Trócaire's Agroecology Research in Western Guatemala 2016-2017

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Global Food Systems crisis -Trocaire's framing of the solution.

1. Global Policy :- A work in progress, preparing a new strategy for

   Challenging the dominant business as usual and Sustainable intensification models.

2. Global Programmes;-

   Adopting Transformative Agroecological approaches in a rights-based manner.

Trócaire's Strategic Goal 2

- People living in poverty, particularly women, exercise their right to **access and control** natural resources and **benefit** from **the sustainable use and management** of those resources

Trocaire defines its agricultural approach as transformative and agroecological

1. Transforming power relations in the agriculture and food system and

2. Mimicking the natural ecology /ecosystem

Mimicking and retaining the natural system e.g. the forest

Mimicking the forest ecosystem Guatemala

Yield Concept Shifts

- Optimal Yield vs Maximum Yield
- Whole farm yield vs individual crop yield
- Edible Yield vs Saleable yield

Nicaragua, Cinco Pinos

Trocaire is not so worried about dominant discourses (*in black below*) – happy to change (in red below) the narratives.

- *Shifting from 'subsistence to commercial agriculture*' , we are more concerned about self-sufficiency.
- *Changing from 'traditional to modern agriculture'* - we more concerned with what practices are sustainable from whatever knowledge source.
- Not so critical about rain-fed agriculture - we are more interested in making rain-fed work better.
- Not just concerned with farm production – we also want to consider wild foods which are very important in rural diets but fast being lost .

What does Transformative Agriculture look like?

El Salvador Drought 2013/4 (credit Jose' Adan Cuadra)

- **Top photo;-.**

Business as Usual monoculture.
Maize crop wilted , no harvest.

- **Bottom photo;-**

Transformative, maize still green and some harvest. Pawpaw and other fruits to eat.

Guatemala 2015

Business as Usual

Maize Pinus spp. system

Transformative

Long-cycle agroforestry

Transformative - El Salvador uplands Rainfall 300mm per annum but something to eat or sell every day of the year.

Multi-storey coffee and food forest.

Wild green vegetable leaves from the understorey.

So why do research on agroecology?

- Very little research happening globally. Virtually no public research funding for agroecology.
- Hard to convince our financial supporters, partners and farmers without scientific evidence.
- Want to be sure we are on the right track
- Learn from agroecological farms

Research question

What impact does the adoption of agroecological approaches make to the nutrition security and climatic resilience of farming households?

Approach and methodology

- Literature review of methodologies.
- Conscious that interdisciplinary approach needed. MESMIS framework very useful.
- Inspired by the Holt-Gimenez et al. study following Hurricane Mitch.

- Individual interviews – separate sexes.
- Household interviews
- Direct measurement of field characteristics (slopes, presence of soil protection measures, soil structure& texture, O.M.fertility, biological activity)
- Plant diversity transects
- Maize yield estimation from sample plots before harvest.
- Laboratory analysis
- Focus Group discussions

Parameters measured

Four Broad Well-being/resilience Parameters

- Economic,
- Environmental,
- Social and
- Cultural

Sub-parameters -examples

- See also field-work manual for details.

Cropping diversity, food availability, yields, scarcity periods, soil biological activity, soil resistance to erosion, soil fertility water and energy access, income, market engagement, community solidarity and more.

Sampling

Farms

10 agroecological farms/farm families and 10 conventional farms/farm families of similar size and physical and topographical conditions

Timing

Two study periods –

a. time of plenty and

b. time of constrained food and economic circumstances.

Dry (November through April) and rainy (May through October) seasons over the period 2016-2017

General Context –Tacana and Sibinal, western Highlands

Maps removed for copyright reasons.

