

AGROBIODIVERSITY FOR THE POOREST?

A critical review of a popular idea.

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Contested Agronomy, IDS, 24/02/2016

Biodiversity conservation and poverty alleviation

“The aggregate benefits [of conservation] are valued at three times the estimated opportunity costs and exceed \$1 per person per day for 331 million of the world’s poorest people. [...] these results show win-win synergies between conservation and poverty alleviation”

Turner, W.R. et al., 2012, "Global Biodiversity Conservation and the Alleviation of Poverty". *BioScience* 62: 85–92

“Biodiversity contributes directly to poverty reduction in at least five key areas: food security, health improvements, income generation, reduced vulnerability, and ecosystem services. Conservation is therefore key to achieving the Millennium Development Goals (MDGs).”

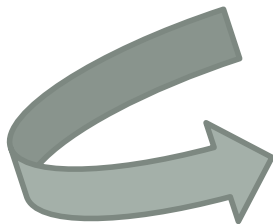
Emerton, L., 2005, Making the Economic Links Between Biodiversity and Poverty Reduction: The Case of Lao PDR,. IUCN — The World Conservation Union

Example: Seeds for Needs Project

- World Bank ‘Development Marketplace’ Competition 2009 for Climate Adaptation

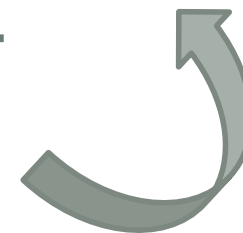
AGROBIODIVERSITY

“access to a diversity of climate-ready crop varieties of barely and durum wheat ”



RISK MANAGEMENT

“Farmers employ locally available and indigenous varieties to hedge their bets”



POVERTY REDUCTION

“prevent (...) farmers from falling deeper into poverty”

- **Project target group:** women from the poorest (i.e. the most vulnerable households)

The academic debate: Crop biodiversity for risk management

- Understanding on-farm crop diversity:
 - patterns of variation across and within communities
 → *who & why?*
- Recent studies focus on the risk management angle:

- using a diverse crop & crop variety portfolio to smooth output at the cost of lower returns

Bezabih, Sarr 2012, Di Falco, Chavas et al. 2007, Di Falco, Chavas 2006, 2008, 2009, Di Falco, Bezabih et al. 2010, Quaas, Baumgärtner 2010



Assessment of the evidence & literature

- Earlier studies: risk management as one of many incentives to maintain diversity
 - *Bellon 2004, Brush, Taylor et al. 1992, Smale, Bellon et al. 2001, Smale, Aguirre 1998*
- Limited empirical evidence for the relationship between high risk exposure & aversion and higher levels of agrobiodiversity
 - Biodiversity as an input in the production/variance/skewness function: mixed results, small sample and endogeneity problems
 - *Di Falco, Chavas et al. 2007, Di Falco, Chavas 2009, Di Falco, Chavas 2006, Di Falco, Chavas 2008, Smale, Hartell et al. 1998, Widawsky, Rozelle 1998*
 - Rainfall variability
 - *Bezabih, Sarr 2012, Di Falco, Bezabih et al. 2010, Di Falco, Chavas 2008*
 - Household wealth as proxy for risk aversion
 - *Bezabih, Sarr 2012, Di Falco, Bezabih et al. 2010, Benin, Smale et al. 2004, Bezabih 2008, Gebremedhin, Smale et al. 2006, Van Dusen, Taylor 2005*

Portfolio diversification in the risk literature

- making production and consumption decisions under risk without insurance and credit markets (see e.g. Fafchamps 1999):
 - *ex ante*: reducing exposure to risk/ managing risk/ smoothing production
 - diversification:
 - sources of income (on farm & off farm)
 - plots
 - crops and crop varieties
 - self-sufficiency
 - *ex post*: coping with risk/ smoothing consumption
 - saving & liquidating assets
 - risk sharing: informal insurance
 - resource allocation

Summary

Who is involved in knowledge production and how?

- Single-issue think tanks and lobby organisations
 - Contested hypotheses —→ facts
 - Strategic interests (political agenda, funding)
- Academia
 - Selective referencing
 - Acknowledging limitations of data and methods
 - Decoupled agendas within the social sciences
- Development agencies/professionals
 - Pre-conceived ideas vs. contextual knowledge/data

Study background

- 428 randomly sampled households in three study sites/ agro-ecologies: lowland, midland, highland locations in East Shewa surveyed in May & June 2013

Characteristics:

- proximity to capital, market integration
- semi-commercialized
- moisture reliable
- above average productivity
- diversity hotspot
(durum wheat, barley)
- conservation projects



