

Climate change and climate variability adaptation measures on coffee farms in four municipalities of Madriz, Nicaragua



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Partners for Resilience (PfR) implemented the Program for Disaster Risk Management in the Face of Climate Change in 28 communities of the municipalities of Somoto, Las Sabanas, San Lucas and San José de Cusmapa in the department of Madriz. One of the program's actions was to sensitize actors in the economic sector on three issues—disaster risk reduction (DRR), climate change adaptation (CCA) and ecosystem management and restoration (EMR)—with the purpose of strengthening livelihoods and community resilience.

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An environmentally-friendly producer

The community of El Castillito in the municipality of Las Sabanas has been experiencing changes in its climate. Inhabitants say that 15 years ago the rainfall was more abundant, which favored coffee growing. Local farmers currently perceive an increase in temperature and pests, forcing them to look for alternatives to help them respond to climate variability and change.

Justo Rufino Méndez lives in the community with his wife, three children and son-in-law. He has a farm covering two manzanas⁴ of land where he produces coffee, bananas and fruits (oranges, mangos and avocados, when in season). He has been a coffee grower all his life, but recent years have seen a drop in productivity caused by the coffee rust disease⁵ and inadequate agricultural practices.

“My family helps me with the farm work to push ahead with production”, said Justo Rufino, but he is aware that they need training to be prepared for climate change and has even had to take paid work to make ends meet. *“I’ve been a member of the June 5 Multiple Services Cooperative for more than six years and I’ve received credits to lift coffee production, but the low harvests in recent years have forced me to look for other sources of work.”*

Through the cooperative and the PfR Program, Justo Rufino received training on climate change and participated in an experience sharing visit to the municipality of El Júcaro, where he observed good coffee crop management practices and the installation of biofilters⁶ to treat wastewater from coffee processing plants⁷.

“In 2011 my farm produced 40 loads⁸ of coffee cherries, which were processed and handed in to the cooperative,” Justo Rufino explained. *“In 2012 and 2013 my harvests only covered our self-consumption needs because the coffee bushes were affected by rust. In 2014, I’m expecting to produce half of what I did in 2011.”*



Justo Rufino Méndez and his three children in front of their new biofilter. (Photo: Nicaraguan Red Cross)

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⁴One manzana is the equivalent of 7,026 square meters.

⁵The scientific name of the fungus that causes coffee rust is *Hemileia vastatrix*.

⁶Biofilters are a coffee wastewater treatment system that filters the waters through sand to eliminate the coffee pulp.

⁷These are the wastewaters resulting from the coffee de-pulping and washing process.

⁸One load is equal to two quintals of aired parchment coffee.

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Due to the drought, Justo Rufino is also starting to grow organic chia on his farm with support through his cooperative from the Bancentro and Root Capital financial organizations. In this way, this small-scale producer is seeking other alternatives to improve his farm.

The importance of coffee growing



Establishment of eco-forest coffee plots in the community of La Fuente in the municipality of San José de Cusmapa. (Photo: Nicaraguan Red Cross)

In Nicaragua, coffee is a very important category in the national economy. It ranks sixth in terms of its contribution to the gross domestic product (GDP) and accounts for 18.2% of the country's exports. Activities related to this crop generate approximately 300,000 direct and indirect jobs and account for 53% of the employment in the agricultural sector and 14% of the total employment at the national level.

In Madriz, 8% of the land is dedicated to coffee growing. The main coffee-producing municipalities are San Juan del Río Coco, Telpaneca, Somoto, Las Sabanas, San Lucas and, to a lesser degree, San José de Cusmapa⁹. The PfR Program is implementing actions with the coffee sector in the latter four municipalities, stressing the protection of river watersheds, crop diversification, and adaptation to climate change and climate variability.

A total of 1,275 manzanas are dedicated to coffee production in this geographical area, providing a source of employment throughout the year, although particularly during the harvesting period which runs from November to February.

The difficulties faced by coffee growers

Small- and medium-scale coffee producers face a number of difficulties on their farms, including the bad agronomic management of the crop, which generates low yields; limited technical assistance; a lack of financing; and price fluctuations in the international markets.

