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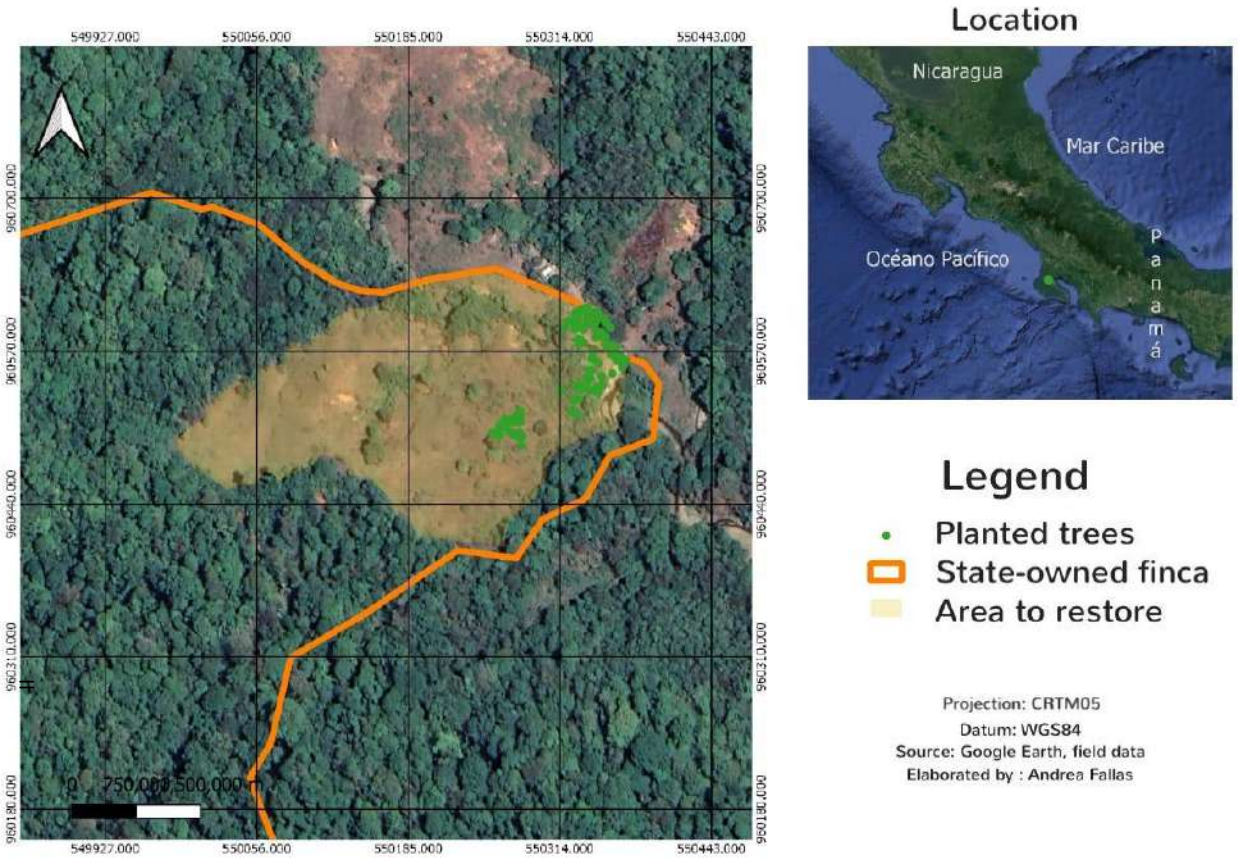
1. EXECUTIVE SUMMARY

The Banegas Farm is a reforestation project located in the Golfo Dulce Reserve, Costa Rica. Wildsense will support and certify Fundación Corcovado's restoration efforts which will generate significant environmental and social co-benefits, such as ecosystem restoration, and species conservation, as well as contribute to local communities' economic empowerment. Over the next three years, local communities will plant a total of **8,000 native trees**, which will absorb a total of **1,851 tonnes of carbon equivalent** over its lifetime (hence **1,851 carbon credits** of which **1,573** can be sold and **278** will be set aside as an insurance pool in the case of unexpected events). Wildsense will remotely monitor the project using satellite imagery to ensure the planted trees survive over the project's lifetime.



➜ WILDSENSE

Founded in 2020, Wildsense selects, certifies and verifies carbon sequestration projects to bring more transparency to voluntary carbon markets. We are on a mission to build a wilder world where people and nature thrive. This is why, since our beginnings, we have been

monitoring the health of over 1 million hectares of forests across the world using cutting edge remote sensing technology. The company currently employs eleven full-time employees, mainly consisting of remote sensing and data engineers, as well as developers. We are also supported and empowered by the European Space Agency (ESA).

➜ OUR APPROACH[1]

To ensure our alignment with the guiding principles set out by the Task Force on Scaling Voluntary Markets & the IPCC, we have established a rigorous project selection, project verification and project guarantee process. Beyond the carbon sequestered by each project, we evaluate the co-benefits to biodiversity and communities. Wildsense sources, selects, certifies and verifies each reforestation and restoration project according to 3 major principles: right tree, right place, right community.

➜ PROJECT DEVELOPER

The Corcovado Foundation is a non-profit organisation working for environmental conservation in the Osa Peninsula of Costa Rica to protect its unique natural resources since 1992. They mainly strive to protect areas such as the *Reserva Natural Golfo Dulce* as well as the *Parque Nacional Corcovado*, run sea turtle conservation programs and provide environmental education, community development, sustainable tourism, and community-based rural tourism opportunities. *Read more about the Corcovado Foundation in Appendix 1*.

[1] Refer to the section "Our Methodology" for more information

2. THE PROJECT

The Banegas farm is located in the National Park of Corcovado in the South of Costa Rica at the following coordinates: 8.686570°, -83.543647°.

The plot used to be a privately-owned *finca*, a traditional Latin American ranch or farm, which was greatly degraded and deforested for grazing necessities by the previous landowners. Fundación Corcovado will rehabilitate **4 hectares** of lowland tropical forest and plant **8,000 native trees** to restore the Banegas farm area and protect its important fauna and flora. The foundation will plant 2,000 native trees per year at the designated site over three years. Planting will be carried out by local volunteers and local youth with seeds and seedlings purchased from a local women-owned tree nursery. The owners from the neighbouring farm will help with watering in the first few months of the project to sustain growth and then throughout the dry season to lower mortality rates.

