Environmental Leadership & Training Initiative

COURSE REPORT

Training of Trainers:

Ecological Restoration Strategies in Agricultural Landscapes of Panama

Province of Chiriquí, Panama
August 26-28, 2018

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

A Peace Corps Volunteer planting native tree species to reforest a degraded stream bank within a local cattle ranch.

Background: The Republic of Panama is known for providing a critical link in global trade via the Panama Canal, as well as its impressive economic growth in Latin America. Despite this progress, Panama suffers from stark regional disparities. Extreme poverty is still high in rural areas at 27%, while indigenous territories are above 40%[1]. Economic opportunities in rural areas are sparse and landowners often rely on conventional agriculture and cattle ranching practices that involve the cutting and burning of forests to plant annual crops and pasture grasses. When practiced on marginal, steeply sloped land, soils quickly erode and lose fertility, leading to low agricultural production, decreased ecosystem integrity, and few social benefits. As a result, the

1. World Bank Panama Profile: http://www.worldbank.org/en/country/panama/overview

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Photo: Eli Wittum

Volunteers learn about practical ways to prepare and measure sits for reforestation.

FAO (2014)[2] estimates that 27% of Panama's agricultural lands are dry and degraded, which severely impairs the ability of these areas to generate the range of ecosystem services necessary to support sustainable production systems including soil fertility, provision of water, carbon sequestration, and biodiversity.

Given this context, rural landholders can benefit from capacity building and access to information about more sustainable land use practices, especially considering changing climatic conditions. Invited by the Panamanian Government, the United States Peace Corps helps to address this need by sending professionals to "serve as Peace Corps Volunteers (PCV), who work at the grassroots level toward sustainable change that lives on long after their service[3]." Volunteers are assigned for a two-year period to rural communities that request assistance from the Peace Corps. The cultural exchange and development assistance that PCVs provide is critically important for improving human capacity, providing better opportunities for rural people and sharing goodwill between countries.

To strengthen the technical background of PCVs in their role as environmental conservation extension agents, ELTI delivered a "training of trainers" 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 six months in their respective communities.

Course Objectives: The general objective of this training of trainers course was to provide PCVs with the basic knowledge and skill sets needed to teach and facilitate forest restoration strategies with community counterparts in their host sites. Since their communities are comprised of a mosaic of agriculture and cattle ranching systems, the course focused on introducing a range of strategies that can help to restore ecological function to create landscapes that are more resilient to climate change. The course also focused on providing PCVs with the tools to disseminate and train others on how to utilize restoration knowledge and skills.

2. Panama America (11/20/2014): http://www.panamaamerica.com.pa/economia/27-de-deterioro-registran-algunas-tierras-del-pais-953263
3. United States Peace Corps Website: https://www.peacecorps.gov/volunteer/

José Montero, a local farm owner with over two decades of sustainable ranching experience, explains how he restored the forest cover around the riparian area within his farm.

Content: The course was divided into three training modules, illustrated through introductory lectures, field-based demonstrations, and group exercises facilitated by ELTI Staff and guest experts:

Module 1: *Forest ecology, disturbance and degradation*
Module 2: *Forest restoration conceptual model and strategies*
Module 3: *Technical approaches to native tree species propagation and reforestation*

Day 1: Participants traveled to the La Amistad International Park, a Transboundary Protected Area and UNESCO World Heritage Site, located in Las Nubes, Chiriquí Province, Panama. Participants received an introductory presentation about the park from Panama's Ministry of Environment. The presentation discussed the importance of the area, being situated within the Mesoamerican Biological Corridor and how it serves as a testament to cross boundary collaboration. The talk was followed by an introductory presentation about ELTI's efforts in Panama to conduct environmental training to decision makers, facilitated by Jacob Slusser (Neotropics Training Program Panama Coordinator). Next, Jacob presented on tropical forest ecology and restoration approaches, which covered both theoretical and practical methods of restoring forests in human-dominated landscapes. The presentation also included practical approaches to communicating restoration techniques and strengthening environmental leadership to landowners. The day finished with participants hiking a short interpretive trail loop within the park.