Since 2011, coffee plantations have been affected by the rust fungus, which reduces production levels¹⁰. For the 2011-2012 production cycle, the Ministry of Agriculture and Forestry reported 3,555 manzanas affected by a national-level rust outbreak.

All of this is compounded by bad crop management, as producers have exploited coffee without investing in plantation renewal, shade regulation, tissue management (pruning) and fertilization.

And now they are also facing more frequent and severe episodes of drought and a gradual increase in temperatures, which is displacing coffee cultivation to higher areas, including the Tepesomoto-La Patasta protected area¹¹.

Facing problems together

To provide responses to the above-mentioned problems, 300 small- and medium-scale coffee producers from Las Sabanas, San José de Cusmapa, San Lucas and Somoto in the department of Madriz and from Pueblo Nuevo in the department of Estelí formed the June 5 Multiple Services Cooperative.



Coffee growing is an important source of employment in Madriz. (Photo: Nicaraguan Red Cross)

⁹ Source: Fourth National Agricultural Census (CENAGRO, 2013): <http://www.magfor.gob.ni/descargas/publicaciones/IVCensoNacionalAgropecuarioCENAGRO/MADRIZ.pdf>

¹⁰ Results of the Segovias Regional Coffee Forum, January 2013.

¹¹ "Future climate impact scenarios in coffee-growing areas in Nicaragua", (FUNICA - CIAT 2012)



In recent years, climatic conditions have favored the propagation of the rust fungus in coffee plantations. (Photo: Nicaraguan Red Cross)

The farmers affiliated to this cooperative benefitted from basic technical assistance on their plots of land, low-interest financing to carry out coffee management work and the acquisition of the tools and machinery needed to wet-process¹² their production.

Despite being a relatively new cooperative with modest economic resources, they have succeeded in entering the “Fair Trade” program¹³. In this respect, these cooperative members have to comply with requirements such as organic coffee production, soil conservation, forest protection and water source conservation.

The impact of coffee growing on the environment

Coffee growing generates important economic resources in the municipalities of Madriz, but without adequate agroecological management it can cause negative impacts on the environment. Unfortunately the forest coverage has been reduced to establish coffee plantations and this has led to increased soil erosion and slope instability. In addition, the disposal of wastewaters used for wet processing also contaminates bodies of water.

The PFR Program’s contributions in the communities

In 2011, the organizations in Partners for Resilience (PFR) mapped the different actors in the municipalities covered by the program, identifying the possibility of collaborating with the June 5 Multiple Services Cooperative on a training plan for producers on the issues being promoted by Program.

At the beginning of 2012, the community vulnerability and capacity assessments” (VCAs) the Program conducted for 16 communities of the municipalities of Somoto, Las Sabanas and San José de Cusmapa highlighted the importance of small- and medium-sized coffee farmers in the local economy. They also revealed the problem of wastewater disposal.

The actions promoted by the PFR Program included holding a regional climate change and coffee forum, experience-sharing exchanges, the building of biofilters for the treatment of coffee wastewaters, strengthening the capacities of the June 5 Multiple Services Cooperative, and the establishment of eco-forest coffee plots.

In response to the rust fungus problem that affected coffee growers in 2012, the PFR Program organized the First Segovias Regional Forum on Coffee and Climate Change¹⁴, which provided a discussion arena for affected producers, academics and the government.



The El Castillito brook, contaminated by coffee wastewaters. (Photo: Nicaraguan Red Cross)



A coffee de-pulper, which is an important component of wet processing. (Photo: Nicaraguan Red Cross)

¹²Wet processing involves removing the pulp from the coffee bean without affecting its quality. The berry is classified and the fermented bean is washed, before finally being dried.

¹³“Fair Trade” is a program that works to improve small traders’ access to markets and commercial conditions.

The Forum was held on January 31, 2013, under the slogan “*The future of coffee in a changing climate: Challenges and opportunities.*” The presentations highlighted the impact climate change has had on the sector, the negative effects of coffee rust, and climate change adaptation and mitigation technologies.

The producers reflected on the need to receive training on watershed management, land-use planning, good agricultural practices and organic coffee growing to improve yields and implement adaptation measures.



