Environmental Leadership & Training Initiative

COURSE REPORT

Tropical Forest Restoration Strategies for Human Dominated Landscapes

ELTI Training Landscapes
District of Pedasí, Province of Los Santos
December 8-13, 2019

A field course organized by:
The Environmental Leadership & Training Initiative (ELTI),
the World Wildlife Fund's (WWF) Russel E. Train Education for Nature Program (EFN) and
the Association of Livestock and Agrosilvopastoral Producers of Pedasi (APASPE)

Photo: Eli Wittum

Participants learn to identify key tree species found in the tropical dry forest.

Background: As a result of its geological history, Panama possesses an extraordinary biodiversity. As the last part of the Central American isthmus to emerge from the sea some 3.5 million years ago, the country became a natural bridge that has allowed the exchange of living organisms from North and South America. However, like many other developing countries in Latin America, Panama has suffered extensive deforestation, which has been favored by an economic model and policies that promote the transformation of forests into cultivated land and livestock production as well as for urbanization, mining and infrastructure development. Therefore, Panama's forests are rapidly degrading and disappearing and with them, a wide range of ecosystem services of great importance for supporting life on the planet.

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Participants conduct an analysis of macrofauna in forest soils to learn about and soil health.

One ecosystem, the tropical dry forest, is the most threatened ecosystem in the Neotropics. Panama's tropical dry forest ecosystem is principally found in the most degraded region of Panama, the Azuero Peninsula, the result of centuries of deforestation and conventional cattle ranching, the most common land-use practice in Latin America. With an erratic annual rainfall and a dry season lasting from five to six months, the Azuero's extreme climate variations compound the stresses of unsustainable land-use practices and make efforts to restore the ecosystem particularly challenging. Understanding of the principal ecological processes that govern the function of forests' ecosystems in addition to the socio-economic contexts are critical to inform decision makers how to facilitate informed conservation and restoration strategies. Tropical forest restoration provides an opportunity to transform these degraded areas into resilient landscapes that offer ecological and social benefits.

While in recent years valuable information has been generated in restoration research, it has not been effectively transmitted to the various stakeholders that influence the management of landscapes. In fact, within Latin America there is a great need for training opportunities to help guide informed decision making about the management, use and restoration of tropical forests. Therefore, since 2006 the Environmental Leadership and Training Initiative (ELTI) has been facilitating conferences and training courses in order to provide different stakeholders with the knowledge and tools on how to conserve and restore forests in the tropical regions of Latin America and Asia. This field-based course was developed for forest reforestation professionals working in agricultural mosaic landscapes in Latin America that were awarded a EFN Reforestation Grant from WWF, to provide them with the practical basis necessary to design and implement conservation and restoration strategies to increase the biodiversity and resiliency of landscapes. Over six-days, the course was facilitated at ELTI's Training Landscape in Panama's Azuero Peninsula, which conveys restoration principles through lectures, field visits and exercises conducted at demonstration sites and model farms from expert trainers and local landowners.

A participant consulting her field guide during a visit to the old growth stand of the Achotines Forest Reserve.

Objective:: The main objective of this course was to provide participants with a practical, hands-on forest restoration experience in order to guide them in the successful implementation of their community-based reforestation projects.

Content: The course was divided into five training modules, illustrated through introductory lectures, field-based demonstrations, and group exercises facilitated by ELTI staff and local experts, as follows:

Module 1: Tropical dry forest ecology
Module 2: Limitations for the restoration of tropical dry forests
Module 3: Strategies for restoring ecosystem services in agricultural landscapes
Module 4: The role of community organizations in forest restoration
Module 5: Developing a forest restoration management plan

Field-Course Format: This course was facilitated through classroom lectures, field visits, active group exercises and a capstone forest restoration management plan. It took place over six days, starting in Panama City and the remainder at ELTI's Training Landscape in the tropical dry forest, located in the Province of Los Santos in the Azuero Peninsula. ELTI's Training Landscape demonstrates the varied biophysical and socio-economic contexts of different types of land use: (1) the Achotines Forest Reserve, a tropical dry forest ecosystem with some of the last preserved old growth forest as well as regenerating younger secondary forest; (2) IDB Forestal, a native timber tree plantation that incorporates cattle grazing and ecotourism for multiple income generation; and (3) the APASPE model farms, privately-owned by members who have conducted different forms of forest restoration including, native species reforestation and the establishment of silvopastoral and agroforestry systems.

Photo: Eli Wittum

José Vargas, Panama Coordinator for The Peregrine Fund presents The Peregrine Fund's efforts to conduct forest restoration for harpy eagle habitat.