The Banegas Farm project has been carefully selected to meet our three criteria:

1. Right tree

Main tree species planted include Mico comb (*Apeiba thibourbou*), Rum rum (*Astronium graveolens*), Vaco (*Brosimum utile*), Cedro Maria (*Calophylluym longifolium*), Pilon, Zapatero (*Hieronyma alchorneoides*), Manú, (*Minquartia guianensis*), Gallinaso (*Schizolobium parahyba*), Golden fruit (*Virola laevigata*) which are all native species of Costa Rica but endangered; hence the importance of restoring those ecosystems urgently. The full list of species selected for planting is available in *Appendix 2*.

2. Right community

Trees and seeds are collected, planted and grown by local communities. All of the trees come from nurseries 100% managed by women and 70% of the volunteers involved in forest restoration are women.

The construction of a “living fence”, also called “green fence” which is a natural buffer zone made of trees and shrubs, also improves biological and wildlife connectivity, enhancing biodiversity and thus soil productivity for local communities. Restoration of local forests protects water systems necessary for the replenishment of aquifers. In addition, forest restoration protects communities from landslides, floods and extreme droughts.

Fundación Corcovado also uses education to address and promote local community involvement, especially through ecotourism which is essential to many people's livelihood in the area. As a result, at least 25 community-based tourism projects were created through their tourism project, and more than 25 local people were certified as local guides, enabling them to earn a living wage while protecting the local ecosystem. They also provide forestry workshops in their bio hostel with the participation of people from Bahía Chal, Banegas, El Progreso, Agujitas, Los Planes y Río Claro de Golfito.

Through their Environmental Education programme, they have been continuously working with thousands of children both in schools and in afternoon groups as after-school activities since 2003, to promote environmental citizenship. The Banegas project will be another opportunity to offer on-the-ground activities for local kids.

3. Right place

The Banegas Farm area provides significant ecological services since it includes three life zones or ecological zones (lowland cloud forest, nursery forest, and primary/secondary forest) and high-density forests that welcome very rich and varied fauna. It is a habitat for many native species, such as the Geoffroy's Spider Monkey (*Ateles geoffroyi*), the Jaguar (*Panthera onca*), the Manigordo or Ocelot (*Leopardus pardalis*), the Caucel (*Leopardus wiedii*), the Puma (*Felis concolor*), the Yaguarundi (*Herpailurus yagouaroundi*), the Tapir (*Tapirus bairdii*), the Green macaw (*Ara ambigua*), the Red macaw (*Ara macao*) and the Mangler hummingbird (*Amazilia boucardi*).

For further information regarding the current status of the prior species, refer to the list of endangered species Appendix 3.

Please find the full photo and video album of the project here.

The Banegas Farm project also meets four United Nations Sustainable Development Goals[2]:

SDG 8: Decent work and economic growth

The Corcovado Foundation contributes to local economic development by purchasing their seedlings from the nearby Rancho Quemado, a women-led nursery, collecting, growing and selling seeds and seedlings for their livelihood. Restoring the forest will also help maintain and regenerate topsoil thus boosting soil productivity for the neighbouring farm.

SDG 13: Climate action

Each planted tree will sequester additional atmospheric carbon during its lifetime. Our remote sensing tools monitor each project to ensure that trees are actually planted and that greenhouse gases are effectively being removed from the atmosphere, thus participating in limiting global warming and fighting climate change.

SDG 15: Life on land

Rehabilitating the Banegas farm will help connect patches of the Corcovado National Park thus restoring the old-growth forest and creating biological corridors in the forest. The forest is indeed a habitat for vulnerable and endangered species such as Mono colorado, (*Ateles geoffroyi*), Jaguar, (*Panthera onca*), Manigordo, Ocelot, (*Leopardus pardalis*), Caucel, (*Leopardus wiedii*), Puma, (*Felis concolor*), Yaguarundi, (*Herpailurus yagouaroundi*), Tapir (*Tapirus bairdii*), Green macaw (*Ara ambigua*), Red macaw (*Ara macao*), and Mangler hummingbird (*Amazilia boucardi*).

[2] The United Nations's 17 Sustainable Development Goals

3. OUR METHODOLOGY [3]

➜ Project Selection

We are currently putting together a scientific committee to verify our selection criteria, double-check our baseline methodology and help us improve our risk modelling matrix to assess project guarantees and insurance (see "Project Guarantee" below). A robust methodology should therefore be released by mid-2022. Until then, we select and rate our projects based on a thorough analysis of the following criteria:

- **Partner background check**

Prior to selecting our on-the-ground partner, we made sure (1) to analyse Corcovado Foundation's annual impact reports and financial reports for the past 3 years, (2) to make reference calls with their existing financiers and past partners to ensure of their legitimacy and trustworthiness and (3) to meet with the team on the ground to visit the planting site and the person in charge. Such due diligence is conducted to make sure that our partners have historically had low mortality rates for their replanting projects, that community benefits are reported and quantified, that they are financially stable and that they truly work with local communities to ensure the respect of polyculture and the planting of local species.

- **Project Quality**

We select projects that not only support local communities but also positively impact biodiversity and endangered species. We have established 3 main criteria for our project selection process:

1. **Right tree.** All planted trees must be native species, preferably endemic to the region. A minimum of two species, preferably at least three must be planted, per hectare. Crop plans must be appropriate for the project's location.
2. **Right community.** In order to favour community ownership of projects, seed collecting and tree planting must be carried out by locals, preferably women. All workers must be paid fair living wages. Some workers may be volunteers but only when it is by choice and local communities have other occupations and do not need an extra revenue.
3. **Right place.** Projects must improve ecosystems on which local livelihoods depend. Projects that form corridors between or buffer zones around existing habitats are

[3] To have a full overview of our methodology, please refer to this document.

preferred, especially if the habitats are home to endangered species. We also strive to select projects that are government-owned but community-managed and that have not been forested for the past 10 years approximately.

