

Rehabilitation of degraded soils with conservation forestry systems on the Mira River Basin, Ecuador



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1. Introduction

In Ecuador, water erosion and inappropriate soil management are the major cause of soil degradation. Around, the 47% of the soils in the country are eroded. From 2014, two field experiments were established in the north of Ecuador (Zone 1) and were conducted in 2 representatives soils, with slopes varying from 30 to 50%; however, in these areas the strongest slopes are until 150%.

2. Challenges in Ecuador

- In Ecuador, the natural topography of the country has a very high vulnerability to water erosion.
- According to capability classes, 67% of the soils corresponds to VII and VIII classes.
- There is low attention to these areas due to the low agricultural potential.
- As a result of inappropriate land management practices on steep slopes, soils have low fertility and low productivity.

3. Achievements since July 2015

1 - SLM Field experiments

Site 1. Agroforestry systems in soils > 30% slope. The objectives were to evaluate:

- The establishment of *Acacia melanoxylon*, *Caesalpinia spinosa* and *Persea americana* in contour ploughing (Cp) and barrier hedge (Bh) compared with a control (C) treatment.
- To determine the yield of a crop in the intensive agroforestry system.

Site 2. Gully restoration on soils > 40% slope. The objectives were:

- To evaluate the establishment of *Schinus molle*, *Caesalpinia spinosa*, *Vachelia macracantha* established in contour ploughing.
- To quantify Net erosion (erosion-sediment) with 'erosion pins'.

2 – Results obtained from field experiments

After 28 months the results showed:

Site 1

- Plant height was higher in *Acacia* under Cp by 22 and 19% compared to Bh and C treatments, respectively.
- *Caesalpinia* had a higher growth in Cp by 57 and 49% compared to Bh and C treatments, respectively.
- The 3 species showed a higher survival in Cp>Bh>C.

Site 2

- *Schinus* and *Caesalpinia* had very low survival <3%.
- *Vachelia* had a higher survival of 87%.
- Net erosion fluctuated between 29 and 42 ton ha⁻¹.

These results showed that conservation practices have a positive environmental and economic impact in the study area.

3 – WOCAT training / networking

► The results have been presented in two **International Conferences** in Ecuador.

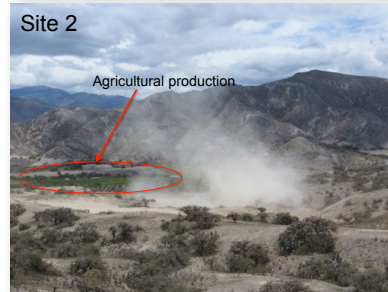
► **6 Professors** are involved in the Project.

► **7 students** did their thesis in the project.

► **60 Professors and students** trained.

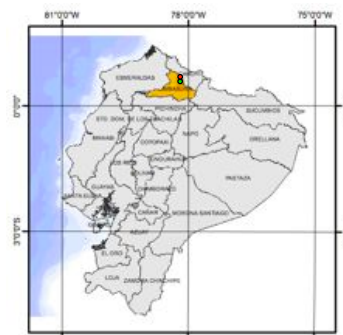
► Site 1 was developed in the field of a local farmer.

► Site 2 was developed with an Agreement with the **City Hall of Ibarra**, Imbabura Province.



4. Outlook with respect to challenges

- 1) To establish other field experiments using the WOCAT technologies.
- 2) Organise workshops at the north of Ecuador (Zone 1).
- 3) We would like to be involved in WOCAT.



Ecuador. Zone 1, Province of Imbabura