

COURSE REPORT

Ecosystem Services and Tropical Forest Restoration

Los Santos Province, Panama

January 28 - February 2, 2013

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

Background: Tropical forests are the most complex terrestrial biome on the planet in terms of structure and biodiversity, containing 50% of the biodiversity and 70% of the terrestrial plant and animal species. The Neotropics alone contain an estimated 9 million km² of forest, equivalent to 20% of the world's forests. Panama's levels of biodiversity are exceptional, as a result of the country's geological history. As the last part of the Central American Isthmus to emerge from the oceans 3.5 million years ago, Panama became the bridge that allowed the exchange of living organisms between North and South America. Like other developing countries, however, Panama's forest have been heavily deforested due to the prevalence of economic models and policies that have encouraged the conversion of forest to agricultural land and pastures for livestock.

Tropical forests in Panama and the world are rapidly disappearing, and with them, a range of ecosystem services necessary to maintain life on the planet. In recent years, however, interest in conserving and restoring tropical forests has increased. Nevertheless, in order to effectively promote these activities and to best inform the decisions regarding the development of strategies for restoration and land use planning, there needs to be a basic understanding of the ecological processes underlying the provision of ecosystem services.



SERVICIOS AMBIENTALES
Y RESTAURACIÓN
DE BOSQUES TROPICALES



Tropical forests tend to be comprised of a mosaic of different systems within highly complex landscapes due to the combination of various geological, soil and climate characteristics and anthropogenic land uses. Many tropical forest ecosystems are currently degraded to some level, and often have a limited ability to regenerate. In such cases, ecosystem services can be recovered via the implementation of different active and passive restoration strategies, such as natural regeneration, reforestation, and agroforestry systems, which permit the coexistence of trees with productive activities and sustainable use of forests.


Objectives:

The overall goal of the course was to provide participants with the technical foundation needed to design and implement restoration strategies that increase the provision of ecosystem services in different land uses. The specific goals were:

- Provide participants with an understanding of the fundamentals affecting the ecological functions of forests, land use decisions and the provision of ecosystem services in tropical regions through field-based observations and exercises;

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- Teach participants how to analyze the causes and consequences of environmental degradation on natural regeneration and restoration of tropical forests at the local and regional scales;
- Introduce participants to the different strategies, tools and technologies available to guide decision-making in forest management and landscape restoration;
- Provide participants with the opportunity to meet and establish networks for the implementation of landscape restoration projects, with potential to be supported through ELTI's Leadership Program.

Format: Over the five days of the course, participants had a space for dialogue and learning, and had a chance to meet and exchanged experiences, concepts and practical tools with ELTI facilitators and international experts. Lectures were presented during the mornings, including discussions of readings and case studies, while field visits and exercises took place in the afternoons. The field-based components of the course were facilitated on interpretive trails and private farms at four permanent training sites: (1) the Achotines Forest Reserve (old-secondary dry tropical forest); (2) the Madroño property (young-secondary dry tropical forest); (3) IDB Forestal (a native species tree plantation); and (4) the Barrios farm (intensive silvopastoral system -iSPS).

The course was divided in three core training modules, and each of the course themes were illustrated through regional case studies and field-based exercises, as follows:

Module 1: Forest ecology fundamentals and facilitation of ecosystem services in dry tropical forests

This module included lectures on: Introduction to the dry forests of Central America (geology, soils, hydrology, forest dynamics and forest succession); Introduction to dry forests dynamics, forest succession and natural regeneration contrasting with tropical wet forests; and Forest goods and ecosystem services. Lectures were illustrated with a visit to the forest trail where participants observed forest dynamics and succession, forest gaps, and riparian areas in mature and secondary forests, followed by an exercise in the gridded plots where teams measured timber volume, diversity, and carbon.

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

Lectures in this module included: Degradation of tropical forests; Ecological effects of degradation; and Introduction to regional drivers of degradation in tropical dry forests.

Module 3: Strategies for restoring ecosystem services in landscapes modified by humans

Lectures in this module include: The importance of site conditions and management goals for developing a restoration strategy; Principles and methods of forest restoration, both passive and active; and Introduction to tropical silvopastoral systems (SPS) as a restoration tool. Presentations on three case studies were used to illustrate these topics: one on the PRORENA trials for species selection, a second on the Azuero Earth Project's (AEP) use of GIS to develop a restoration strategy, and a third about the Association of Livestock and Agro-Silvopastoral Producers of Pedasí (APASPE) on their silvopastoral system (SPS) and riparian reforestation project.

Field trips included: a visit to the Madroño property to observe the different successional stages in a secondary forest under passive restoration and assisted natural regeneration (ANR); a visit to the IDB Forestal plantation to discuss active restoration, and the influence of social values and site context; a visit to the Barrios farm to observe an intensive SPS and a riparian restoration buffer zone; and a visit to the Solis farm to observe an agroforestry system and riparian restoration zone with native tree species.

For the final exercise, participants worked in three groups, each representing a different land use interest: conservation, native species reforestation, and sustainable cattle ranching. Applying the theory and practice learned during the course, groups were asked to develop a landscape-scale management plan for a degraded and fictional dry tropical forest landscape. This exercise reinforced the importance of making restoration decisions based on scientific knowledge and individual socio-economic and biophysical variables.

Participants: This course was designed to convey advances in ecology and restoration of environmental services to national and international professionals and technicians. The thirteen individuals selected to attend the course represented a number of organizations and institutions from the natural resources management, including: (1) the government, such as The Panamanian Authority of the Environment (ANAM), the



Panama Canal Authority (ACP), the Office of the First Lady, and STRI; (2) NGOs, including The National Conservation of Nature Association (ANCON), the Center for Research on Sustainable Agriculture Production Systems (CIPAV), Fundación CoMunidad, Fundación Natura, and World Wildlife Fund (WWF); and (3) the private sector, including Ancon Expeditions.

Outcomes and Conference Follow-up: Throughout the course, participants were actively engaged in learning about the ecology and restoration of dry tropical forests, an ecosystem unfamiliar to some. They also benefited from opportunities to network and to discuss project ideas with course instructors and colleagues.

This course evidenced the interest and need for a tropical forest restoration course aimed at professional practitioners, and therefore ELTI will replicate this course for similar audiences in the future. The Azuero permanent training sites also can be utilized for other themes and audiences, with potential future course topics including native tree species propagation, corridor connectivity in productive landscapes and passive restoration of riparian zones. The Neotropics Training Program will explore the best options in the coming months.

Finally, a similar version of this course is being developed for the wet tropical forest ecosystem in the Agua Salud permanent training site, located in the Panama Canal Watershed. The course will target natural resource professionals working on watershed management and the restoration of wet tropical forests. ELTI staff will develop the site's infrastructure and course curriculum over the next months and expects to deliver the first course in August, 2013.



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.