General Context

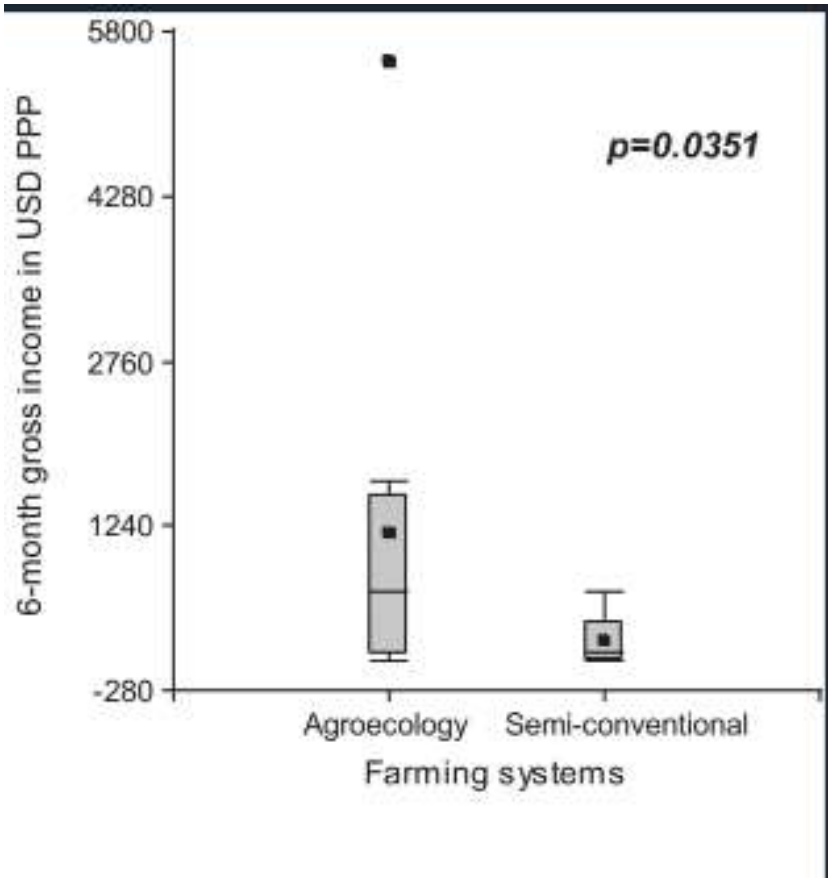
- Malnutrition incidence level of 55% (MSPAS, INE, and ICF Internacional 2015).
- Poverty at or above 84.4%
- Steep terrain, high altitude
- Lack of access to infrastructure and to social services.
- Migration to Mexico is common and disrupts social structures.

Limitations of the research

- Very small sample.
- Semi-conventional rather than fully conventional was compared to agroecological.
- Did not take whole farm productivity/ yield measurements- thus unfair comparison of polycropping to less diverse system
- Very short study- just 2 seasons.

Results - Income

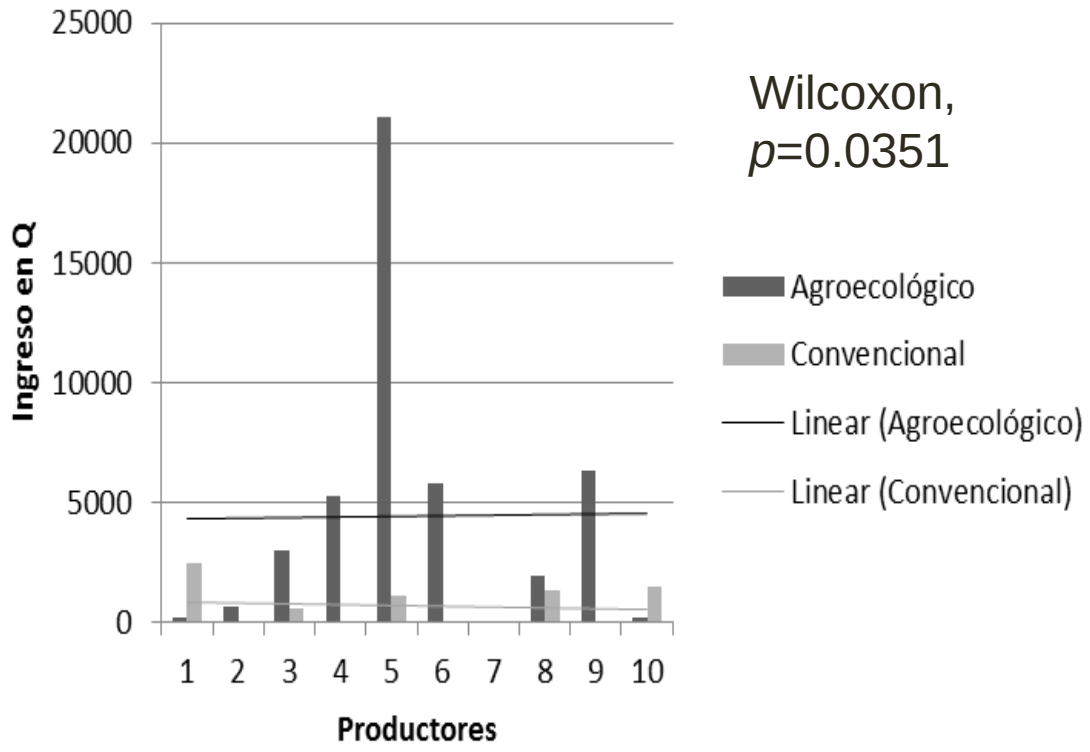
Statistically significant differences were found for gross agricultural income



