TIERRA MADRE

BACKGROUND

Tierra Madre was initially founded in 2008 by a Belgian family in search of a traditional lifestyle closer to nature. Approximately 60 hectares of land, then mostly dedicated to cattle farming and neighbouring the Costa Rica -Nicaragua border, were purchased.

Image 1. *Deforested original pasture*

This long ridge begins at an altitude of 440m, where the vegetation is characterized by humid rainforest and goes down progressively to an altitude of 130m where it connects with a protected area called "border biological corridor". This 2km wide reserve stretching from the Pacific Ocean to the Caribbean, displays a warmer and less windy climate and a much drier tropical forest.

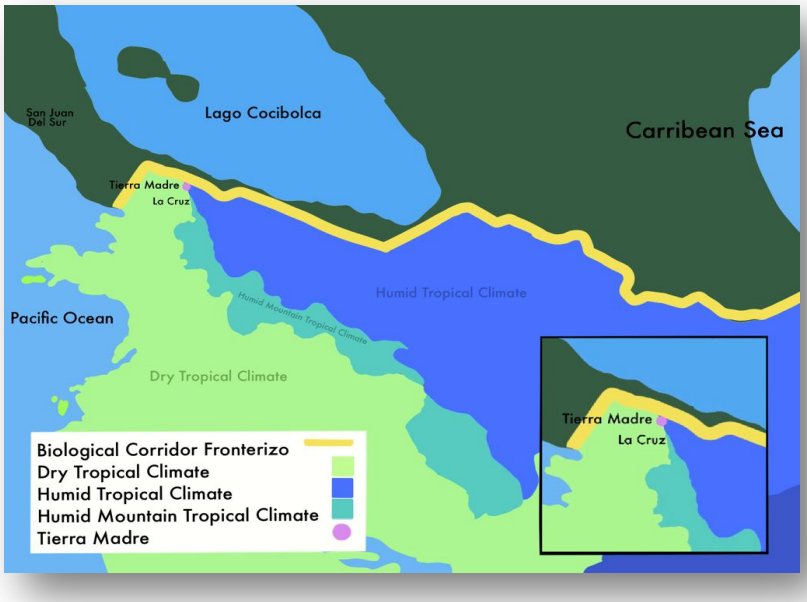


Image 2. *Tierra Madre's location.*

Between 2008 and 2018, in addition to conserving the 8 hectares of primary rainforest forest subsisting on the land, Tierra Madre reforested more than 18 hectares (180.000sq meters) on the slopes adjacent to it. The proximity of the existing forest allowed the seeds to roll down the slopes by gravity or to be dispersed by birds and mammals species. The shade, water and nutrients stored by the forest also sped up the recuperation process of these areas.

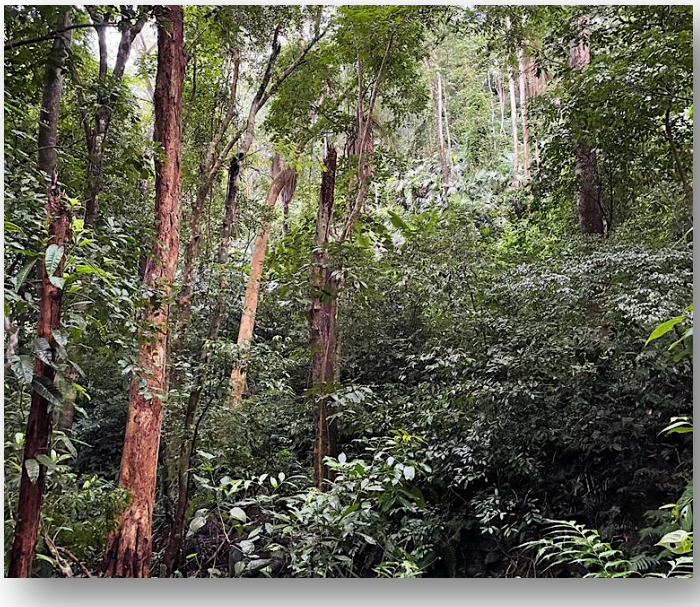


Image 3. *Successful reforestation in Tierra Madre*

With the forest spreading again, a rich and diverse fauna came back to occupy the land such as parrots, toucans, coatis and agoutis, but also sloths and after less than 7 years the first big predators such as coyotes, ocelots, jaguarundis and even pumas and jaguars.

