Environmental Leadership & Training Initiative

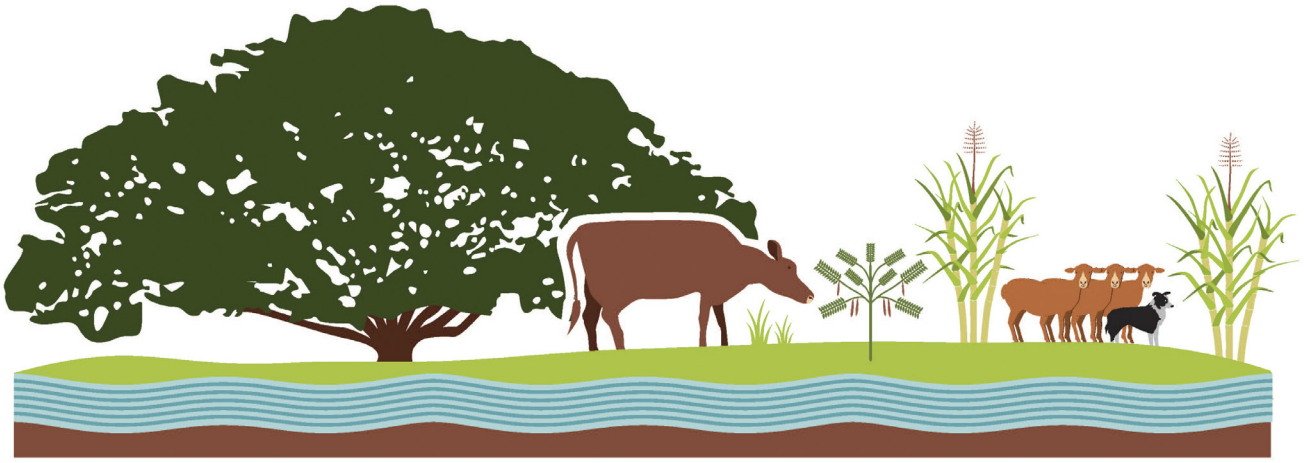
COURSE REPORT

Agroecology and Ecological Restoration:
Sustainable Agricultural Landscapes with Resilience

Module 1: El Hatico Natural Reserve, El Cerrito, Cauca Valley, Colombia
Module 2: Alcala, Andean Coffee-Growing Region of the Cauca Valley, Colombia

July 21 – 27, 2016

A field course organized by:
The Environmental Leadership & Training Initiative (ELTI), the Center for Research in Sustainable Systems of Agriculture (CIPAV), the Latin American Scientific Society of Agroecology (SOCLA) and the El Hatico Natural Reserve.



AGROPAISAJES SOSTENIBLES CON RESILIENCIA

Background: Conventional cattle ranching and agricultural practices have severely degraded and fragmented tropical forests in Latin America. This trend has resulted in the loss of a range of ecosystem services upon which humans depend, especially those that support agricultural production, such as biodiversity, the provision of water and soil fertility. Consequently, conventional cattle ranching and agricultural techniques require the addition of outside inputs to maintain yields. Furthermore, climate change continues to challenge these vulnerable conventional systems, disrupting production and undermining food security of small farmers. Establishing agroecological systems is one approach to develop more resilient agricultural landscapes. These systems are characterized by their high plant and animal diversity and interrelationships, which have shown an extraordinary ability to adapt to a changing climate. Agroecology also shares many similarities with ecological restoration practices, such as agroforestry and silvopastoral systems, which reintegrate ecological function into agricultural landscapes through increased diversity of tree cover. Agroecology and ecological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restoration practices in Latin America have demonstrated to be successful alternatives to conventional practices by providing vigorous production, high profitability and many environmental and social benefits. Conducting intensive field-based courses situated in diverse biophysical and socio-economic landscapes, such as the dry tropical forest and Andean Coffee-Growing Region of the Cauca Valley of Colombia, is one strategy to communicate the knowledge and skill sets needed to implement these systems to a range of stakeholders. The Cauca Valley has been highly degraded via the establishment of monoculture sugarcane, coffee plantations and conventional cattle ranching in marginal agricultural lands. This region also contains a diversity of agroecological production systems that illustrate how landholders who reintegrate ecological practices into the landscape can restore ecosystem function, increase agricultural production and help rural families to achieve food security and sovereignty.

Objectives: The overall objective of the course was to teach participants how the application of agroecological and ecological restoration principles can improve environmental and socio-economic conditions in agricultural landscapes by creating production systems that are resilient to climate change.

Field-Course Format: This course was divided into two three-day modules focused in two different regions of the Cauca Valley:

- **Module 1.** Focused on silvopastoral systems, agroecological sugarcane production and ecological restoration and took place at the El Hatico Natural Reserve, located outside of Cali, Colombia. El Hatico is a farm that the Molina Family has owned and operated for nine generations and includes a variety of agroecological practices related to livestock and sugarcane production.
- **Module 2.** Focused on agroecology, agroforestry and silvopastoral systems and ecological restoration. This portion of the course was facilitated in three different private farms within the Andean Coffee-Growing Region of the Cauca Valley.

