Generation Forest Concept

Game Changer in Tropical Forestry

The combination of a tropical timber plantation with the ecological benefits of a natural forest creates one of the most effective solutions to combat the climate and biodiversity crises.

Generation Forest Group

Generation Forest Invest

The Generation Forest

GF Project Management

Generation Forest Foundation

Developed by Futuro Forestal

FUTURO FORESTAL
IMPACT FORESTRY

Biodiverse, Productive & Permanent Reforestation

Moving beyond the conventional monoculture forest plantation, we build mixed native species, biodiverse, carbon efficient and permanent tropical forests, which continuously provide timber and ecosystem services, forever.

Generation Forests create long-term value for local communities and investors alike. They outperform monoculture timber plantations when it comes to positive climate, social and ecological impacts. While competing with conventional plantations in terms of financial return, they are never clear-cut in a final harvest. Instead, Generation Forests maintain permanent canopy cover and continuously provide ecosystem functions similar to a natural tropical forest.

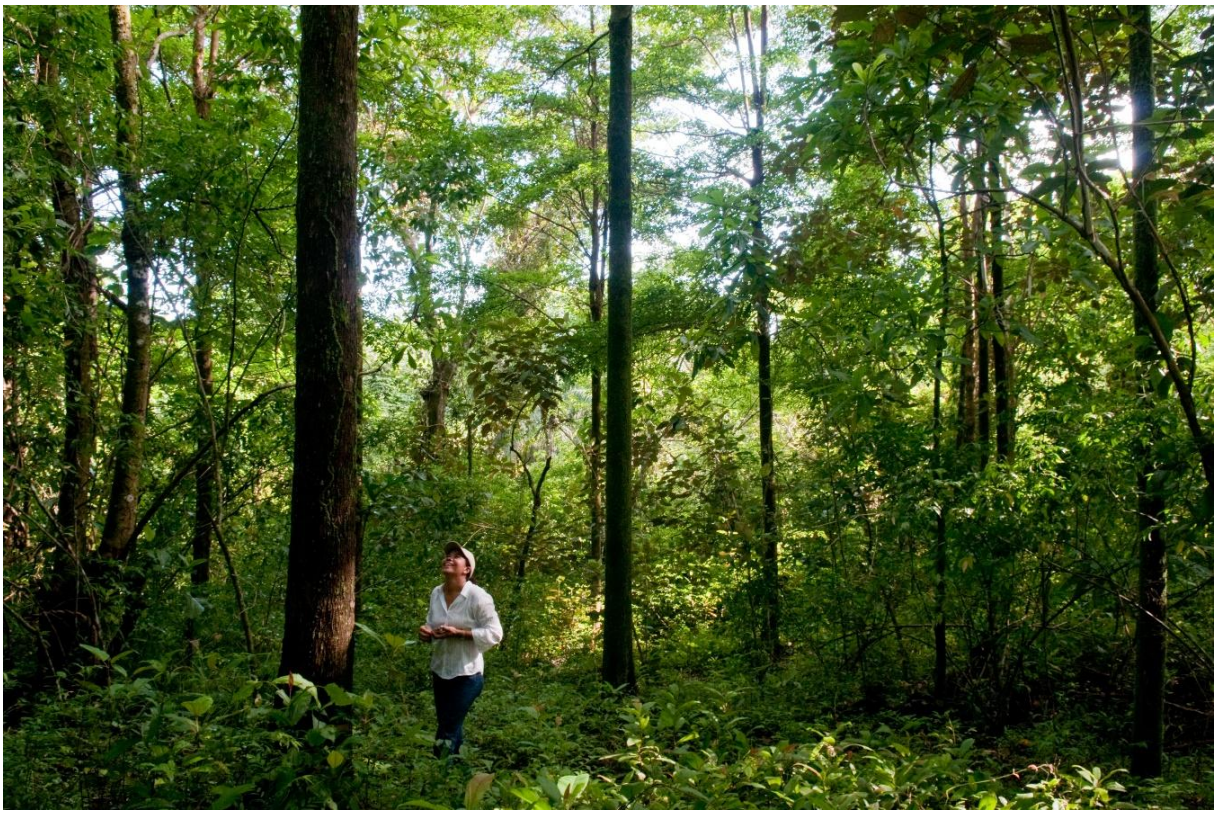
Generation Forests are designed to resemble the structure of a natural forest, with different tree species and ages, and forest strata (layers) such as understory vegetation. However, the density of commercially valuable species such as mahogany and rosewood is significantly higher than in a natural setting, which makes the Generation Forest economically viable. This allows us to maintain a forest while selectively harvesting valuable trees in a sustainable, balanced way.

