

## COURSE REPORT

# Ecological Restoration Strategies for Cattle Ranching Landscapes of the Azuero

ELTI Focal Training Sites  
District of Pedasi, Province of Los Santos  
September 18-22, 2017

A field course organized by:  
The Environmental Leadership & Training Initiative (ELTI)  
and the Association of Livestock and Agro-Silvopastoral Producers of Pedasi (APASPE)



Photo: Saskia Santamaría

Participants learn about assisted natural regeneration at ELTI's Focal Training Sites in the Azuero Peninsula.



ESTRATEGIAS PARA  
LA RESTAURACIÓN ECOLÓGICA  
EN PAISAJES GANADEROS DE AZUERO

**Background:** The tropical dry forest, the most endangered ecosystem in the Neotropics, is threatened by the dominance of extensive conventional cattle ranching. The consequences of this land use system are particularly evident in the dry forest ecosystem of Panama's Azuero Peninsula. Deforestation and soil degradation have impaired ecosystem services, which are necessary to support ranching and agricultural livelihoods. In addition, the extremes in rainfall and drought associated with climate change further compound the stresses of unsustainable land use practices and make efforts to restore the ecosystem

ELTI is an initiative of:

**Yale** SCHOOL OF FORESTRY &  
ENVIRONMENTAL STUDIES

In collaboration with:

Smithsonian Tropical Research Institute  PANAMA



Photo: Jacob L. Slusser

Saskia Santamaria delivers an introductory lecture about ELTI.

particularly challenging. Nevertheless, advances in forest restoration and silvopastoral system (SPS) practices have shown to enhance production and ecosystem services in cattle ranching landscapes. SPS integrates trees, forage shrubs, and livestock production for a more efficient land use system. Unfortunately, these practices are virtually absent from the Panamanian landscape, mostly due to the lack of information and incentive available to cattle ranchers.

To strengthen forest restoration capacity, ELTI offers practical, hands-on field-based courses facilitated at ELTI's Focal Training Sites located in the Azuero Peninsula. At the Focal Training Sites, course participants learn the importance of the scientific method in the development of sound restoration strategies from on-going research and group exercises in the model farms, interpretative trail networks, and demonstration areas. To communicate the practices and benefits of forest restoration to other landowners in a practical and culturally appropriate manner, ELTI integrates landowners from the Association of Livestock and Agrosilvopastoral Producers of Pedasi (APASPE) as co-facilitators. APASPE is a local organization of environmental leaders at the forefront of transforming the Panamanian ranching sector by promoting the use of sustainable practices in order to benefit the environment, producers, their families, and other inhabitants of the region. APASPE members effectively disseminate their knowledge and experiences to other decision makers by facilitating "farmer to farmer" exchanges on their model farms.

This training was offered to officials from Panama's Ministry of the Environment, who are responsible with implementing Panama's national reforestation initiative: The One-Million Hectare Reforestation Alliance (Reforestation Alliance). Over a period of five days, course participants learned the technical skills necessary to design and implement strategies to increase forest cover and ecosystem services in cattle ranching landscapes, as part of their responsibility to implement the Reforestation Alliance. Additionally, participants had the opportunity to learn and exchange experiences, concepts, and practical tools with ELTI facilitators, local experts, and peers.



Participants conduct a macrofauna analysis of mature forest soils.

**Course Objectives:** The overall goal of the course was to educate the ministry officials on the role that forests play in providing ecosystem services as well as the types of restoration strategies that can be integrated into agricultural landscapes to restore forest cover, ecological function and sustain production.

**Content:** The course was divided into six training modules, illustrated through introductory lectures, field-based demonstrations, and group exercises facilitated by ELTI staff and APASPE members, as follows:

**Module 1:** *Forest ecology and ecosystem services*

**Module 2:** *Limitations for the restoration and provision of ecosystem services*

**Module 3:** *Strategies for restoring ecosystem services in ranching landscapes*

**Module 4:** *Sustainable cattle ranching, environmental and productive contributions*

**Module 5:** *The role of community associations in restoring degraded cattle ranching landscapes*

**Module 6:** *Final exercise: Developing a farm plan for forest restoration*

**Field-Course Format:** This course took place over five days at ELTI's Focal Training Sites in the tropical dry forest, located in the Province of Los Santos in the Azuero Peninsula. These sites demonstrate the varied biophysical and socio-economic contexts of different types of land use: (1) the Achotines Forest Reserve, a mature tropical dry forest; (2) the Madroño property, an abandoned cattle pasture in the early stages of a regenerating secondary forest; (3) IDB Forestal, a native species tree plantation that incorporates cattle grazing in the understory; and (4) the APASPE model farms, which are privately-owned by members who have established silvopastoral and agroforestry systems, home gardens, and riparian forest restoration. The following activities occurred throughout the week:

**Day 1:** Course participants arrived at the Achotines Tuna Laboratory and were given an introduction to the laboratory and a tour of the installations. ELTI staff facilitated introductions and each ministry official explained the challenges they were experiencing implementing the Reforestation Alliance and what they hoped to learn from the course. After introductions, Saskia Santamaria (Neotropics Training Program Assistant) facilitated an introductory presentation about ELTI and the objectives of the course. Jacob Slusser (Neotropics Training Program Panama Coordinator) delivered a lecture on the importance of ecosystem services and how tropical dry forests provide them.

**Day 2:** Jacob presented an introductory lecture on forest ecology and degradation of Panama's tropical dry forests. Afterwards, he led a field trip on ELTI's interpretive trail network, within the Achotines forest, where participants visited six different demonstration areas. The walk included the following topics: dry forest species identification, functional characteristics, successional guilds, forest regeneration and successional phases, and hydrological cycles in riparian areas. In addition, participants worked in groups to conduct soils assessments on macro-fauna,



Photo: Jacob L. Slusser

Odielca Solis discusses her solar powered cattle aqueduct system and its advantages to protect riparian areas while providing clean water and the ease of conducting pasture rotations.