Over the course of the six days, participants had the opportunity to learn and discuss key concepts and tools with a range of instructors and international experts. Lectures provided participants with a theoretical foundation


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for course themes and field visits provided opportunities for observations and discussions. Throughout the course, participants had ample opportunity to ask questions and to exchange their experiences and ideas.

Course Format:

Day 1 – Module 1:
The course began with introductions from course facilitators and participants. ELTI's Panama Coordinator, Jacob Slusser, introduced ELTI's Training Program in the Neotropics. Dr. Miguel Altieri and Dr. Clara Nicholls introduced basic themes about agroecology, including: (1) the scientific basis and principles of agroecology; (2) comparisons between agricultural systems and natural ecosystems; (3) agroecological management of soils; (4) ecological management of crop pests and diseases; and (5) methods of integrating agroecology practices into conventional systems.

To complement the use of ecosystem function in agroecology systems, Zoraida Calle and Alicia Calle presented the importance of restoring the forests that provide ecosystem services by discussing the following themes: (1) principles of forest ecology and dynamics; and (2) restoration in agricultural landscapes.

The day concluded with a field trip to El Hatico's agroecological sugarcane system, which differs drastically from the conventional practices conducted throughout the monoculture plantations in the Cauca Valley. El Hatico's practices focus on agroecology principles, such as: (1) conserving soils by not burning or using agrochemicals; (2) utilizing cover crops and green manures; (3) intercropping high value palm species; and (4) utilizing goats to control weeds instead of herbicides.

In the evening, Dr. Florencia Montagnini provided an overview of agroforestry systems and discussed how to utilize forest restoration and agroforestry practices to develop systems that are biodiverse and important for landscape connectivity and ecosystem function. She explained how agroforestry systems are effective in agricultural landscapes because they integrate conservation and production practices into a system that meets both ecosystem restoration objectives and agricultural demands.


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Day 2 – Module 1:
The second day of the course focused on sustainable livestock systems, specifically silvopastoral systems (SPS). Enrique Murgueitio and Zoraida Calle first discussed the history and theory of systems that integrate tree cover into livestock pastures.

Enrique José Molina, Carlos Hernando Molina and Enrique Murgueitio provided an overview of SPS and how the reintegration of ecological processes provides productive, ecological, economic and social benefits within the El Hatico Natural Reserve. The two Molina brothers who administer El Hatico (part of the 8th generation of the family) explained the history of the farm in terms of historical land use and degradation drivers. They described how they were able to preserve their family's history on the farm by improving production through the use of SPS and ecological restoration techniques. Furthermore, the Molina brothers discussed the 20 years of research that has been conducted on their farm and the mounting evidence that shows how SPS maintain production levels during extreme weather conditions, especially drought. In addition, Carolina Giraldo discussed her research on macro-fauna in SPS and their importance in facilitating nutrient cycling for soil health, which helps sustain production without the addition of outside chemical inputs.

In the evening, three participants briefly presented their work in restoration and agroecology from their own regions. The day concluded with a presentation by Jacob Slusser, who discussed ELTI's efforts to strengthen forest restoration capacity of cattle ranchers in the dry forest of Panama's Azuero Peninsula and the creation of the Association of Livestock and Agrosilvopastoral Producers of Pedasi (APASPE), a community based organization focused on sustainable ranching.

Day 3 – Module 1:
In the final day of the first module, Clara Nicholls and Miguel Altieri presented the importance of agroecology practices to meet the challenges of climate change. They reiterated that having a profound understanding of local social contexts is essential in order to develop effective strategies that support cultural and economic realities. They illustrated this point by focusing on case studies throughout Latin America where local traditions and knowledge have been built upon to create more resilient agricultural systems to meet food security.

Carolina Giraldo, Zoraida and Alicia Calle presented the importance of reintroducing ecological function into ranching landscapes via SPS in order to sustain agricultural production while also conserving the environment. They 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 other ecosystem functions.

The first module concluded with a group discussion session, during which participants were encouraged to ask questions and discuss course concepts. The evening closed with a local Colombian band well known for playing a repertoire of Latin American music genres, as well as their efforts to communicate the importance of agroecology and ecological restoration through their songs.

Day 1 – Module 2:

The second module included nine new participants in addition to the 20 that had participated in the first module. Clara Nicholls and Miguel Alteri launched the second module by presenting a number of introductory agroecology themes, including: (1) the role of biodiversity in agro-ecosystems; (2) converting conventional systems to agro-ecological management; (3) agroecology pest management; and (4) utilizing agroecology for small farmers to meet food security and sovereignty.

Zoraida and Alicia Calle discussed the function of agroforestry systems utilized in the Andean Coffee-Growing Region and the different ways they are established. Álvaro Zapata discussed the different types of SPS that he helped to establish in the region via the Mainstreaming Biodiversity in Colombian Cattle Ranching Project and the challenges faced when promoting an alternative ranching system. He reiterated the importance of utilizing practices that are built upon local knowledge and traditional practices.

