

Farm Resilience in Different Cocoa Production Systems in the Yungas, Bolivia

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Background & rationale: Cocoa-based small-scale agriculture is the most important income source for most of the ~8000 families in the region of Alto Beni in the sub-humid foothills of the Andes. Cocoa cultivation is affected by various climate impacts, soil degradation, pests and plant diseases, fluctuating market prices and a difficult transport situation. Farm resilience is thus an important feature of sustainable regional development. Although results from research and development projects agree that agroforestry-based organic cocoa production is the best way to deal with the fragile ecosystem, cocoa monocultures and annual crops are common. This study compares farm resilience of monoculture and agroforestry cocoa farms and evaluates the role of regional cooperatives for the livelihoods of local families and for sustainable cocoa cultivation.



Fig.1 (from left to right) Cocoa flower, cocoa pod, cocoa monoculture, agroforestry system, the research area (Yungas)

Objectives & guiding research question: What is the contribution of organic cocoa agroforestry to farm resilience?

This study evaluates farm resilience in different cocoa cultivation systems and the role of organic certification and local organizations such as cooperatives for building of ecological and socio-economic resilience, referred to as "farm resilience".

- **Compare** cocoa cultivation in monocultures and agroforestry, focussing on soil fertility, biodiversity aspects, yield, carbon sequestration
- **Determine** the role of local organizations working with organic agriculture for the families' livelihoods and resilience
- **Understand** rationales behind decision making regarding how to cultivate cocoa and possible incentives for agroforestry

Theoretical & conceptual approach

Components of farm resilience: Buffer capacity (e. g. biodiversity), self organization (e. g. in cooperatives), and adaptive capacity (e. g. training courses, access to knowledge).

→ Interfaces of environmental services and socio-economic benefits of agroforestry cocoa cultivation

Approach: Cocoa cultivation as a livelihood strategy, taking into account activities and external influences (ecological and socio-cultural, according to Wiesmann 1998), perceptions and ambitions of actors (Baumgartner and Högger 2004)

→ Farmer/family as actor(s) at the centre of the framework



Fig.2 Concept of farm resilience. Milestad and Darnhofer 2003, modified

Research & methods

1st phase: Soil analysis, biodiversity and biomass sampling
 March – December 2010, in cooperation with students, Facultad de Agronomía, UMSA, La Paz.



Fig.3 Cognitive mapping and participant observation

2nd phase: Socio-economic assessment of cocoa cultivation in agroforestry and monocultures (April-December 2011 in cooperation with Masters' students, CDE, University of Bern)
 → Participant observation, cognitive mapping, and semi-structured interviews with families with and without affiliation to different local organizations and cooperatives

Progress & preliminary results

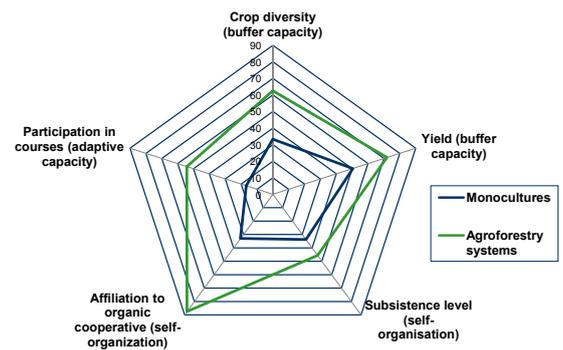


Fig.4 Preliminary comparison between some farm resilience indicators in cocoa farms

→ **Indicators of farm resilience are higher in agroforestry plots that are mostly organic**

→ **Organic cocoa agroforestry systems are efficient, diverse and self-sufficient**

→ **Preliminary livelihood analysis shows that social capital and local organizations play a crucial role in cocoa production**

→ **Diversification and capacity building enhance farm resilience**

→ **Local cocoa cooperative as a knowledge resource centre**

The role of local institutions for livelihoods and farm resilience:

The preliminary comparison of farm resilience parameters (Fig. 2) shows that agroforestry systems are more resilient when facing disturbances and are a viable alternative to conventional slash-and-burn monoculture practices regarding yields. Local institutions working on organic certification enhance a socio-cultural process of family integration into cooperatives and towards organic principles with important ecological implications. Therefore, the best way to enhance farm resilience is to strengthen these organizations and their integrative function in linking their work to the families' needs.

- References:
- [1] Wiesmann, U. (1998): Sustainable Regional Development in Rural Africa. Geographisches Institut, Universität Bern.
 - [2] Baumgartner, R. and Högger, R. (2004): In Search of Sustainable Livelihood Systems. Managing Resources and Change. Sage, New Delhi.
 - [3] Milestad, R. and Darnhofer, I. (2003): Building Farm Resilience: The Prospects and Challenges of Organic Farming. Journal of Sustainable Agriculture 22:3.