Environmental Leadership & Training Initiative

COURSE REPORT

Training of Trainers on Ecological Restoration Strategies for Agricultural Landscapes

Parita, Province of Herrera, Panama
September 18-19, 2024

A field course organized by:
The Environmental Leadership & Training Initiative (ELTI) in collaboration with the United States Peace Corps

Peace Corps Volunteers (PCVs) learn about the 40 different dragon fruit varieties planted in the Don Lolo Farm.

Background: The Republic of Panama provides a critical link in global trade via the Panama Canal and is one the fastest growing economies of Latin America. However, Panama suffers from stark economic disparities. Extreme poverty is common in rural areas, especially indigenous territories. Economic opportunities are sparse, and landowners often rely on conventional agriculture and cattle ranching practices that involve the cutting and

PCVs learn about the management of dragon fruit in agroforestry systems.

burning of forests to plant annual crops and pasture grasses. When practiced on marginal, steeply sloped land, soils quickly erode and lose fertility, resulting in low agricultural production and biodiversity loss. Consequently, a third of Panama's agricultural lands are highly degraded, severely impairing ecosystem services such as soil fertility, provision of water, carbon sequestration, and biodiversity - all of which enable human wellbeing. While advances in ecological restoration have been shown to enhance biodiversity and productivity in farms, they are uncommon due to the lack of knowledge and accessible information available.

Given this context, rural landholders can benefit from capacity development about sustainable land use practices to adapt to climate change. Invited by the Panamanian Government, the United States Peace Corps helps to address this need by sending pro¬fessionals to "work at the grassroots level toward sustainable change that lives on long after their service (USPC 2017)." Peace Corps volunteers (PCVs) are assigned for a two-year period to rural communities that request Peace Corps assistance and work in collaboration with Panamanian partners. The cultural exchange and development assistance that PCVs provide is critically important to empower rural people to make informed and sustainable decisions.

To strengthen the technical and leadership skills of PCVs from the Community Environmental Conservation sector in their role as extension agents, ELTI delivered a "training of trainers" (TOT) course, which was facilitated as part of the Peace Corps Panama's "In-Service Training," a two-week technical training offered to PCVs after serving five months in their respective communities.

PCVs practice transplanting native tree seedlings into bags.

Course Objectives: The objective of this TOT course was to provide PCVs with the basic knowledge and skills to effectively communicate and facilitate forest restoration strategies with community counterparts.

Content: The course was divided into four training modules, illustrated through introductory lectures, field-based demonstrations, and group exercises facilitated by ELTI affiliates and ELTI alumni/model farm owners:

Module 1: Forest ecology, disturbance, and degradation

Module 2: Forest restoration and agroforestry strategies

Module 3: Native tree species propagation and reforestation

Module 4: Effective approaches to communicate restoration to others

Field-Course Format: The course took place over two days. The first day focused on introductory presentations, followed by a second day of practical field-based activities. The course included the following activities:

Day 1: Jacob Slusser (Global Training Landscapes Manager) was invited to the Peace Corps Panama office in Panama City to facilitate an introductory presentation about the course themes. Slusser in collaboration with Peace Corps personnel welcomed the participants and facilitated introductions. Slusser then presented about ELTI and the objectives of the course, followed by the principles of ecological restoration, which illustrated how tropical forests function and produce ecosystem services, the range of forest restoration strategies, and the basics of agroforestry systems. At the end of the presentation, volunteers discussed the barriers they have faced to communicate conservation themes in their communities and Slusser provided feedback on how to overcome them.

PCVs practice grafting dragon fruit.

Day 2: Peace Corps Panama staff and volunteers (PCVs) traveled to Parita, Herrera Province to the Don Lolo Farm, owned and operated by ELTI alumnus Rolando Villalobos. The participants were greeted by Villalobos and officials from Panama's Ministry of Agricultural Development, who have also supported Villalobos on his farm. After introductions, Villalobos discussed the history and objectives of the family farm, detailing how he has transformed the farm from a conventional cattle ranch to silvopastoral and agroforestry systems. His main motivation was to enable his farm with greater climate resilience, which is located within the Dry Arc of Panama, one of the driest and degraded regions of Panama.

Villalobos led a guided tour of his farm, starting with his multi-strata dragon fruit agroforestry system. He explained that he decided to utilize dragon fruit because it is a native species that grows well in the region and can be combined with other fruit trees and crops. Villalobos described how he experimented making a trellis for dragon fruit, utilizing wood from the farm and recycling old tires, which are often abandoned in local communities. He also demonstrated how he uses live stakes, which provide a living trellis but also forage for cattle and habitat for local wildlife. The PCVs learned the different steps of establishing a dragon fruit agroforestry system, including trellis construction, planting, organic fertilizer application, pruning, and harvesting. Villalobos also demonstrated dragon fruit grafting techniques and the PCVs practiced combining selected scions to robust root stock. During the visit, Villalobos addressed many of the challenges and lessons learned growing dragon fruit. Slusser provided additional insight about agroforestry strategies that facilitate synergistic benefits. He emphasized integrating multi-purpose native tree species to facilitate soil and water conservation, which improves overall farm resiliency.