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In the afternoon, participants visited La Cabaña Farm, focused on coffee and livestock production that Fabiola Vega and her family operates. During the visit, the owners discussed the history of the farm and their experiences converting conventional coffee and cattle ranching systems into more sustainable systems. For example, they incorporated a range of agroecological and SPS components into their farm, including shade coffee, organic fertilizers, living fences, diverse forage trees and shrubs, and a biodigestor to treat livestock manure. The owners also mentioned how the conventional systems required high levels of external inputs (e.g., agrochemicals and fertilizers) and often failed under the stresses of extreme weather or pest infestations, which almost caused the farm to go bankrupt. In contrast, their agroforestry coffee system and intensive SPS are more resilient and maintain production levels even during strong El Niño phenomena, which caused devastating droughts and crops losses in 2015 throughout the region.

Day 2 – Module 2:

The day began with a field visit to the Bamboo Paradise Farm, which highlights the diversity of Neotropical bamboo species and their myriad uses. Ximena Londoño, owner and agronomist specializing in the taxonomy of Neotropical bamboos, welcomed the participants and facilitated a visit of her farm. The visit highlighted her management of the bamboo species guadua (*Guadua angustifolia*), which is an important species in the Andean Coffee-Growing Region. For example, guadua is a very fast growing and versatile species that can be used for a diversity of construction and artisanal uses. Furthermore, Ximena demonstrated how she was able to restore degraded riparian areas on-farm by planting and sustainably harvesting guadua. She also presented about the potential of guadua as a timber species to replace conventional materials in a more environmentally friendly manner and how different countries have developed the infrastructure to develop diverse bamboo markets.

The afternoon included lectures about the principles of ecological restoration and participatory research in restoration. Zoraida Calle presented on different case studies from the coffee ecoregion, which highlighted the importance of obtaining the knowledge, opinions and perspectives of local communities in order to conduct participatory research and develop informed restoration strategies. Alicia Calle discussed her Ph.D. research, which will evaluate the motives and perspectives of ranchers adopting SPS. Lina Giraldo discussed her research regarding the importance of restoring watersheds to provide ecosystem services in cattle ranches. Finally, Julián Giraldo presented a compelling case study on the use of ecological restoration in his home town to restore a local watershed, help local farmers achieve food security and sovereignty and develop a network of farmer co-researchers.


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Day 3 – Module 2:

The final day of the course began with a series of presentations focused on the importance of native tree species for ecological restoration and agroforestry and silvopastoral systems. Zoraida Calle discussed several case studies regarding bioengineering - the use of native plant species to restore degraded land prone to erosion and landslides. Julián Giraldo discussed the methods of integrating native tree species as a component of the Mainstreaming Biodiversity in Colombian Cattle Ranching Project. Irene Montes, a Yale F&ES student, discussed her Master's thesis research on the silviculture of a rare timber species, *Maclura tinctoria*. Jacob Slusser presented about ELTI and PRORENA's native tree species propagation and management field guides as tools for active forest restoration projects in the Neotropics. Finally, Jacob provided the final lecture about ELTI's Leadership Program, discussing the various opportunities for ELTI alumni to receive follow-up support for professional development and site-based projects.

After the lectures, participants traveled to the Pinzacua Farm, where the owner, Olimpo Montes, facilitated a field visit to various demonstration sites that illustrated sustainable ranching and ecological restoration practices. The demonstration sites included: pasture rotations with electric fences, reforestation strips in pastures with high value timber species, riparian restoration with natural regeneration and guadua and the management of *Maclura tinctoria* timber plantations.

At the conclusion of the course, participants proposed final questions, discussed course themes, offered their opinion of the course and shared their appreciation for course organizers and instructors.

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Instructors and Coordinators: The course was facilitated by staff from ELTI (Dr. Eva Garen, Jacob Slusser and Saskia Santamaría), the Yale School of Forestry and Environmental Studies (Dr. Florencia Montagnini), CIPAV (Dr. Enrique Murgueitio, Zoraida Calle, Alicia Calle, Carolina Giraldo, Lina Giraldo, Julián Giraldo, Álvaro Zapata and Dr. Thomas Preston), SOCLA (Dr. Miguel Altieri and Dr. Clara Nicholls), and El Hatico Natural Reserve (Carlos Hernán Molina, Carlos Hernando Molina, Enrique José Molina, and Juan José Molina). In addition, participants visited several farms and the owners of these properties (Ximena Londoño, Olimpo Montes, Irene Montes and Fabiola Vega).

Participants: A total of 29 participants from twelve Latin American countries (Mexico, Guatemala, El Salvador, Costa Rica, Panama, Colombia, Peru, Ecuador, Brazil, Uruguay, Paraguay and Bolivia) attended the two modules. Participants came from a range of backgrounds, including the public and private sectors (community leaders, ministry officials, project managers and university professors).

Outcomes and Follow-up: Participants were actively engaged throughout the course and shared rich experiences from their diverse regions and cultures. Many participants discussed project ideas with ELTI staff for receiving support via ELTI's Leadership Program. ELTI will follow up with alumni to identify their application of course concepts and to assess interest in ELTI's Leadership Program.

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.