Solidaridad-Nicaragua

Jinotega & Matagalpa

2022

Rabobank

Introduction

This report represents a summary of the project details. It has been created in close collaboration between Solidaridad and Acorn. A more detailed Acorn Design Document (ADD) for the project will be made available on the Acorn platform and can be requested by validation and verification bodies and certifiers for third-party oversight or quality checks.

This Plan Vivo certified project run by Solidaridad in Nicaragua has helped over 1700 smallholder coffee farmers in Jinotega and Matagalpa districts overcome low productivity and crop loss from climate change by transitioning 2500 hectares of cultivated land to agroforestry. In addition to climate change mitigation through carbon sequestration, the agroforestry systems promoted by Solidaridad also serve as a climate change adaptation strategy in coffee landscapes. The integration of trees within these coffee systems enhances biodiversity, protects crops and top soil from harsh weather conditions, and provides a financial and environmental safeguard for farmers when facing disease and pest outbreaks, floods, drought or other climate related disasters.

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Project Summary

Local partner

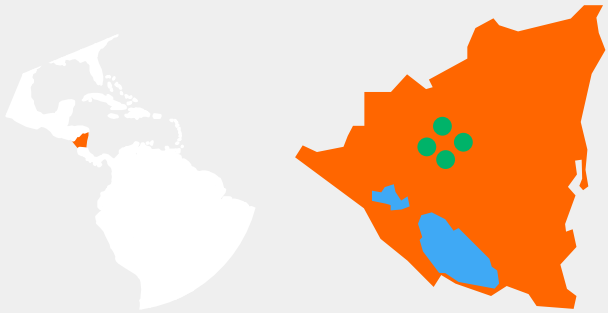
Solidaridad

Project location

Nicaragua, Jinotega
&
Nicaragua, Matagalpa

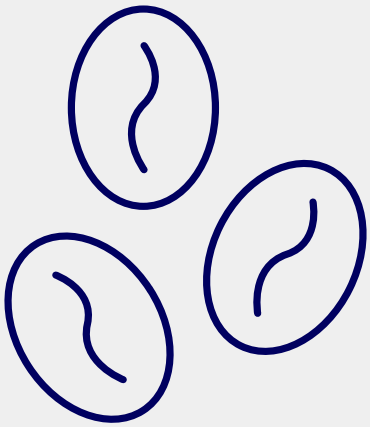
Ecoregion

Central American Pine-oak Forests and Central American Atlantic moist forests



Main crops

Coffee



Number of existing participants

1,700

Potential number of additional participants

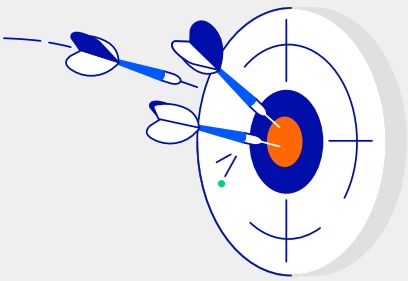
25,000+

Estimated total size of project area

2,500 ha

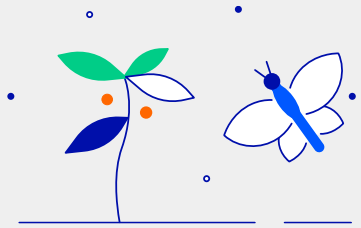
Project's aims and objectives

To help smallholder coffee farmers transition to agroforestry systems and become climate resilient. Solidaridad aim to achieve this at scale by connecting farmers to high-value carbon markets as a mechanism to reward them for planting and maintaining trees within their farm and the reduction in carbon emissions that follow.

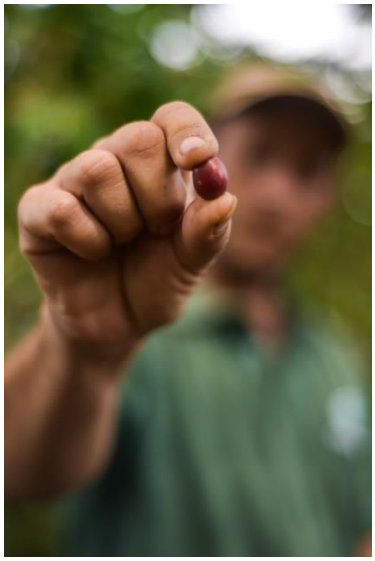


Impact to the farmer livelihood and environment

- Increased food security
- Increased farmer income
- Increased farmer access to resources
- Increased biodiversity on farms
- Increased productivity
- Empowerment of women