- **Carbon Offset Requirements**

We carefully select projects based on existing carbon absorption and the potential for future carbon removal. This is why we have calculated a baseline (see *Appendix 4*) and identified risks (see *Appendix 5*) that might impact our project's ability to absorb carbon in the long term in order to mitigate and compensate for such risks (see "Project Guarantee" below). Such metrics are based on the IPCC's 4 guiding principles, including:

1. **Additionality** ensures that the project is generating a greenhouse gas emission reduction that would not occur otherwise. Wildsense measures project carbon baselines before restoration begins and estimates the carbon potential over the lifetime of the project to respect this principle. The Banegas Farm project will absorb approximately **1,851 t CO2e** by the end of the project duration and even more after the project has been completed. 15% of the total carbon absorbed will be "set aside" as an insurance pool and hence will not be sold as carbon credits to make up for any potential unexpected events. Hence, 278 credits out of the 1,851 will be saved and **1,573 carbon credits will be sold through this project**. *See Appendix 4 for more information on our calculations.*

2. **Durability** ensures that emissions are kept out of the atmosphere for the entire duration of the project and beyond. We monitor forest cover change to ensure that the project's integrity is **maintained over the next 30 years**. The duration of the monitoring period is determined by the time taken for all planted trees to reach maturity and re-create a full canopy cover. In this case, the tree species selected will take about 10 years to grow and create a primary cover while it will take about 30 years to create a secondary canopy cover. We will therefore monitor the evolution of the project for the next 30 years. Our risk assessment also looks at the likelihood that the project will survive based on geopolitical, climate change, socio-economic, land-ownership, and management structure factors in each area. *See Appendix 6 for details on each factor.*

3. **Leakage** occurs when emissions avoided through a particular carbon project are displaced, and simply occur elsewhere. For each project, we define and monitor forest cover change and potential leakage areas around our planting zones. Our project is a

"buffer belt" around or nearby an existing forest area suffering from degradation and therefore is used to mitigate pressure and degradation of the old-growth forest. The existing Golfo Dulce reserve has been defined as our buffer zone for this project. *See Appendix 7 for the map of the monitored leakage area.*

4. **Double counting** is the risk associated with the double claim of a carbon credit by both the project developer and the credit issuer. To avoid such confusion and transparently account for every ton of carbon sold, each of our projects is recorded into a double-registry system. We have created our own registry, accessible on our website, and we are currently in negotiations with IHS Markit to display our sold tons on their meta registry and ensure complete transparency and third-party verification.

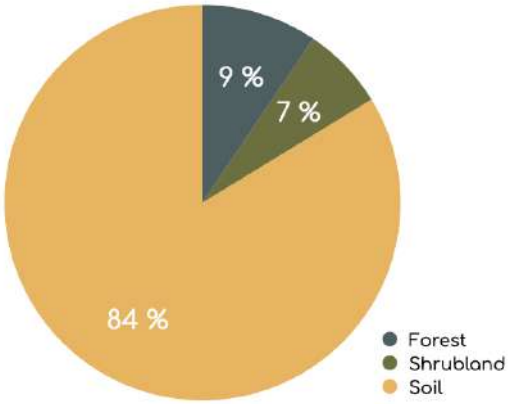
➜ Project Verification & Monitoring

Wildsense verifies projects with a three-step process: (1) satellite monitoring, (2) field data collection verification, and (3) in-person audits.

1. **Satellite monitoring**[4]

   Wildsense monitors its projects on a quarterly basis, using cutting-edge remote sensing technology, backed by the European Space Agency. More specifically, we first establish baselines by checking forest and shrub cover prior to the beginning of the project and we then monitor changes in forest cover by following the evolution of the canopy cover using deep learning and machine learning techniques. Such models, developed by our team of engineers, allow us to monitor in almost real-time the evolution of our projects by making sure that trees are actually planted and dieback rates remain low. To do so, we use satellite imagery from the Pléiades constellation which provides very high-resolution optical images designed for both civil/commercial and military purposes. First baseline analyses allowed us to get the following estimations until we go on the field to take samples for carbon and biodiversity and complete more thorough analyses:

[4] See *Appendix 8* for an NDVI photo of our project



2. Field data collection verification

In collaboration with project developers, we are developing an app to facilitate data collection and verification. Local caregivers can take photos, videos, and audio - geolocated and timestamped, and must report project KPIs on a quarterly basis. This data is then automatically synced to our project platform and can be checked at all times. Our app will also include a tree species identification feature allowing users to

verify if the right species are actually planted, thus ensuring that it matches the original Project Planning Document.

If the project developer does not wish to use our dedicated field app, they must provide (1) geolocalized and timestamped baseline photos of the sites prior to planting work, (2) additional geolocalized and time stamped photos of the site every 6 months during the 3-year planting period and (3) every year after planting has been completed. Wildsense will use those pictures to verify tree cover under the canopy, identify tree species and related biodiversity, and assess tree health. Fauna biodiversity & co-benefits are self-reported by project developers and will be subjected to in-person audits.

Please note that verification intervals can vary depending on project type and our contract with project developers. See Appendix 9 for more information on the project timeline and project f.

3. In-person audits and random sampling

To complement our satellite and field verifications, we are building an internal field team charged with performing in-person audits on all our projects. Every 3 to 5 years, we will go through random sampling exercises on our sites to perform full biodiversity inventories and carbon auditing. A specific focus on fauna biodiversity and co-benefits will be carried out since those topics are self-reported by project developers and not subjected to quarterly verifications. To verify additionality estimates, we use LiDAR technologies as well as *in situ* Soil Organic Carbon (SOC) samples. As for biodiversity assessment, we use Environmental DNA (eDNA) technologies based on molecular genetics as well as bioacoustics.

Our partner is also monitoring all the trees planted on a monthly basis. Trees are measured to establish the fastest growing ones and their condition which is evaluated from 1 to 5, with 1 being a dead tree and 5 being a healthy tree with sufficient growth.

Quarterly satellite verification and bi-annual field verification will be available on our projects' platform.

➜ Project Guarantee

Not every tree makes it. To insure against any potential losses, we conduct a risk assessment for each project and calculate contribution to an insurance pool accordingly. We then monitor

forest cover to verify the validity of carbon credits over the lifespan of the project and replace any credit which fails with a credit from the insurance pool. ***Note that the role of the insurance pool is solely to back projects against losses and cannot be sold.***

The Banegas Farm project has a **risk rating of A**. Our risk assessment matrix measures the probability of the project being undisturbed over its lifetime and efficiently absorbing carbon and protecting wildlife. We evaluate geopolitical stability, socioeconomic situation, vulnerability to climate change, as well as additionality, leakage, and project durability. Each criterion is evaluated on a scale from 1 to 5. This project scored well on all factors apart from climate change vulnerability. Indeed, despite being a global leader in environmental sustainability, Costa Rica remains a very vulnerable country to changing climates and temperature increases. Therefore, it scored lower as its mitigation is beyond Wildsense's control and hard to predict.

