Organic agriculture and climate change in developing countries

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Nicaragua organic production

1. Coffee
   10% organic (13,100 ha)
   3,500 small producers
   90% export to EU, USA

2. Sesame

3. Cocoa

4. Cashew nuts

5. Vegetables

6. Cattle production

7. Honey
Nicaragua investigation on climate change

- Legal framework for environmental services
- Studies on carbon sequestration and carbon emissions in agriculture, forest and industry
- No investigation on organic agriculture and climate change
Background investigation since 2004 (Costa Rica)
Theoretical model

\[ Y_{ijklmn} = \mu + F_1 + Q_m + E_j + S_k + B_n + \epsilon_{ijklmn} \]

Resultados en:
- Reducción de emisiones.
- Secuestro de Carbono.
- Eficiencia Energética.

ANÁLISIS DE LA INFORMACIÓN

Variables FÍSICAS Y QUÍMICAS

Emisión de GASES DESDE SUELOS
Contenido de CARBONO DESDE SUELOS
EFICIENCIA ENERGÉTICA del sistema

Variables ECONÓMICAS Y SOCIALES

Desempeño SOCIO ECONÓMICO
Caracterización BIOLOGÍA DE SUELOS

SISTEMA DE PRODUCCIÓN

Valoración de GASES DESDE SUELOS
Valoración CARBONO DESDE SUELOS
Valoración de EFICIENCIA ENERGÉTICA
Valoración SOCIO ECONÓMICA
Valoración BIOLOGÍA DE SUELOS
GHG emissions from soils under different coffee production systems

- Organic coffee production reduces GHG emissions of 1 ton of Ceq/ha
- 13,000 ton of Ceq/ha for all organic coffee in Nicaragua
- In the VCM is a value of 300,000 USD yearly for the 3,500 small farmers
Energy efficiency of organic coffee production
Carbon sequestration under organic coffee production is higher in the depth soil layers than in conventional coffee.
Assessment and improvement of climate relevant techniques in organic coffee production

Do we need a model?

- Reduction of GHG
- Carbon Sequestration
- Use of Natural Resources
- Conservation of biodiversity

CEDECO/UNA/FiBL
Assessment and improvement of climate relevant techniques in organic coffee production

- Assess possible environmental services of organic coffee production systems

Carbon Sequestration

Reduction of GHG

Water use and conservation

Conservation of biodiversity
Assessment and improvement of climate relevant techniques in organic coffee production

- Optimize and enhance benefits of organic coffee production systems in all its life cycle to and throughout the value chain

- Climate neutral production
- Biogas and energy production
- Bio fertilizer without GHG emissions
- Compost elaboration
- Post harvest with low energy
- Waste management
Strategies and objectives

1. Research: on station and on farm

2. Dissemination: capacity building, exchange of experience, promotion, multiplication, networking

3. Policy dialog
Process

1. Participatory process
2. Linking stakeholders: producers, authorities, NGO’S research centres, etc.
3. Generating local Know-how
How development & cooperation can promote organic agriculture as a solution for climate mitigation

- Set up projects with small farmers groups to improve specific management techniques:
  - Fertility and carbon sequestration
  - Compost production
  - Biogas and energy production
  - Management of the biodiversity
  - Management of the waste and natural resources

- Research, Dissemination and policy dialogue
- Organic agriculture as excellent tool to mitigate climate change