6th International DAAD Workshop

The science policy gap regarding informed decisions in forest policy and forest management:

what scientific information are policy makers really interested in?

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Zoning of an Agroforestry System: Organic Coffee Production in Santa Cruz Island – Galápagos

By:

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Santiago de Chile, 14/11/2016

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INTRODUCTION

A large number of small-scale coffee producers live in areas with fragile ecosystems and also compete against large-scale coffee producers.

This is also true in the production of coffee in the Galapagos Islands.

Coffee zoning presents an opportunity to identify the areas with the best potential to produce coffee and face environmental and social challenges.

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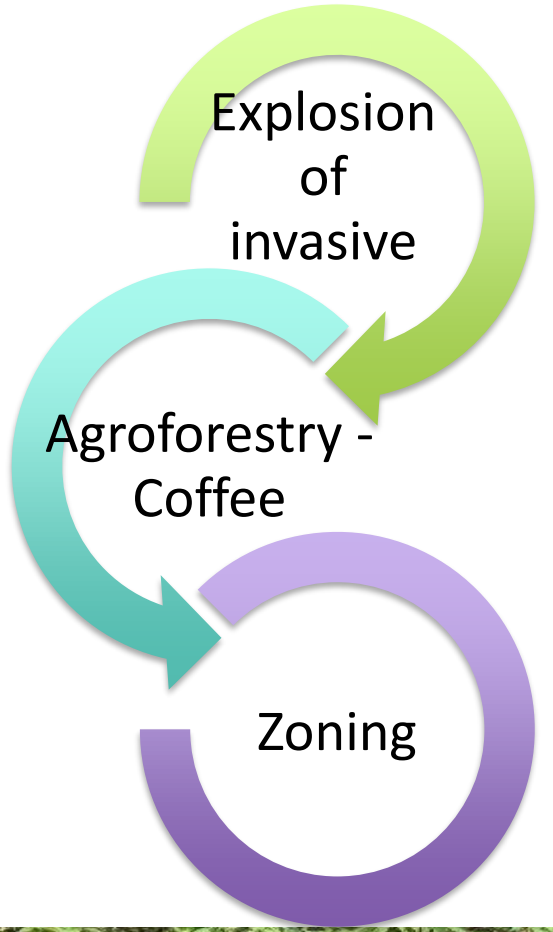
INTRODUCTION

According to FAO (1993), agroforestry is the deliberate growth and management of trees, along with agricultural crops and/or livestock, in systems that aim to be ecologically, socially and economically sustainable.

The final product of the zoning is a map that identifies the areas with the greatest potential to implement an agroforestry system for the production of organic coffee.



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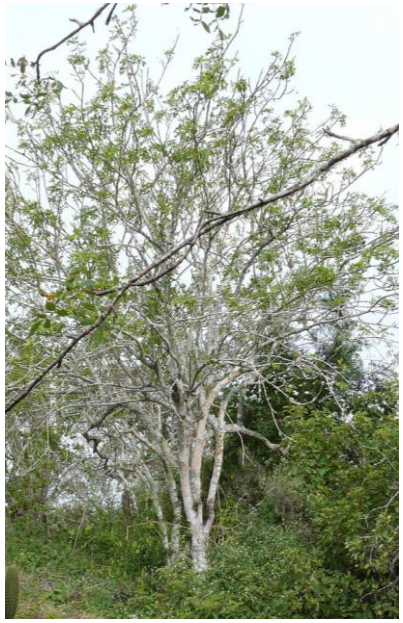
Organic Coffee Production

- 36 coffee farms exists in the Santa Cruz Island.
- Only one farm produces organic coffee under shade of endemic species.

USDA AND BIRD FRIENDLY CERTIFICATION

AGROFORESTRY REFERENCE SYSTEM



Palo Santo
Bursera graveolens

Matazarno
Piscidia carthagenensis

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Organic Coffee Production

Agroforestry reference system:

- Production depends on precipitation
- 100% organic production
- During 2015 the coffee production was 4545 kg in 10 ha.

