

# Agros- Rick Steves Europe

## Nicaragua Climate Smart Agriculture



### 1. Amount Awarded

\$149,016.00

### 2. Project Description

This project aims to help subsistence farmers with a sustainable pathway out of poverty by providing land, tools and training for income development implementing climate smart agriculture practices.

Agros International, has worked with the rural poor in Central America and Mexico for 35 years, helping families living below the poverty line to own productive agricultural land, attain self-sufficiency and realize their God-given potential. Agros has purchased more than 7,800 acres of quality land, established 45 villages and provided 2,100 previously landless families with a path to land ownership and the tools to launch agriculturally based businesses.

This project focuses on subsistence farmers from the villages of San José and La Bendición and Tierra Nueva in Matagalpa, Nicaragua. Matagalpa is a region highly sensitive to extreme weather, including hurricanes, excessive rainfall and drought - events which have created crop losses and previously trapped these smallholder farmers in a cycle of poverty. The Climate Smart Agriculture program addresses these issues providing tools and training in modern climate-resilient practices for subsistence farmers during the program's first year of implementation. The trainings concentrate on reforestation, soil and crop management, as well as equipping farmers in San José and La Bendición with tools and infrastructure to reduce their vulnerability and become sustainable agricultural producers, even in the event of environmental stresses. This project's purpose is to empower smallholder families to acquire productive assets, feed their children, and generate ongoing income for sustainable livelihoods. The focus of this project is in laying the foundation of Climate Smart Agriculture through innovative infrastructure, strengthening market connections and consolidating our technical team for the implementation of climate smart agriculture practices.

#### Goals of this project:

- Establishing hydroponic production systems
- Establishing a vermicompost production and distribution space
- Establishing an agroforestry nursery
- Building a water irrigation system
- Improving Market connections
- Strengthening our professional technical team

#### Project Objectives

- Transform traditional smallholder families into climate-resilient farmers with sustainable agricultural practices.
- Increase the household income of smallholder families and provide food security to reduce

poverty conditions.

- Increase the climate resilience of smallholder farms in the villages of San José and La Bendición.
- Provide clean water access to families in La Bendición through a separate Cross International initiative.

### Overall Performance

In partnership with Rick Steves Europe, Agros international has successfully launched the first of three years of a Climate Smart Agriculture program in Nicaragua. The main goal of the program is to transform subsistence farming families into climate smart resilient farmers, increasing their agricultural productivity, food security and income level.

Climate Smart Agriculture (CSA) seeks to increase the resilience or adaptability of farmers to changing climate conditions, reducing the level of gas emissions due to agricultural production and ensuring farmer productivity.

We are encouraged by the progress that families in Agros communities are achieving. The early results reported surpass even our most optimistic expectations and among the main learnings are:

- *Climate smart practices work:* The practices introduced have had a direct impact on improving the sustainability of the agricultural production systems, increasing its profitability and reducing the dependence of chemical inputs and costly synthetic supplies.
- *Climate smart production is scalable:* One major goal was testing the effectiveness of CSA practices and that they can be implemented at scale. During this initial phase the families at Agros villages have been able to move from learning and testing practices in experimental demo plots to produce a variety of crops at commercial scale.
- *It demands professional expertise:* CSA practices are complex and require a strong technical assistance team, constant training and support. Farmers need professional training and supervision for adequate knowledge transfer.
- *Farmers embrace change once results can be shown:* Farmers are risk averse, they learn by doing and value the farming traditions and practices that were learned since childhood. The adoption of a new concepts of agriculture is not easy but possible and behavioral change is reached when backed up by results.
- *No external incentives:* A major barrier for the mass adoption of CSA practices is the lack of external incentives for farmers to make the change from traditional production systems. CSA demands more work and planning, it is a labor-intensive process, but the local markets don't compensate the extra effort with a price differential. CSA produce and chemical intensive produce are paid the same which becomes an entry barrier for many producers. However, adoption and conversion occur as the farmer recognizes the benefits in the quality of soil, availability of water, reduced dependence on chemical inputs and

better yields.

### 3. Outcomes

#### Outcome 1:

EXPECTED: Establish two (2) hydroponic module

ACTUAL: One (1) hydroponic module has been established and one more is expected to be completed in January 2021. The hydroponic module is 420 m<sup>2</sup> and reduces water use by 50%

#### Outcome 2:

EXPECTED: Establish a vermicompost module

ACTUAL: One (1) vermicompost production and training facility established producing 13,000 pounds of compost (bokashi) and biopesticides. 97 families have participated in 28 out of 40 workshops, trained in the production of biofertilizers and biopesticides.