Thanks to the superior carbon sequestration capacity of the Generation Forest and the growing demand for high quality CO_2-certificates, the overall financial return can now even be higher than that of a monoculture plantation.

With the establishment of Generation Forests, we restore deforested landscapes that have been degraded by unsustainable land use, mainly cattle ranching.

Silviculture

Silviculture is the art and science of growing forests. For us, it encompasses the care and cultivation of a forest to obtain timber in a way that is economically, socially, and environmentally sustainable. We reforest with climate change resilient species known to naturally occur in the region. We always match the species selection and forest design to site conditions.



Initial Phase

We initially plant approximately 833 trees per hectare. This high density induces a proper form of the trunks. During the first years, we remove competing vegetation that could harm the newly planted trees. The objective of this maintenance is to ensure that the trees receive the necessary space and light to grow well.

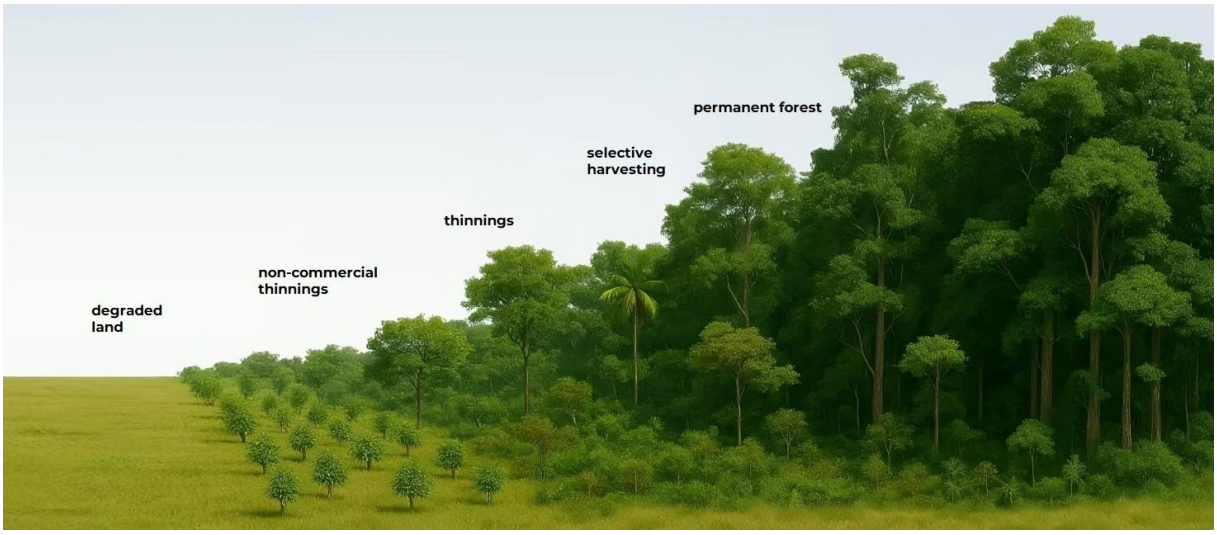
This initial stage is a process of assisted natural succession. It consists of replacing the conditions of degraded land with new conditions that favor the growth of natural vegetation. Depending on the project site:

1. We eliminate exotic and invasive species, such as certain grasses on improved pastures.
2. We plant mostly native, pioneer tree species that tolerate full sunlight, such as *Dalbergia sp., Cedrela sp., Tabebuia sp.*
3. While we continue to eliminate harmful species, we allow the natural regeneration of certain sun-tolerant pioneers such as *Cecropia sp., Bursera sp., Ochroma sp., Guazuma sp., Muntingia sp.*, which spur the growth of the planted species by lateral competition and improving the surrounding environmental conditions.