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Organic Coffee Production: Ecosystem Services

Agroforestry coffee systems make possible:

- Control invasive species
- Retrieve certain patches of native and endemic species.
- Attract species of fauna
- Improve the income of local people in the Santa Cruz Island.

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Application of GIS for Zoning Agricultural Systems

Agricultural zoning: preserve and maintain the agricultural production, the aim is to protect the crop land against non compatible uses that in the long term affect negatively the economical capacity of the area (Kruft, 2011).

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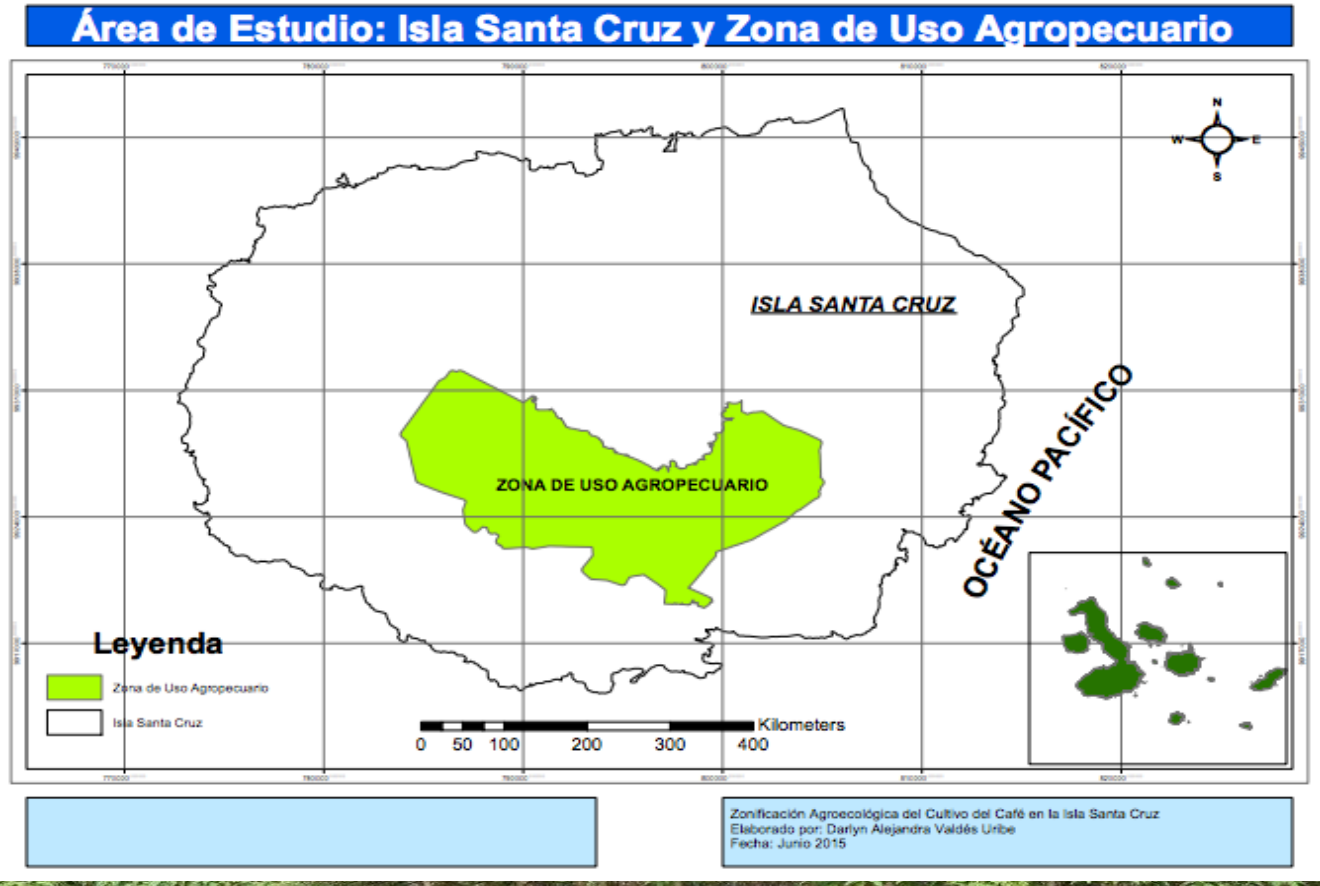
Application of GIS for Zoning Agricultural Systems