Photo: Saskia Santamaria

Participants conduct a site diagnostic and develop restoration strategies on a local farm.

soil structure, texture, infiltration, and pH, comparing differences between a ridgetop and lowland forest.

Afterwards, Jacob presented on a range of passive and active forest restoration strategies utilized in agricultural landscapes. Following the lecture, Jacob led field visits to two properties demonstrating different restoration strategies. At the Madroño property, participants were shown the results of passive and assisted natural regeneration (ANR) activities in a ten-year-old abandoned cattle pasture. The practices ranged from selective cleaning around desired species to enrichment planting where favored species were absent. Participants also visited IDB Forestal, an active restoration example where native tree species plantations were established and cattle were released to graze in the understory once the trees reached a certain height. Ranch manager Jaime Madrid explained the owner's objectives and management regime. The two sites were compared in terms of their success to achieve the owner's goals while considering cost efficiency.

In the evening, Jacob delivered an introductory lecture about sustainable ranching

methods via SPS. Jacob presented SPS not just as a model for production, but as a tool to facilitate ecological restoration by increasing biodiversity and utilizing conservation practices to recuperate ecosystem function.

**Day 3:** Belgis Madrid, President of APASPE, presented on the experience of creating and managing a community-based group. He specifically discussed the process of obtaining legal status, the planning and application for project funding, the implementation and management of the APASPE project, and strategies for disseminating the successes and challenges to others.

Participants then traveled to the small town of Los Asientos to meet APASPE members and visit three different model farms that demonstrate a range of restoration practices. The owners of these farms integrate diverse forest cover while maintaining production in pastures via the use of living fences, natural regeneration of trees in pastures, restoration of riparian areas, intensive SPS, mixed forage banks, grazing within forest plantations, and agroforestry. The owners shared their experience of transforming conventional cattle ranches into SPS and the resulting improvement of ecosystem services and increased on-farm production.



The day also focused on restoration of riparian areas. Although sources of water are critical for ranchers, they are often degraded due to deforested buffer zones and open riparian access to cattle. In the field, participants visited two different cattle aqueducts that utilize water banks, reserve tanks, and solar powered pumps to provide clean water. Water delivery systems are a crucial alternative to cattle freely utilizing riparian areas as a source of water. Therefore, these systems help conserve gallery forests and water sources as well as facilitate the division of pastures for more productive intensive rotational systems.

**Day 4:** The final full day of training focused on putting the course concepts into practice. Participants visited a farm that had suffered high levels of degradation due to

conventional cattle ranching practices. At the farm, they worked in groups to conduct a site diagnostic utilizing a conceptual restoration model to develop their strategy to increase forest cover. Groups presented their plans to the owner of the farm, who provided feedback. The visit also focused on discussing best practices for conducting reforestation efforts with farmers, the challenges that ministry officials face, and strategies that can help overcome difficulties.

For the final exercise, participants were tasked with applying ELTI's farm planning methodology to a property from each official's home region. The planning methodology is a useful tool for extension agents working with property owners, as it assists the landowner in developing a clear process for implementation of their restoration strategy. Before starting the exercise, Jacob provided an introductory lecture on the ten-step farm planning process including: drawing a property map, rating and qualifying the property on twelve indicators, planning restorative activities in a table, and then updating the farm map to illustrate interventions. Officials worked in pairs and utilized the knowledge and skills acquired from the course to develop management plans. Each pair presented and received feedback from the facilitators.

Saskia presented ELTI's Leadership Program and the types of resources and support that ELTI provides to its alumni. She discussed various examples of how ELTI alumni have requested support and implemented course themes in the field. Participants filled out course evaluations and submitted them to ELTI Staff. To close the course, course certificates were presented to the participants and a group photo was taken. Afterwards, participants, ELTI Staff, and APASPE members joined together for a final dinner to celebrate the completion of the course.

**Day 5:** Course Participants departed back to their communities.



Participants and facilitators at the conclusion of the training course.

**Instructors and Coordinators:** The course was facilitated by ELTI's Neotropical Training Program Staff: Jacob Slusser (Panama Coordinator) and Saskia Santamaría (Program Assistant). Saskia introduced the course objectives to the participants, as well as ELTI's Leadership Program at the conclusion of the course. Jacob delivered introductory lectures and field demonstrations on the concepts of ecosystem services, forest ecology, restoration strategies, and sustainable ranching systems (SPS). In addition, course collaborators: Jaime Madrid of IDB Forestal, Jorge Gutierrez (ELTI), Belgis Madrid, Zoilo Vergara, Odielca Solís, and Dolores Solís of APASPE facilitated portions of the field trips to their model farms.

**Participants:** The course was offered to officials from region offices of Panama's Ministry of the Environment, who are leading efforts to implement the One-Million Hectare Reforestation Alliance. Participants were selected by Michael Rodriguez, the Ministry's National Coordinator for the Reforestation Alliance.

**Course Follow-up:** Participants were actively engaged in learning about the range of restoration strategies that can be applied in agricultural landscapes. Officials will work with their staff to implement forest restoration activities. Numerous officials expressed interest in applying for Leadership Program support to facilitate further training activities for them and their staff at ELTI's Focal Training Sites.

**Cost:** This course was offered at no cost for 15 selected participants thanks to collaborative support from the generous donations of Panama's Ministry of the Environment and the Arcadia Fund (<http://www.arcadiahfund.org.uk>).

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*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.*