Additionality



The agroforestry transition project led by Solidaridad was established in 2017 and the first trees were planted in 2018 on 160 hectares. The project area has now grown to 2500 hectares, with farmers planting trees in 2019, 2020 and 2021. The collaboration between Acorn and Solidaridad Nicaragua began in 2020 to provide carbon finance as an incentive for the first 1700 farmers to maintain and enhance their agroforestry systems. Solidaridad's agroforestry project was established with the intention to connect farmers to the carbon market, however, a combination of a lack of knowhow, high project development costs and low carbon prices meant that this did not happen until contact with Acorn. As part of Solidaridad's agroforestry design, it is the goal that each farmer plants approximately 100 trees per hectare, with the sowing of trees in batches and over multiple years. Solidaridad believes that a phased approach to planting is more sustainable as it allows for learning among farmers and more opportunity for knowledge sharing. The carbon credits farmers receive for the trees planted in the project are ex-post based and will only be derived from one year before CRU issuance.

Farmer Level

Nicaraguan smallholder farmers located in Jinotega and Matagalpa, experience moderate poverty levels. Coffee production in this region has been negatively impacted by the changing climate, resulting in an increase of pests and disease. From 2012 to 2015, the coffee sector was seriously affected by leaf rust disease. Producers were ill-prepared to cope with the outbreak and many farms were destroyed. In recent years, production costs rose significantly. Coffee prices are currently at a 10-year high, however, profits that farmers receive are limited by significantly increased production costs due to high agri-input costs as a result of shortages in the COVID era, high labour costs, as well as the removal of previous tax exemptions on agri-inputs. This results in farmers barely being able to break even. The threat of climate change and the impacts of such disease outbreaks were the initial driving factors that sparked farmers' interest in transitioning to agroforestry, however, it was the additional incentive of carbon finance that enabled farmers to commit to practicing long-term agroforestry in a period where they experience high production costs, leading to low productivity, and low profits.

Before project intervention, farmers faced multiple barriers due to their poor systems management, high production costs, climatic phenomena, their lack of knowledge on how to care for trees in their first year of establishment, and how to monitor and evaluate the success of an agroforestry system. To overcome these barriers, Solidaridad used grant funding to provide farmers technical support (i.e. planting materials, monitoring, and training). The mortality rate of trees before project intervention was at least 35-40% in the first three years. Solidaridad believes the

training they offer farmers through reduces mortality rates to at least 5%. The CRU payment provides an additional benefit to the producer to improve tree care and avoid tree mortality. Solidaridad coordinate with multiple community nurseries to ensure availability of a large number of diverse and good quality saplings. In terms of financial support, Solidaridad cover the costs of agri-inputs (i.e. seedlings, fertiliser, and farm tools such as pruning shears and saws). If they cannot finance the planting materials for all farmers at scale, they connect producers with financing or cooperation solutions. Solidaridad also helps farmers to register their agroforestry systems with the national authorities. Without the support of Solidaridad and Acorn, farmers would not have the necessary resources, skills, knowledge or network to successfully transition to a long-lived agroforestry system. With the support of Solidaridad's technical assistance and the income diversification that Acorn provides through carbon finance, it is expected that project interventions will deliver an increase of 300kg/ha of coffee output per farmer.

The carbon finance provided by Acorn to farmers will help support them to break even and ensure they have an extra source of income in case of extreme events such as disease outbreak and are incentivised to keep their trees in the ground during financial hardship. Many of the trees planted by these smallholder farmers do not provide immediate tangible benefits, such as shade trees compared to fruit trees, and if they lack cultural significance, may be the first cut down in severe financial hardship (even with a low risk of deforestation in the project area) if no financial incentive or reward was in place for farmers to preserve them. The long-term sustainability of recently implemented agroforestry systems and the first additional trees planted are jeopardized if farmers don't receive compensation for the carbon they sequestered.

Project level

Solidaridad does not work with a fixed number of smallholder farmers but a constantly growing and expanding network. The first trees planted under the initial phase of this project are few compared with what will be planted over the following years with the provision of grant funding and CRU income. If focus is placed purely on the first 1700 farmers to plant their trees and not those expected to transition with the scaling of the project, the additionality of the full project is not being considered. The success of the farmers, who are compensated for the carbon they have sequestered, is likely to work as an extra stimulus to increase the participation of the wide range of farmers that Solidaridad has access to, roughly 25,000. Acorn's systems approach involves looking at the financial barriers these 25,000 potential farmers face and ensuring the first farmers receive carbon payment, critical to start the development of a carbon financing structure required for scaling. If the first farmers who transitioned with Solidaridad are not rewarded with income from the carbon credits that Acorn offers, both Solidaridad and the farmers may be discouraged from scaling up their agroforestry interventions after all their hard work during the implementation phase and lack of financial benefits in the years that follow. Providing carbon finance to compensate Nicaraguan farmers is the only practical way to achieve scale and proof of concept

