantation & timber production	nd		
6	El Tigre	Rioforest	145.90	Plantation & timber production	Environmental certificate No. MAAE-SUIA-DZDG-2020-CA-0013 Date: August 24 th , 2020 Authority: Zonal Direction Balzar Attached non intersection certificate	MAG Forest harvesting licence Code 69340T49456 Harvest volume: harvest 1,580 m ³ Area: 127 ha Duration: 330 days since issuance Date of issuance: 11/05/2021	1 permit for the legal transport of wood (guías) from El Tigre to the Forescan industry where presented. This load was transported on June 21st encompassing 20 m ³ .

No.	Property	Owner	Area (ha)	Activity	Environmental permit	Forest permit	Permits for legal transport of wood
7	La Marina	Rioforest	559.51	Plantation & timber production	Environmental certificate No. GPM-SUIA-2020-CA-0025 Date: August 24 th , 2020 Authority: Provincial Government Manabi Attached non intersection certificate	MAG Forest harvesting licence Code 62128T49455 Harvest volume: harvest 2,813 m ³ Area: 229 ha Duration: 360 days since issuance Date of issuance: 07/05/2021	16 permits for the legal transport of wood (guías) from La Marina to the Forescan industry where presented. These were conducted between June 24th-July 2nd, encompassing loads of about 20 m ³ , making up 316 m ³ in one week.
8	La Selena	Forescan	76.17	Plantation & timber production	Environmental certificate No. GPG-SUIA-2020-CA-0038 Date: August 24 th 2020 Authority: Provincial Government Guayas Attached non intersection certificate	MAG Forest harvesting licence Code 69339T49454 Harvest volume: harvest 266 m ³ Area: 68 ha Duration: 120 days since issuance Date of issuance: 28/04/2021	
9	San Ramón (Industry)	Forescan	16.5	Plantation & timber production	Environmental certificate No.5633-GPG-2020-CA-SUIA Date: January 15 th 2020 Authority: Provincial Government Guayas	Outdated license of 2016 for more than 7,000 m ³	

Table 10: Summary of non-compliance to laws

No.	Finding	Detail	Compliance		Applicable law
			C+	NC-	
1	Environmental permits – lack of environmental license for the forest industry	The project has been wrongly categorized; by dividing, subdividing, segmenting, or sectioning project activities, in order to obtain environmental permits of a lower category than those required by the type of environmental impact.		NC-	Código orgánico del ambiente & AM O61
2	Lack of a registry for hazardous waste	Due to the substances used throughout the production process, it is necessary to obtain the hazardous waste registry; which will guarantee an adequate management of hazardous products. The hazardous waste to be generated must be classified and the quantity declared before an authorized environmental manager.		NC-	Código orgánico del ambiente & AM O61
3	The use of water for commercial activities must be authorized by MAATE	The project was granted 4 valid authorizations for water use for human consumption and irrigation, through Resolution 2526-2018, Resolution 2527-2018, Resolution 924-218, Resolution 923-2018.	C+		Ley Orgánica de Recursos Hídricos, Uso y Aprovechamiento del Agua
4	Harvesting licenses are required for timber harvesting, commercialization and transport	The project was granted harvesting licenses and the permits for wood transport and commercialization.	C+		Código orgánico del ambiente / resolución Nro. MAG-SPF-2020-0007-R
5	Health and Safety provisions must comply with national regulation	The project needs to acquire permits to conduct high risk activities, and document health and safety measures, such as the delivery of protective equipment, trainings, and the conformation of fire brigades. .		NC-	Reglamento de Seguridad y Salud de los Trabajadores D.E. No. 2393.

The fine established for the infractions detected have been summarized by Lexvalor, as presented below.

Table 11: Legal fines for infractions

Infractions	Fines
Infractions regarding the use of hazardous products	
Lack of the authorization for the use of hazardous substances	5-75 Unified Basic Salaries Possible temporary suspension of activities