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Application of GIS for Zoning Agricultural Systems

- Mapping
- Environmental factors/attributes

Zoning

Attributes

- Soil Taxonomy
- Precipitation
- pH
- Temperature
- Elevation
- Fertility
- ED

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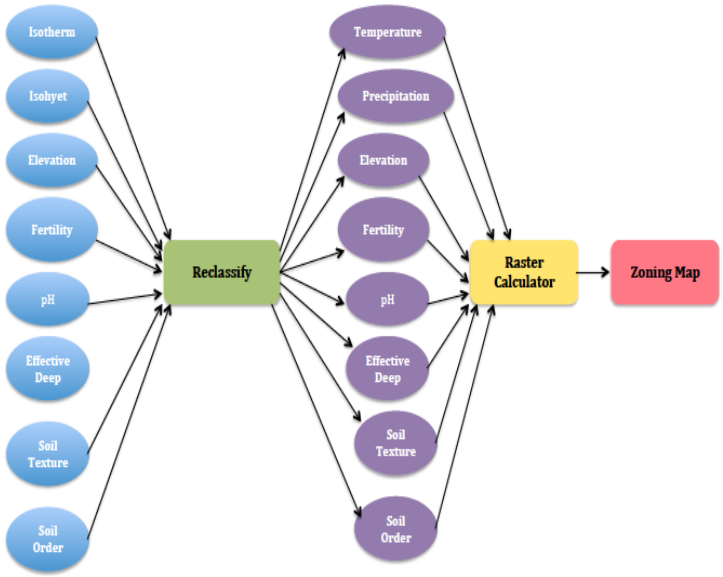
Application of GIS for Zoning Agricultural Systems

STEPS

1. Same Format: Raster 10 x10m
2. DEM
3. Reclassification of Environmental Factors
4. Raster Calculator
5. Zoning Map



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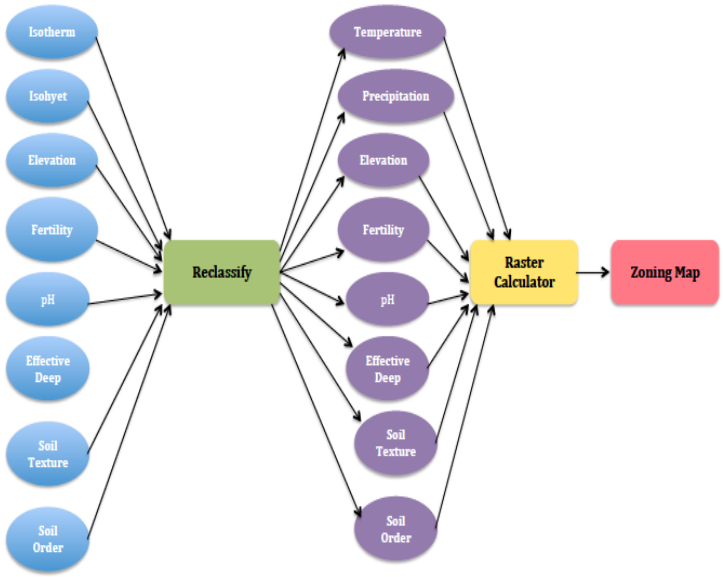
Application of GIS for Zoning Agricultural Systems