Project Baseline

Land use

Aside from cultivation of coffee, smallholder farmers also use the land in the project area for the cultivation of bananas, basic grains, beans, and cocoa. Farmers never have more than 2 crops at a time and most have only one, coffee. The majority of the farmers use manual prevention and control (i.e. weeding, harvesting, biological traps) to reduce risk of pests. However, more than half of the farmers in the project area use herbicides and fungicides, especially for diseases such as leaf rust and rooster's eye. The majority of the farmers use inorganic fertilisers. Without project intervention, there would eventually be abandonment of crops due to the land degradation occurring from global warming, which is already happening in some areas in Nicaragua. The increasing input costs such as for fertiliser would result in farmers not being able to keep the soil in a suitable condition for their coffee and disease outbreaks in a monoculture system would further add to the risk of coffee abandonment and land being turned into pastures for cattle.

Habitat species

The ecogeographic zone is humid tropical with productive systems in jungle rainfall consisting of mainly broadleaf trees. The predominant tree species are Inga spp. Juglans regia, Cedrela odorata, Cordia alliodora, Persea americana, Albizia saman. Wild fauna sometimes found in the project area include squirrels, lemurs, rabbits, foxes, sloths, reptiles, deer, armadillos, mountain cats, and exotic birds (including the threatened and loved parakeet). Without project intervention and carbon income, Solidaridad expect biodiversity to continue to drop significantly as has been the case historically due to the decrease in forest cover in the country. Additionally, farmers would be likely to convert their farms to cattle raising without the diversified income and resilience to climate change that the project intervention offers. Land use change to cattle farming is seen as one of the biggest causes of biodiversity loss in Nicaragua.

Socio-Economic Benefits

Area	Indicator	Result
Local livelihood	Nutritional variety	The average farmer consumes 8 food groups out of 13.
	Agricultural land use productivity	The average productivity of coffee is 1051 kg/ha/year
	Women empowerment	21% of participants and 60% of those in the decision making council are female
	Farmer Income	The average annual farmer income is 204,896 Nicaraguan Córdoba
Environmental improvement	Agricultural biodiversity	23.97 Gini Simpson Index Score

Nutritional variety

Majority of farmers are able to eat enough food each day and do not skip meals. However, they lack variety because they consume the same limited basic Nicaraguan diet (beans, corn, rice, sugar) every day. On average, farmers consume 8 out of 13 food groups each day, with no farmers consuming any form of seafood. A minimum of 15% of fruit trees must be selected by farmers for the agroforestry design. These trees will offer an extra source of fruit for self-consumption. This is valuable as 26% of farmers reported they consume no fruit at all. The additional income from carbon finance may help the farmers afford to eat a more varied diet including more costly foods such as seafood which contain critical omega fats needed for physical and mental development and to ward of disease.

Agricultural land use productivity

Productivity is low due to high input costs, the effort required to control diseases, the lack of technical resources and skills of farmers. This project will teach farmers necessary skills and supply them with resources to overcome their barriers to productivity. The planting of shade trees will increase soil health and the provide a natural source of fertiliser, reducing the need to purchase costly inputs.

Women empowerment

In the project area women have less access to formal land rights and experience less participation in decision-making processes due to social-cultural norms. Solidaridad prioritize opportunities that benefit women coffee producers by aiming to improve women's access to services (like non-reimbursable projects, financing and training) and/or means of production (inputs or formal land rights). The beneficiaries of agroforestry systems are currently 21% but will be at least 30% women. Solidaridad strives to include a strong female presence in the project council for equality in decision making. Solidaridad employs women in the roles of monitoring, technical assistance, nurseries, and agronomist for this project.