The First Segovias Regional Forum on Coffee and Climate Change was held on January 31, 2013, in Palacagüina. (Photo: Nicaraguan Red Cross)

Capacity building



Workshop on chia cultivation with the June 5 Cooperative. (Photo: Nicaraguan Red Cross)

After the forum, training sessions were held on good agricultural practices, organic coffee growing, climate change and adaptation measures.

Some members of the June 5 Multiple Services Cooperative participated in two diploma courses, the first implemented with the Estelí Multi-Disciplinary Regional Faculty of Managua’s National Autonomous University of Nicaragua and the second with the Central American University (UCA). During these courses, participants learned about risk reduction management, climate change adaptation, river watershed management, and ecosystem management and restoration.

The cooperative also participated in an international scientific congress on agroecology organized by a local organization and the Latin American Scientific Society of Agroecology.

With the desire to support the diversification of its members’ income, the June 5 Multiple Services Cooperative asked the PFR Program to train the producers on alternative ways of responding to drought. It also obtained funding to promote the production of organic chia for export, with financial support from Bancentro and Root Capital.

Experience sharing exchanges

During the First Regional Forum an opportunity was identified for the June 5 Multiple Services Cooperative to hold an experience sharing exchange with the El Jícaro-Nueva Segovia cooperative, which uses biofilters to treat the wastewater produced by the coffee-washing process.

60 male and female coffee producers from the municipalities of Las Sabanas and San José de Cusmapa participated in the trip to the El Jícaro-Nueva Segovia cooperative to learn about the benefits they have obtained through the use of biofilters, which have reduced the contamination of water sources and allowed the treated water to be reused for coffee-washing.

¹⁴Video: “First Segovias Regional Forum on Coffee and Climate Change”

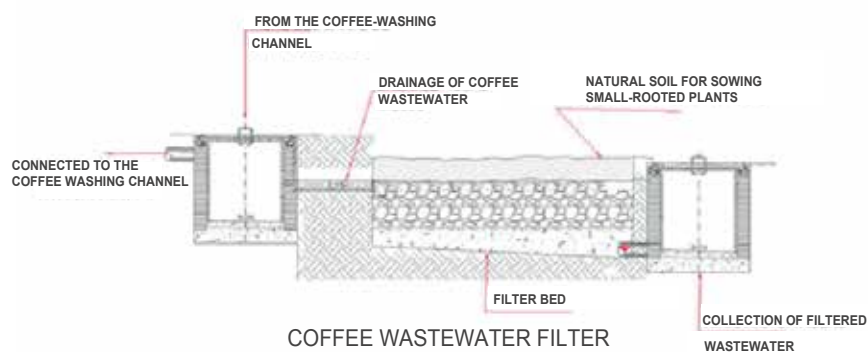




Gisella Hoyes, a producer from the community of El Castillo, benefited from the construction of a demonstration biofilter. (Photo: Nicaraguan Red Cross)

The farmers in the June 5 Cooperative were very interested in the biofilters and asked the PfR Program to help them build five demonstration biofilters on coffee-producing farms in the municipality of Las Sabanas, which was where the community vulnerability and capacity assessments identified the most serious cases of water source contamination.

The June 5 Cooperative and the PfR Program agreed on the selection criteria for who would benefit from the building of biofilters on their coffee farms and the following producers and communities were selected: Gersan Ismael Rivera Alvarado from the community of El Cipián; Virgilio Arturo Moncada López from Buena Vista; José Dolores Alvarado Mejía from Quebrada Honda; Justo Rufino Méndez from El Castillito; and Gisella Hoyes from El Castillo.



Components of a coffee wastewater filter

“Before this I didn’t know what to do with the water and coffee pulp, and we often left them in the alleys between coffee bushes, but it produced a bad smell. I’m happy now because the water we get is clean and we can use it for the trees on the farm.” Producer Ismael Rivera from the community of El Cipián in the municipality of Las Sabanas, who benefited from the construction of a biofilter.