To guarantee that each ton issued ex-ante will meet its 30-year durability standard, the project financer will fund an insurance pool of **278 credits, equivalent to 15% of the project's total additionality.** *See Appendix 6 for a detailed view of our risk rating.*

4. APPENDICES

➜ Appendix 1: Our partner: Corcovado Foundation

Founded in 1992, the Corcovado Foundation is a non-profit organisation working for environmental conservation in Costa Rica to protect its unique natural resources. Their conservation programs are based in the South Pacific region of Costa Rica, known as the Osa Peninsula, which is famous for its intense biodiversity and unspoiled nature. Their main activities include supporting protected areas (National Parks), providing environmental education, community development, sustainable tourism, community-based rural tourism, and sea turtle conservation. Since their beginnings, they have provided environmental education to over 4,500 students, trained over 50 families on regenerative agriculture, protected over 10,000 turtle nests and delivered over 700 food packages to single mothers and elderly populations during the pandemic. The Corcovado Foundation is driven not only by ecosystem restoration but social justice as well. They employ local communities for their reforestation projects thus creating thousands of job opportunities and slowly closing the gender gap. Their work represents a significant leap towards restoring key ecosystems, protecting threatened species, and mitigating climate change. Some of their key trusted partners include The World Resources Institute, The United Nations Decade on Ecosystem Restoration and the Earth Restoration Project.

➜ Appendix 2: List of tree species planted in the project area

Our on-the-ground partner, the Corcovado Foundation, sent us a comprehensive list of all the native tree species that qualify to be planted on the Banegas Farm site:

Family	**Species**	**Common Name**
Malvaceae	Apeiba thibourbou	Peine de mico
Anacardiaceae	Astronium graveolens	Rum rum
Moraceae	Brosimum utile	Vaco

Calophyllaceae	Calophylluym longifolium	Cedro Maria
Moraceae	Castilla tunu	Hule
Sapotaceae	Chrysophyllum cainito	Caimito
Fabaceae	Copaifera camibar	Camibar
Arecaceae	Cryosophila guagara	Guagara
Phyllanthaceae	Hieronyma alchorneoides	Pilón
Phyllanthaceae	Hieronyma alchorneoides	Zapatero
Fabaceae	Inga edulis	Guaba bejuco
Fabaceae	Inga marginata	Square Guabo
Fabaceae	Inga sapindoides	Guaba
Fabaceae	Inga spectabilis	Guaba machete
Melastomataceae	Miconia schlimii	Lengua de vaca
Oleaceae	Minquartia guianensis	Manú
Rubiaceae	Palicourea guianensis	-
Fabaceae	Schizolobium parahyba	Gallinazo
Anacardiaceae	Spondias mombin	Jobo
Myrtaceae	Syzygium jambos	Pink Apple
Myrtaceae	Syzygium malaccense	Water Apple
Myristicaceae	Virola laevigata	Golden fruit

➜ Appendix 3: List of protected species based on the IUCN (International Union for Conservation of Nature) Red List of threatened species.

- **Ateles geoffroyi**

  Also known as the Geoffroy's Spider Monkey, they have been categorised as an "Endangered species" by the *IUCN Red List of Threatened Species* in 2020. These

monkeys are native to most Central American countries from Mexico to Brazil, including Costa Rica. They live in a variety of forests such as tall evergreen tropical forests, lowland tropical forests, dry successional deciduous forests, cloud forests and mangrove forests. They spend most of their time feeding, travelling and resting. As for their diet, they mostly enjoy ripe fruit, but also consume leaves, flowers and invertebrates, and drink water directly from water sources as well. Spider monkeys have fission-fusion social organisation, in which large groups form smaller groups on a daily basis. Their population has been significantly reduced in the past 45 years. Indeed, their population has declined by half in the last three generations. Habitat loss, degradation and fragmentation are the major causes for their decline. They have been found to be highly susceptible to habitat degradation and often fail to persist in smaller forest fragments.

- **Panthera onca**

  Commonly known as jaguars, they have been assessed as “Near Threatened” by The *IUCN Red List of Threatened Species in 2016*. Jaguars are native to countries in Central and South America, including Costa Rica, but are unfortunately already extinct in El Salvador and Uruguay. They typically live in dense forests but have already been found in rainforests, pampas grassland, thorn scrub woodlands and dry deciduous forest. In terms of diet, they are opportunistic hunters, meaning they attack a large variety of prey based on their availability, ease of capture and other factors. Over 85 different species have been identified as part of their diet, ranging from mammals to reptiles and birds. Jaguars do not have a specific breeding season. Once the female is pregnant, she can carry up to four cubs. They stay with her for approximately 2 years after which they are independent. Overall, their population has been decreasing. In Central America, they are threatened by habitat destruction and loss caused by deforestation as well as hunting. According to Gonzalez-Maya, the probability of long-term persistence is medium to low.

- **Baird's Tapir**

  Also known as tapirs, they have been assessed as “Endangered” by the *IUCN Red List of Threatened Species* in 2014. Tapirs are native to Central American countries including Costa Rica but are extinct in El Salvador. Their natural habitat consists of forests, shrublands, grasslands and wetlands, often close to freshwater. Their total population has been declining and is expected to continue on this trend because of the existing threats in the region. Paired with their low reproduction rate, habitat destruction and hunting are the primary causes of their decline.

- **Ara ambiguus**

  More commonly known as the Great Green Macaw, has been categorised as "Critically endangered" by the *IUCN Red List of Threatened Species* in 2020, which is the last phase before extinction in the wild. These large red and green birds are native to Colombia, Costa Rica, Ecuador, Honduras, Nicaragua and Panama. Their natural habitats are humid and wet lowland, foothills and dry deciduous forests. In Costa Rica, 87% of all active nests found are found on *Dipteryx panamensis* trees. In terms of diet, they mainly consume orchids

Please find below the full list of **protected species** present on the site:

Ateles geoffroyi (Endangered, 2020), *Panthera onca* (Near Threatened, 2016), *Ara ambiguus* (Critically Endangered, 2020), *Leopardus pardalis* (Least Concern, 2014), *Leopardus wiedii* (Near Threatened, 2014), *Felis concolor* (Least Concern, 2014), *Herpailurus yagouaroundi* (Least Concern, 2014), *Tapirus bairdii* (Endangered, 2014), *Ara macao* (Endangered, 2014), *Amazilia boucardi* (Endangered, 2020).