Reclassification of Environmental Factors

Old values	New values
1000-1200	3
800-1000	4
600-800	5
400-600	4
200-400	3
NoData	NoData



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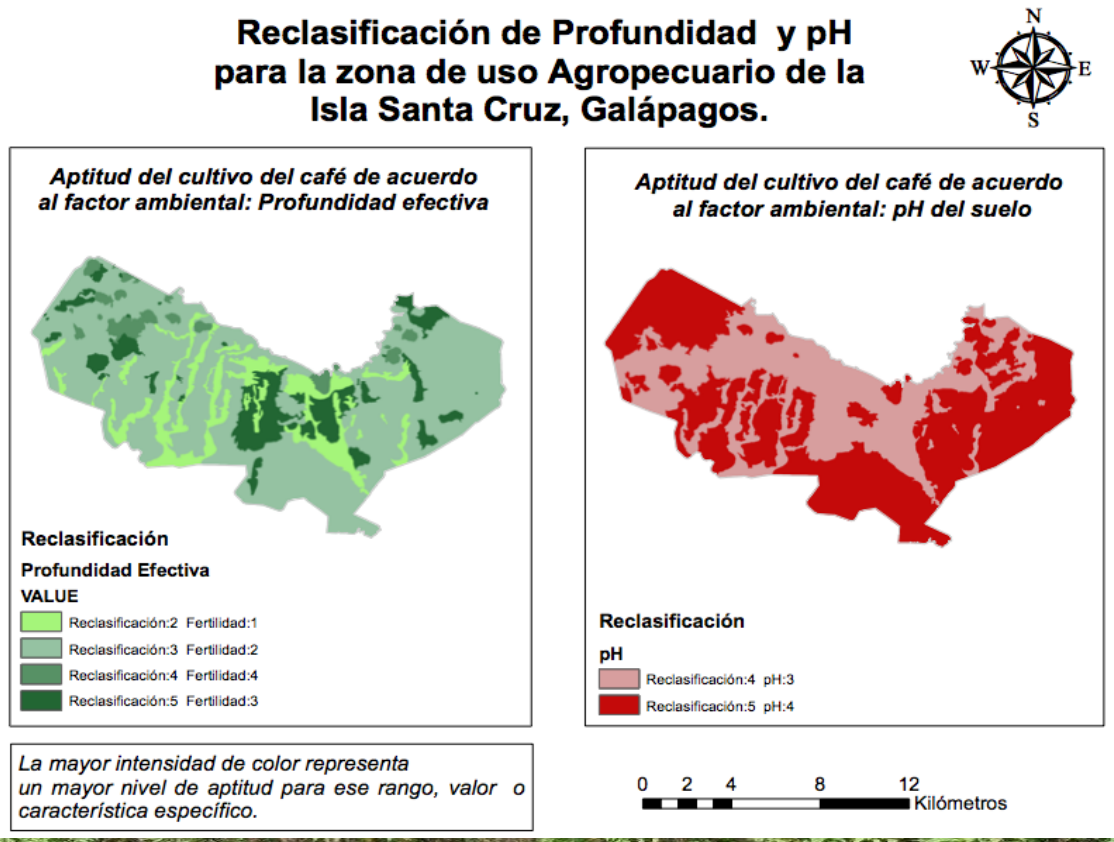
Application of GIS for Zoning Agricultural Systems



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Zoning of organic coffee in Santa Cruz Island

The final result is a map in raster format with a cell size of 10 x 10 m, in which is possible to identify the less and most suitable areas to establish an agroforestry system for organic coffee inside the zone ruled by the GNP.