Comparison of annual net income

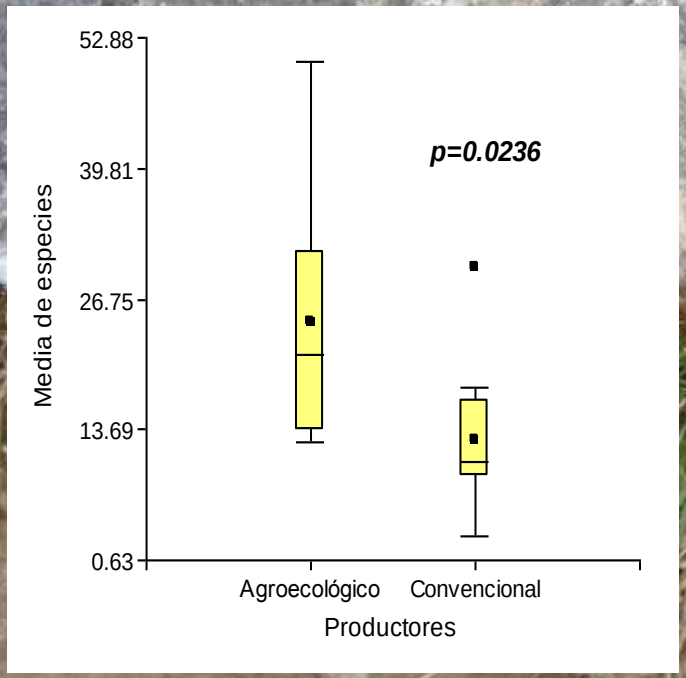
Agricultural produce	Agroecology				Semi-conventional		
	Dry season	Rainy season	Total net income		Dry season	Rainy season	Total net income
		USDPPP				USDPPP	
Cereals	-669.29	0.00	-669.29		-1112.86	0.00	-1112.86
Legumes	890.55	161.01	1051.56		-41.99	15.49	-26.5
Vegetables and herbs	5069.29	1795.28	6864.57		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

Cash Income from trading



Wilcoxon,
p=0.0351

Diversity of plant species



Number of cultivated plant species according to season

Household	Number of plant species cultivated during the dry season	Number of plant species cultivated during the rainy season	Mean
A1	16	18	17
A2	12	13	12.5
A3	28	27	27.5
A4	15	15	15
A5	15	16	15.5
A6	43	35	39
A7	29	34	31.5
A8	43	58	50.5
A9	13	18	15.5
A10	29	25	27
C1	8	14	11
C2	0	6	3
C3	14	19	16.5
C4	10	10	10
C5	18	18	18
C6	17	22	19.5
C7	6	13	9.5
C8	10	15	12.5
C9	9	7	8
C10	28	32	30

Consumption of the staple food maize

Families consume a similar amount of maize regardless of their production system and season.