Infractions	Fines
Non-compliance to technical norms related to the management of hazardous products	5-75 Unified Basic Salaries Possible temporary suspension of activities
Non-compliance to present a management plan for hazardous waste	5-75 Unified Basic Salaries Possible temporary suspension of activities
Generation of hazardous waste without a permit	1-2.5 Unified Basic Salaries
Non-compliance regarding the obligation of presenting programs for the management of pesticide packaging	1-2.5 Unified Basic Salaries Possible temporary suspension of activities
Infractions regarding the lack of environmental permits	
Initiation of a Project or activity of low impact without the environmental permit	1-2.5 Unified Basic Salaries Possible temporary suspension of activities
Initiation of a Project or activity of medium to high impact without the environmental permit	5-75 Unified Basic Salaries for medium impact 10-200 Unified Basic Salaries for high impact
Provision of incorrect information to the authority leading to wrong environmental permits	10-200 Unified Basic Salaries for high impact License could be revoked

The environmental certificates have been granted to conduct following activities:

- A) For Canchones Norte A and Canchones Sur, the certificate has been granted for the operation of nurseries and planting, replanting, transplanting, thinning and conservation of forests and forested areas (these activities can be carried out in natural forests or in forest plantations). This adequately reflects the seller's activities on these sites.
- B) For San Ramón, the certificate has been granted for "other crops subject to incentives". This does not adequately reflect the seller's activities on this site, as it does not reflect all activities within the scope of the forest industry.
- C) For the other properties (Canchones Norte B, Canchones-Delia 1, El Tigre, La Marina, La Selena), certificates have been granted for the activities of forest inventory and stock assessment, pest control, and consulting services. While this does not completely reflect the seller's activities on these sites, in this case there are no negative consequences, as requirements posed are generic regardless.

The environmental certificate is accompanied by a list of environmental best practices that should be followed by the project proponent. All certificates are accompanied by the same generic list of best practices that applies for the rural land use sector, except for Delia and La Selena, where best practice lists seem to be more adequate for other sectors (such as commerce, for instance).

In Table 12, the seller's compliance to these best practices are analyzed. This results in a compliance rate of 90 %. Non-compliance is related to: a) the absence of records regarding activities to protect the water, soil and air resources; b) the lack of training on environmental awareness; and, c) although the buffer areas around streams and rivers have been respected, the company does not conduct active reforestation with native species, as required by these practices. In one situation, the buffer zone left on the area before the seller has initiated its activities does not comply to the minimum established by Law, and active restoration has not taken place (particularly along the Daule river bordering La Selena).

Table 12 Level of compliance to best practices

Detail	Plantations
No of best practices set forth in the certificate	55

Applicable	45
No of best practices implemented	41
No of best practices not implemented	4

6.2 Workers rights

The seller has provided a list of their current workers and contractors, as follows:

- 11 people have employment contract according to the provisions of the law.
- 8 people are contracted as external service providers. However, the nature of their service and/or their relationship to the Company does not reflect a typical service provider-client relationship. Two types of service providers could be identified: a) Those that are dependent on the Company and their working hours and services are equal to people employed; b) Informal field contractors that do not comply with the legal provisions to be characterized as a company or a service provider.
- All field and industry workers are informal. During the field visit conducted in August, following groups of workers were observed working on Company grounds (besides employees and service providers): 1 helper in the nursery, about 20 people harvesting in El Tigre, and about 20-30 people in the industry. Thereof, 7 people were interviewed, shedding light on the following conditions:
 - No situation has been found that could be described as worse forms of labor, such as child labor or forced labor.
 - All work is informal. Workers have no social security, and no access to other benefits such as vacation, payment for extra-hours. etc.
 - People interviewed in the plantation stated they were paid the minimum daily wage (18 USD per day as per Ecuadorian law), however this cannot be guaranteed due to the informality of the working relations.
 - In the industry, workers got paid according to production. According to an analysis of the legal advisor Lexvalor, about half of the industry workers get paid more than the minimum, whereas the other half may not even get the minimum. This suggests that the variable payment is set without fixing the minimum wage. They have also found cases of workers doing night shifts and not getting paid extra-hours and benefits associated to this type of work.
 - The results of the interviews suggest that even workers directly engaged by the Company conducting work that is not seasonal are sometimes informally employed. According to one person interviewed in such a situation, the worker stated having asked his direct supervisor about the possibility to acquire social security, with no response by the time of the conversation.
- It should still be noticed that many of the people working for the Company, particularly young people that were given more responsibility in the forest industry, or long-standing employees such as the finca managers, seemed to take great pride and feel identified with the Company.