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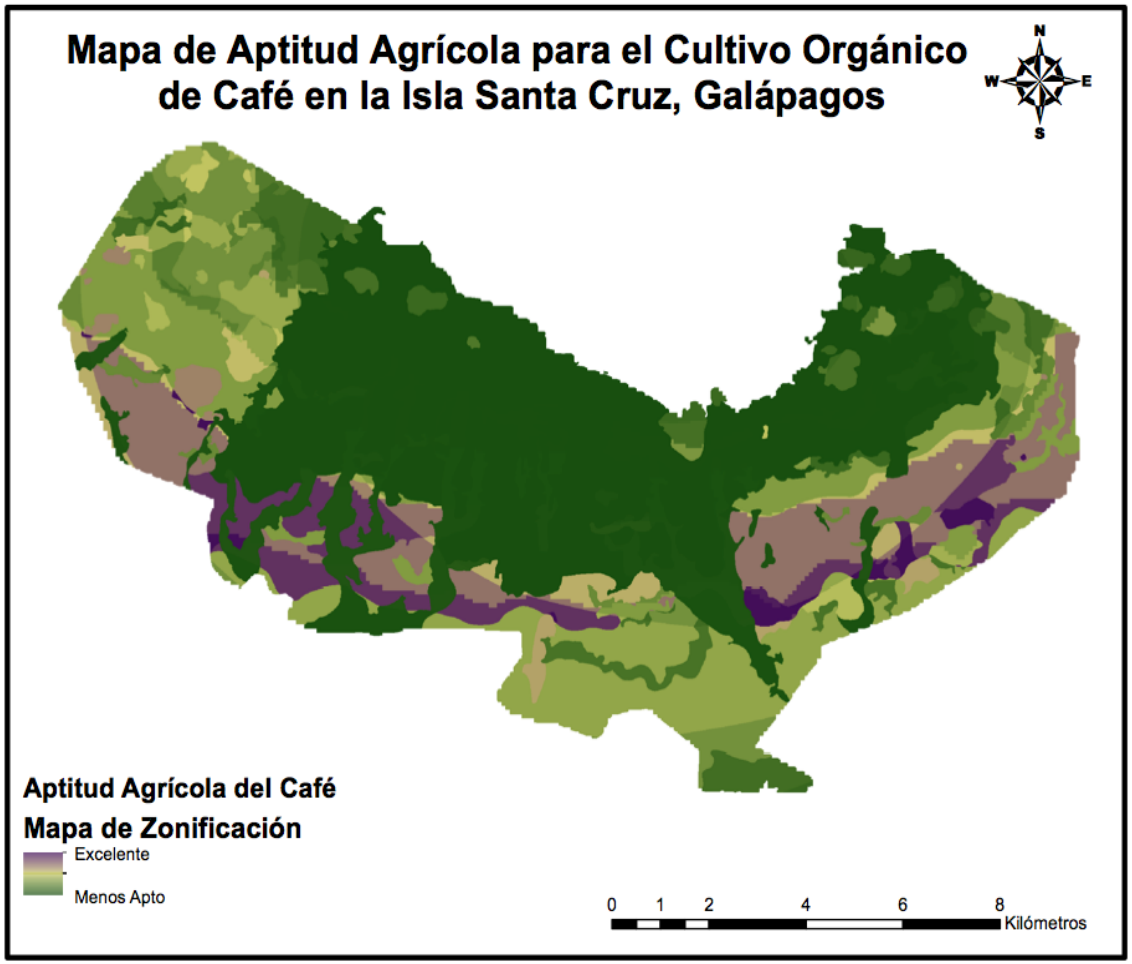
Zoning of organic coffee in Santa Cruz Island



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Zoning of organic coffee in Santa Cruz Island

For determining the area that corresponds to the suitable and non-suitable locations for organic coffee growing, the results of the zoning map were classified in five categories.

Suitable	Area (km^2)
Not Apt	50.45
Marginal	13.78
Apt	11.82
Very Apt	34.47
Excellent	28.27

More than 50% of the agricultural area is suitable for organic coffee growing under shade of forest species.