Intermediate Phase

At this stage, there is a young forest with a structure that enables the growth of shade-tolerant species, such as balsam or bálsamo *(Miroxylon balsamum)*.

As the trees grow, it is necessary to remove some of them (thinning) to make room for those that will be harvested in the future. This thinning is carried out in various stages and proportions, depending on the species, site, development and composition of the forest. In the end, the best trees will be maintained.



Permanent Phase

We expect that after around 12 years, some trees extracted during thinning will have a sufficient size and quality to be sold (commercial thinning). However, their optimal relationship between volume, quality and price will be reached only after 20-30 years, which is when selective harvesting will occur. On the other hand, for the slower growing species, their commercial ages will be reached later.

After thinning or selective extraction, the resulting gaps are filled with either naturally regenerated trees from the same forest or through planting of saplings from the nursery (depending on the development of the forest). These trees form the next generation.

In the end, we expect that natural regeneration within the forest will be significant. At this stage, the forest will have the potential to regenerate *on its own* and will allow regular, selective and sustainable harvesting of timber.

Low Risk by Design

The Generation Forest Concept was originally designed by Futuro Forestal as a forest that would lower natural risks per design, by imitating the dynamics of natural forest ecosystems. This continues to be one of the central elements of the concept. Our work is science-based, and we continuously work to generate and apply new knowledge to improve the development of our forests, thereby also optimizing natural risk management.

Climate Change Resilient

We select species that are climate change resilient. These species naturally occur in a wide range of habitats and can tolerate long droughts of 4 to 5 months. Most of them do well in tropical climates with precipitation ranges of 1,800 to 2,800 mm per year, at elevations ranging from sea level up to 700 meters, adapted to loamy or even very clayey soils with a pH of 5 to 6.5. The natural geographic distribution of native species that we have been planting ranges from southern Mexico to Peru.

Pest and Disease Control

The biodiverse forest design, planting small stands (blocks) of a single species or stands of two mixed species, plus natural regeneration, favors the natural control of pests and diseases (e.g., by preventing the fast spreading of disease that can occur in monocultures). The forest understory provides habitat for different species of fauna, like birds, which prey on and thereby control the population of potentially harmful insects.

Although we design Generation Forests to reduce risks through natural mechanisms, we have the option to actively mitigate them as well. For example, if massive insect attacks occur, we detect and treat them.

Fire prevention

From the project design phase, fire breaks are established, and a detailed fire prevention and control plan is in place with special focus on the dry season.

Soil Conservation

The forest cover reduces erosion, as well as producing organic matter, which improves the recycling of nutrients in the soil, in turn strengthening the growth and resistance of the plants.

Drought Resistant

The permanent forest cover and root systems enhance the capacity of the soil to absorb and retain water from rainfall, preventing desertification and increasing the resilience of the forest during prolonged dry seasons.

Impacts

Generation Forests are designed to mimic natural forests in terms of their ecosystem services, including CO_2 sequestration, providing habitat for flora and fauna, and restoration and protection of soil and water resources. At the same time, they provide a sustainable source of income to local communities. Generation Forests are a **scalable, nature-based solution** that addresses several challenges at the same time (as shown in the table below).

Challenge	Generation Forest Solution
Climate Change	Average of up to 28 tons CO_2 per hectare per year absorbed and permanently stored in the growing forest.
Biodiversity loss	Habitat creation, protection and connectivity for flora and fauna (CCB certification).
Rural development	Long-term employment opportunities, training and education (B-Corp).
Soil loss and degradation	Erosion control, accumulation of organic matter.
Water (degradation of hydrological functions)	Increased water holding capacity, reduced rainwater runoff, filter function.

Protection of Remnant Forests

On most of the properties we acquire for reforestation, there are already some patches of remaining forests that were not deforested. We protect these remnant forests because they harbor native biodiversity and help protect freshwater resources (as they are mostly located along streams). These forests also benefit our planted forests in several ways, for example, by acting as seed sources for the natural regeneration of valuable species.

