

Community Reforestation in San Juan de Limay, Nicaragua



Project summary

In this community-based reforestation initiative in the Platanares watershed in the municipality of San Juan de Limay, Nicaragua, smallholder farming families collaborate to reforest underutilised portions of their land. Thanks to better land-use management and more sustainable use of forest resources the forest cover of the nearby watershed will be increased and the quality of life of Limay residents will be improved.



Project benefits

The program leads to a reduction of CO₂ and at the same time produces co-benefits:

- Increase and diversification of small-scale farmers' income, initially through carbon credits and eventually sale of forest products (especially timber and firewood)
- Improve small scale farmers' quality of life, amongst others women health benefits from reduced smoke by energy-efficient stoves with chimney
- Increase supply of locally and sustainably produced wood products
- Reduce future forest degradation by addressing drivers of forest degradation and deforestation
- Water regulation services such as flood control and water security – ecosystem services that trees provide.

Facts and figures on the carbon offset programme

Programme location

San Juan de Limay, Nicaragua

Programme standard

Plan Vivo

Programme type

 Reforestation

Emission reductions

190,663 t CO₂e (over 40 years) (as of December 2013)

Situation without programme

Use of non-renewable biomass fuels for cooking

Programme start

October 2010

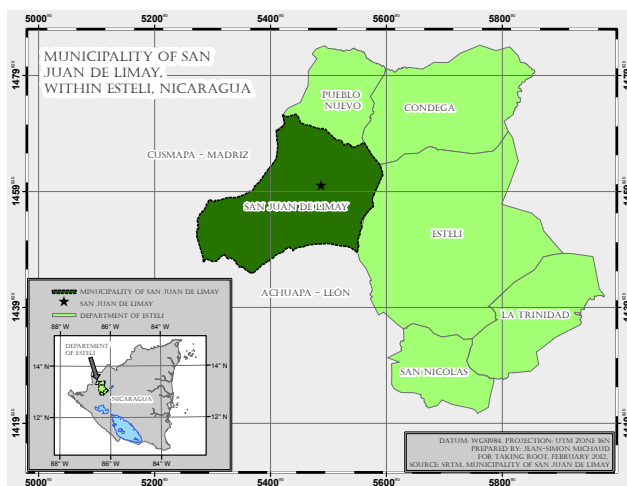
The project country and region

Bordering Honduras in the North and Costa Rica in the South, Nicaragua is the largest and at the same time the least populated country in Central America.

With a GDP per capita income of \$1,754 per year Nicaragua is the second poorest country in the Western hemisphere.

Tropical rainforest is covering about a fourth of the country's area. Yet, deforestation for agricultural land (especially for commercial agriculture and cattle pasture) as well as logging is a critical issue: 75% of Nicaraguan forests have already been deforested. The "Green Revolution" that arrived in the 1950's caused most of the deforestation for largescale cotton production, which became Nicaragua's second biggest export product. By the end of the 1980's cotton prices dropped and cotton production fell leaving heavily eroded land.

Also in the project region, San Juan de Limay, the low soil fertility restricts the land-use mainly to subsistence crops like beans and corn and to cattle farming. Additionally the use of firewood for cooking which the farmers usually harvest in an unsustainable manner in the nearby forest, constitutes a continuous pressure on these forests and is one of the main sources of forest degradation.



Map of the project boundary, the municipality of San Juan de Limay, and its location in Nicaragua.



A typical Nicaraguan landscape with farmer's fields and sparse trees.

Indicator	Nicaragua	Switzerland
Total area (in km ²)	130,370	41,285
Population	5,788,531 (2009)	7,996,026 (2013)
GDP in USD per capita (2012)	1,754 USD	79,052 USD
Share of population living below the national poverty line	42.5 % (2009)	7.9 % (2010)
Energy use per capita (kg of oil equivalent, 2011)	515 kg	3,207 kg
CO ₂ emissions per capita (2010)	1.02 t	14.6 t
Human Development Index	0.589	0.903
Rural population (% of total population)	42%	26%

Table 1 – Facts & Figures: Nicaragua vs. Switzerland.

(Source: fairunterwegs.org [2013]; World Development Indicators, web.worldbank.org [2013]; carbonfootprintofnations.com [2013])

How the programme is implemented

Taking Root Nicaragua, a Canadian Non-Profit Organisation that has a base in Nicaragua, is the project implementer and coordinator. It is also doing the technical operations such as the development of technical specifications for the forest plantations supported by the Nicaraguan Non-Profit Association APRODEIN who is especially involved in the capacity building of the local farmers besides conducting the annual monitoring.