6.3 Health and Safety

- Workers were found to be very conscious of the dangers of their work. The forest manager seems to pay attention and talk to workers about the importance of being safe.
- According to all interviewees, including managers, no important or particularly bad accidents happened in the past, leading to death or long-lasting effects. Managers were found to share accidents through a WhatsApp group, where pictures were shared when something happened. While the exact number of accidents could not be inferred, the information gathered suggest not many accidents happened in the last years. At least two accidents like cuts with machete or the cut of a part of a finger happened in the last two years.
- Seller's managers were equipped with first-aid kits, the pesticide storage rooms were signalized appropriately with emergency numbers and safety warnings. Overall, pesticides storage was appropriate for the relatively low volume of products used. The common areas were also

equipped with an informative poster on snakes in the area, and snake bites. Protective equipment was provided to the workforce. Nevertheless, the protective equipment used by the personnel was insufficient for the type of work conducted. Some of the workers using the chainsaw, for instance, were working without gloves, appropriate footwear (no steel tip) or anti-cut pants.

- While anecdotally some training took place in the past, the seller does not have a formal training program or training records.
- Safety during harvesting could also be improved by techniques to avoid the trees “kicking” to the back after cutting.
- From a formal perspective, current health and safety provisions implemented by the seller are insufficient to fully comply with national regulations, which require the seller to have permits for risky work, record trainings, etc.



Figure 19 Warning sign regarding snakes to inform the workers installed in the main houses of the management units (left), and (deficient) protective equipment of chainsaw operator (right)

6.4 Local people

According to the interviews conducted with neighbours, triangulated with information from the literature and observations, following points are considered important to mention:

- In general, the region seems to be going through a process of rural exodus. Therefore, the areas surrounding the plantations used to be more populated by smallholders. The seller has been purchasing cheap land and concentrating it in larger units (particularly in Canchones), however no evidence could be found of coercion during purchase. According to the seller, they have helped some of the sellers to relocate and find other properties for a similar price.
- The six neighbors interviewed have already been living in the region for a long time. There were several reasons people leave the rural areas, as follows:
 - Many people want to sell their properties because the young generation leaves to look for better opportunities in the towns and cities. Older people are not in the condition to keep maintaining their farms as they get older. This comes accompanied by policies

- that have centralized certain public services (such as schools), making it easier to live in urban centers.
 - In the past, some people also sold their land due to conflicts and local mafias. This is no longer the case.
- All neighbors ensured having good relations to the seller. There were situations where relations were particularly friendly. For instance, in El Tigre, the finca manager is related to many of the neighbors. Also in the same property, one neighbor that has access to a natural spring and provides water to all of his neighbors for domestic consumption, including seller's assets.
- There was one situation of a neighbor in Canchones having illegally felled a tree in the natural forest of the seller.
- In Canchones, the neighbors are against the seller's truck using the bridge crossing the Macul river in the rainy season or with heavy loads (above 25 tons) in the dry season. For this reason, the seller bypasses the bridge through a neighboring property using other material crossing the river. This has been a good solution, confirmed by the neighbours interviewed.

6.5 Certification

No situation has been detected that would qualify as a no-go for FSC certification. Provided the new company implements all measures to comply to national law, formalize its workers, and improves health and safety conditions, the project is considered certifiable according to the Forest Management and Chain of Custody standards, as follows:

- FSC-STD-01-001 V5-2 FSC Principles and Criteria
- FSC-STD-60-004-20 V2-0 International Generic Indicators (Ecuador does not yet have a national standard, and therefore the IGIs apply)
- FSC-STD-40-004 Chain of Custody Certification

To achieve chain of custody certification, the industry must meet the FSC-STD-40-004 Chain of Custody Certification standard. FSC chain of custody certification verifies that FSC-certified material has been identified and separated from non-certified and non-controlled material as it makes its way along the supply chain, from the forest to the market. To achieve certification, the industry must show that it checks on the certification status of incoming material, ensures traceability throughout the process, and complies with formal invoicing rules.