Junk food consumption

- Agroecological families claim to eat no junk food or drinks, while semi-conventional families eat junks food between twice pre week and daily.

Maize yields

Ave Yield Agroecological = 2t/Ha

Ave Yield semi-conventional = 1.82t/Ha

The yield differences are **not significantly different**.

Conclusion;-

Even in the absence of synthetic fertilization and with mixing several more plant species in their maize fields, agroecological producers are able to keep up with their conventional peers.

Dependence on purchased food

- Semi-conventional families spend double on grocery shopping than agroecological ones,
- Which suggests that the former are less economically efficient and more dependent on purchased food items than the latter.

Social organisation

- Agroecological families seem to be better organised and have access to stronger solidarity networks.

Few gender differences observed

- Gender differences were observed in regard to schooling. Agroecological families seem to distribute schooling opportunities more evenly (15 girls and 15 boys) than their semi-conventional peers (15 girls and 23 boys)

Summary conclusion

Agroecology-based farmers are more resilient than their semi-conventional peers because of a more diversified production system, a higher agricultural income, and a stronger social network.

Summary of results

Consultancy headings	Attributes	Criteria	Indicators	Relation between agroecology-based (A) and conventional (C) farmers	p value
Food security	Resilience	Diet composition	Household dietary diversity index	A≈C	0.6323
Household economy	Productivity	Efficiency	Market integration	A>C	0.0072**
	Resilience	Diet composition	Maize consumption	A≈C	0.4212
	Productivity	Efficiency	Gross agricultural income	A>C	0.0351*
	Stability	Natural resource conservation	Fuelwood consumption	A≈C	0.1572
	Productivity	Efficiency	Harvest index	A≈C	0.1597
	Productivity	Efficiency	Maize yields	A≈C	0.5039
Soil management	Stability	Natural resource conservation	Invertebrate abundance in topsoil	A≈C	0.0826
	Resilience	Adjusted technology	Soil conservation practices	A≈C	0.0682
	Stability	Natural resource conservation	Soil organic matter	A≈C	
Plant diversity	Reliability	Agro-diversity	Cultivated plant species diversity	A>C	0.0236*
	Reliability	Agro-diversity	Plant diversity Hedge row diversity index	A≈C A≈C	0.0674 >0.9999
Gender	Equity	Gender roles	Women in agriculture	A≈C	0.8994
	Equity	Gender roles	Men in household chores	A≈C	0.5353

Lessons learnt for future research

- Find truly conventional farmers for comparison with the agroecological ones.
- Do whole cropping productivity comparisons/Ha
- Perform the study over at least a three year (six seasons) period
- Take a far bigger sample of farm families.
- Use Net primary Productivity (NPP) and Land Equivalent Ratios (LER) for yield measurements,
- Take into account the savings when inputs are not purchased and
- Measure labour costs.

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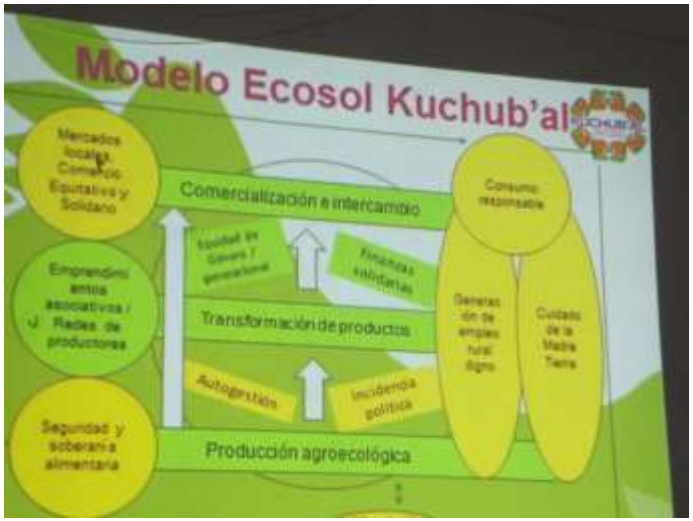

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Thanks! Keep in touch.
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Trócaire is the official overseas development agency of the Catholic Church in Ireland.

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