Day 1: Course participants were welcomed to Panama and after introductions, an overview lecture about Panama was facilitated by Jacob Slusser (Neotropics Training Program Panama Coordinator) and Saskia Santamaría (Neotropics Training Program Associate). The presentation consisted of a detailed introduction of Panama covering historical, political and ecological themes in order to provide participants with a clear understanding of the factors that have influenced the current context. After the presentation, students were taken on a tour of Panama City, stopping at both historical sites such as Panama Viejo, Casco Viejo and the former Canal Zone, as well as sites of interest such as the Panama Canal's Miraflores Locks. The day concluded with a dinner of traditional Panamanian cuisine.

Day 2: The group departed Panama City and traveled the five hours to Achotines Tuna Laboratory and were provided a tour of the installations. Afterwards, Saskia presented on ELTI's capacity building model in Panama, discussing the needs for training in Panama, audiences, types of courses and the development of ELTI's Training Landscapes to facilitate interactive field-based courses. Later on, Jacob lectured on the forest ecology of the tropical dry forest. The lecture provided participants with an overview of the key species and dynamics, before visiting mature and secondary forest stands during the field visit.

Day 3: Jacob led a walk on ELTI's interpretive trail network, within the Achotines Forest Reserve. Participants were able to learn about a mature tropical dry forest, its seasonal characteristics and visualize the type of ecosystem which farmers originally encountered in the area over 100 years ago. Participants also visited different demonstration areas to complement the following ecological principles: species identification and their functional characteristics, forest regeneration pathways, successional phases and buffer zones in riparian areas. In addition, participants worked in groups to conduct soils assessments on macro-fauna, soil structure, texture, infiltration, and pH, comparing differences between a ridgetop and lowland forest. Participants also observed wildlife in the forest including several bird species and large mammals such as white faced and howler monkeys. Overall, participants gained a better understanding of the floristic composition, interactions between flora and fauna and the ecosystem services produced in different aged stands.

Participants visited a younger secondary forest, which had been cattle pasture twenty years prior. They were able to observe the difference in species composition, structure and wildlife presence from the mature forest. Furthermore, it emphasized that forests can often recover after disturbance, without human intervention, especially when conditions are ideal.

Participants present their transplanted saplings during the native species propagation exercise.

After the walk, Jacob lectured on the social and economic history of deforestation and degradation drivers of tropical dry forests of the Azuero, in order to provide a background on how the landscape transformed over time. Understanding how human influence impacts both degradation and restoration decisions is key to making informed decisions.

In order to learn more about local NGOs conducting wildlife conservation, participants received a presentation from José Vargas, Panama Coordinator for The Peregrine Fund, which focuses on harpy eagle conservation. José discussed the mission and objectives of the organization and how their approach has evolved from strictly conservation to a more integrated ecological restoration focus. In addition, José stressed the importance of working with local communities and landowners in order to conduct conservation and restoration of harpy eagle habitat. He discussed the challenges of working with farmers who often consider wildlife as a threat to their crops as well as the strategies to overcome these barriers. As an alternative, increasing awareness and educational opportunities for local people can help change assumptions and inspire sustainable alternatives that strengthen conservation efforts while also improving livelihoods.

Next, Jacob lectured on the passive to active range of forest restoration strategies that can be utilized in agricultural landscapes, including (1) natural regeneration; (2) assisted natural regeneration; and (3) reforestation. Following the lecture, Jacob led a field visit to IDB Forestal, an active restoration example. Participants were informed on the owner's objectives and how they influence the management of the property. One objective is to produce both timber and cattle by reforesting old degraded pastures and allowing grazing in the understory once the trees are large enough to not be trampled by the cattle. The other objective is to generate income by renting out a guest house for tourists who prefer wildlife watching. Participants visited plantations with differing ages and species mixtures to discuss how to conduct tree species selection and long-term monitoring and management based on varied site characteristics and objectives. Additionally, natural regeneration and reforestation were compared in terms of their success to achieve different goals while considering cost efficiency.

Day 4: This day focused on local landowners and their efforts to conduct forest restoration strategies. As an introduction, Belgis Madrid, the President of the Association of Livestock and Agrosilvopastoral Producers of Pedasi (APASPE) delivered a presentation on the role of community-based farmer organizations and forest restoration, specifically discussing the history and res-

Participants reviewing the results of their forest measurements during the monitoring exercise.

toration activities of the APASPE association. APASPE is an organization that has worked with ELTI for almost ten years, receiving training and leadership development. They now serve as co-facilitators of ELTI field courses utilizing their model farms as field schools to illustrate the range of forest restoration strategies that can be used in cattle ranching landscapes.

