

As a request from Mr. Renato Arrieta, owner of the areas on the city of Huánuco and with the idea of making a project of reforestation and carbon sale. A first report is made of the situation of the areas and the first instructions for the work under international standards of high quality, that they contemplate biological technical work, environments and societies.

Reforestation Project

Report 2022

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Se ha realizado el primer paso que es la determinación de mapas y áreas geográficas, además de la identificación de los cambios de uso en el área del proyecto en los últimos 12 años.	Error!
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1.- INTRODUCTION

The five areas, are located in the department of Huánuco, province of Puerto Inca and district of Tournavista. A satellite review of how the use of the area has changed over time has been carried out. There are also photos taken by means of an overflight with RPAS equipment (drone) on November 22, which presents us with a current situation of the property and the types of coverage.

The results of the satellite review and the conclusions of the overflight with drones carried out are presented in the following report. In addition, an action protocol to develop actions in accordance with international standards and the land use change guide of the Intergovernmental Panel on Climate Change.

It is important to indicate that the area is located within the buffer zone of the El Sira Communal Reserve. The purpose of implementing a carbon project, through reforestation or agroforestry, leads to a series of prior actions that we must consider and that are presented in this Report.

Objective: Present the area review and possible actions for the development of a reforestation carbon project.

2.- REVIEW OF SATELLITE IMAGES AND AERIAL PHOTOS OF THE PROPERTY

2.1 Review of the area with satellite images

The identification of the project area has been developed and a recognition of its changes in use over the years has been carried out. The vertices of the area and the changes in use since 2010 are presented in the following table

Table N1. Change of use of the area over time

Vertice	East	North	Segment	Distance (m)	Year 2010 (05/08/2010)	Year 2015 (21/08/2015)	Year 2022 (25/10/2022)
1	527482	9010242	1-2	283	Young secondary forest	Young secondary forest	Young secondary forest
2	527765	9010242	2-3	16	(Purma)	Farmland	Farmland
3	527772	9010228	3-4	35	(Purma)	Farmland	Farmland
4	527803	9010242	4-5	178	(Purma)	Farmland	Farmland
5	527982	9010242	5-6	101	Farmland	(Purma)	Farmland
6	527982	9010140	6-7	500	Farmland	(Purma)	Farmland
7	527482	9010142	7-1	100	Young secondary forest	(Purma)	(Purma)

Support images:

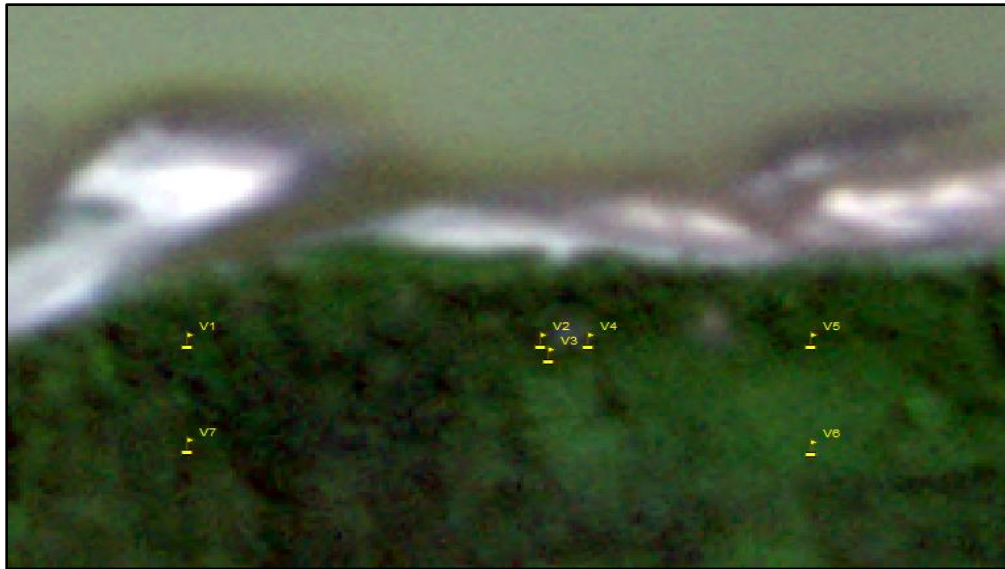
Image 1. Satellite image year 2010 (05/08/2010)



Image 2. Satellite image year 2015 (21/08/2015)



Image 3. Satellite image year 2022 (25/10/2022)



Conclusion

As can be seen, the area is in constant change from farmlands to purma, a situation that occurs throughout the jungle, where they cut the purma to establish farmlands, for a few years and then leave it purma, so that the land gets nutrients again..., and they grow it back and so on.