#### Outcome 3:

EXPECTED: Establish one (1) agroforestry module and nursery

ACTUAL: Established one agroforestry module that has produced 41,000 plant up to date (goal is 50,000 this year). This module includes 7 reforestation campaign to reforest 60 acres of land, training and hiring of 4 forest guards, all of which have been trained and hired, and the purchase of equipment.

#### Outcome 4:

EXPECTED: Water Irrigation System

ACTUAL: A water irrigation system has been 100% completed in the community of Nueva San Jose. The system includes a water tank or reservoir, two water pumps (90 gpm) and irrigation engines (10 HP), conduction lines, water meters, distribution pipes and hoses, tools, inputs, supplies and filters.

#### Outcome 5:

EXPECTED: Develop a market strategy for each crop to increase incomes

ACTUAL: There has been little progress in this project component given the current circumstances around COVID -19

#### Outcome 6:

EXPECTED: Increase productivity of smallholder farming systems and household income by 20% by program end in 2022.

ACTUAL:

##### Increasing productivity and income:

Through the adoption of CSA practices farming families in the communities of La Bendicion and San Jose in Nicaragua have increased the productivity of their agricultural production by 18% and increased their household incomes by 15%. Considering that the goal stated in Outcome 1 is a three-year goal, we feel confident that by year three all participating families will significantly surpass the productivity and profitability metrics.

Main drivers of productivity:

- *More productivity:* Vegetable crop yields increased by 18% compared to crop cycles before starting the program.
- *More diversification:* Families diversified their crops from one to at least three on average. In addition to basic grains such as corn and beans families are growing coffee and a variety of horticultural products (lettuce, cucumbers, Jalapeño and Nathaly peppers) and other nontraditional crops such as Chaya, bananas, passion fruit and basil.
- *More harvests:* More diversification lead to an increased number of harvests. More harvests translate into higher income and more regularized income throughout the year. In San Jose, where more intensive production technologies existed before the program the number of harvest cycles oscillated between 4-5 per family per year. However, in La Bendicion, a coffee dependent community the farming cycles increased from 1- 2 harvests a year (coffee, corn and beans) to at least 4 harvests a year (coffee, corn and beans, banana, Chaya and lettuce).
- *Increased use of technology:* Agros' first hydroponic module was established, and this technology reduces the use of water by 50%. Further investments in pumps and recirculation mechanisms are needed to reduce the use of water by 80%.
- 23 farmers have been trained on soil management, harvest and post- harvest techniques, integrated pest management, hydroponics and vermicomposting.

Outcome 7:

EXPECTED: Improve climate-resilience in farming systems by having 90% of the producers trained in Climate Smart Agriculture (CSA) practices.

ACTUAL:

#### Changing Behaviors and building knowledge

- Increased climate smart literacy:  
Improving climate resilience in farming systems starts by changing behaviors and the way smallholder farmers see their land and their productive systems. Changing attitudes is the prerequisite for building knowledge and driving adoption of practices.

Traditional technical assistance and extension services focus exclusively on training and knowledge as the drivers for adoption of improved agricultural practices and leave behind important aspects in adult learning such as understanding their behavioral preconditions and creating an appropriate and motivating learning environment that creates a positive attitude.

From the moment families join an Agros village they go through constant, rapid and positive change. Reminding families of their successes and how they overcame their initial obstacles creates a positive environment that promotes an attitude for change. Developing agricultural promoters to implement farmer to farmer trainings and demo plots help farmers learn techniques by doing and provides an opportunity to see the results and effectiveness of each practice. This patient approach breaks the trust barrier and encourages farmers to test and adopt more sensible techniques such as pest and disease control practices.

- Today 63 of 97 families have adopted on average 4-5 CSA practices and have shifted the way they see agriculture production and its relationship with the environment.
- All families completed trainings on CSA and BAP (Best Agriculture Practices) and implemented soil conservation practices.
- The technical capabilities of Agros staff has been improved through online courses on climate change with FAO training modules.