➜ Appendix 4: Additionality and baseline calculations [5]

To calculate the baseline for our project, we estimated the baseline carbon stock in our project's trees and shrubs, as well as in the soil by calculating the change in Soil Organic Carbon (SOC) between the end and the beginning of the project. Calculations for carbon stocks in trees and shrubs are based on tree crown cover at the beginning of each project, denoted respectively as C_{TREE_BSL} and $C_{SHRUB,t}$. This refers to the above-ground and below-ground living biomass of both trees and shrubs. To do so, we used the "estimation by proportionate crown cover" technique as we do not have plot samplings yet that we can base our analysis on. This will be done within the next month (May 2022), when our field team goes to the ground to source more accurate data. The aforementioned technique is only applicable for estimations of ex-ante projects (trees that are yet to be planted, as opposed to ex-post projects). Please find below our baseline estimations for the project:

Estimation for carbon stock in trees at the beginning of the project

$$C_{TREE\_BSL} = 44/12 \times CF_{TREE} \times b_{FOREST} \times (1 + R_{TREE}) \times CC_{TREE\_BSL} \times A_i$$

$$C_{TREE\_BSL} = 44/12 \times 0.47 \times 220 \times (1 + 0.25) \times 0.09 \times 4$$

[5] All baseline calculations are based on the A/R methodological tool developed by the UN Framework Convention on Climate Change as well as the A/R Methodological Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities

$$\mathbf{C_{TREE\_BSL} = 170.61\ t\ CO_2e}$$

Where

C_{TREE_BSL} = Carbon stock in pre-project tree biomass; t CO2e

CF_{TREE} = Carbon fraction of tree biomass; t C $(t.d.m.)^{-1}$. A default value of 0.47 t C $(t.d.m.)^{-1}$ is used.

b_{FOREST} = Mean above-ground biomass in the forest in the region or country where the A/R CDM project is located; t d.m. ha^{-1}. Values from Table 3A.1.4 of IPCC GPG-LULUCF 2003[6] are used unless transparent and verifiable information can be provided to justify different values.

R_{TREE} = Root-shoot ratio for trees in the baseline; dimensionless. A default value of 0.25 is used unless transparent and verifiable information can be provided to justify a different value.

CC_{TREE_BSL} = Crown cover of trees in baseline stratum i, at the start of the A/R CDM project activity, expressed as a fraction (e.g. 10% crown cover implies = 0.10); dimensionless. We estimated a 9% tree cover on the site as a baseline.

A_i = Area of baseline stratum i, delineated on the basis of tree crown cover at the start of the A/R CDM project activity; ha. The Banegas farm spans across 4 ha.

Estimation for carbon stock in shrubs at the beginning of the project

$$C_{SHRUB,\,t} = 44/12 \times CF_S \times (1 + R_S) \times \Sigma\, A_{SHRUB,\,i} \times b_{SHRUB,\,i}$$
$$C_{SHRUB,\,t} = 44/12 \times 0.47 \times (1 + 0.4) \times 4 \times (0.1 \times 220 \times 0.07)$$
$$\mathbf{C_{SHRUB,\,t} = 14.86\ t\ CO_2e}$$

Where

$b_{SHRUB,\,i} = BDR_{SF} \times b_{FOREST} \times CC_{SHRUB,\,i}$

[6] Good Practice Guidance for Land Use, Land-Use Change and Forestry by the IPCC

BDR_{SF} = Ratio of shrub biomass per hectare inland having a shrub crown cover of 1.0 (i.e. 100%) and the default above-ground biomass content per hectare in forests in the region/country where the A/R CDM project activity is located; dimensionless. A default value of 0.10 should be used unless transparent and verifiable information can be provided to justify a different value

$CC_{SHRUB, i}$ = Crown cover of shrubs in shrub biomass estimation stratum i at the time of estimation, expressed as a fraction (e.g. 10 percent crown cover implies = 0.10); dimensionless. We estimated a 7% tree cover on the site as a baseline.

CF_S = Carbon fraction of shrub biomass; t C $(t.d.m.)^{-1}$. A default value of 0.47 is used unless transparent and verifiable information can be provided to justify a different value.

R_S = Root-shoot ratio for shrubs; dimensionless. The default value of 0.40 is used unless transparent and verifiable information can be provided to justify a different value.

$A_{SHRUB, i}$ = Area of shrub biomass estimation stratum i; ha

$b_{SHRUB, i}$ = Shrub biomass per hectare in shrub biomass estimation stratum i; t $d.m.ha^{-1}$

Estimation for total carbon stock at the beginning of the project

$$C_{TOTAL,B} = C_{TREE\_BSL} + C_{SHRUB, t}$$
$$C_{TOTAL,B} = 170.61 + 14.86$$
$$C_{TOTAL,B} = \mathbf{185.47\ t\ CO_2e}$$

Estimation for carbon stock in trees at the end of the project

$$C_{TREE\_PROJECT} = 44/12 \times CF_{TREE} \times b_{FOREST} \times (1 + R_{TREE}) \times CC_{TREE\_BSL} \times A_i$$
$$C_{TREE\_PROJECT} = 44/12 \times 0.47 \times 220 \times (1 + 0.25) \times 0.95 \times 4$$
$$\mathbf{C_{TREE\_PROJECT} = 1{,}800.88\ t\ CO_2e}$$

Estimation for carbon stock in shrubs at the end of the project

$C_{SHRUB,\,t} = 44/12 \times CF_S \times (1 + R_S) \times \Sigma A_{SHRUB,\,i} \times b_{SHRUB,\,i}$

$C_{SHRUB,\,t} = 44/12 \times 0.47 \times (1 + 0.4) \times 4 \times (0 \times 48 \times 0.1)$

$C_{SHRUB,\,t}$ = 0 t CO_2e

Estimation for total carbon stock at the end of the project

$C_{TOTAL,F} = C_{TREE\_PROJECT} + C_{SHRUB,\,t}$

$C_{TOTAL,F}$ = **1,800.88** + 0

$C_{TOTAL,F}$ = 1,800.88 t CO_2e

Total emission reduction by trees and shrubs on the project:

$C_{Captured} = C_{TOTAL,F} - C_{TOTAL,B}$ = 1,800.88 - 185.47 = **1,615.41 t CO_2e**

Estimation for total carbon stock at the end of the project

Based on the IPCC's calculator for changes in SOC stocks[7], we found that at the beginning of the project, the soil absorbs 112.78 tC/ha (equivalent to 414 tCO_2e/ha[8]) and 128.78 tC/ha (equivalent to 472 tCO_2e/ha) at the end of the project. This means that, through our reforestation project, we contribute to a reduction of 16 tC/ha in SOC (equivalent to 59 tCO_2e/ha) at the end of the project.