Although the area is private, nearby communities have been known to enter it for agricultural activities. The 5 ha, are some areas of continuous succession of land use change.

2.2 Review of the area with drones

- On November 19, two flight plans were made for the geophoto and panoramic views
- The Property of interest is located in the district of Tournavista, province of Puerto Inca, department of Huánuco. And the area flown over was approximately 5 hectares.
- 3 control points were taken for the georeferencing of the Orthomosaic.
 - The first control point was made at the following coordinates 527577.5355 mE 9010237.0618 mN
 - The second control point was carried out at 527539.8163 mE 9010163 mN
 - The third control point was carried out at the following coordinates 527937.1497 mE 9010141.0800mN
- The overflight with RPAS equipment (Drone), with two flight plans consisting of:
 - The first overflight, obtain Geophotos.

- The second overflight, obtain Panoramas and videos.
- The areas that are being worked on were identified, which makes up an area of approximately 5 ha.
- Photos and videos were taken of the areas of greatest interest to the owners in order to obtain a digital elevation model and an Orthomosaic.
- A quick cadastral analysis was carried out, identifying that the assigned cadastral unit is code 050745.

Image 4. Satellite image location of the property

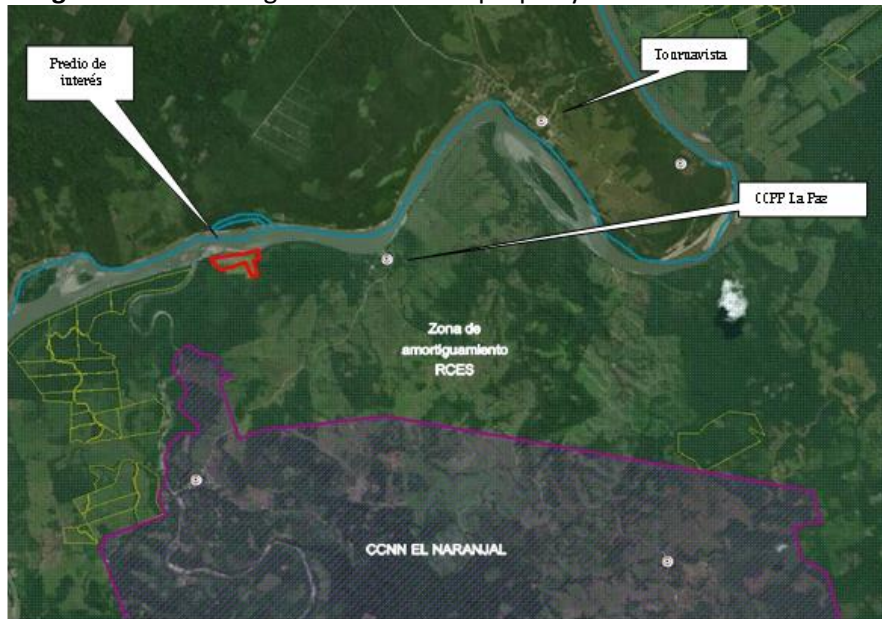


Imagen 5. Imagen Distribución de puntos de control



Table 2

PROPERTY UCC	COORDINATES UTM (WGS84)		REFERENTIAL AREA (ha)
	CENTROID X	CENTROID Y	
050745	527778.2590	9010244.0140	5.8068