Next, participants visited the silvopastoral system, which is composed of a forage bank, small rotational paddocks, multi-strata living fences, mango shade and fruit trees, and a cattle aqueduct system. Villalobos explained how he converted his farm to more regenerative practices by intensifying the area through pasture rotations and increasing species diversity. He emphasized how the farm used to maintain his herd for only six months of the year, which resulted in high costs to rent neighboring farms to graze his cattle, while his pasture recovered. But with the implementation of the silvopastoral system, his cattle remain on his farm throughout the year and produce much more milk and meat than in the past. Slusser reiterated the importance of integrating high plant species richness within multiple strata, which mimics the natural tropical forest ecosystem and therefore lowers the dependency on outside inputs and increases farm resiliency to climate change. Slusser also discussed simple and practical methods to explain ecological and regenerative practices to local landowners, drawing upon the example of how Villalobos, a skilled facilitator, uses humor, simple analogies, and hand's-on activities to describe complex agroforestry principles.

PCVs learn about identifying native tree species to facilitate seed collection of preferred trees.

After lunch, the PCVs learned about the construction of tree nurseries and the propagation of native species. Slusser described how to account for different factors and the steps to construct a small-scale community tree nursery. Next, PCVs constructed a seed germinator bed, learning about different species, their phenology, seed types, storage, and germination process. Once the bed was constructed and disinfected, they practiced scarifying seeds and varied planting practices. The PCVs also learned about making substrate and practiced mixing and filling bags. Finally, they transplanted seedlings from the seed germinator bed into prepared bags and sapling care techniques. To conclude the nursery session, Slusser stressed the importance of carefully selecting tree species for reforestation projects based on their ecological and social importance, since selected tree species must be able to function in degraded site conditions as well as have value for local people.

Next, Slusser led a session on technical approaches to establish and manage agroforestry systems. He asked participants to rate the agroforestry systems on the Don Lolo Farm, based on the principles discussed during the introductory lecture. Participants discussed the strengths and weaknesses of each system and brainstormed on ways to enhance them through enrichment planting and management. Next, Slusser demonstrated how to select species based on their functional and site adaptability characteristics – which ensures that the right species is planted in the right place at the right time. Slusser then demonstrated how to measure spacing for agroforestry systems on hillsides, via an A-level to mark contour lines and three-meter poles to measure a triangular planting pattern. Both techniques effectively facilitate soil and water conservation on steep slopes. Participants were tasked to use the tools to measure an area to be planted.

Afterwards, Slusser demonstrated effective tree planting practices in terms of sapling size requirements, site selection, hole depth, and fertilizer types. Participants were then tasked with selecting specific tree species to improve a shade coffee agroforestry system and a beef cattle silvopastoral system. Slusser provided feedback on their selections and planting techniques and demonstrated maintenance practices such as mulching, fertilizing, pruning, and thinning.

To conclude the course, PCVs raised doubts on how to conduct conservation and restoration efforts in their communities. Slusser facilitated a brainstorming session on ways to overcome these challenges and methods ELTI utilizes to systhesize restoration science into practical terms.

A group photo of PCVs with their transplanted native tree seedlings.

Participants: This course was developed for 18 Peace Corps Volunteers (PCVs) serving in Panama as extension agents in the Community Environmental Conservation (CEC) sector. PCVs serve for two years in rural communities of Panama, assisting landholders and local groups in designing, planning, and implementing biodiversity conservation and forest restoration projects.

The course was developed and facilitated by Jacob Slusser, ELTI's Global Training Landscapes Manager. Rolando Villalobos, ELTI alumnus and owner of the Don Lolo Farm facilitated the farm visit. Peace Corps Panama CEC staff members Francisco Santamaría, Leyla Wittgreen and Sara Caez-Rivera managed the logistics during the training.

Outcomes and Follow-up: Participants were actively engaged throughout the course and were grateful for the opportunity to receive practical training on forest restoration and agroforestry strategies, which is of high interest in their communities. Participants rated the course a 4.9 out of 5. The PCVs expressed interest in attending ELTI's 5-day forest restoration course with a community counterpart. Additionally, PCVs discussed visiting ELTI's model silvopastoral farm networks that are close to their communities, to learn how other landowners have adopted restoration strategies.

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