It should be noticed that, besides sourcing its own material the project also sources Gmelina from third parties for the production of pallets. It may therefore be possible that the industry may source both – certified and non-certified material. This does not hinder Chain of Custody certification. Following options are possible:

- Either the industry gets certified according to FSC-STD-40-004 by ensuring it does not mix certified with non-certified material. In this case, only the material purchased from FSC FM certified sources may be sold with an FSC label (FSC 100 %).
- In case the new company cannot ensure a full separation of certified from non-certified material, or in case of supply shortage certified origins, the new company has the option of mixing certified with non-certified material through the mix label. This is only possible when the non-certified material comes from acceptable sources, complying with the requirements of what is called "Controlled wood". Controlled wood is not from FSC-certified forests but rather from areas covered by FSC's system for avoiding the use of wood from five unacceptable sources:
 - Illegally harvested wood;
 - Wood harvested in violation of traditional and human rights;

- Wood from forests in which high conservation values are threatened by management activities;
- Wood from forests being converted to plantations or non-forest use; and
- Wood from forests in which genetically modified trees are planted

There are two ways that material can be designated as controlled wood:

- The source forest can be audited to FSC’s controlled wood standard for forest management (FSC-STD-30-010).
- Manufacturers can control their non-certified inputs by being audited against FSC’s controlled wood standard for chain of custody (FSC-STD-40-005). This requires them to adopt a due diligence system which includes determining the origin of the material, assessment of risk of material originating from one of the 5 categories considered unacceptable in FSC supply chains and mitigating whatever risk if found.

To support companies in their due diligence process according to FSC-STD-40-005, FSC has conducted National Risk Evaluations (NRE) for over 60 countries. Ecuador’s NRE has been conducted in 2019. From 21 indicators, 15 have resulted in “specified risk”.

During the visit of the industry, some purchase contracts could be verified with third-party suppliers of Gmelina. According to seller, this process is being carefully conducted, as they had problems with the wood quality in the past if purchases were conducted without a previous site visit. Therefore, third-party purchases are already conducted following certain rules, as follows:

- The wood from third parties is bought exclusively from plantations visited and measured by company representatives.
- On the spot purchases are not conducted as these are considered too informal.
- Company managers ensure the emission of valid permit for the legal transport of this wood.

While this process is certainly not enough to comply to FSC-STD-40-005, it already covers for wood legality. The process could be expanded for full compliance.

6.6 Comments on Governance and final remarks

- While the project has some serious compliance shortcomings (non-compliance to a number of laws and informal work), all of these risks are considered manageable, as there are known and tested solutions to them. However, to ensure improvements and compliance, proper governance must be ensured by the future management team.
- The level of informality suggests these issues have not been paid much attention to in the context of poor law enforcement, maybe to reduce production costs. New company management must put best practice in place.
- In addition, to ensure proper ESG management, additional capacities will most likely be needed, particularly to achieve certification in the context of expansion.

7 MANAGEMENT PLAN

7.1 Introduction

The Environmental and Social Management Plan (ESMP) constitutes a key element to ensure that new company operations are conducted in line with ES requirements. The new company must develop its ESMP after investment takes place. The ESMP should be continuously reviewed and improved as needed to meet best standards, based on new assessments and monitoring results. The ESMP must be appropriate also to encompass the future expansion of operations.

This chapter provides a description of the major elements of the ESMP and formulates additional recommendations to be considered by the Company.

7.2 Policies and procedures

The new company must develop an Environmental and Social Management System (ESMS) in line with the standards followed by Arbaro and national law. The ESMS defines the overall framework and tools to manage ES matters in the new company operations. For this several policies, procedures and plans have been developed.

The following list presents the most relevant documents which must be developed by the new company that are important to address potential adverse ES impacts:

- Environmental and social policy
- Forest management plan, including training program
- Integrated pest management plan
- Procedures to ensure safeguards are introduced during expansion
- Health and safety procedures, including provisions for emergency preparedness and response, measures for fire prevention and firefighting and procedures for use of chemical products
- Best Operating Practices for operations
- Stakeholder engagement plan and grievance mechanisms
- Monitoring procedures

The documents will be adjusted as needed to make sure that the new areas are properly covered.

7.3 Safeguards during expansion

To ensure expansion is conducted considering appropriate safeguards, internal procedures for expansion should include:

- Evaluation of legitimate property rights and any claims over the land
- Evaluation and mapping of baseline land use and biodiversity
- Evaluation of legal considerations, including an assessment of whether the expansion will bring about new legal obligations (due to its location, baseline characteristics, or the operations required)
- Protection of all natural forests and buffer areas, including any secondary forest with some structure in it (different tree strata; oftentimes reached after 10-15 years of regeneration).
- Evaluation of the presence of local stakeholders (neighbours, local authorities) and possible impacts on them
- Expansion of the scope of the current risk and impact analysis to include the new area and/or new impacts and risks, if any

- Evaluation of impacts on traditional activities and food security.

