Environmental Leadership & Training Initiative

COURSE REPORT

Ecological Restoration Strategies for Cattle Ranching Landscapes of the Azuero

District of Pedasi, Province of Los Santos
August 30 – September 2, 2014

A field course organized by:
The Environmental Leadership & Training Initiative (ELTI), the Center for Research in Sustainable Production Systems (CIPAV) and the Association of Livestock and Agro-Silvopastoral Producers of Pedasi (APASPE)

ESTRATEGIAS PARA LA RESTAURACIÓN ECOLÓGICA EN PAISAJES GANADEROS DE AZUERO

Background: Ever the dominant forest type along the Pacific coast of Central America, the tropical dry forest ecosystem is now the most severely endangered in the Neotropics, only 1.7% of the original cover remains in Central America (Calvo-Alvarado et al., 2009). The Azuero Peninsula of Panama has lost most of its tropical dry forest due to the expansion of the agricultural frontier, which began during the time of Spanish colonization. As traditionally practiced in this region, conventional-extensive ranching without trees, has not only been the main driver of the loss of the dry forests of the region, but has also led to severe degradation of ecosystem services. Consequently, farm production levels have decreased and negatively affected traditional livelihoods, resulting in conventional ranching as an unsustainable and economically inefficient effort.

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While the situation of degradation in productive lands in Panama is severe, it can be reversed if corrective action is taken. These solutions must ensure an integrated landscape management, introducing changes in land-use that are more consistent with forestry and agroforestry practices. Landscapes need to combine forest management elements such as; the protection of remaining forests, watershed restoration and the use of native species in sustainable livestock systems. These production systems based on the incorporation of beneficial trees and intensifying natural processes, offer a variety of advantages that make them truly sustainable. Understanding the fundamentals underlying ecosystem services, forest ecology and the integration of forests in productive systems such as silvopastoral systems, which combine trees, forage shrubs and grasses in livestock production, is essential to recuperate the provision and regulation of ecosystem services in a highly fragmented landscape as the Azuero.

Silvopastoral research conducted by the Center for Research in Sustainable Production Systems (CIPAV) in Colombia has generated valuable information and experience to advance sustainable ranching systems. However, this knowledge has not been effectively communicated to local landowners in Panama, who are directly making land use decisions. In fact, Panama and especially in the livestock landscapes of the Azuero Peninsula, there is a great need for more training opportunities to help inform farmers to make decisions about the management, use and restoration of forests. To communicate the practices and benefits of silvopastoral systems to local audiences in a culturally sensitive manner, ELTI integrates a community group of environmental leaders, like the Association of Livestock and Agro-Silvopastoral Producers of Pedasi (APASPE) in their training courses. APASPE is an organization that has received more than 5 years of support from ELTI and CIPAV in order to develop themselves as a pioneer association in the transformation of the Panamanian agricultural sector, promoting the use of sustainable and environmentally friendly productive models that help to protect the water resource and restore soil quality, in order to benefit the producers, their families and all the inhabitants of the region.

Objectives: The overall goal of the course was to introduce local landowners to the role that forests play in providing and regulating ecosystem services and the types of sustainable practices that can be integrated into productive landscapes as a way to both restore the integrity of ecosystems and sustain production. The individual objectives were to:

- Introduce the basic concepts of forest ecology and how tropical forests influence the provision and regulation of ecosystem goods and services.
- Analyze land use in ranching landscapes and the causes of environmental degradation and its impact on ecosystem services.
- Improve the knowledge of different strategies, tools and technologies available to inform and guide decisions regarding land-use and restoration of forests.
- Introduce the concepts of silvopastoral systems and the menu of options that can be utilized to improve the integrity of ecosystem services and increase production in conventional ranching systems.
- Facilitate farmer to farmer discussions regarding; sustainable ranching systems, community organization and project development experiences with an established sustainable ranching organization.
- Develop individual farm management plans that illustrate restoration strategies that consider the local biophysical and socio-economic constraints.
- Provide participants with the opportunity to meet and establish contacts for collaboration, technical assistance and to generate projects that can be supported through the Leadership Program.

Field-Course Format: This course took place at ELTI's Permanent Training Sites in the dry forest that are located in the Province of Los Santos of the Azuero Peninsula. The sites demonstrate the varied biophysical and socio-economic contexts of different types of land use: 1) the Achotines Forest Reserve, a mature dry forest; 2) the Madroño property, a regenerating young-secondary dry forest; 3) IDB Forestal, a native species tree plantation that incorporates silvopastoral practices; and 4) the APASPE model farms, which are locally-owned properties that have established restoration practices such as silvopastoral and agroforestry systems and riparian zone restoration. The content was divided in six core training modules, illustrated through lectures and field-based demonstrations and exercises facilitated by ELTI staff and collaborators, as follows:

- **Module 1. Basic forest ecology and ecosystem services**

The first module presented a general introduction composed of four main themes: 1) characteristics of tropical dry forest ecosystems in the Azuero region; 2) ecosystem goods and services that originate from forests; 3) forest ecology; and 4) forest dynamics. The concepts introduced during the lectures were illustrated in the field with a visit to ELTI's interpretative ecological trail located in the Achotines Forest Reserve. At various demonstration sites, the participants observed the influence that forests have on the provision and regulation of ecosystem services, the characteristics of a mature forest and how forests grow and change based on their disturbance regimes and regeneration potential.

- **Module 2. Land use and the degradation of ecosystem services**

The second module provided an introduction of the regional drivers of forest degradation. Examples in the field illustrated how conventional agricultural practices degrade forests and their ability to provide and regulate ecosystem services as well as the negative consequences of these practices upon local livelihoods practices such as agriculture and cattle ranching.