Day 2: The day began with a visit to a local dairy farm, where owner José Montero has been implementing conservation practices for the past twenty years. Participants visited a riparian area where José conducted numerous restoration strategies to increase forest cover, as it is the primary source of water for the farm. The owner described the importance of protecting the stream not only to sustain dairy production but also to provide habitat for flora and fauna. Participants also learned about the principles of sustainable cattle ranching which includes protecting water sources, reintegrating ecological processes into pastures through increased forest cover and conducting pasture rotations to avoid soil compaction and overgrazing.

Next, participants visited José's vermiculture system, where he uses worms to decompose the cow manure from the dairy stalls. The decomposed manure or vermicompost is then applied to pastures and crops and sold as a foliar fertilizer. Finally, participants visited José's tilapia fish tanks, which utilize the water from the conserved riparian area to produce another source of income for the farm. Overall, the farm was a prime example of how multiple restoration strategies and integrated ecological practices can be utilized to sustain agricultural production.

Participants then traveled to a tree nursery established by the Association of Agricultural Producers for the Conservation of the Environment (APACA), located in the town of San Miguel de Gómez. The president, Alerio Pitti described the association's objectives and activities focusing on sustainable agriculture. Afterwards, Jacob led a tree species identification walk, discussing different native species that are commonly found in agricultural areas. Jacob also focused on teaching the traditional uses, functional characteristics

Jacob Slusser discusses best practices for nursery establishment.

Volunteers practice tree planting techniques learned during the course to reforest a degraded area of a farm.

and phenology of species, so that PCVs could understand how to adequately select species for different restoration endeavors.

After lunch, Jacob led a session about how to construct a small-scale community tree nursery. Before commencing, Jacob reiterated that reforestation should always be the last option when developing a forest restoration strategy due to its complexity and high cost in terms of time and resources. To start, Jacob discussed the objectives and site considerations for developing nurseries. Next, PCVs constructed a seed germinator bed, learning about different seed types, storage and scarification processes. Once the bed was constructed and disinfected, participants practiced scarifying seeds and varied planting practices. Participants also learned about making substrate and practiced mixing and filling bags. Finally, participants transplanted seedlings from the seed germinator bed into prepared bags. To conclude the nursery session, Jacob 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.

For the reforestation activitiy, Jacob led a field-based session to demonstrate different tree planting techniques and had participants plant trees in a designated riparian area of a local farm. Jacob demonstrated practical strategies for establishing different reforestation plots and sizes, utilizing simple tools such as a roll of twine and lightweight three-meter PVC tubes to quickly and accurately measure out planting distances. Afterwards, Jacob discussed best planting practices, specifically calling attention to digging 40-centimeter holes to break compact soils and planting saplings with high amounts of organic material or by using beneficial microorganisms from nearby forest soils. He also discussed post-planting maintenance including fertilizing, mulching with cardboard, and digging mini-swales and barrier walls for sediment and water catchment. Participants then worked in teams to plant 50 trees in the two sites utilizing the methods they had learned.

Day 3: The same field-based activities were conducted for the second group of 11 participants. At the end of the day, time was reserved for final questions and discussion. Participants also completed course evaluations.

A group photo of Peace Corps Volunteers and Staff, Ecological Police Officers from Panama's National Police Force and personnel from Panama's Ministry of the Environment at the entrance of the La Amistad International Park.

Participants: This course was developed for 22 Peace Corps Volunteers serving in Panama as extension agents in the Community Environmental Conservation sector. These PCVs serve for over 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 Neotropics Training Program Panama Coordinator, with the assistance of Peace Corps Panama staff and local landholders. Local land owner José Montero and APACA President Alerio Pitti facilitated visits during the training and Peace Corps Panama Staff Members Francisco Santamaría, Leyla Wittgreen and Sara Caez Rivera also assisted in sessions during the training. Eli Wittum, Peace Corps Response Volunteer who serves as ELTI's Multi-Media Specialist, documented the event by taking photos and video of the event.

Outcomes and Follow-up: Participants were actively engaged throughout the course and were grateful for the opportunity to receive practical training on forest restoration strategies, which is of high interest in their communities. Participants rated the course a 4.8 out of 5 on course evaluations. Many PCVs expressed interest in attending ELTI's 5-day forest restoration course offered at the Azuero focal training sites. In addition, PCVs discussed possible ideas for participating and requesting assistance from ELTI's Leadership Program to develop restoration projects in their communities.

This event was possible thanks to Arcadia Fund, whose Environmental Conservation grants support programmes that protect and enhance biodiversity, and provide field training and academic research.