Farmer income

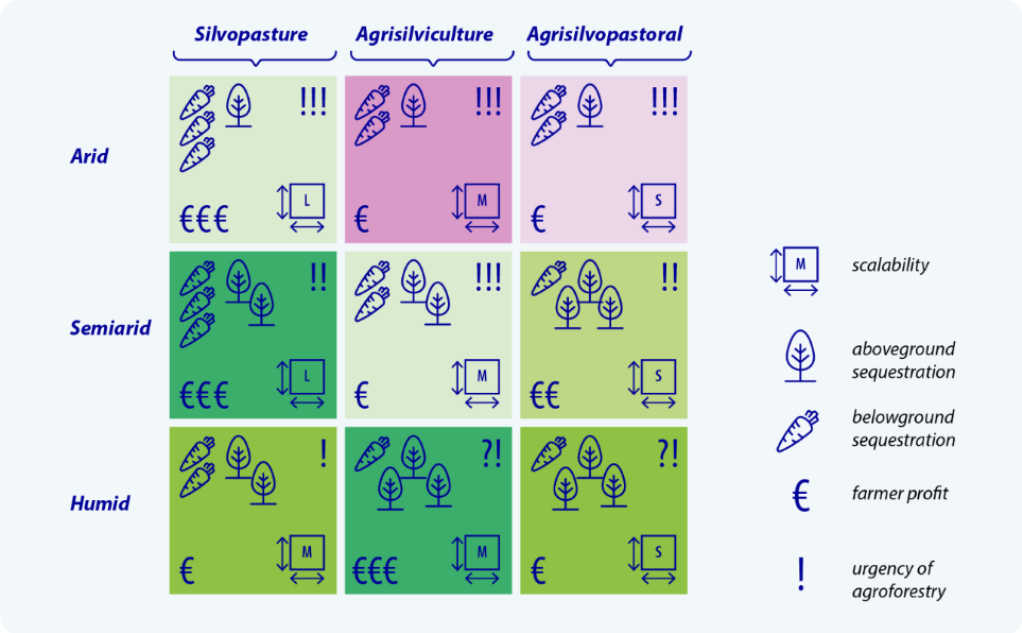
Average annual farmer income is 204,896 Nicaraguan Córdoba. Most farmers have a poor financial state because they are unable to get financing or credit due to strict requirements and the processes involved that are too difficult for the farmer to understand. Farmers also face high input costs and the price of coffee is unstable and fluctuates. The project is located in rural communities in the coffee-growing areas of Jinotega and Matagalpa, characterised by moderate poverty levels. Coffee production in this region has been impacted by changing climate which in turn has increased pests and disease. In recent years, production costs rose significantly, barely enabling farmers to break even. This project intervention will reduce the costs of farmers in terms of inputs (i.e. fertiliser), the CRUs will give farmers additional income to spend on costly inputs or help for the farm so they can expand their agroforestry system further.

Agricultural biodiversity

The score of biodiversity, under the gini-simpson index, is unsustainable at roughly 24%. This result reflects the poor variety of crops grown in the project area with majority of farmer growing purely coffee and maybe one or two other crops such as beans or bananas in a small percentage. Farmers grow multiple species of coffee as a preventive for disease outbreaks. The variety of plants and animals differs on each farms, with many farmers having livestock for self-consumption of eggs or selling of dairy products. Wild animals are sometimes spotted in the project area such as squirrels and birds. Some rare species are also spotted in small occasions such as mountain cats, exotic birds, monkeys, sloth etc. Concerning threatened species, Solidaridad in consultation with farmers, believe only the Orange-fronted parakeet has been observed in the project area. Many other threatened species may exist in the region, however, they are either too rare to be seen on the farmland as it is not an ideal habitat compared with the more forested areas in the mountains. This presence of wild animals would enhance the gini-simspon score proving that the project area does have a bit more biodiversity than reflected as wild animals are not included in the equation. Under project intervention, farmers have a range of tree species on their farm, increasing biodiversity. Project intervention will further increase the adoption of additional tree species to increase variety in flora. Farmers will be given skills necessary to teach them how to grow other vegetable crops among their coffee so producers don't rely on one main species and have a buffer in time of disease outbreak in coffee. The trees planted and maintained under the agroforestry system will provide a safe space for wild fauna looking to take shelter in or travel through with many other regions of the country deforested and degraded.

Project Activities

The agroforestry system is classified as existing agrisilvicultural agroforestry in a humid environment on which coffee is the main cash crop. The planting of native/naturalised shade and fruit trees is prioritised in this system.



There are 10 native tree species promoted under the agroforestry design that offer shade, fruit and medicine. These species have been chosen after testing soil, looking at climatic variables, and using traditional knowledge of the community and farmers. Farmers are able to decide for themselves which of the following tree species they would like to plant:

- Cedrela odorata
- Juglans olanchanum
- Swietenia macrophylla
- Albizia saman
- Inga spuria
- Cordia alliodora
- Persea Americana
- Pouteria sapota
- Platymiscium pinnatum
- Inga punctata

The aim for farmers is to plant up to 100 trees per hectare, with majority of these selected to attract pollinators and natural predators that help biologically control coffee pests, and 15% of these being fruit trees. It is the goal that these trees will reduce the need for costly inputs such as fertiliser and pesticides, with farmer encourage to use tree leaves as an organic fertiliser and less risk of disease outbreaks. Other advantages expected for the agroforestry system include improved soil fertility, reduced water erosion, improved soil structure, lowered temperature on the farm, creation of a microclimate favourable for coffee production, and improved productivity and quality.