7.4 Roles and responsibilities

The new company must designate a person responsible for ES matters, made up of at least one person dedicated to the project. In addition, people on the ground must be trained regarding national law, Arbaro standards, and FSC certification. Human resources dedicated to the project's environmental and social management must be adapted according to its expansion.

7.5 Environmental protection

Areas designated for conservation

The seller has demarcated the areas that will be set aside for conservation. These include all the patches of secondary forests and riparian vegetation and associated buffer zones. For future expansion, protection sites will be designated before planting through appropriate site assessments.

Conservation provisions

The new company must avoid negatively affecting natural environments and patches of secondary forests as a result of future expansion.

In addition, the protection of natural sites includes further conservation provisions, as follows:

- Wildlife hunting and tree harvesting are prohibited in the areas of natural forests
- The use of fire is prohibited in natural habitats
- Installation of signage with Company policies and training to employees, with disciplinary in case of breach

7.6 Social engagement

In case of new company expansion, the social due diligence to evaluate the aspects put forward under Section 7.3 should include stakeholder engagement including current property owners and occupiers, as well as their neighbours, and local community leaders and representatives. This should be conducted through community mediators.

Following aspects should be paid particular attention to:

- Loss of territories and traditional land
- Evictions
- Migration
- Possible resettlement
- Depletion of resources necessary for physical and cultural subsistence
- Destruction and contamination of the traditional environment
- Social and community disorganization
- Long-term negative health and nutritional impacts
- Abuse and violence

Social engagement plan

The new company must be committed to establish transparent communication and engagement with stakeholders, and to provide positive impacts to local population, mainly through employment.

The new company is advised to develop a social engagement plan, which includes the following elements:

- Mapping and analysis of stakeholders, with identification of level of influence and interest over the project and particular vulnerabilities, disaggregated at least by gender-, age-, and ethnicity
- Definition of level of engagement and communication channels in each case
- List of stakeholder contacts

These elements are adapted to the scope and scale of the project whenever necessary. The new company is also advised to introduce a structured and more formal approach to identifying and contacting stakeholders for the first time in case of expansion.

Grievance mechanisms

The new company is advised to introduce a grievance mechanism so that stakeholders can express their concerns without fear and anonymously. The mechanism is mainly targeted at the most vulnerable stakeholders: field workers and local people.

The grievance mechanism must be communicated to neighbours and the workforce, be culturally appropriate and easily accessible. Also, a person dedicated to follow upon grievances and record grievances and measures taken must be assigned.

7.7 Monitoring

The new company will monitor and evaluate on a regular basis that project operations are conducted as planned. In addition to aspects related to productive activities (operations, costs, forest growth and forest health) the new company is advised to develop specific procedures to monitor ES matters.

Table 13 Environmental and social monitoring

Source: UNIQUE forestry and land use

Component	Indicators	Procedures
Carbon sequestration	– CO ₂ of carbon sequestered through project activities	– VCS methodologies
Impact	– Keep an account of impact and mitigation measures where environmental, social, governance, and cultural impacts of the Company are evaluated and adjusted according to the scope and intensity of activities.	– Updated impact matrix
Compliance	– Number of trainings on the national ES and labour law conducted – Annual recompilation of new laws	– Updated list of relevant laws and provisions and compliance check – Training records
Employment	– Number of employees and breakdown according to gender, ethnicity, and age (youth) – Level of compliance with local laws such as minimum age, social security and minimum wage – Satisfaction level of employees	– Employee records – Employee satisfaction survey
Health and safety	– Level of compliance of health and safety procedures: most importantly the use of chemical products and use of protection equipment – Hours of trainings and number of participants	– Health and safety check forms – Training records
Accidents	– Number and description of accidents – Causes of accidents and follow-up measures	– Accident records
Communication and grievances	– Number and description of grievances – Causes of grievances and follow-up measures	– Grievance records – Meeting records

Component	Indicators	Procedures
Illegal activities	<ul style="list-style-type: none"> - Number of meetings - Number of illegal activities, description of the event, measures taken 	<ul style="list-style-type: none"> - Illegal activity records
Biodiversity	<ul style="list-style-type: none"> - Impacts on biodiversity and development since the baseline - Species diversity and richness - Level of compliance with land use planning and restrictions 	<ul style="list-style-type: none"> - Regular reporting on progress against the plan - Biodiversity assessments
Water	<ul style="list-style-type: none"> - Values of drinking water analysis 	<ul style="list-style-type: none"> - Annual tests on drinking water tests
Waste	<ul style="list-style-type: none"> - Volume of hazardous waste generated and disposed of 	<ul style="list-style-type: none"> - Volume/weight of hazardous waste

