Agroecology provides grounds for resilient livelihoods among small-scale farmers in Western Guatemala

Executive summary report of a comparative study of agroecological versus semi-conventional farms.

Alexandra Praun, Claudia Irene Calderón, Claudia Jerónimo, Jaime Reyna, Carlos Maldonado, Iván Santos, José Pablo Prado Córdova

Introduction

Small-scale agriculture in Guatemala entails, among other things, both the basis for national food supplies (Isakson, 2013) and a reservoir for traditional knowledge on soil management, natural resources, water cycle regulation, and native plant species conservation. Agroecology comprises a set of production practices tailored to small-scale farming and consistent with a food-supply strategy based upon social justice and ecological integrity within those territories where it is implemented. This allows for agroecology to strengthen local economies and provide an alternative rationale for food production vis-à-vis current alarming levels of global warming. (IPPC, 2014; Gliessman, 2013; Lin *et al.*, 2011; Altieri & Toledo, 2011).

Justification and methodology

Despite various social actors' efforts to promote agroecology as an alternative at the national level there is still insufficient leverage to bring about favourable outcomes in decision making circles. Hence the need to inform the on-going debate as to how to improve agriculture's potential to both eradicate rural poverty and halt child malnutrition. Given this situation, the Programme for Territory and Rural Studies (PERT)[1] at the University of San Carlos in Guatemala, the Department of Horticulture at the University of Wisconsin-Madison, and a team of associated researchers on nutrition and agroecology teamed up in 2016 to respond to a public research call prepared by *Trócaire* and local NGO *Asociación Red Kuchub'al*[2] with the aim of estimating food - and resilience-related[3] changes under climatically unstable circumstances among small-scale farmers who have adopted agroecology as their production method and rationale.

This research was carried out by comparing 10 agroecology adopting farming families with 10 semi-conventional ones on a wide range of social, economic, environmental and cultural criteria. Field visits took place in both dry (November-April) and rainy (May-October) seasons to capture seasonal differences. Direct measurements of biophysical characteristics including soil moisture, soil fertility and organic matter levels were taken alongside socio-economic questionnaire surveys.

Cultivation on terraces in Tacaná

[1] PERT is part of the Institute for Agriculture and Environmental Research, at the same institution.
[2] Red Kuchub'al focuses on solidarity-based economy and good living.
[3] By climate resilience we mean the ability of a system to survive, overcome, and even thrive in a changing climate (Choptiany et al., 2015), including environmetnal, economic, social and cultural components.

Results

In what follows we present a summary of the study results (Praun et al 2017) which are applicable to both groups compared:

1. These small-scale farmers carry out their production activities under particularly challenging conditions, notably a steep terrain, lack of basic infrastructure and services, and water scarcity for irrigation during the dry season.

2. A meagre access to public health services entails a hindrance for achieving food security in these households, mainly as it pertains to nutrition quality for both children and adults.

3. This study was carried out in peasant family-managed agricultural units where similar techniques were found such as organic matter incorporation to the soil and soil conservation structures to deal with the steep terrain, all of which fall within the category of agroecological practices put in place by extension work promoted originally by the Catholic Church.

4. Widespread soil conservation techniques help these fields maintain acceptable levels of organic matter contents throughout the year. This entails more drought-related resistance and less vulnerability to run-off erosion and therefore better resilience than more poorly endowed soils.

5. Soil microorganisms occur in both systems at equivalent frequencies with the remarkable exception of a semi-conventional potato field where no microorganism was spotted during the survey.

6. Seed storage is, for the most part, done in an artisanal fashion, which suggests that potential contamination with mycotoxins calls for appropriate action.

7. Maize yields are also equivalent for both systems and at the lower level if compared with national averages.

8. Even though both groups of farmers consume cereals (notably maize) frequently, protein consumption turned out to be below acceptable levels and does not guarantee, in its present amount, recommended daily intakes.