Image 5. Photo of the area

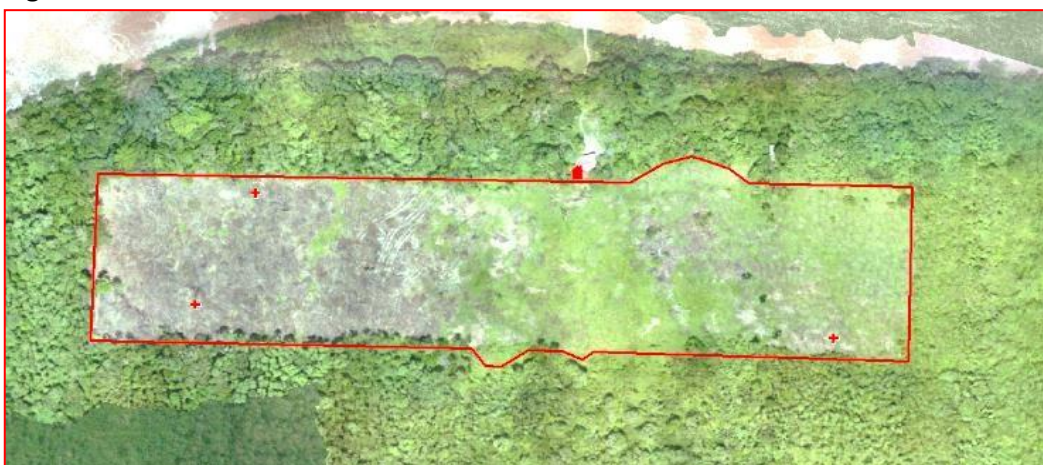


Image 6. Photo of the area



Conclusion

As can be seen, the area is clear, according to the photos of the overflight. In November, the clearing of areas of purmas, crops and secondary forest was carried out. In no part of the area has deforestation of primary forest been carried out.

3.- BASIC CONCEPTS FOR REFORESTATION PROJECTS

3.1 According to the Guide of the Intergovernmental Panel on Climate Change 2006

Land converted to forest land. It is determined as forest land in case of conversion, it corresponds to the definition of forest adopted by Peru. According to the IPCC, a time interval of 20 years is suggested and this is until the moment when the soil carbon of the new forests reaches a stable level.

Annual increase in carbon stocks in biomass, ΔCG will be used to perform the ΔCG calculations according to Equation 2.9 in Chapter 2. Since the growth rate of trees is highly dependent on the management regime, a distinction must be made between forests under intensive management (ej, forest plantation) and under extensive management (groves that regenerate naturally with little or minimal human intervention).

Intensively and extensively managed forests can be further stratified based on climate, species, management practices, etc. Finally, the annual increase in carbon stocks can be estimated separately with the following quantity.

$$\Delta C_G = \sum_{i,j} (A_{i,j} \cdot G_{TOTAL_{i,j}} \cdot CF_{i,j})$$

ΔC_G = incremento anual de las existencias de carbono en biomasa debido al crecimiento de la biomasa en tierras que permanecen en la misma categoría de uso de la tierra por tipo de vegetación y zona climática, ton C año⁻¹

A = superficie de tierra que permanece en la misma categoría de uso de la tierra, ha

G_{TOTAL} = crecimiento medio anual de la biomasa, ton d. m. ha⁻¹ año⁻¹

i = zona ecológica i ($i = 1$ a n)

j = dominio climático j ($j = 1$ a m)

CF = fracción de carbono de materia seca, ton C (ton d.m.)⁻¹

3.2 According to the Afforestation, Reforestation and Revegetation Methodology of the Verra Standard.

Planting Unit. Clearly defined individual woody plants (for example, trees, shrubs, bamboo clumps) (which are identifiable in the field and subject to a complete census used in census quantification).

Vegetative propagation. Deliberate artificial establishment of new planting units from vegetative material (for example, shoots or cuttings), obtained directly from the original planting units included in the project boundaries.

Project borders. The spatial extent of the project boundaries encompasses all lands subject to implementation of the ARR project activity.

Carbon reservoirs. They may have minimal carbon pools and do not need to be accounted for if it is less than 5% of the total GHG benefit generated by the project. Reservoirs are considered: Wood on the ground of trees, wood under the ground of trees, wood on the ground of others such as palm trees, wood under the ground of other trees such as palm trees, litter, soil, dead wood and wood of products.

Base line. Actions that have taken place in the area without the implementation of the project. These actions are accounted for in units of CO₂ equiv. The reference scenario is represented by the usual growth of new storages, based on observations of a representative control area outside the project area. The control area is adequately adapted to the project area through the incorporation of biophysical and demographic parameters correlated with the probability of natural restoration/regeneration and productivity. The control area is used to track baseline vegetation growth remotely; direct field measurement is not necessary.

