

COURSE REPORT

Forest Restoration Strategies in Productive Landscapes

Los Santos Province, Panama
June 21-22, 2013

A field course organized by:
Environmental Leadership & Training Initiative (ELTI)

Background: Once the dominant forest type along the Pacific slope of Central America, the dry tropical forest is now the most highly endangered ecosystem in the Neotropics. One such region of Panama, the Azuero Peninsula, has lost the majority of its dry tropical forest due to the expansion of the agricultural frontier, which started during the time of Spanish colonization. As conventionally practiced in this region, extensive and tree-less cattle ranching has not only been the main driver of dry forest loss, but it has also led to the severe degradation of ecosystem services. Consequently, on-farm production levels have declined turning the traditional livelihood into an unsustainable and economically inefficient endeavor.

Understanding the fundamentals that underlie forest ecology and the use of tropical forests is, therefore, indispensable in order to sustainably manage the provision of ecosystem services in a highly fragmented landscape, such as in the Azuero Peninsula. While in recent years multiple research projects have generated valuable information, this knowledge has not been effectively transmitted to local landholders who make the final land use decisions. In fact, in Panama and Latin America in general, there is a great need for more training opportunities that help inform decision makers about the management, use and restoration of tropical forests in productive landscapes.



The Association of Agricultural and Silvopastoral Producers of Pedasí (APASPE) is a cattle ranching group from the District of Pedasí in the Province of Los Santos, Panama. Over the past two years, APASPE has implemented a Small Grants Programme (SGP) Project, with funding from the Global Environmental Facility (GEF) and support from ELTI. The first component of the project was the implementation of two demonstration plots using intensive silvopastoral systems (iSPS), a strategy aimed at improving on-farm productivity while increasing the provision of ecosystem services. The second component was the reforestation of riparian corridors on several farms, aimed at providing a number of ecosystem services that have socio-economic value (for example; provision of drinking water for cattle and biodiversity). While APASPE successfully implemented riparian reforestation areas with native species (approximately 8,000 trees planted in 25 different farms within 2 years), these active restoration efforts showed poor long-term results due to site biophysical conditions, high maintenance cost and a limited understanding of forest restoration using native species.





Objectives:

The overall goal of this field based course was to provide the participants with the technical and practical foundation needed to implement restoration strategies that increase the provision of ecosystem services, as well as on-farm production. The specific goals were to:

1. Provide a basic understanding about the fundamentals of ecology that influence forest functioning, land use and the provision of ecosystem services with a focus on productive landscapes;
2. Analyze the causes of environmental degradation and its consequences for ecosystem service integrity and subsequently on-farm productivity; and
3. Improve the knowledge of different strategies, tools and technologies available to inform and guide the decision making process regarding land use and restoration of degraded riparian areas, while considering farmer objectives and economic costs.

Workshop format: The lectures of this short course were provided on the afternoon of the first day, followed by a day of field visits and observations facilitated on the interpretive trails and private farms at ELTI's three permanent training sites: (1) the Achotines Forest Reserve (old-secondary dry forest); (2) the Madroño property (young-secondary dry forest); and (3) IDB Forestal (a native species tree plantation-silvopastoral system and small tree nursery). The content was divided in three core training modules, illustrated through lectures and field-based exercises, as follows:

Module 1: Basic forest ecology and the supply of ecosystem services

This module included a general introduction to dry forest ecology (forest dynamics, succession and natural regeneration) and the provision of ecosystem services (soils, water, biodiversity, timber and non-timber forest products (NTFPs)). The principles introduced during the lectures were illustrated in the field with a visit to the Achotines forest trail, where participants observed forest dynamics and ecosystem services in mature and secondary forests. The site visit also included an exercise comparing the differences between disturbed versus non-disturbed ecosystems.



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

The lectures included in this module covered: (1) the degradation of tropical forests via conventional cattle ranching systems; (2) the ecological effects of degradation via use of fire and chemical herbicides; and (3) the decline of on-farm production levels. Furthermore, local soil conditions and topography were discussed in order to illustrate the biophysical constraints for practicing certain types of land use in fragile or susceptible areas.

Module 3: Strategies for the restoration of ecosystem services in human-modified landscapes

This module included lectures on: (1) the importance of restoring degraded areas on farm by taking them out of production and implementing restoration strategies that are relevant to site conditions and the land owner's socio-economic goals; (2) methods of forest restoration, both passive (natural regeneration and assisted natural regeneration (ANR)); and (3) active (reforestation, agroforestry and SPS). In addition, APASPE's past iSPS and riparian reforestation project was commonly used as a case study to illustrate which strategies were successful and others that needed improvement for better results.

Field trips included: (1) a visit to the Madroño property to observe the influence of legacy structures on secondary forest regeneration under passive restoration and assisted natural regeneration (ANR); and (2) a visit to the IDB Forestal plantation and tree nursery to discuss active restoration. At both sites, the themes of the owner's unique objectives, site quality and restoration potential versus costs were discussed.





For the final exercise, participants worked in three 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 riparian areas, 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 which types of forest restoration activities (natural regeneration, ANR, reforestation, silvopastoral and agroforestry systems) could be completed on their farm while considering the objectives of the farm owner, the site conditions and the economic cost of implementing the strategy.



Applying the theory and practice learned during the course, the groups discussed, decided and presented on the following different restoration strategies taken on each farm: (1) Increase the size of riparian buffer zones via natural regeneration and ANR to improve water infiltration and the catchment of sediments and agrochemicals; (2) Increase forest cover in pasture landscapes via dispersed planting of native leguminous tree species; (3) Increase living fences and wind breaks with evergreen species to decrease wind damage; (4) Utilize reforestation with fast growing pioneer species in degraded areas and where local seed banks are not present; and (5) Combine active and passive restoration strategies to increase connectivity between riparian areas and forest patches to stimulate the movement of more fauna. This exercise reinforced the importance of utilizing a "tool box" of restoration strategies in order to select the appropriate restoration decision for different needs.

Participants: This course was designed to convey advances in ecology and restoration of ecosystem services to local landowners. Thirteen members of the APASPE participated in the course, all of who practice conventional cattle ranching and have suffered a decline in ecosystem service integrity and subsequently low production on their farms. The APASPE members were selected for the course since they have shown interest in learning restoration strategies that will improve their farm and increase production levels.

Outcomes and Follow-up: Throughout the course, participants were actively engaged in learning about the basics of forest ecology and different types of forest restoration strategies that can be implemented on their own farms. Participants

took home the message that while restoration activities require investment, such ventures will increase their farm's resilience and put their livelihoods at less risk.

Furthermore, the executive board of APASPE who attended the course developed a better understanding of the range of restoration strategies beyond reforestation that can be implemented via the funds from the Small Grants Programme of the Global Environmental Facility (GEF) for which they are currently applying to expand their silvopastoral activities. Incorporating more cost effective and less intensive strategies will provide more sustainable results.

Finally, this course demonstrated the interest and need for a tropical forest restoration course aimed at regional stakeholder, including cattle ranching organizations, community environmental groups and regional extension agents. Additionally, the flexibility of the Azuero permanent training sites also demonstrates how a diversity of training course themes can be tailored to different audiences. Further exploration of training themes, audiences and collaborations with national and international organizations interested in forest restoration courses will need to be explored.

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