8 CONCLUSION AND RECOMMENDATION

The assessment has identified potential ES impacts that may result from project operations. Impacts identified in this assessment are deemed as manageable through appropriate risk management and ES governance. Some of these impacts are already fully or partly addressed in current operations, but the new company must ensure that implementation is done as planned. Additional mitigation measures are recommended and should be followed by the new company in order to further reduce risks.

On the other hand, the project has the potential to provide substantial positive impacts, most importantly in the form of employment and carbon sequestration

ANNEX 1 Laws and regulations

No.	Law/Regulation	Registry	Promulgation
Constitution and International Treaties			
1	Constitution of Ecuador	R.O. No. 449	October 20th 2008
2	Basel Convention	R.O. Suplemento No. 153	November 25th 2005
4	Rotterdam Convention	R.O. No. 425	September 21st 2007
	Paris Agreement	R.O. No. 53	August 8th 2017
5	Stockholm Convention on Persistent Organic Contaminants	R.O. Suplemento No. 180	July 20th 2004
Organic Codes			
6	Organic Code of the Environment	R.O. Suplemento No. 983	April 21st 2017
7	Organic Integral Penal Code	R.O. Suplemento No. 180	February 10th 2014
8	Labour Code	R.O. No. 167	December 16th 2005
Laws			
9	Law of Environmental Management	R.O. No. 245	September 10th 2004
10	Law for the Prevention and Control of Environmental Contamination	R.O. Suplemento No. 418	September 10th 2004
11	Forestry, Natural Areas Conservation and Wildlife Law	R.O. 418	
12	Hydrocarbons Law	R.O. No. 711 Reforma R.O. No. 244	November 15th 1978 July 27th 2010
13	Water Law	R.O. No. 339	May 20th 2004
14	Organic Law on Water Resources and Water Use	R.O. 305	August 6th 2014
15	Organic Law on Health	R.O. 423	December 22nd 2006
16	Organic Law of Rural Lands and Ancestral Territories	R.O. 711	March 14th 2016
17	Organic Law of Land Transportation, Transit and Road Safety	R.O. Suplemento No. 398	August 7th 2008
18	Fire Protection Law and its implementing regulations	R.O. No. 815	April 19th 1979
Reglamentos			
19	Regulations for the Application of the Organic Environmental Code	R.O. Suplemento 507	June 12th 2019
20	Environmental Regulations for Hydrocarbon Operations in Ecuador	R.O. No. 265	February 13th 2001
21	Regulations of the Organic Law on Water Resources and Water Use	R.O. Suplemento No. 483	April 20th 2015

No.	Law/Regulation	Registry	Promulgation
22	Regulations for the Application of the Social Participation Mechanisms Established in the Environmental Management Law. D.E. 1040	R.O. 332	May 8th 2008
23	Fire Prevention, Mitigation and Protection Regulation	R.O. No. 114	April 2nd 2009
24	Worker Safety and Health Regulations D.E. No. 2393	R.O. 565	November 17th 1986
25	Regulation to the Organic Law of Land Transportation, Transit and Road Safety	R.O. Suplemento No. 731	June 25th 2012
26	Unified Text of Secondary Environmental Legislation - TULSMA	R.O. Edición Especial 2	March 31st 2003
Acuerdos Ministeriales			
27	Interministerial Agreement No. 001 Application Guidelines for Compensation for Socio-environmental Affectations	R.O. No. 819	October 29th 2012
28	Interministerial Agreement No. 002	R.O. Suplemento No. 884	February 1st 2013
29	Interministerial Agreement No. 258		May 28th 2013
30	Ministerial Agreement 083-B Payments and Fees		July 8th 2015
31	Ministry Agreement No. 028. In force only annexes	R.O. No. 270	February 13th 2015
32	Ministerial Agreement No. 061 Amendments to Book VI "on environmental quality" of the TULSMA	R.O. No. 316	May 4th 2015
33	Ministerial Agreement No. 026 Procedures for registration of hazardous waste generators, hazardous waste management prior to environmental licensing and for transportation of hazardous material.	R.O. No. 334	May 12th 2008
34	Ministerial Agreement 142 National List of Hazardous Chemical Substances, Hazardous and Special Wastes	R.O. No. 856	December 21st 2012
35	Ministerial Agreement No. 097-A Annexes to the Unified Text of Secondary Legislation on the Environment	Edición Especial 387	November 4th 2015
36	Ministerial Agreement No. 103 Instructions to the Regulations for the Application of the Social Participation Mechanisms established in the Environmental Management Law.	R.O. Suplemento No. 607	October 14th 2015
37	Ministerial Agreement No. 0125 The Norms for the Sustainable Forest Management of Forests	R.O. No. 272	February 23d 2015
Normas Técnicas			
38	Technical Norm INEN 2266	R.O. No. 881	29 de enero 2013
39	Technical Regulation INEN 078	R.O. Suplemento 1 No. 0299	29 de julio 2014
40	Technical Norm INEN 2288	R.O. No. 17	15 de febrero 2000
41	Technical Norm INEN 2841	R.O. No. 214	28 de marzo 2014
40	Technical Norm INEN-ISO 3864-1	R.O. No. 954	15 de mayo 2013

