Resource Management at the Margins: Implications for Policy and Institutional Development

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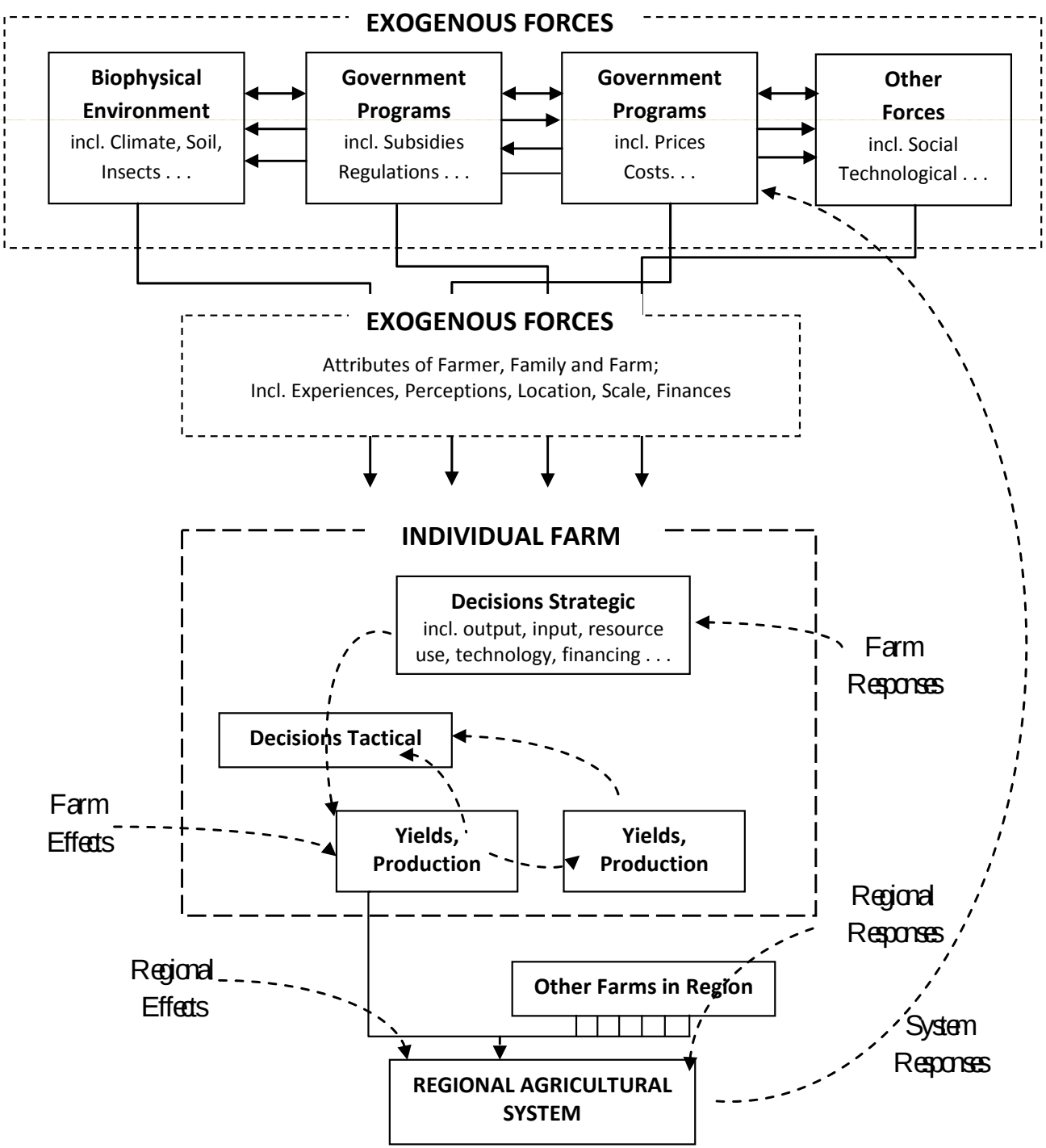
Why focus on resource management at the margins?

- The margins, typified by the uplands are ecologically fragile ecosystems
- Institutions are less formal
- Population is less educated
- Observed increase in population
- Resource management strategies create externalities downstream, especially when farmers practice intensive agriculture

Why focus on resource management at the margins?

- Upland farmers are poor
- Important to understand decision parameters of farmers as they decide their farm portfolio, in normal and abnormal years.



Conceptual model of agricultural adaptation to climatic variation

The Key Concepts

- There is price transmission from urban markets to marginal areas.
- Output prices in the urban centers affect land use decisions at the margins.
- Wages influence marginal farmers' decisions on soil conservation practices.
- Security of tenure promotes adoption of soil conservation practices.
- But, soil conservation practices, i.e permanent structures such as agroforestry may reduce farm production during climate extremes (drought).