- **Module 3. Strategies for restoring ecosystem services in cattle ranching landscapes**

The third module presented a simple diagnostic method to develop appropriate restoration strategies based on biophysical and socio-economic variables, such as: 1) ecosystem resiliency; 2) land use history; 3) landscape matrix and 4) landowner goals and objectives; and 5) resource availability. Participants were also introduced to the principles and methods for forest restoration, via the range of passive-active restoration options for productive landscapes; 1) natural regeneration; 2) assisted natural regeneration; 3) reforestation; 4) agro-successional crops; 5) agroforestry; and 6) silvopastoral systems. Field trips to the Achotines Forest Reserve and other properties that form ELTI's Permanent Training Sites, demonstrated the different types of restoration strategies that can be implemented in agricultural landscapes, considering each owner's own social objectives and availability of resources.

- **Module 4. Sustainable ranching: An alternative to conventional cattle ranching**

This module focused on providing a more profound understanding of sustainable ranching practices, such as silvopastoral systems (SPS), which integrate native tree and shrub species into conventional, tree-less pasture landscapes and utilize a more efficient use of pastures. Fernando Uribe of CIPAV introduced three

important components of SPS to the participants: 1) the context of unsustainable cattle ranching practices and its effects on production levels and ecosystem services; 2) the importance of biodiversity in agro-landscapes; and 3) the benefits of silvopastoral systems and the factors to consider in implementing, establishing and maintaining them. Participants were hosted by APASPE's Production Secretary, Belgis Madrid, whom explained the background of the APASPE model farms and the practices being adopted and promoted by association members. This visit served as a backdrop to illustrate the practical application of the themes covered in the course in an actual farm setting, which provided participants the opportunity to interact with property owners and ask questions.

- **Module 5. Community groups: Advancing ecological restoration via local leaders**

The participants were provided an introduction about the experience of creating and managing a community-based group by Belgis Madrid, of APASPE. Belgis discussed APASPE's process of becoming a legally recognized organization, the planning and application for project funding, the implementation and management of their project and the strategies for disseminating information to the community and region.

- **Module 6. Final exercise: Develop a farm management plan**

The final module focused on the participants utilizing the knowledge they had learned during the course to develop a farm management plan with the objective to integrate ecological restoration strategies in their conventional agricultural systems. The participants were split into four different groups, each of which was directed to draw a picture of one of the group member's farm on a large piece of paper. They were asked to illustrate the characteristics of the farm; riparian areas (streams, rivers and natural springs), forest cover (secondary forests, gallery forests and living fences), productive agricultural areas (forage banks, pastures, annual crops) and areas of low agricultural output (steep hills, gullies, erosion prone areas). The groups were then asked to discuss and draw the types of restoration strategies that could be completed on their farm while considering the site conditions on-

farm, the owner's objectives and the economic cost of implementing the strategy.

Applying the theory and practice learned during the course, the groups discussed and presented on a variety of different restoration strategies taken on each farm: 1) increase the size of riparian buffer zones via natural regeneration and assisted natural regeneration to improve water infiltration and the catchment of sediments and agrochemicals; 2) increase forest cover in pasture landscapes via natural regeneration of beneficial forage and timber species such as *Guazuma ulmifolia* and *Cordia alliodora* and plant dispersed native leguminous tree species to increase soil fertility and moderate microsite-climate; 3) utilize naturally regenerating plant species and integrate forage shrub species like *Tithonia diversifolia* in both forage banks and pastures to increase available forage biomass and nutrition; 4) minimize the use of highly sloped degraded areas for pasture and instead promote conservation by utilizing natural regeneration (if possible) and/or reforestation with fast growing pioneer species to promote forest recovery and develop strategies to intensify more adequate agricultural areas on-farm; and 5) combine active and passive restoration strategies to increase connectivity between riparian areas and forest patches to stimulate the movement of more flora and fauna. This exercise emphasized the importance of reviewing a farm's attributes and one's objectives to develop appropriate restoration strategies. In addition the participants were able to present their plan and receive feedback from the instructors and their peers.

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's objectives and format to the participants, as well as ELTI's Leadership Program at the conclusion of the course. Jacob introduced the concepts of ecosystem services, forest ecology and restoration strategies in lecture format and in the field at the demonstration sites. In addition, course collaborators, Fernando Uribe of CIPAV and Belgis Madrid of APASPE provided lectures and facilitated portions of the field trips to the model farms.

Participants: This course was designed to provide the participants with a basic understanding of forests and how they influence the provision and regulation of the ecosystem services that they as farmers depend on for their livelihoods. The audience for the course was focused on inviting participants from two strategically important areas of the Azuero Peninsula; 1) La Tronosa, which is a community located in the buffer zones of two protected areas; the Cerro Hoya National Park and La Tronosa Forest Reserve; and 2) El Calabazo, which is one of the most deforested areas of the Azuero that commonly suffers from prolonged drought and high agricultural losses. From these two communities, eight farmers were selected in addition to three extension agents from different development organizations that assist both communities with implementing sustainable agricultural practices. In addition, the course was also attended by the Director of Agriculture of the Panamanian Chamber of Commerce.

Course Follow-up: Participants were actively engaged in learning about restoration strategies for cattle ranching landscapes. In addition, individuals were very excited to transmit this knowledge to their communities and implement changes in their farms. Also the participants expressed interest in receiving further ELTI trainings and professional assistance to help them develop their own ranching organizations and identify potential funding opportunities. Finally, this course demonstrated the need for ecological restoration courses for local land owners in the Azuero Peninsula, who due to a lack of information, often make uninformed land use decisions.

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