ANNEX 2 Stakeholder consultation

List of people interviewed as part of the ESDD:

Stakeholder group	Property	Name	Date
Forest Manager	All	Ever Sequeira	08-11.08.2021
Property supervisor	La Marina	Demecio Mendoza	09.08.2021
Property supervisor	El Tigre	Santos Mero	10.08.2021
Property supervisor	Canchones		11.08.2021
Employee (nursery)	La Marina	Cristóbal Suárez	09.08.2020
Local population – Neighbor	La Marina	Antonio Ormaza Peláez	09.08.2020
Contractor	El Tigre	Alex López	10.08.2021
Local population – Neighbor	El Tigre	Clever Zamora	10.08.2021
Local population – Neighbor	El Tigre	Roque Mero	10.08.2021
Workers		Luchila	11.08.2021
	Canchones	Fidel Montoya Stalin Hilse Francisco Hilse Claudio Espinoza	
Local population – Neighbor	Canchones	Hugo Gómez	11.08.2021
Local population – Neighbor	Canchones	John González	11.08.2021
Local population – Neighbor	La Selena	Stalin Velez	12.08.2021
Employee	Industry	Carlos Ruíz	11.08.2021

ANNEX 3. INSTITUTIONS REPRESENTING INDIGENOUS, MONTUBIO AND AFRO-DESCENDANT PEOPLES IN ECUADOR

Level	Institution	Mission
Legislative	National Assembly	Elaboration, discussion and approval of public policies related to Constitutional Guarantees, Human Rights, Collective Rights and Interculturality.
	Commission on Constitutional Guarantees, Human Rights, Collective Rights and Interculturality	
Executive	National Council for the Equality of Peoples and Nationalities (CODENPE)	Ensure the full enforcement of the rights of equality and non-discrimination, through the formulation, mainstreaming, observance and monitoring of public policies, with a focus on equality and non-discrimination of peoples and nationalities.
	Plurinational and Inter-cultural Conference on Food Sovereignty (COPISA)	To influence the construction, implementation and participatory accompaniment of policies for the implementation of Food Sovereignty.
Transparency and social control	Ombudsman's Office	National Human Rights Institution that promotes and protects the rights of individuals.
Local Government	Decentralized Autonomous Regional and Municipal Parochial Governments and their decentralized bodies	Entities in charge of applying the principles of interculturality and plurinationality, gender and generational equity, and guaranteeing the collective rights of communities, peoples and nationalities, in accordance with the Constitution, international instruments and the law.
Organizations of peoples and nationalities of Ecuador	Confederation of Indigenous Nationalities of Ecuador (CONAIE)	Consolidate the country's indigenous peoples and nationalities.
	Confederation of Indigenous Nationalities of the Ecuadorian Amazon (CONFENIAE)	Confeniae is made up of 11 Amazonian nationalities belonging to 22 grassroots organizations and federations in the 6 Amazonian provinces.
	Confederation of Nationalities and Indigenous Peoples of the Ecuadorian Coast (CONAICE)	Represents the Awa, Eperara, Chachi, Tsa'chila, Manta, Wankavilka and Pukro peoples.
	National Confederation of Indigenous and Black Campesino Organizations (FENOCIN)	Civil society organization that vindicates the rights of peasants in Ecuador, based on the principles of interculturalism, food sovereignty,