Performance benchmark. It is set equal to the average cumulative increase in the estimate of vegetative stocks (EVS) from its initial state, observed in designated control plots, relative to the project area. Through the Methodology, the performance benchmark is derived for: Demonstration of additionality and

the accreditation baseline. Performance benchmarks are independently developed for each project area. Performance benchmarks are established ex ante, based on observations.

4.- FIRST STEPS TO CARRY OUT

The main actions to be carried out are presented

4.1 Technical-environmental actions

- Determination of maps and geographical areas limits of the project area.
- Determination of performance benchmarks
- Determination of baseline emissions in the project area.
- Estimate of emissions and removals of the project
- Determination of carbon reserves of the project.
- Determination of species and type of plantations
- Determination of the average annual IMA increase of the species to be reforested, according to bibliographic reference.
- Determination of project activities that lead to other sources of project greenhouse gases.
- Determination of burned biomass
- Estimation of leaks
- Determination of risks and uncertainties

These actions will be carried out by reviewing Verra Standards under the Afforestation, Reforestation and Revegetation Methodology.

4.2 Social and biological-Technical actions

- Determination of neighboring communities and how they could benefit from the project.
- Determination of community actions throughout the project.
- Establishment of training in environmental education throughout the life of the project.
- Demonstration of the project's positive impact on communities.
- Determination of biological benefits of the project.
Determination of positive biological impacts.

These actions will be carried out by reviewing Climate Community and Biodiversity Standards

4.3 From the Technical-environmental actions

The first step has been carried out, which is the determination of maps and geographic areas, in addition to the identification of changes in use in the project area in the last 12 years.

The control points or performance reference points should be continued, according to the VERRA afforestation, reforestation and revegetation methodology. The steps to follow are:

Step 1. Assess the initial conditions in the project area for the possible application of the simplified performance benchmark. where at $t=0$

1. The project area is located within a political jurisdiction where there is no government funded program that provides incentives for tree planting in operation.
2. The initial land use in the project area is continuous cultivation (growing a crop on the same site year after year, with no barbecue periods longer than one season) demonstrated for 10 years or more prior to the start of the project.
3. The performance benchmark is applicable from year t to year $t=4$, percentage is reset to zero. Otherwise, continue with step 2

Step 2. Delimit an eligible control area outside the project area, applying coincident factors. Define the project area and initial conditions (values at $t=0$) for the matching factors and delineate the eligible/matched control area, outside the project area (values at $t=-5$). All matching factors and source data specified in Table 5 should be incorporated into the delineation of the eligible control area. The process to determine the eligible control area is implemented with a series of GIS overlays. As necessary, stratify the eligible control area in cases where the project area unites multiple exact match criteria (political boundaries, agroecological conditions) zones, initial non-forest land use and/or land tenure. When the project is a grouped project. The following factors must match the eligible geographic area and all relevant eligibility requirements.

Step 3: Select the approach to quantify the estimated plant population (EVS)

The performance benchmark is equal to the average cumulative increase in vegetative storage estimate (EVS) from baseline, observed in designated control plots, relative to the project area. The EVS is quantified using one of the following approaches:

1) Percentage cover: EVS in control plots is assessed on the basis of percentage cover, applying the simplistic assumption that populations are directly proportional to percentage cover. Vegetation cover will be defined as the entire Surface (living) biomass pools included in the project boundary (ie, trees, shrubs, and/or herbaceous). This approach is best suited to activities involving trees and/or shrubs. plantation, but not to herbaceous systems (due to photo interpretation limitations).

Coverage percentage is assessed through direct visual inspection of Google Earth imagery, other high-resolution ($\leq 5m$) satellite imagery, or aerial photography, using an approach like the current version of the i-Tree Canopy tool. . Within each control plot, visually assess the cover (eg, tree/no tree) at 50 random points, and calculate and record the percent vegetation cover as the EVS value.