Biodiversity Benefits

Generation Forests restore forest cover and promote connectivity between existing forests. The goal is to restore habitats and catalyze the return of species that have disappeared. A good example is the **jaguar** *(Panthera onca)* captured by a camera trap in a Generation Forest, on land which had been grassland only a few years earlier (photo below).

We constantly monitor biodiversity in our Generation Forests and have identified several endangered species of flora and fauna, which we protect. By pioneering the commercial planting of several threatened native tree species, we also aim to make a key contribution to their conservation. For example, we plant rosewood (*Dalbergia retusa*), a highly valuable timber species that is listed as critically endangered on the IUCN Red List and that has been depleted in natural forests, mainly due to illegal logging.

Climate Benefits

The growing forest absorbs carbon from the atmosphere and stores it in above- and below-ground biomass, as well as in the soil, deadwood and litter. As a result, Generation Forests are highly effective carbon sinks, capturing an estimated average of up to **28 tonnes of CO_2 per hectare per year**[1] (not counting the additional carbon that is stored in the durable products made from harvested wood). Generation Forests sequester more CO_2 than many other forest projects, while storing it permanently by maintaining continuous forest cover.

Since 2022, we have certified the carbon sequestration of several Generation Forest projects under Verra's **Verified-Carbon Standard (VCS)** and **Climate, Community and Biodiversity (CCB) Standards**. More information about the certified group project is available in the Verra registry: Generation Forest Group Project 2481.

Rural Development

Our Generation Forest projects bring numerous social benefits including the generation of medium- and long-term formal employment, the promotion of

[1] *Average carbon sequestration for a Generation Forest is based on our certified group project in Panama following CDM Methodology AR-ACM0003: Afforestation and reforestation of lands except wetlands.*

gender equality, and investment in capacity building and staff training. Another key aspect is promoting environmental awareness; Generation Forests demonstrate that a forest can be valuable both environmentally and economically.

Environmental impacts cannot be seen separately from the social benefits as the involvement of local communities is crucial. The sustainable income and employment from the forest provides an incentive for local communities to protect and maintain the forest long-term.

Our projects in Panama demonstrate that the positive social impacts are particularly important for marginalized rural communities. Many of our team members come from Indigenous communities with high unemployment rates and some of the lowest socioeconomic indicators in the country. For many of them, this is one of the few employment opportunities with social insurance, providing income for their families and increasing their skill set through training.

Generation Forest Revenues

Commercial products

- Portfolio of more than 20 high-value, fine tropical timber species. Mostly native species such as mahogany (*Swietenia macrophylla*), rosewood (*Dalbergia retusa*) and Spanish cedar (*Cedrela odorata*), and where suitable also a limited proportion of teak (*Tectona grandis*).
- High quality CO_2-certificates (VCS-CCB), tradable on the Voluntary Carbon Market.
- Potential to develop biodiversity certificates and other tradable ecosystem services.

Carbon Revenue

Our Generation Forests are expected to generate an average of up to 28 CO_2-certificates per hectare per year, over 35 years. CO_2-certificates from Generation Forests are tradable on the Voluntary Carbon Market and help to cover forest establishment costs in earlier years when timber revenues are still limited.

Unlike many other forest-based credits, our certificates represent real permanent carbon sequestration and real additional social and biodiversity benefits.

That is why our Verified Carbon Units (VCUs) with the additional Climate, Community and Biodiversity (CCB) label from the Generation Forest Group Project have recently fetched prices at a market premium.

Timber Revenues

Although the first commercial thinnings are expected to begin around year 12, revenues from the sale of **FSC-certified** fine timber will begin to exceed carbon revenues after about 20 years. Over the first 100 years of a Generation Forest's lifetime, about 80% of the total revenues are expected to come from timber sales.

The market for fine tropical timber is a niche market characterized by a stable long-term trend of price increases above inflation. Much of the supply on that market has been sourced from natural forests through unsustainable and/or illegal timber extraction. Natural supplies are therefore becoming scarce. Large-scale Generation Forests can play a vital role in replacing this unsustainable market supply with a steady supply of sustainably produced timber.

In the permanent phase, a Generation Forest will provide a constant and significant supply of timber. The selectively harvested timber will be in balance with the natural growth of the forest.