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Title: Twenty Years of Agroecological Practices on a Family Farm in Pinar del Río, Cuba

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Introduction

The research includes an experience in a family farming Farm the results is integrated into the Diversifying Cropping Systems Project (DiveCropS) supported by financing from the DAAD in Germany.

The important argument is the criteria of the farm, Juan Alonso Hernández, “when his father arrived here in 1920, it rained regularly; we cultivated of crops no irrigation and obtained high yields; now the droughts are so intense that they affect even the most resistant crops.

The problem to be investigated: how to stop the processes of deforestation, soil erosion and deterioration of biodiversity that cause serious problems for the development of productive processes in family farming systems?

Objective: To implement a system of good agroecological practices that a llow the development of agroforestry systems, the recovery and stability of the soils of slopes dedicated to family farming systems in mountain areas of the province of Pinar del Río

Materials and methods

The site research was carried out in an area with hilly relief, belonging to the slate heights of the Guanigüanico mountain range, in the municipality of Los Palacios, in the province of Pinar del Río, Cuba.

The study area is located between 150 meters above sea level, between the following coordinates:

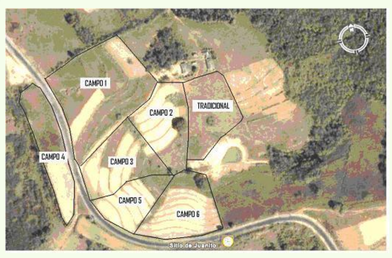
01 22°37'38.86"N, 83°27'20.39"O
02 22°37'38.70"N, 83°27'12.35"O
03 22°37'32.35"N, 83°27'12.90"O
04 22°37'32.46"N, 83°27'18.61"O

Beginning to the study of the area, referring to the characterization of the soil (chemical and physical), topographic and climatic factors, as well as the determination of the main limiting factors of productive yields.

An agroecological management system is built based on he following practices:

- ✓Creation of an agroecological management design for the farm.
- ✓They implement soil conservation technologies, with the design and layout of contour lines and the establishment of living barriers.
- ✓Creation of agroforestry management areas
- ✓Increase in the diversity of the farm's productions.
- ✓Handling of organic fertilizers and green manures, with the use of compost using crop residues.
- ✓Application of technologies for minimum tillage of soil with animal traction and contour lines
- ✓Application of ecological pest management technologies.
- ✓Philosophy of developing low-input technologies with a farm's natural resource management model

Results



In a first process, an agroecological management design of the farm was carried out. Together with a diagnosis of the characteristics of the soils

Technologies are implemented Soil conservation, with the design and contour plotting and setting of living barriers

Integrated management system Agroforestry were established crops and forestry areas, and the farm's production diversity is increased.

Fertilizer management is developed organic a nd green manures, with the use of compost and use of waste from Harvests.

A relevant aspect is the improvement of the physical and chemical properties of soils. These results are shown in Table 1.

Properties	Initial diagnostic	Value with applied technologies 20 years later.
pH (KCl)	3,98	5.13
Organic material (%)	0,97	1.90
P_2O_5 (mg/100 grams)	5,02	6.91
K_2O (mg/100 grams)	9,47	18.16
Ca^{++} (Cmol(+), Kg^{-1})	1,30	3.34
K^+ (Cmol (+). Kg^{-1})	0,14	0.35
Na^+ (Cmol (+). Kg^{-1})	0,02	0.4
Da (g/cm^3)	1,48	1.37
Dr (g/cm^3)	2,54	2.51
Porosity (%)	41,00	46.4

The organic matter content increased from 0.97% to 1.90% as a result of the applied technologies of conservation tillage

The farm's production levels increase significantly when increasing from a production of only five (5), and increase of more than 25 agricultural productions

This entire process of implementing agroecological technologies based on soil conservation techniques, agroforestry management, crop rotation, ecological pest management and other applied technologies, allows a significant increase in biological diversity in the Agroecosystems

Conclusions

With the practical application of integrated management with sustainable technologies, the nutrient balance of the soil was improved, erosion decreased and its fertility increased. The results achieved show a reduction in erosion, by improving the chemical, physical and biological properties of the soil, increasing its fertility and the biodiversity of the agro-ecosystem, as well as a significant increase in agricultural production in the Family Farming Farm, thus allowing greater stability in the ecosystem and the family in their settlements without the need to migrate to other areas.