Recently sown seedlings growing on a wide terrace in Tacaná

Goats provide manure for agriculture in Tacaná

Table 1. Comparison of annual net income (Praun et al 2017)

Agricultural produce	Agroecology				Semi-conventional		
	Dry season	Rainy season	Total net income		Dry season	Rainy season	Total net income
		USDPPP				USDPPP	
Cereals	-669.29	0.00	-669.29		-1112.86	0.00	-1112.86
Legumes	890.55	161.01	1051.56		-41.99	15.49	-26.5
Vegetables and herbs	5069.29	1795.28	6864.57		399.15	213.91	613.06
Roots, tubers and bulbs	2011.29	446.72	2458.01		214.17	3605.82	3819.99
Fruits	558.53	328.08	886.61		393.70	0.00	393.7
Medicinal plants	525.98	299.34	825.32		215.88	2.62	218.5
Livestock	711.29	886.48	1597.77		868.24	36.09	904.33
Total	9097.64	3916.91	**13014.55**		936.29	3873.93	**4810.22**

Conclusions

As for agroecology-adopting farming families we conclude the following:

1. Despite challenging conditions, agroecology-based production is more diverse, which translates into a better locally based market integration. This link allows these families to generate higher levels of agricultural income than their semi-conventional peers, which, in turn, improves their chances for food access.

2. Agroecology-based farmers rely less on purchases for meeting their food-related needs and therefore save valuable scarce financial resources by producing a significant share of their food items themselves.

3. Maize yields turned out to be equivalent for both groups of farmers, which means that agroecology-based producers manage to keep up even in the absence of chemical fertilizers, pesticides and herbicides. This also means that the latter rely less on technological packages promoted by agribusinesses.

Female-headed householder tending her field

4. There is a higher number of plant species in the agroecological fields (Fig 1.), which translates into a more balanced intake of soil nutrients, ecological redundancy, and therefore more resilience in the long run. (Praun et al. 2017)

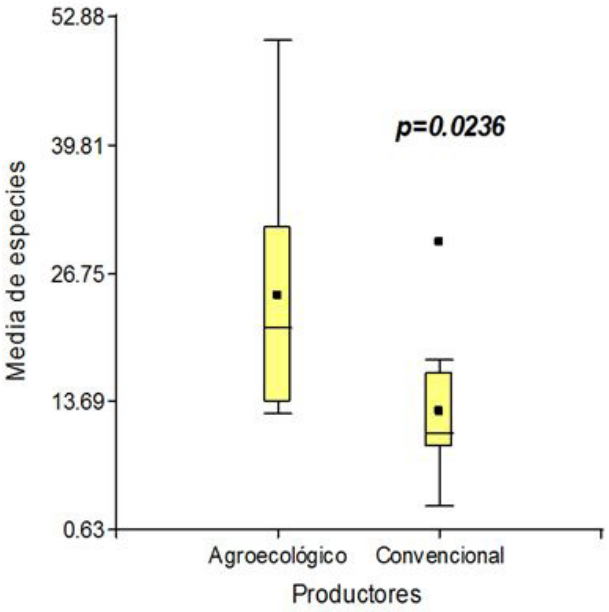
5. Agroecology adoption seems to permeate various aspects of rural life among surveyed farmers, notably gender dynamics, community organization and culture. Of relevance is previous organization work promoted by the Catholic Church and later by Asociación *Red Kuchub'al*. This laid the foundations for a rural subject eager to embrace a more productive agricultural rationale, and build upon a value-laden set of social norms stemming from a growing concern for the common good, the realization of the need to deal with ecologically detrimental threats in an organised fashion, and the desire to promote a solidarity-based economy.

6. Agroecology-adopting farming families seem to be on the move towards a more gender-balanced scenario. They purposefully distribute schooling opportunities more evenly between boys and girls. Women, however, are still burdened with most domestic chores, which entails a pending challenge.

This evidence suggests that those farmers who have adopted agroecology also partake more actively in community-related work and promote environmentally sound production practices in their territories.

Researchers Claudia Calderón and Carlos Maldonado exploring plant species in the agricultural fields in Tacaná

Figure 1. Plant species diversity comparison between agroecological and semi-conventional farms



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