### Increased climate resilience

- *Reduced dependence on chemical inputs:* Through the adoption of CSA practices farmers can reduce production costs by 37% when applying the different techniques listed below.
- *Fertilizers:* 53 farmers have learned how to produce biofertilizers and bokashi compost to improve the soil health and structure. These practices substituted the use of chemical fertilizers by 40% so far. The goal is to eventually substitute chemical fertilizer with biofertilizers by at least 60%. Further, the use of biofertilizers and bokashi has decrease the production costs by 15%.
  - On eight acres of vegetable production, families have reduced chemical inputs by applying 2000 liters of bio fertilizers and 12,300 pounds of bokashi (a composted organic fertilizer), thus reducing costs and improving the health of the soils and crops.
- *Pesticides:* Farmers adopted the use of the fungus *Beauveria bassiana* as a biocontrol agent against many pests. The fungus is applied through sprayers at the crops and infects worms and other pests acting as a natural insecticide. In just one year in the community of La Bendicion they went from 0 to 139 acres of coffee with this type of biological control. Biological controls have substituted pesticides and have reduced pest incidence by 50%.
  - Other types of non-chemical controls for pests that farmers are now using are chromatic traps, plants as insect repellents (basil), and insect traps.
- *Soil management (improving fertility, structure and combating erosion):*
  - Cover crops have been planted in 73 acres of coffee plantations improving soil fertility, reducing soil stress and protecting the soil from erosion
  - Soil samples of 22.6 acres have been analyzed in laboratories to identify the appropriate fertilization needs depending on the fertility conditions of the different soils and the crop mix cultivated.
  - 63 families adopted best soil and conservation practices such as raised beds, terracing and drainage techniques in 53 acres of land.
  - Plastic mulch for weed suppression, moisture retention in vegetable growing was established in order to increase productivity.
  - 8530 feet of live barriers established in La Bendicion as effective soil erosion and wind barriers. Also, these barrier trees capture carbon and are a renewable source of wood for fuel.
- *Natural resource protection:* Reforestation, watershed management
  - A collaboration agreement between Agros International, INAFOR (National Forestry Institute) and the municipality of el Tuma la Dalia, Matagalpa was signed and trainings and workshops on carbon capture and forest evaluation and protection were provided.
  - Forest guards are being trained to protect from depredation.
- *Prevention of safety hazards:*
  - Workshops on chemical use and safety benefit 58 farmers.

- Protective equipment: gloves, masks and protective suits for 58 farmers were purchased and equipment is being used while they manipulate chemicals and spray their crops.

#### Outcome 8:

EXPECTED: Eradicate hunger among 90% of participating families, establishing them as food secure.

ACTUAL:

#### COVID, Political and Socio-Economic Impacts on Food Security

Nicaragua has gone on a downward socio-economic spiral since the crisis of 2018. The unrest, roadblocks and economic slowdown increased unemployment, raised prices for basic services and main food basket items. In addition, a total restriction on loans resulted in more instability and vulnerability for smallholder farmers. This situation has only worsened with the COVID 19 pandemic and has affected all Nicaraguans and families in Agros villages.

From 2016 up to 2018 families had increased their food security, as measured by our path to prosperity evaluation system, from 60% to 70%. In 2018, after the sociopolitical and economic crisis, however, the food security index dropped to 54%. This year we have been prevented by COVID to conduct our annual evaluation, but we are committed to conduct it as soon as the conditions allow us to. Given the current circumstances, we don't expect this index to get any better. Despite this, compared to a rural poor family in Nicaragua, Agros families are doing much better. When other small holder farmers have stopped investing and producing, Agros families have continued producing.

#### Emergency Response

- Given the slowdown of the economy due to the pandemic, we conducted an assessment to identify the most vulnerable families and provided an emergency food supply package as well as an agricultural package

#### Technical Assistance

- Provide technical assistance on their staple crops for food security

#### Training Network of Health Volunteers

- Agros has continued to provide training to health volunteers to monitor adequate growth of children under five years old
- Started our first children learning center where early childhood stimulation and weighing sessions are conducted to make sure children are well nourished
- Agros has provided training and washing stations in the communities to prevent the spread of COVID-19

#### Outcome 9:

EXPECTED: Position smallholder farm families to move from a food security outlook to one of income generation.

ACTUAL:

Families are introducing agricultural technology, equipment and shifting from subsistence agriculture to market-led agriculture.

#### Added Value to Production

- The community of San Jose has a Community Agribusiness Center where families select, standardize and package their production before sending it to the market. These value-added processes help families earn more income.