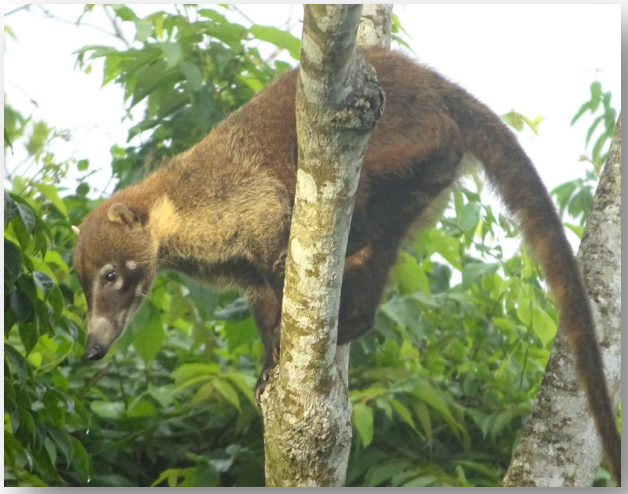


Image 4. *"Nasua Nasua" in the farm.*

Thermal cameras, as well as biologists from our NGO FAWN partners, opened our eyes to the exceptional potential of our geographical location, at the crossroad of three different climate zones and offering a cool, humid "retreat" to the fauna of the nearby reserve during the dry season.

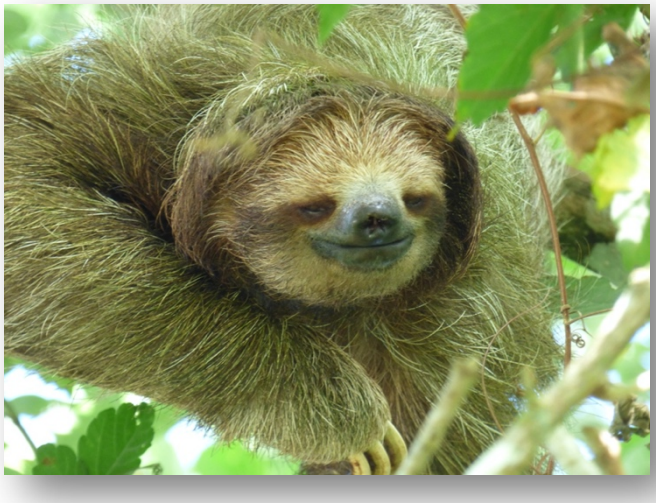
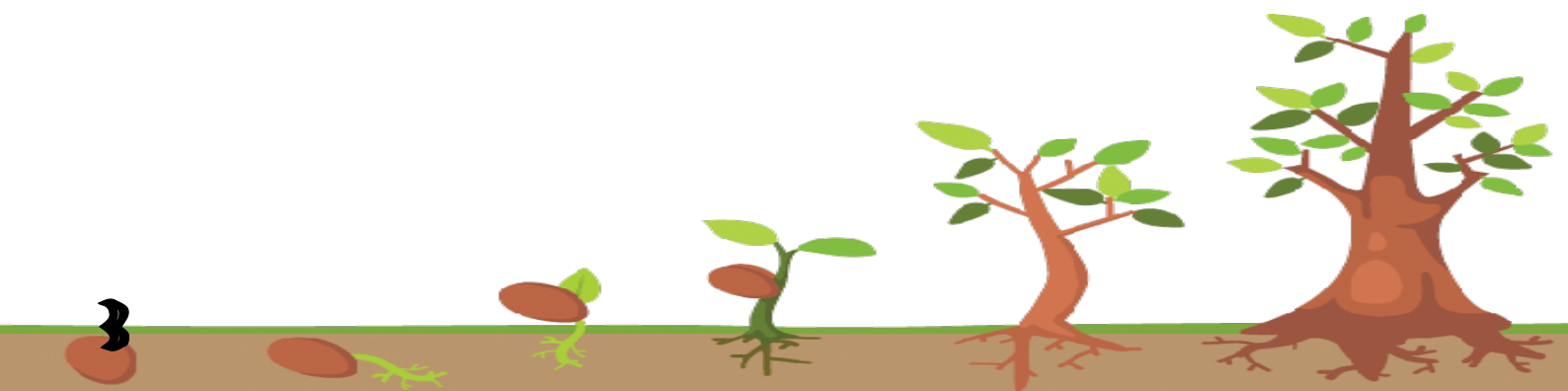


Image 6. *"Florivora" in the farm.*

All this led us to consolidate our conservation project to turn 50 of the 60 hectares into a sanctuary by reestablishing an endemic jungle forming a wide enough corridor to allow for altitudinal migration of local fauna. This objective will also provide important environmental services to the neighboring region and the planet as a whole. The tropical jungle is indeed the fastest growing in the world and its numerous stories of vines, epiphytes and canopy all act as carbon capture devices.

In a nutshell, strategically located tropical rainforest as the one we are replanting at Tierra Madre does have a positive impact in:

- Co2 capture and storage in the plants, trees and soil. 25 sq meters of mature jungle absorb as much as 3 tons of Co2 during their growth.
- Sunlight absorption and temperature control.
- Medicinal resources, food and clean water for neighboring communities.
- Altitudinal corridors allow the migration of plants and animal species to cooler areas.
- Water retention limiting both droughts and floods in the valleys.
- Erosion control.



CURRENT PROJECT

1. **Soil state**

Deforestation as well as cattle grazing, combined with abundant precipitations and steep slopes lead to the washing of the land. In the absence of trees to provide organic matter, and of roots to decompact and retain the soil and allow for water absorption, the pressure from the cattle and the use of herbicides for more than 20 years had transformed the red clay into a watertight, brick-like, sterile substrate.