		agrarian revolution, solidarity economy, and commercialization.
	Campeño Intercultural Confederation of Ecuador (AMARU)	Social organization of communities, peoples and nationalities
	Organization Montubio peoples of Ecuador	One of the most important active organizations, it has 1417 Montubio communities nationwide.
	Federation of Montubian Organizations of Ecuador (FEDOMEC)	Working for equity, equality and non-exclusion of the Montubio people.
	Corporation of Montubios of the shoreline (CORMONLI)	Establish a common front of struggle seeking the benefit of all citizens framed in the "good living" of the people.
	Montubio Peoples of the Ecuadorian Shoreline	
	National Afro-Ecuadorian Confederation	Organization made up of 36 federations, which bring together 564 grassroots organizations representing the 24 provinces of Ecuador.
	National Coordinating Committee of Black Women (CONAMUNE)	
National	Standing Committee for the Defense of Human Rights, CDH	Study, defence and promotion of Human Rights, enshrined in the Universal Declaration, the Constitution of the Republic, international norms for the protection of Human Rights and Ecuadorian laws.
	Observatory on Rural Change (OCARU)	
	Observatory of Socio-Environmental Conflicts of Ecuador	Space for research and monitoring of socio-environmental conflicts in Ecuador, mainly extractive.

ANNEX 4 RIGHTS AND OBLIGATIONS OF THE PARTIES INVOLVED IN LAND TENURE

Taking into consideration that the properties are located in private rural territory, this section is based on the Organic Law of Rural Lands and Ancestral Territories of Ecuador.

Forms of rural land ownership

Art. 85.- a) Private property. That acquired by individuals, natural or juridical persons from adjudications made by the State or acquired in the manner provided for in civil legislation.

Rights

Art. 20: Private foreign companies may participate directly or in association with national public companies, mixed economy companies, private companies or with community associations or cooperatives in agrarian projects. Foreign investment for the purchase, lease or usufruct of rural land shall be made to an extent that does not give rise to land concentration or speculation, in accordance with this Law and other applicable norms. Foreign investment in agrarian matters shall seek the generation of productive capacity, employment, the incorporation of national components and the transfer of technology, as well as contribute to guarantee food sovereignty.

Art. 22: - Right to property. The right to ownership of rural land shall be recognized and guaranteed in all its forms and modalities: public, private, associative, cooperative, community and mixed.

Article 39 - Credit Guarantee System. The Credit Guarantee System created by Law, may support the financial operations carried out by public, private and popular and solidarity economy financial entities, authorized by the National Land Fund; as well as the credit requirements of families belonging to communes, communities, peoples and nationalities, subject to the conditions set forth in this Law.

Art. 86: Guarantee of ownership

a) Legal security of property.

b) Simplification of administrative procedures.

c) Special regime for the promotion of production: in favor of small and medium-sized producers of family farming and peasant agriculture.

d) Protection of rural land.

e) Integration of family productive systems.

Obligations of the landowners

Article 11 - Social function. The social function of rural land ownership implies that the right of the owner or possessor does not affect other individual and collective rights that concur with it.

Article 33 - Responsibility. The owners, possessors or those who have usufruct of rural land, under the terms of this Law, are responsible for the fulfillment of the social and environmental functions.

Article 53 - Pollution prevention. The owners, lessees, possessors, usufructuaries of rural land or those who under any other contractual form have access to the same, are obliged, subject to environmental control regulations, to prevent the degradation of agricultural soils and environmental contamination.

Sixth Provision: The owners, possessors or usufructuaries of rural land with agrarian aptitude have the obligation to provide the National Agrarian Authority with the information requested for the evaluation and control of the fulfillment of the social and environmental functions.

Obligations of the State

a) To dictate economic measures and establish products and services for small and medium producers that support the associativity of the owners of small plots of land, constitute associations, groups or rural community enterprises;

b) Promote the development of productive entrepreneurship programs and projects by small and medium-sized associated producers, in order to link them to programs for the provision of monetary resources for risk capital, financial support services, technification, agricultural insurance and credit guarantees.

c) Develop sectoral programs for production, agricultural marketing and agro-industry, with special attention to the territorial jurisdictions with the lowest human development index; and,

d) Promote processes of integration or regrouping of small plots, associative production and marketing; and market information programs, financial services, technification, among others.