#### Enhanced Use of Technology

- Two solar coffee dryers add value to coffee increasing income for small holder farmers
- In the village of La Bendicion, 38 families added value of parchment coffee drying 1,105 qq (110,500 pounds), using solar dryers, a new technology that allowed them to reach a price differential of \$2.00 per qq
- Installed a weather station in San Jose village, monitoring the climate conditions to provide critical information to make adequate decisions related to crop hydration.
- Labeling supplies for working stations and farms
- The use of equipment and tools has increased the efficiency of agricultural work, providing technology, reducing soil preparation times, increasing the quality of agricultural activities, optimizing cultivation techniques, and protection equipment is reducing the risk to family health

#### Increasing Incomes

- To date, 63 families from 3 communities have an average of 4 crops, improving crop diversification and marketing their crops in formal markets. As a result, income has increased by 15% compared to informal market prices, generating more income to these families.
- 80% of the smallholder farmers are commercializing their production in formal markets
- Small holder farmers have working relationships and forward purchase contracts with three supermarkets
- Agros' small holder farmers hold 2-3 certifications which enables them to get better prices and access to better markets.

#### **4. Budget to Actual**

	<b>Budget</b>	<b>Actual</b>	<b>% Executed</b>	<b>Variance</b>
<b>Total</b>	<b>149,016.00</b>	<b>98,299.94</b>	<b>66%</b>	<b>50,716.06</b>
Established two (2) hydroponic modules	27,690.00	18,607.06	67%	9,082.94
Establish a vermicompost module	13,640.00	3,151.87	23%	10,488.13
Establish one (1) agroforestry module and nursery	19,830.00	2,534.14	13%	17,295.86
Water Irrigation System	33,960.00	29,586.00	87%	4,374.00
Market Strategy	3,800.00	13.20	0%	3,786.80
Professional Technical Team	34,130.00	28,441.67	83%	5,688.33
Agros Program Management	15,966.00	15,966.00	100%	0.00

## 5. Partner Story

Edwin Antonio Blanco is a young farmer from La Bendición village, in the department of Matagalpa, in northern Nicaragua. Edwin shared that he is deeply grateful for Agros since his arrival in the community.

"I come from working on different farms with my mother and my brothers. For many years we gave our bosses our lungs with hard work, and the payment barely rewarded the effort and sacrifice we made, earning \$ 4.00 a day and working from 4:00 a.m. at 6:00 pm, without rest. In my heart I did not want that for my children, I had to break that cycle, I began to dream of a better future for them, I asked God to move us to a better place where there would have the opportunity to our own land".



"And God moved me to La Bendicion, he quickly answered my pleas, not only for me, but also for my mother and my brother who are part of this community, of this rich land, full of blessings, just as its name says"

"Since I came to the Agros community, we began training in coffee production, it was the first crop I established, but later we diversified the farm with vegetables, and basic grains that helped us improve our income and ensure our food. Thank God all the crops I have grown have done well. "Today we are learning new practices - when Agros technicians told us that we should change certain farming practices to reduce the impact of climate change, on the soil and also on our health, I was left wondering: 'What will that be'? Concepts such as climate-smart, bio-fertilizers or protected crops were new for me. It has been an interesting and innovative process and Agros opened spaces for us to learn each of the best practices so that we would apply them in our production areas"



"Personally, I am already applying my knowledge of climate smart agriculture, mainly in my coffee plot. For example, I have used bio-fertilizers, I have established cover crops to improve soil conditions and thus avoid erosion, I continue with management the shade for the coffee plants, and all my crops were established using contour farming techniques. " "I am proud of my work, the effort pays off, but I know we can give more. I am happy because Agros selected some of my coffee areas for validation, the idea is to measure phenols and the quality of the grain using organic fertilizers based on bio fertilizers and biological controllers, this will open doors to better markets and better prices, my goal is to always grow and here I have everything I need to achieve my goals, because my dream is already being fulfilled: Earth, Family and Hope " Edwin ends by saying.



## 6. Final Considerations

The climate smart agriculture project has been a huge success. Even though the project has not been fully completed and some activities have been slowed down due to COVID-19 pandemic, the project is moving forward. We have seen encouraging results in very little time, and this project has launched Agros into a new set of innovative, transformational programmatic interventions that are improving the livelihoods of small holder farmers allowing them to increase their productivity and incomes while protecting the environment. We are deeply grateful to Rick Steves Europe and his team for making this possible. Thank you so very much!