Image 7. *Deforested and desertified soil.*

2. **Soil rehabilitation**

No tree or plant can be expected to grow without a solid root structure providing access to water and nutrients to young plants, especially during the three months-long dry seasons.

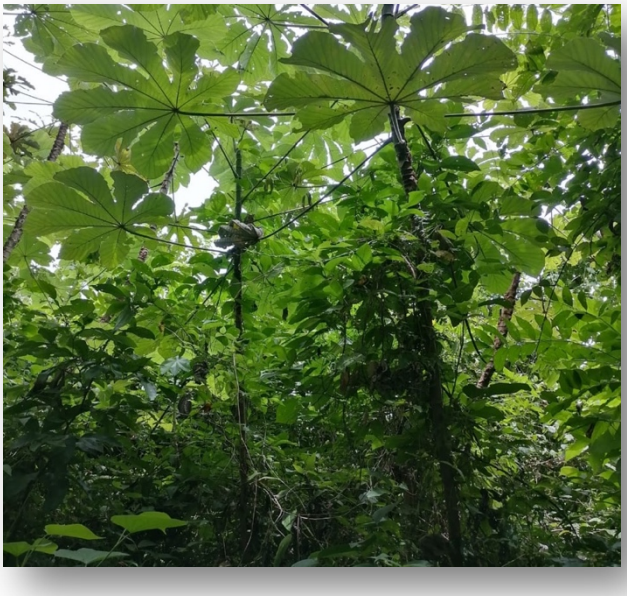


Image 8. *Pioneer plants.*

Before replanting anything in these conditions, we leave the land to itself for a long period without maintenance or mowing. This will allow for the emergence of "pioneer" plants in the grassland.

Thanks to their resistance to drought and general sturdiness, their limited nutrient requirements, fast growth and strong roots, these plants will progressively cover the soil, decompact it and enrich it with their biomass.

Image 8. *Comparison of the state of the soil.*

The cover and shade they provide will allow the return of decomposer insects, microorganisms and fungi, which will, in turn, participate in the drainage and restoration of the soil food web.

This process, although efficient to create soil fertility, has limits when it comes to allowing for the emergence of a complete, balanced and perennial ecosystem. Indeed, pioneer plants species are few when compared to the hundreds of species to be found in the rainforest and their invasiveness and competitive behavior make it hard for any competitor to develop in the areas they occupy. Most pioneers being either palms, plants or vines, do not offer many branches or trunks to shelter birds or big fauna.

The natural transition from there to a diverse rainforest is possible but represents a slow and uncertain process.

3. Active reforestation

One of the most efficient solutions to accelerate this process is to wait 4 years after the colonization of grassland by pioneer species and cut them clear, except for some trees and important structural elements.

Imagen 9. *Planting a tree.*

New trees, selected for their diversity and their importance with regards to the local fauna (habitat, fruits, pollen flowers...) are then planted.

This system presents the following benefits:

- The soil is richer in organic matter and humus coming from the growth and decay of pioneer plants.
- The soil is partially decompacted and allows the growth of young tree roots.
- The roots of the trees left on site will retain and provide water to young trees.
- The shade of the trees and plants left on site will limit the impact of the first droughts on the newly planted trees.
- The fallen leaves, branches and fruits of the trees left in place will nourish the soil, naturally or through controlled pruning if necessary.

As the new trees grow tall and their resistance and light requirements expand, the trees left on site will progressively be pruned or cut entirely and their biomass will feed the replanted trees.

We will replant a new tree for each treelet that does not make it, and ensure the maintenance and care of the young trees during three years. This period is usually enough for them to reach 3 to 5 meters in height, which puts them out of reach of most competitors.

Imagen 10. *New leaves on a planted tree.*

The maintenance includes regular mowing to protect the young trees from the return of invasive or remaining pioneer plants, the pruning of neighboring trees and their watering during the dry season.

Our philosophy, as well as the topography and access to the land, do not allow for any mechanization of these tasks, which are all performed by hand or with the help of simple tools such as machetes, hand pruners, spades, axes and buckets.

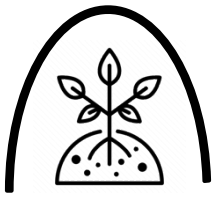
Young trees are planted without any previous soil tilling or turning to minimize disturbances at the soil level.

Imagen 11. *Volunteer transporting a tree.*

Imagen 12. *Reforested forest.*

After four or five years, the trees will bear their first fruits and flowers and attract birds, mammals, bats and pollinators, in turn participating in the fast recuperation of true and complete biodiversity.

TIMELINE


1980-2008	2009	2019	2021	2025 <
Deforestation and livestock.	Sanctuarization of the upper parts of the ancient forest (protection of ancient forest and expansion by passive reforestation).	Active reforestation of lower parts (1HA)	Boost to the process of active reforestation of the lowers parts (4HA).	To reforest the 85% of the farm land and create a corridor to join the wet forest with the dry forest.