Total emission reduction by trees, shrubs and soil on the project:

$C_{Total\ Captured}$ = (1615.41/4) + 59 = **462.85 t CO_2e ha^{-1}**

Carbon captured on Banegas Farm: 462 t CO_2e / hectare or 1,851 t CO_2e in total.

[7] IPCC's tool for estimation of changes in soil organic carbon stocks due to the implementation of A/R CDM project activities
[8] The biggest source of mistakes: C vs. CO2

➜ Appendix 5: Risk assessment matrix for carbon criteria

	1	2	3	4	5
Additionality We ensure that the project is generating a greenhouse gas emission reduction that would not occur otherwise.	The additionality claim is completely erroneous. It is likely that it was based on false data or no data at all. No remote sensing data can be used to monitor the evolution of the project.	There is some additionality to the project but it is unsure how much. The data on which the analysis was based is likely to be flawed and not a perfect representation of reality.	The projects should live up to their additionality promises in the long-run but more accurate data and better remote sensing estimates should be used to validate it.	Remote sensing models and on-the-ground data regarding biomass absorption and co-benefits validated with certainty the fact that the project is additional.	Our technologies have proven that the project is absorbing even more carbon than originally planned for.
Durability We ensure that emissions are kept out of the atmosphere for the entire duration of the project.	Emissions will not be kept out of the atmosphere due to a poorly managed project with a very high likelihood of fire or deforestation for agricultural purposes. No buffer zone.	There is not enough data to guarantee permanence which requires assuming the worst and being conservative. Emissions are unlikely to be kept out for the duration of the project and beyond. No buffer zone.	Without unexpected events and based on the available data, the project is likely to absorb carbon according to predictions for the entirety of the project.	Low disturbance allows saying with confidence that the project will absorb emissions beyond the project duration. If the project is negatively impacted, a guarantee is attributed to each ton of carbon to compensate for the potential loss of emission reduction.	Low disturbance allows saying with confidence that the project will absorb emissions across multiple generations. If the project is negatively impacted, a guarantee is attributed to each ton of carbon to compensate for the potential loss of emission reduction.
Leakage	The area	Deforestation	Deforestation	Trees are	Reforestation

We ensure that emissions avoided through our projects are not displaced, nor occur elsewhere.	protected for reforestation is mostly inefficient (i.e. carbon is not absorbed) AND deforestation activities are displaced.	activities are not displaced to another location but reforestation efforts are not optimal and agricultural projects remain in place for subsistence.	is not displaced and reforestation is conducted as planned. Emissions are not displaced as a consequence and carbon is taken out of the atmosphere.	planted efficiently and death rates are low which allows the project to expand beyond its original delimitations. If leakage occurs, a guarantee will make up for each lost ton of carbon emission reduction.	efforts were so promising and beneficial that they sparked new initiatives in the region or elsewhere. If leakage occurs, a guarantee will make up for each lost ton of carbon emission reduction.

➜ Appendix 6: Factors potentially affecting the durability of our project's carbon sequestration over the full project's duration (see *Appendix 10* for the risk assessment matrix)

- **Geopolitical**[9,10,11,12,13]

Costa Rica has a long history of political and democratic stability. It has indeed had far more political and economic stability compared to other countries in the region. The country has sustained civilian democratic governance since 1949, after the country adopted a new Constitution following a short civil war in March to April 1948. Since then, governments and other national authorities have been elected through free and fair elections with freedom of rights well respected in the country.

Its political stability index is 0.76 (for comparison, the world average in 2020 based on 194 countries is -0.07 points). The index of Political Stability and Absence of Violence/Terrorism "measures perceptions of the likelihood that the government will be destabilized or

[9] Costa Rica, an overview
[10] Payments for Environmental Services Program
[11] Political Stability index
[12] Climate vulnerability
[13] National Decarbonization plan

overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism. The index is an average of several other indexes from the Economist Intelligence Unit, the World Economic Forum, and the Political Risk Services, among others".

The Osa peninsula is particularly known for its outstanding conservation with many national parks and protected areas like the Corcovado National Park, the Golfo Dulce Forest Reserve, the Terraba Sierpe National Wetlands, and the Piedras Blancas National Park. The area thus receives a lot of attention and funding from local and national authorities to conserve the natural wonders of the region, making it fairly stable.

- **Climate Change**

Costa Rica's unique geographical location makes it very vulnerable to climate change. Located between the Atlantic and Pacific oceans, the country is affected by droughts, cyclones and el Niño events. Climate change is expected to have major impacts on Costa Rica's environment. The country experiences two seasons: a dry season from December to April, and a rainy season from May to November. Climate models expect the region to become warmer and drier as the changing climate accelerates, with changing rainfall patterns and spikes in temperatures. The IPCC identified Costa Rica as a country where weather conditions will change the country's current landscape in the next 50 years.

Despite its vulnerability, Costa Rica has been taking a wide range of legal actions to fight these risks and is a global leader in terms of environmental sustainability. 95% of its electricity mix is running on renewable energy and over half of its territory is covered with forests. They have developed a plan to completely decarbonise the country by 2050, aligned with the Paris Agreement that they signed in 2016. In 2019, President Carlos Alvarado Quesada expressed his will to be one of the first countries to achieve net-zero emissions by 2050. Their decarbonization plan revolves around public and private sectors including transport, energy, industry, agriculture, waste management and soil and forest management. They plan on increasing the level of forest cover to at least 60% of the national territory.