The project participants are small landholders located in the Platanares watershed. By October 2013, 233 smallholders were participating putting a total of 643.48 ha (this equals about 900 soccer fields) under reforestation sequestering a total of 190,663 tons of CO₂ over the project crediting period. Participants must own economically underutilized land that is in need of reforestation, be located within proximity to road access, and must demonstrate that participating in the project will not conflict with their subsistence activities, notable cattle ranching and agriculture. The latter is especially important for avoiding leakage.



Project participants after a planting activity.

A major driver of deforestation is the continuous need for fuelwood for cooking. The establishment of sustainable forest plantations reduces the need to deforest in forests that are important for watershed protection. But there are more activities incorporated in this project that try to enhance quality of life for the community members. Through the implementation of fuel-efficient cooking stoves only a third of the firewood is needed compared to the traditional stoves. These are also equipped with chimneys which greatly benefit the health of the women who spend most of the day by the fire.

PlanVivo is the standard by which this project is certified – a standard for forest projects that emphasizes community participation, the use of native tree species and the protection of critical watersheds. 60% of the



The team of Taking Root who coordinates and implements the project.

price of the carbon credit goes directly to the farmers and is paid on an ex post basis over a 10-year period in case the farmer meets the carbon sequestration objectives. As trees sequester carbon slowly – it takes up to 50 years – the VERs are sold ex-ante (before the actual carbon sequestration takes place) to allow the farmers to make investments into planting the trees. For a small subsistence farmer a payment after 50 years would make it impossible to participate in a reforestation project.

Situation without the project

The project is established in one of the region's most important watersheds which is the source of Limay's fresh water supply. Since most of the trees in the region have been cut down, the forest roots and canopy are no longer present to retain water in the soil. This results in floods when it rains and in droughts during the dry season as the forest canopy no longer protects the soil from the sun and the region turns into a seasonal desert.

This watershed is also the birth place of the Rio Negro, a river that originates in the mountains, flows to Limay and ends up in the Estero Real, one of the most biologically important estuaries in Central America. Therefore, reforesting this area has an important hydrological impact on both the local and regional level.



The Adan family has been participating in the project since 2009.

Reforestation activities

The activity of this project, which produces emission reductions (carbon credits) is the establishment of tree plantations on underutilized portions of the farmers' land. At the same time the planted trees have the function to retain water in the watershed during dry season and to minimize flooding during the rainy season.



Project participants fill seedling bags with soil and arrange them in rows in the nurseries.

To meet the need for firewood and also building material, the tree plantations are designed as a sustainable source of firewood and timber.

As of 2013, three different types of plantations are applied on the farmers' properties: Mixed species plantations, boundary planting and silvopastoral planting. All of the species planted are native to the region and are chosen in consultation with local smallholder groups and professional foresters. The seedlings are raised in community nurseries that have been implemented through the project. The native tree seeds are purchased directly from families in neighboring communities. The focus is on the implementation of mixed species plantation. Mixed species plantations take up 376.92 ha (about 528 soccer fields), boundary planting 46.96 ha (about 65 soccer fields) and silvopastoral planting 79.83 ha (about 112 soccer fields) as of 2013.



Participants purchasing seedlings for their forest plantation.



Reforestation activities.

Mixed Species Plantations are intensively managed multi-purposed tree plantations composed of rows of fast growing firewood species and longer-lived hardwood species. The firewood species are nitrogen-fixing and are coppiced after four years. This provides an early harvest of firewood and high-protein fodder while fertilizing the soil. The firewood grows back after the first harvest before it gets entirely crowded out by the growing hardwood species. The hardwood species provide the farmers with an income in the long-term, when the carbon payments stop (after 10 years). They can be harvested after 14 and 21 years. From then on, wood can be selectively cut every 5 years. This income is larger than the carbon payments providing an incentive for the farmer to continue the sustainable hardwood management.

Boundary Plantings are "living fences", using trees to mark the property line instead of a fence.



Project participants plant seedlings along a fence line to establish a "living fence".

Silvopastoral Plantings acknowledge the need for cattle pastures; it integrates trees with improved pasture and livestock. Nitrogen-fixing species are harvested at young age for fuel wood; hardwood species provide highly-prized sustainably produced timber in the long-run.