2) Remote sensing metric: EVS in control plots is assessed based on a remote sensing metric with proven confirmation with biomass (eg, normalized Degradation Fraction Index from Landsat images, or average canopy height derived from Lidar). The applied remote sensing metric must satisfy the following:

a) Significant correlation with above-ground (living) biomass pools included in the project boundary (i.e., tree, shrub, and/or herbaceous) previously corroborated by published studies

b) Validated with selected direct above-ground (living) biomass pools included in the project boundary (i.e., trees, shrubs, and/or herbaceous) from the project region (collected within national boundaries), demonstrating a statistically significant relationship significant ($p < 0.05$)

Step 4: Select and monitor control plots from the eligible control area

Select control plots

From within the eligible control area at time $t = -5$, select by occasionally simple or demonstrated occasionally stratified, 250 or more permanent virtual control plots.

When the EVS is defined by the coverage percentage, the control plots are circular with a 56.4 meter radius (corresponding to a circle of 1 hectare area). Where EVS is defined using a remote sensing metric, control plots are defined as the aggregate of pixels that most closely approximates a 1-hectare area.

In each control plot, evaluate and record the initial EVS value ($t = -5$). Exclude any parcels with initial EVS greater than $\pm 10\%$ of the project area value at time $t = 0$. EVS values will be derived by referring to the most recent imagery (at the assessment date or up to two years prior). Note that the indicated $\pm 10\%$ is treated as a nominal value when applied to percentage cover, for example, if the percentage cover in the project area at $t = 0$ is 15%, then any control plot selected with a percentage of coverage lower than 5%, or that exceeds 25%, are excluded.

Any parcels determined to be in forest use and temporarily out of stock at $t = -5$ (eg, recently cut plantation), confirmed through direct visual inspection of Google Earth imagery, other high-resolution satellite imagery (≤ 5 m) or aerial photographs (eg, obvious seedlings planted in rows or in a site surrounded or adjacent to plantings), will also be excluded.

Se registrarán las coordenadas UTM de los centros de las parcelas de control que cumplan con los criterios anteriores. y fijo por la duración del período de acreditación.

Reassess EVS and calculate cumulative increase in EVS

At each evaluation event, remove control plots in areas that no longer match the project area in terms of:

- 1) Be subject to any subnational government funded program that provides incentives for tree planting, implemented during the evaluation period, to which the project area is not subject
- 2) Land tenure, i.e. an area where land tenure has been redesignated (eg, private to public), referring to the same land tenure classification used at the initial time $t = -5$ delimitation of the eligible control area.

Reassess EVS, referring to the most recent images (at the assessment date or up to two years prior). The observed cumulative increase in the estimated vegetative population, EVS, is calculated as:

$$\Delta EVS_{control,i,t_{eval}} = MAX(EVS_{control,i,t_{eval}} - EVS_{control,i,t=-5}, 0)$$

$\Delta EVS_{control,i,t_{eval}}$	Increase in estimated vegetative stocking (EVS) in control plot i , in the interval from $t = -5$ to t_{eval} (year of last evaluation event)
$EVS_{control,i,t}$	Estimated vegetative stocking (EVS) in control plot i at time t
i	Control plot (1, 2, 3, ..., n)
t	Time elapsed since project start date (y)

Step 5: Derive performance benchmark The performance benchmark is then calculated as:

$$PB_t = t \times \frac{1}{t_{eval} - (t=-5)} \times \frac{1}{n} \times \sum_{i=1}^n \Delta EVS_{control,i,t_{eval}} \times \frac{1}{\Delta EVS_{WP,i,t}}$$

...

PB_t	Performance benchmark applicable from year t through year $t + 4$ (%)
$\Delta EVS_{control,i,t_{eval}}$	Increase in estimated vegetative stocking (EVS) in control plot i in the interval from $t = -5$ to t_{eval} (year of last evaluation)
$\Delta EVS_{WP,i,t}$	Increase in average estimated vegetative stocking (EVS) in the project area, in the interval from $t = 0$ to T
i	Control plot (1, 2, 3, ..., n)
t	Time elapsed since project start date (y)
t_{eval}	Year of last evaluation (every 5 years)

Note. When the eligible control area is stratified, the performance benchmark is calculated by weighting each stratum by its areal representation in the project area.

5.- RECOMENDATIONS

It is recommended:

- Determine the type of project that will be developed, to carry out the search for the required bibliographic information.
- Visualize the nearby communities and what activities they could carry out so that they become allies of the project.