Costa Rica has, however, suffered from one of the highest rates of deforestation in the past century. Between 1950 and 1995, they lost over 50% of their national forests. In order to reverse this trend, policymakers introduced a restoration program known as the Payments for Environmental Services Program. To promote environmental preservation, they directly pay private landowners for sustainable practices such as forest protection, reforestation and

sustainable agroforestry and forestry. Not only does this program protect natural resources, but it also lifts Costa Ricans out of poverty.

- **Socio-economic**[14,15,16]

Bordered by Nicaragua and Panama, Costa Rica has one of the lowest poverty rates in Latin America and the Caribbean (LAC). It has had a steady and stable economic growth over the past two decades, in part due to its openness to foreign investment and gradual trade liberalisation. The average GDP growth between 1960 and 2020 was 4.4% with a minimum of -7.29% in 1982 and a maximum of 9.2% in 1992. Its environmental policies have largely benefited the country. Indeed, Costa Rica has a unique biodiversity whose preservation generates many job opportunities through ecotourism.

Its strong economic development was also accompanied by significant human development. In 2019, Costa Rica's HDI value was 0.810, which places the country in a very high human development category, ranking 62 out of 189 countries and outperforming its neighbours. The HDI is a summary measure for assessing long-term progress in three basic dimensions of human development: a long and healthy life, access to knowledge and a decent standard of living.

If the country has one of the highest standards of living in the area, the economic development has not benefited inhabitants equally. In terms of inequality assessment, Costa Rica's Gini coefficient was 48.20% in 2019 according to the World Bank. The Gini coefficient is the most commonly used measure of income distribution across the world. The higher it is, the greater the income gap is between a country's richest and poorest. Costa Rica, therefore, experiences a large income gap. Additionally, 12% of the population is considered poor, and 4.7% is considered very poor.

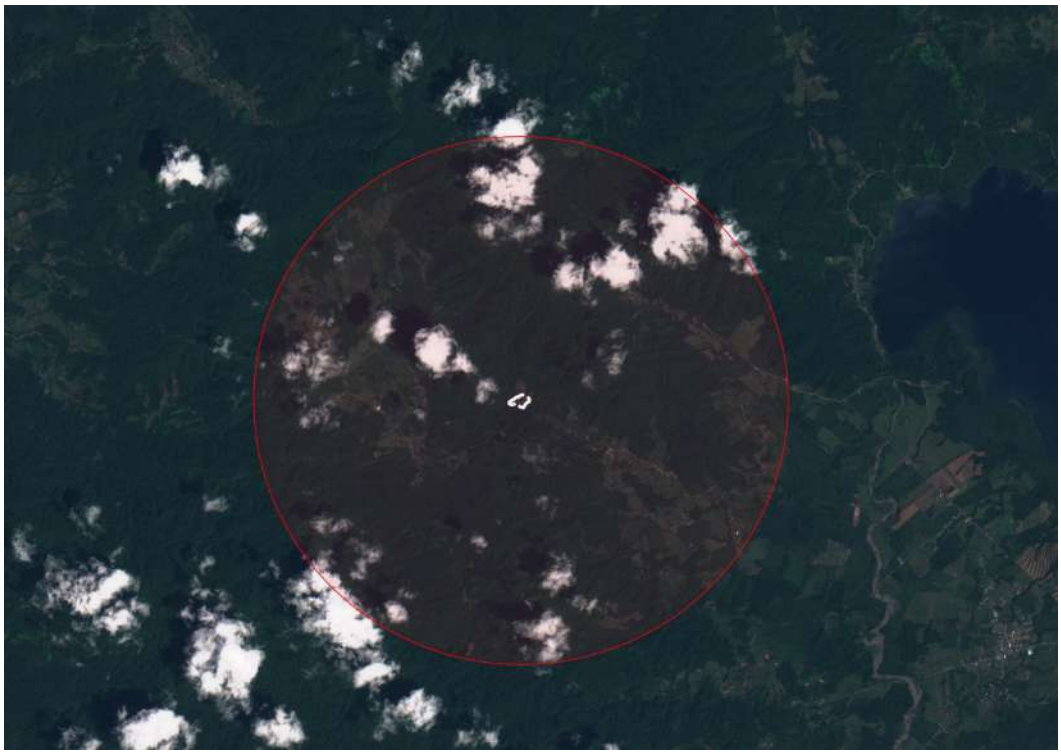
- **Land ownership and management**

The site is a state-owned *finca* that used to be privately owned but was retrieved by the government who bestowed upon Fundación Corcovado the responsibility to reforest the land. It will be managed by local communities. Agreements have been signed between the foundation and governmental agencies granting authorisation to the foundation to carry out ecosystem restoration work on the *finca*. To ensure that the project will stay viable after trees

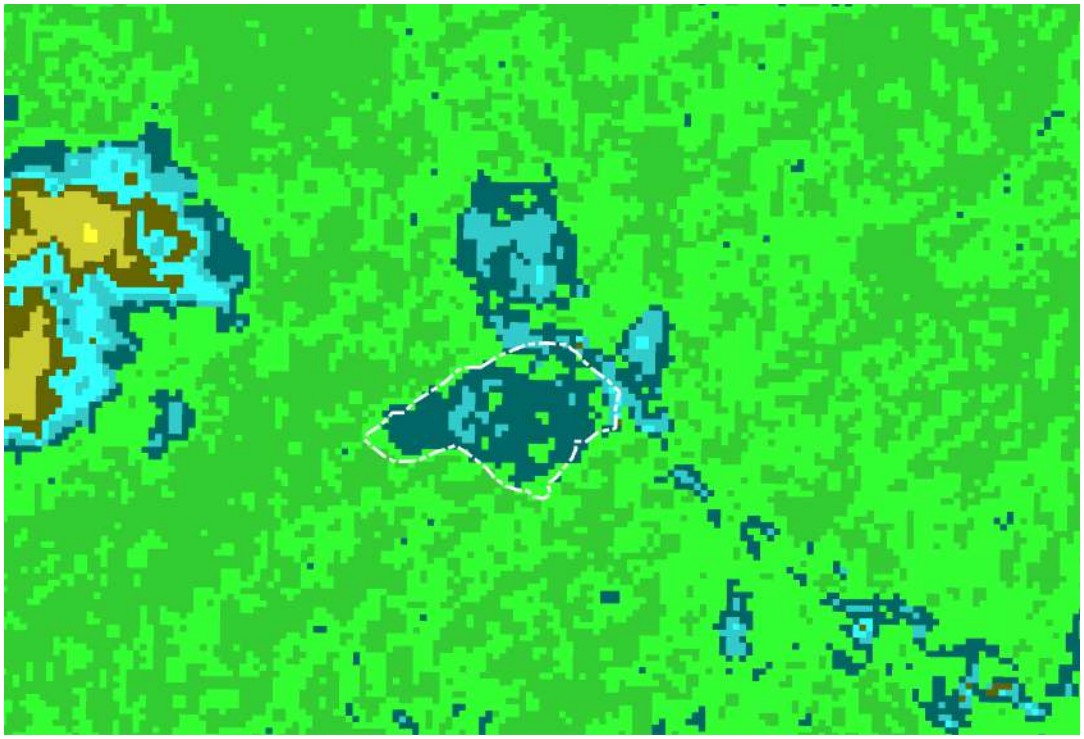
[14] Gini coefficient by The World Bank
[15] Social, Economic and Political Context in Costa Rica
[16] HDI