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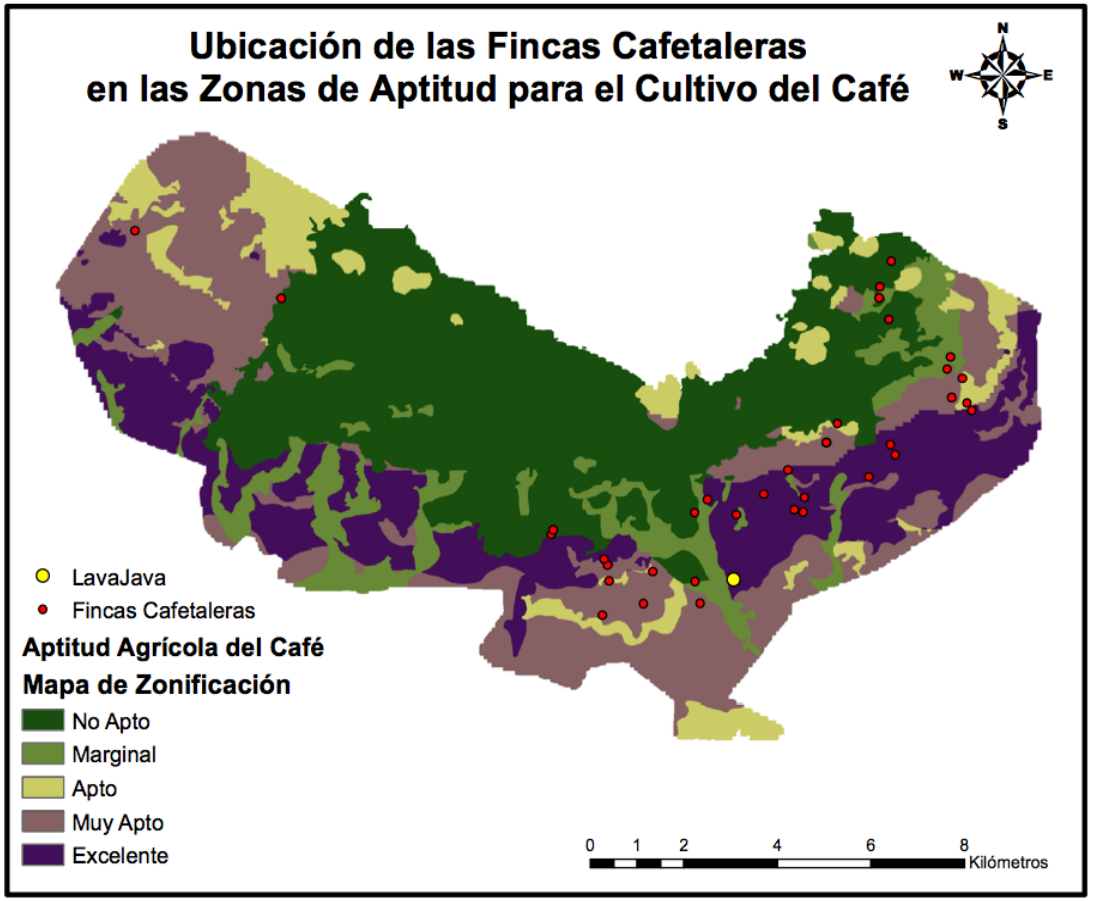
Zoning of organic coffee in Santa Cruz Island