A biofilter is a treatment system that filters coffee wastewater through sand to eliminate the coffee pulp. It includes the following components: a drainage channel and an excavation lined with plastic and filled with gravel, sand and stones, which help filter out the residues. Finally, the excavation is connected to a water collection tank where the filtered water is stored and can be reused to water vegetables or to wash more coffee, as the filtering reduces the levels of contamination, according to laboratory studies conducted by the Santiago cooperative.

In addition to the biofilters, a pulp treatment tank was also built, which is used to produce organic fertilizer.

Establishment of eco-forest coffee plots¹⁵

One of the most recent actions developed by the PfR Program was the development of three eco-forest coffee micro-projects in the communities of El Coyolito, San Lucas, La Fuente and El Rodeo in the municipality of San José de Cusmapa.

These microprojects were identified and formulated by the community members with the objective of re-establishing vegetation cover in areas degraded by inadequate agricultural practices. The aim is to improve the ecosystems, produce food, and provide families with economic income. A total of 29 one-manzana plots of land were established using coffee varieties that are among the most resistant to drought and coffee rust (e.g. Lempira).

Results

The coffee growers from the municipalities of Las Sabanas, San Lucas, Somoto and San José de Cusmapa gained knowledge on organic production and environmental management, as well as additional information on climate variability adaptation measures (in relation to the El Niño phenomenon), disaster risk management and ecosystem management and restoration.

¹⁵Eco-forest coffee is a production system that includes coffee plants, wood-bearing trees and fruit trees in the same cultivation area.



In the community of La Fuente in San José de Cusmapa, eco-forest coffee producers designed their plots of land using an A-frame level, a practice developed in that community's field school. (Photo: Nicaraguan Red Cross)

The producers in the June 5 Cooperative are promoting crop diversification on their farms as a climate change adaptation measure. One example of this is the cultivation and export of organically-managed chia.

The cooperative and the producers that benefited from the wastewater treatment system have shown an interest in replicating the technology that the Program promoted in five communities as a pilot measure.

The June 5 Cooperative's technical team and board of directors received technical training that strengthened their knowledge of comprehensive river watershed management and essential aspects of agroecology.

The PfR Program promoted the implementation of different learning methodologies—such as experience-sharing exchanges between organizations—that have proved attractive to the producers, who have shown an interest in continuing to apply them.

Lessons learned

The June 5 Cooperative had a multiplier effect, allowing small-scale producers to be sensitized, trained and involved in disaster risk reduction, climate change adaptation and ecosystem restoration and management.

The working relationship developed with the coffee producers allowed the implementation of a comprehensive risk management approach and the involvement of people with other specializations and knowledge who came to enrich the work on responding to climate change.

Building capacities through the application of different methodologies and tools, such as VCAs and CVCAs¹⁶, and the identification and formulation of social microprojects, adaptation strategies¹⁷ and watershed management plans¹⁶ has helped build community and institutional resilience.

Conclusion

Coffee is one of the crops that can strengthen the livelihoods of small-scale producers and contribute to community resilience, if cultivated with adequate agroecological management, taking into account aspects related to watershed management, land-use planning, risk reduction and climate change adaptation.

¹⁶VCA = vulnerability and capacity assessment (a Red Cross tool); CVCA = climate vulnerability and capacity analysis (a CARE tool).

¹⁷See the case study "Paso a Paso en la adaptación al cambio climático en cuatro municipios del departamento de Madriz y la Región Autónoma Costa Caribe Norte" (Step by step in climate change adaptation in four municipalities of the department of Madriz and the Northern Caribbean Coast Autonomous Region) (in Spanish): <http://www.desaprender.org/clip/nicaragua-adaptacion-n-al-cambio-clima-tico-pdf>

¹⁸See the case study "Subcuencas Río Inalí y Río Tapacalí: Unidades territoriales ideales para conducir procesos de Adaptación al Cambio Climático, Reducción de Riesgos de Desastres y Manejo de Restauración de Ecosistemas" (The Inalí and Tapacalí Sub-watersheds: Ideal territorial units for conducting climate change adaptation, disaster risk reduction and ecosystem management and restoration processes) (in Spanish): <http://www.desaprender.org/clip/nicaragua-subcuencas-ri-o-inali-y-tapacali-pdf>

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