A participating farmer

NAME Edith Javier Rodriguez Benavidez

PARTICIPATING SINCE 2011

TREES PLANTED THAT SURVIVED (2013)

Mixed Species: 338 | Boundary Planting: 92

CARBON BENEFIT 369 t CO₂

PLANTED AREA Mixed Species: 0.9 ha (1.2 soccer fields)

Boundary Planting: 47 km

CARBON INCOME IN 2013 158.12 USD

(average monthly income in the project area is 80 USD)

Energy-efficient cookers

The farmers depend on firewood as energy source for their cooking stoves: 99% of the rural inhabitants of San Juan de Limay use firewood as their main source of energy for cooking. The wood is taken from surrounding forests, yet not in a sustainably managed way so that the forests continuously degrade. Overall, 25 energy-efficient cooking stoves have been built and installed in households of project participants. These are subsidized by the surplus from sales of the carbon credits. Unlike traditional cooking stoves, the energy-efficient ones not only reduce the amount of fuel wood needed by two thirds, they also have a chimney that drastically reduces the amount of smoke released into the households.



A project participant with her new fuel-efficient cooking stove. The chimney reduces smoke in the house which benefits the woman's health.

Monitoring

For reforestation projects, the amount of carbon stored in the trees over the project lifetime (50 years in this project) is estimated based on data for tree growth before the start of the project. In order to verify whether the trees sequester the targeted amount of carbon a regular monitoring has to be conducted. The Plan Vivo Standard requires an annual monitoring of tree growth parameters over the project lifetime. The monitoring also checks whether a series of milestones in carbon sequestration are reached in order for a farmer to receive carbon payments. The parameters that are annually monitored are among others: 1) a minimum number of trees per sample plot, 2) whether pruning has taken place, 3) height and diameter of the trees in a sample plot in order to estimate the stored carbon per tree and per hectare. The parameters are not measured on the entire project area but in permanent sample plots on each farmer's property. All sample plots added up represent 10% of the total project area.

The data collected by community technicians on iPod touches will automatically be sent to the main database in Canada.



Field technicians monitoring tree growth and survival with a tablet.



Measurements to calculate the carbon storage progress in the forest plantation.

Benefits

With its multi-faceted approach, the project brings along various (co-)benefits:

Preserving ecosystems

Land protection: The project eliminates the dependence on existing forests and prevents further degradation by planting firewood and timber species on underutilized land on the farmers' properties.

Watershed protection: The planted trees help to regulate the water that flows into the nearby Estero Real, one of South America's most important estuaries in terms of biodiversity. Also, the trees capture water in the dry season which increases water security and minimize flooding and landslides in the rainy season.

Biodiversity: Seeds are collected from a variety of surrounding tree species in order to help strengthen these species. Trees that have been over-logged are also reintroduced. All this new growth rebuilds habitat for local wildlife.



Improving livelihoods

Interest-free loans and regular payments help the farmers to plant seedlings, manage their properties and make other life-improving investments. From the sale of forest products such as firewood or timber investments into the housing, agriculture, education among others can be made.

Trees for firewood: Fire wood from sustainable forest management is the primary source of energy for cooking stoves (for 99% of the rural inhabitants of San Juan de Limay firewood is the main energy source) at the farmers' households and can create additional income for the farmer family when sold.

Fuel-efficient cooking stoves in the farmers' households require about one third of the previous amount of fuel wood. This does not only reduce pressure on the nearby forests but also minimizes the time spent gathering wood and releases less smoke – a big health benefit for the women who traditionally spend a great deal of time cooking by the fire.

Employment: Since 2011 the project has been the largest employer in the region, providing a much-needed additional source of revenue for both women and men. Women represent close to 50% of the community members hired for example as tree nursery staff, planter or field technician but also as project participants who build nurseries, clear planting areas, dig holes, plant trees, weed and maintain the trees.



Mitigating climate change

Preventing CO₂ emissions by working with communities to preserve forests and prevent further destruction. Globally, deforestation accounts for over 17% of global CO₂ emissions which is more than all the cars, boats and planes combined.

Carbon sequestration: In the constant stock of trees maintained in the woodlots of the participating farmers, carbon is stored by the trees. While trees are growing they fix carbon – about half of the oven-dry biomass of a tree consists of carbon.

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