Guide for Coffee Farmers



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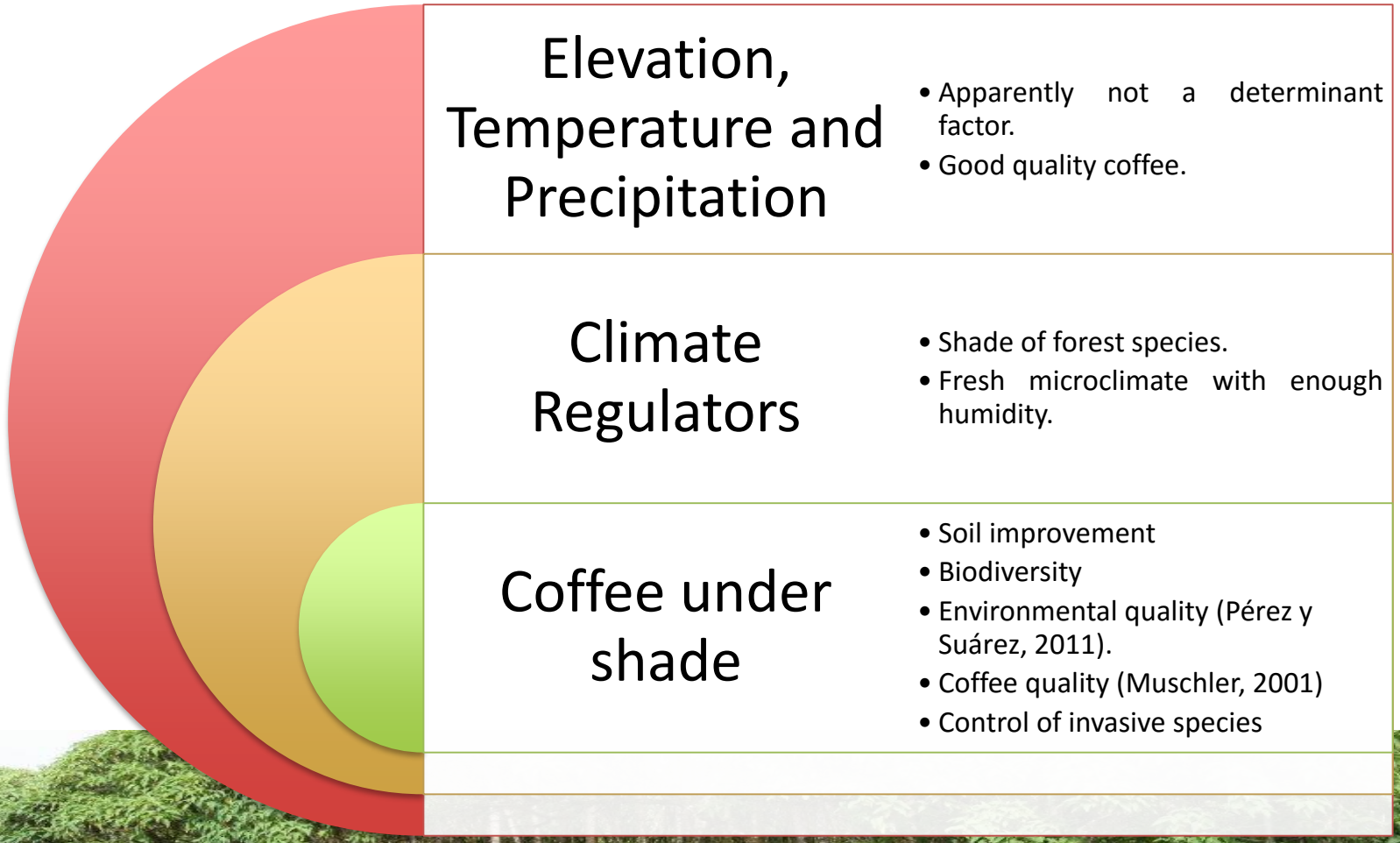
Zoning of organic coffee in Santa Cruz Island



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Conclusions

- 74.56 km^2 are suitable for agroforestry system with organic coffee
- Apparently climate and elevation do not determine the development of coffee in the island.
- Not Apt due to the predominating soil order Inceptisol.
- The effects of the forest shade as temperature regulator, water captor and humidity retainer agent are unknown.
- The increasing market of organic products.

Thank you

Gracias

Danke