Empirical strategy

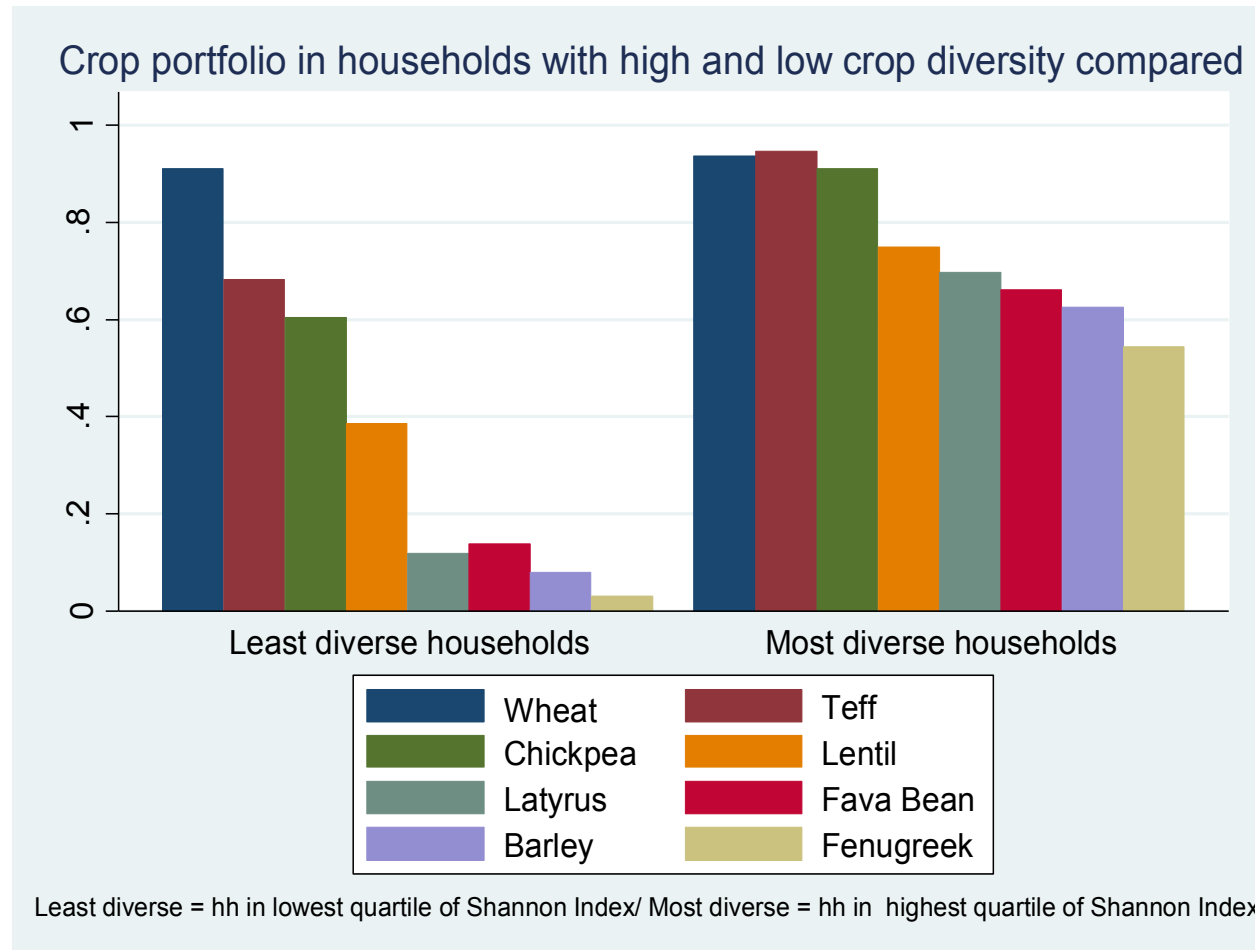
- RQ: *Which households diversify their crop and wheat portfolio in a context of (relative) limited risk? Is agrobiodiversity being used as a risk spreading mechanism?*
- *dependent variable*: crop and varietal diversity in wheat (*Crop Count, Shannon-Wiener & Herfindahl-Hirschmann indices*)
- *independent variables*: characteristics of location/agroecology, household, farm, market, social network
- *estimation procedure*:
 - ordered logistic regression for count variables & tobit model for censored dependent variables
 - no causal interpretation

	Crop/ Inter-specific Diversity			Var/Intra-specific Diversity in wheat		
DV	Crop Count	ShannonC	HerfinC	Wheat Count	ShannonV	HerfinV
Model	OLOGIT	TOBIT	TOBIT	OLOGIT	TOBIT	TOBIT
N	418	414	414	418	392	392
Adjusted/Pseudo R ²	0.120	0.333	-0.201	0.292	0.337	0.412
Oromo	.297	.058	-.022	-.193	-.240*	.156*
Education	-.171	-.035	.018	-.400	-.057	.032
Age	.008	.001	.000	-.004	-.001	.000
Female headship	.863**	.152*	-.053*	.295	-.074	.084
Number of children	.124***	.017**	-.003	.025	.026	-.014
Livestock & Property, log	.419***	.075***	-.032***	.616***	.150**	-.086**
Land size, <i>hectares</i>	.459***	.058***	-.016***	.101	.031	-.019
Slope	-.660***	-.071	.017	-.543*	-.260**	.127*
Irrigation	.380	.039	-.0005	-.465	-.149	.065
Fertility	-.181	-.016	.003	-.247	-.150	.099
Bonding Social Cap	.071	.001	-.002	.203*	.063	-.037
Linking Social Cap	.104	-.004	.005	.155*	.050	-.027
Market distance	.014***	.0021***	-.0007***	.004	.001	-.001

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Findings:

Crops beyond the standard portfolio



Discussion:

A classical tale of transaction costs

- **Risk management?**

- **Risk exposure**

- Higher rainfall variability
- More land degradation
- More sloped land
- Less fertile land

- **Risk aversion**

- more vulnerable/less wealthy

AGRO-BIODIVERSITY



- **Transaction costs!**

- households face transportation and opportunity costs for accessing input, output and food markets
- growing more diverse for home consumption

Implications:

A more holistic view of agro-biodiversity

- Agro-biodiversity is about more than risk management argument
 - Consequences for interventions!
- When is agro-biodiversity the best and preferred risk management strategy?
- Under conditions of limited risk, high transaction costs promote diversity.