have reached maturity, all properties have restrictions on land-use change. This means that once the properties are restored, they will make any land-use change illegal. In terms of land use, permits are typically needed to restore mangroves. However, this project is endorsed by the National System of Conservation Areas (SINAC).

➜ Appendix 7: Map of the leakage prevention area



➜ Appendix 8: Vegetation mapping for our project



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➜ Appendix 9: Project timeline and costs

- **Project timeline**

Activity	2021			2022											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Baseline															
1st reforestation															
Ecological monitoring															
Monitoring of planted trees															

Soil improvement action															
2nd reforestation - 2000 trees															
Monitoring of the second round of plantation															
Systematisation of information															
Result reports															

Table 1. Timeline 2021-2022 of the Banegas farm forest restoration project, RFGD (Reserva Forestal Golfo Dulce).

Activity	**2023**											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Review findings, growth, mortality, soil carbon												
Ecological monitoring												
Monitoring of planted trees												
Soil improvement action												
3nd reforestation - 2000 trees												
Monitoring of the third round of plantation												

Systematisation of information												
Result reports												

Table 2. Timeline 2022-2023 of the Banegas farm forest restoration project, RFGD (Reserva Forestal Golfo Dulce).

Actividad	**2024**											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Review findings, growth, mortality, soil carbon												
Ecological monitoring												
Monitoring of planted trees												
Soil improvement action												
4th reforestation - 2000 trees												
Monitoring of the fourth round of plantation												
Systematisation of information												
Result reports												

Table 3. Timeline 2024 of the Banegas farm forest restoration project, RFGD (Reserva Forestal Golfo Dulce).

- **Project costs**

You will find a breakdown of all the costs involved in the project through this **link**.

➜ Appendix 10: Risk assessment matrix for external factors

This matrix was created to evaluate risks associated with ex-ante projects, based on a scale from 1 to 5. The goal is to give an indication of the likelihood of carbon to be absorbed in the long run based on external factors.

	1	2	3	4	5
Geopolitical Stability We evaluate the risk associated with the level of governance according to previous conflicts and government intervention in the location of the project and the probability of the project failing.	Very poor governance. A considerable amount of corruption, ethnic conflicts and wars. Extreme poverty and inequalities.	Poor governance. A significant amount of conflicts. No Government plan to address sustainability efforts.	Decent governance. Low amount of conflicts. Governance intervention (subsidised health coverage, public education etc.) and government plan to address sustainability efforts.	Good governance. Peace, justice and strong institutions. Low poverty. Governance intervention (subsidised and universal health coverage, quality public schools, decent work and economic growth, reduced inequalities etc.) and government plan to address sustainabilit y efforts.	Excellent governance. Peace, justice and strong institutions. Very little to no poverty. Governance intervention (subsidised and universal health coverage, quality public schools, decent work and economic growth, gender equality, reduced inequalities, affordable and clean energy, and government plan to address sustainability efforts, and

					have met their previous statements.
Climate change vulnerability We evaluate the risk associated with climate change according to the estimated impact of future temperature increases and the ability of trees and vegetation to adapt to such changes.	Extremely vulnerable territory to climate change. Estimates predict climate change will heavily affect the success of the project.	Very vulnerable territory to climate change. Estimates predict climate change will affect the success of the project.	Vulnerable territory to climate change. Estimates predict climate change might affect the success of the project if the country does not take serious action.	Relatively resilient to climate change. The project is likely to adapt to an increase in temperature in the next decades. Estimates predict climate change will not affect the success of the project.	Very resilient to climate change. The project will surely adapt to an increase in temperature in the next decades, Estimates predict climate change will not affect the success of the project.
Socio-economic factor We evaluate the risk associated with socio-economic factors according to the ability of local communities to rely on non-forest resources to live decently.	Local communities are all smallholder farmers and solely reliant on intensive crop farming, detrimental to the soil but essential to their livelihoods. There is no other option for income in the area.	Local communities are mostly smallholder farmers and heavily reliant on crop farming. They typically have just enough to send the next generation to school and get out of the cycle but nothing else.	Local communities have larger farming plots and make a fair living out of their crop yields. There are other options for income but this is still the best option and is a choice.	Local communities have diverse sources of economic income and do not need to rely on farming for their livelihood.	Local communities are completely independent of farming and can engage in reforestation projects as leisure.
Land ownership & management We evaluate the risk associated	No record of ownership or management. The land has been	Previous projects were poorly managed, leading to	Previous projects were fairly well handled, leading to little	Previous projects were well managed.	Fully managed and owned by local communities

with land ownership and management by assessing the success/failure of previous projects.	abandoned or destroyed by anthropogenic activities. The land is considered unproductive and unexploitable.	leakage and/or deforestation.	leakage and/or deforestation.		with a sustainable management plan.

Rating the Banegas Farm Project according to our metrics:

	1	**2**	**3**	**4**	**5**	TOTAL
Additionality					X	5
Durability				X		4
Leakage				X		4
Geopolitical					X	5
Climate Change			X			3
Socio-economic				X		4
Land ownership					X	5
						30/35

Total points	Score
30 - 35	A+
25 -30	**A**
20 - 25	B
15 - 20	C
7 - 15	D