Participants then traveled to the small town of Los Asientos to meet APASPE's members and visit the El Ñopo Farm of Odielca Solís, APASPE Secretary. Participants were given a tour of the farm by Odielca, visiting several restoration strategies and new technologies including: solar water pump and cattle aqueduct system, drip irrigation agroforestry system with shade coffee, forage bank, intensive silvopastoral system, and native species reforestation of a stream bank and wildlife corridor. During the visit, Odielca discussed many of the challenges and lessons learned from implementing forest restoration over the past five years.

After lunch, participants returned to Odielca's farm to focus on tree nursery establishment and techniques for propagating native tree species. 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 quizzed participants on the objectives and factors for developing a nursery. Next, participants learned about the phenology of tree species, different seed types, harvesting techniques, storage and scarification processes and then commenced planting methods. Participants were taught how to make substrate and practiced mixing and filling nursery bags and other containers. Finally, they transplanted seedlings from the seed germinator bed into prepared bags.

The final activity of the day focused on monitoring restoration projects. Jacob discussed the indicators and methods for monitoring restoration strategies, depending on the objectives of the intervention. Additionally, Jacob explained the importance of sound sampling protocols in order to obtain an accurate and precise population of the area sampled, while also being efficient with resources. As a field activity, participants formed groups and then conducted forest measurements (basal diameter, diameter at breast height, overall height and crown diameter) in order to assess the survival and growth of a three-year native species. Groups calculated averages of different measurements and presented on whether the survival and growth of the trees had reached published growth rates for the area and what future management protocols could be conducted to attain desired results.

Participants learn about the multiple benefits of establishing a diverse agroforestry system.

In the evening, participants were given free time to enjoy Deer Beach, before going to the Panga Restaurant, located at the Eco Venao Hotel, which offers a farm to table dining experience. Participants learned from the owner about how the restaurant sources food from local producers, fisherman and ranchers. In addition, the restaurant utilizes locally based non-timber forest products and traditional recipes to both provide economic opportunities for forest-based foods and celebrate regional cuisine.

Day 5: This day was focused on putting the course concepts into practice. Participants visited the Los Yescos Farm and received a guided tour by owner and APASPE member, Dolores Solís. During the visit they learned about the restoration strategies conducted including; a home garden, silvopastoral systems and native species reforestation to protect water sources. Some areas of the farm have suffered high levels of degradation due to conventional cattle ranching practices. As an exercise to practice management plan development, participants focused on these degraded areas of the farm and worked in groups to conduct a site diagnostic based on several indicators and developed their strategy to increase forest cover. Groups presented their plans and received feedback from Dolores as well as ELTI course facilitators.

For the final exercise of the course, participants were asked to utilize their knowledge as well as the concepts learned during the course to develop restoration plans for their own communities. The goal was to utilize the exercise to improve their skills on developing a restoration project that could be submitted for the EFN Program or other international funding opportunities. Each participant developed a plan based on guidelines and presented on their individual plan. Participants discussed the need and challenges in each region and what restoration strategies and monitoring protocols would be utilized to gauge success. Participants received feedback from ELTI personnel as well as their peers.

Day 6: After breakfast, participants departed for Panama City. After lunch, a final session was held for discussion and final thoughts. 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. Certificates were presented to the participants during a graduation ceremony and a group photo was taken. Finally, the course concluded with a dinner held in Panama City.

A group photo during a field visit to a silvopastoral model farm.

Coordinators and Instructors:

- Stephanie Eisenman, MA. (WWF-EFN Senior Program Officer - Global Science), USA
- Erin Knight (WWF-EFN Program Officer – Global Science), USA
- Jacob Slusser, MSc. (ELTI Neotropical Training Program - Panama Coordinator), Panama
- Saskia Santamaría (ELTI Neotropical Training Program Associate), Panama
- Jorge Gutiérrez (ELTI Panama Field Technician), Panama.
- Belgis Madrid (APASPE President), Panama.
- Odielca Solís (APASPE Secretary and El Ñopo Farm owner), Panama
- Dolores Solís (APASPE member and Los Yescos Farm owner), Panama
- José Vargas, MSc./MEd. (Panama Coordinator – The Peregrine Fund), Panama
- Eli Wittum (Peace Corps Response Volunteer), USA

Participants: Course participants were selected by Erin Knight (WWF-EFN Program Officer – Global Science). The 14 participants, whom have been awarded EFN Reforestation Grants, consisted of Latin American forest restoration professionals working with local NGOs in Colombia, Ecuador, Peru, Guatemala and Honduras.

Cost: This course was offered at no cost for 14 selected participants thanks to the support of the World Wildlife Fund's (WWF) Russel E. Train Education for Nature Program (EFN) and the generous donation of the Arcadia Fund (http://www.arcadiafund.org.uk).

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.