

## COURSE REPORT



# Workshop and Field Course on Ecological Restoration of Highly Eroded Lands

**ELTI Permanent Training Site:**  
**Nirvana-Clavellinas Nature Reserve, Zapatoca, Santander, Colombia**  
**March 16-18, 2018**

### A field course organized by:

The Environmental Leadership and Training Initiative (ELTI), the Center for Research on Sustainable Agricultural Production Systems (CIPAV) and the Nirvana-Clavellinas Nature Reserve



Field course participants at Nirvana-Clavellinas Nature Reserve.

**Background:** Roughly 2.9% of continental Colombia is affected by severe and very severe erosion (30,632 km<sup>2</sup> and 2,714 km<sup>2</sup> respectively). This includes landslides and gullies, both of which are common in the densely populated Andes. In these unstable areas, mass movements pose a serious threat to local populations and cause off-site environmental damage through sedimentation, pollution, and increased flooding. Not surprisingly, Colombia is one of the countries with the highest annual number of human losses in landslides and the largest population living in high-risk areas.

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Enormous amounts of money are spent by the Colombian government in structures such as retaining walls in areas that could be enhanced more sustainably through ecological restoration and bioengineering techniques. CIPAV has developed a novel approach for restoring severely eroded slopes, which combines the use of timber stabilization structures and high-density planting of species that exhibit quick growth and sprouting.

This workshop and field course were designed and offered at the municipality of Zapatoca as part of a Leadership Program grant provided to ELTI alumni Melisa Ayala (Online Program) and Mauricio Carvajal (Colombia Program). Restoration for risk reduction or disaster prevention is still an unexplored field in Latin America. No similar courses are yet available in the region.

### **Objectives of the workshop and field course**

- To strengthen the local capacities for the ecological restoration of highly eroded lands in Santander.
- To introduce the theoretical and practical aspects of ecological restoration, bioengineering and revegetation with native plants.
- To initiate the implementation of a pilot model for erosion control at the Nirvana - Clavellinas nature reserve.

### **Workshop and field-course format**

#### **Day 1**

The workshop took place at the main theater of Zapatoca and was open to the general public. Juan Fernando Martínez, owner of Nirvana-Clavellinas reserve, opened the event and introduced the speakers. Following that, geologist Milton Rueda explained the geological history of Zapatoca





Planning a small restoration project at Nirvana-Clavellinas nature reserve.

and described the main formations and predominant rock types of the municipality. Then, Zoraida Calle and Mauricio Carvajal summarized the principles that should guide the ecological restoration of eroded lands in the tropical Andes, and showed several case studies of landslide restoration and slope stabilization processes. Afterwards, civil engineers and geomatics specialists Oscar Sánchez and Miguel Álvarez showed some applications of ecological restoration to risk management from an engineering perspective. The event ended with a general discussion and a session of questions and conclusions.

### Days 2-3 Field course

The field course consisted entirely of practical exercises and guided walks along the reserve's interpretive trails. The field exercises were carried out in two sectors of Nirvana-Clavellinas nature reserve: the large gullies and a trail that crosses different types of vegetation.

Throughout the field course we applied the *learning by doing* method. Mauricio Carvajal and Juan Fernando Martínez coordinated the work of student groups in the gullies, while Zoraida Calle guided other groups along the reserve's trails to observe native plants with useful attributes for restoration, and to collect seeds and seedlings. All groups had the opportunity to practice the main steps of a restoration project in eroded land: collecting seeds and seedlings of native plants, performing assisted natural regeneration in the areas around the gullies, building biomechanical structures with wood and planting vegetation strips across the slope. Group discussions before and after the field exercises illustrated a practical method for analyzing the terrain, water flows and surrounding vegetation. These discussions enriched the diagnosis and design of the restoration project at the Nirvana-Clavellinas reserve.





Field exercise: simple soil bioengineering techniques.



Field exercise: collecting plants and seedlings.

**Participants:** The event was announced by Melisa Ayala between November 2017 and February 2018 through different social networks and contact lists. The course attracted the interest of farmers and professionals from Santander, and from a wider community of restorationists in several regions of Colombia. The field course was attended by 41 people. This included 24 participants from different parts of the country, selected from a larger group of candidates by Melisa Ayala and Zoraida Calle. The remaining participants were 17 local residents and private reserve owners from Zapatoca.

### Instructors:

- Zoraida Calle, ELTI (Colombia Program) and CIPAV, Colombia
- Mauricio Carvajal, CIPAV, Colombia

**Outcomes and Follow-up:** The grant provided by ELTI's Leadership Program to alumni Melisa Ayala and Mauricio Carvajal was an opportunity for the Colombia Program to implement a new field course with high demand in the Andean countries. CIPAV's restoration group has extensive experience in stabilizing eroded land through a combination of soil bioengineering techniques and high-density planting. This approach allows the fast and complete recovery of vegetation and stability in gullies. After this successful pilot course, we hope to offer this training event at least once each year, and to develop Nirvana-Clavellinas reserve as an additional permanent training site for courses on restoration of eroded lands.

An important demand for this type of training exists in Santander and other regions of the Andes. Future plans include:



**2do**   

**SEMINARIO DE RESTAURACIÓN ECOLÓGICA  
PARA LA ESTABILIZACIÓN DE ZONAS  
ALTAMENTE EROSIONADAS EN SANTANDER**  
Del 16 al 18 de Marzo de 2018 en Zapatoca



**16** marzo Charla teórica-Gratuita abierta al público, Teatro Mayor de Zapatoca 8:00 am

**17-18** marzo Curso práctico-Cupo limitado y previa inscripción / Reserva Nirvana, Vereda Santa Rita, última finca carretera principal vía quebrada El Ramo. // 7:00 a.m

Alojamiento y alimentación cubiertos durante la fase práctica

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- Forming a network for the exchange of knowledge on the restoration of eroded lands, with the participation of farmers, landowners, biologists, geologists, foresters, agronomists and civil engineers.
- Editing a manual on eroded land restoration methods.
- Designing an online or blended course on restoration of eroded lands.



*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.*