Organisational Capacity

Solidaridad is an international civil society organization (NGO) with over 50 years of experience in developing solutions to make communities more resilient. Solidaridad has its early roots in supporting repressed communities in Latin America over the last 50 years. Solidaridad is in constant collaboration with the local communities and farmers within the project area to explore the challenges and opportunities they face while implementing agroforestry practices. Solidaridad has been working in Nicaragua since 2015 to support farmers in local level climate change adaptation and mitigation activities, within sustainable supply chains (coffee, cocoa, livestock and palm oil). Since 2017, Solidaridad has been working in Nicaragua to engage with smallholder farmers to build an agroforestry design around coffee farming and provide them with the necessary knowledge and skills to transition to such a sustainable farming system.

Solidaridad work with a local farmer cooperative, Aldea Foundation, to ensure active and regular engagement with farmers during project design and implementation. Aldea Foundation was established in 2016 as the "Other Helping Hand" that complements the business work of Aldea Global Jinotega, a global NGO. Aldea foundation has been promoting agroforestry practices since 2016,and joined forces with Solidaridad in 2018, with farmers actively planting trees in 2018, 2019, 2020 and 2021.

Solidaridad have their own code of conduct that ensures a workplace free from discrimination. Foundation Aldea have their own gender policy that aligns with the United Nations Sustainable Development Goals (SDGs), where explicit commitments to gender equality are made, both as an independent objective on gender equality and the empowerment of women.

Farmer Payment and Benefit Sharing

Solidaridad receives 90% of the value of the CRUs, retains 10% and distributes 80% to producers. The producers will receive online bank transfer or check of between 50% and 100% their CRUs and the remainder in-kind. It will be decided how to allocate up to the remaining 50% for the in-kind payment on a case-by-case basis, according to the specific needs of each subgroup of producers, considering contributions in agricultural inputs, training, communication and livelihoods.

In-kind benefit	Description	Amount
Inputs	• Seedling costs • Sapling costs • Fertilizer	10-50%
Education	• Training costs • Agronomist consultation costs	10-50%
Operation	• Mobile communication costs • Mobile payment costs • Fencing	10-50%
Livelihood	• Land tenure consultation costs	10-50%

Technical Specifications

Carbon Removal Units

The number of CRUs that have been sold and retired to date are found in the table below:

Amount of CRUs retired	Crediting Period
1.049	Dec 2020 – Dec 2021 & Jan 2021 – Jan 2022
9.586	Mar 2021 – Mar 2022

Leakage

No form of leakage is expected because the concept behind the agroforestry design is that the negative impacts on coffee production are minimal. The participants are not likely to move their practices to other areas outside of their farmland because they recognize the benefits of the agroforestry system in utilizing current land optimally with combinations of crops and trees. Farmers have this knowledge due to the effort that Solidaridad has taken to provide training. Training in shade management is crucial to avoid leakage because inadequate maintenance (i.e. overshading and competition) can cause the producer to have negative results in terms of coffee production.

Coffee in full sun, before project intervention, requires more fertilizer and lives less long. A shade system requires less fertilizer and increases the life of the plant by 5 to 6 years more, therefore increasing the net result of productivity. The incorporation of organic matter from the shade and litter of leaves helps to keep the coffee plants healthier and saving costs in phytosanitary management. In full sun, there are more pests and diseases so the producer must invest more in pesticides and insecticides. However, coffee under a shade system could result in a reduction of coffee yield at 15% if not properly managed. Although coffee production may slightly decrease under shade in comparison with full sun, the coffee that is produced will be of better quality (i.e. not damaged from the UV).

If cultivation under shade has a reduction in production of up to 15% short-term, this is compensated by a long-term increase in the useful life of coffee trees for up to 5 years, and less inputs are needed such as fertilizers and pesticides. Solidaridad have established demonstration plots that evidence a 20% increase in production and a 21% increase in income in an agroforestry system.

An impact on the displacement of producers is not expected as they have been on their land for many generations and have strong traditional roots. In very extreme cases where coffee cannot be produced, producers may switch to other types of agricultural activities resulting in land use change. However, this is extremely unlikely, especially with the planting of shade trees which reduce the risk of such an event from climate change and the promise of CRUs for maintaining and improving their current agroforestry system. Additionally, the fine for cutting down a tree in Nicaragua costs USD 10,000. The law is difficult to implement/control, but participants are at least afraid to do so for fear of negative consequences.

Interested?

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