The Case Study Site of the SANREM-CRSP funded by the USAID

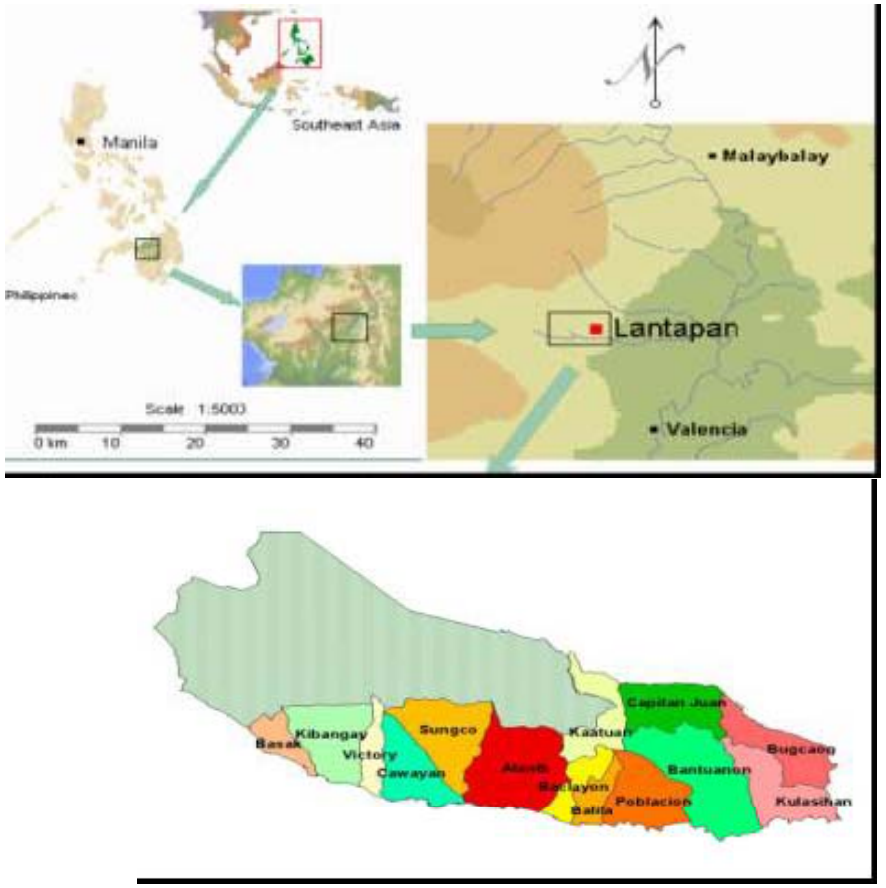


Fig.2.1. Location map of Lantapan

The Data Collection-1994-2006

- Baseline Survey of Farm Households-1994
- Resurvey of households-1995, 1996, 1998, 1999, 2000, 2001,2002, 2006
- Weekly Price Monitoring Data from different markets (retail, wholesale, farm-1994-2002)
- Key Information Collection, FGDs after 2006, mostly for water governance issues.

Data Collection

- Data bracket 1997-98 period, where:

1. Globalization was starting to gain momentum
2. Decentralization in the Philippines was starting to be implemented
3. El Nino event

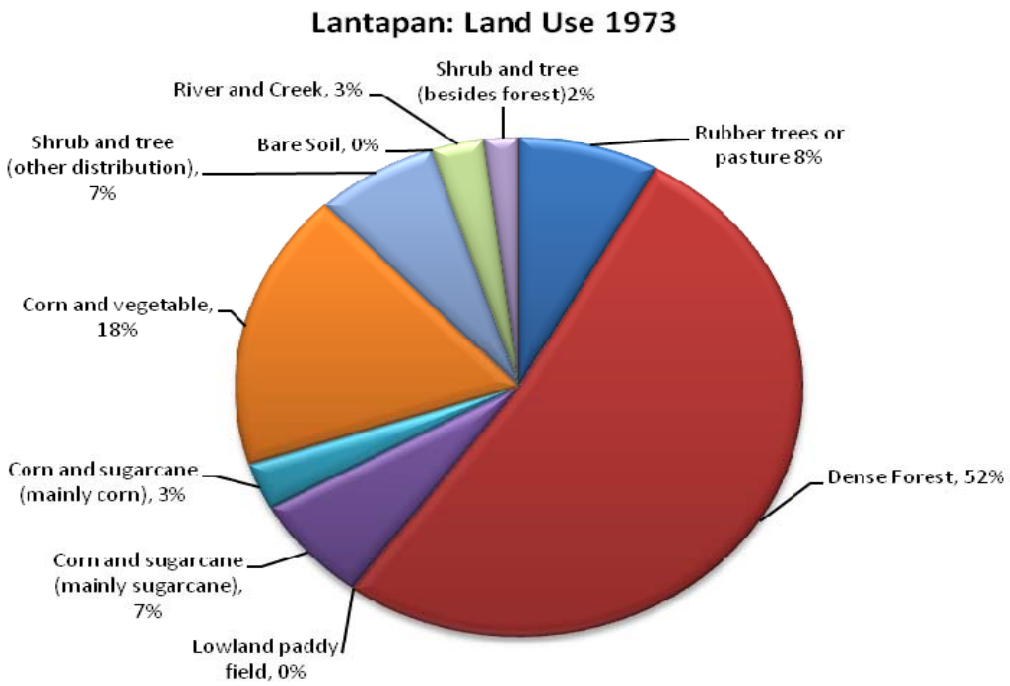
Data Set

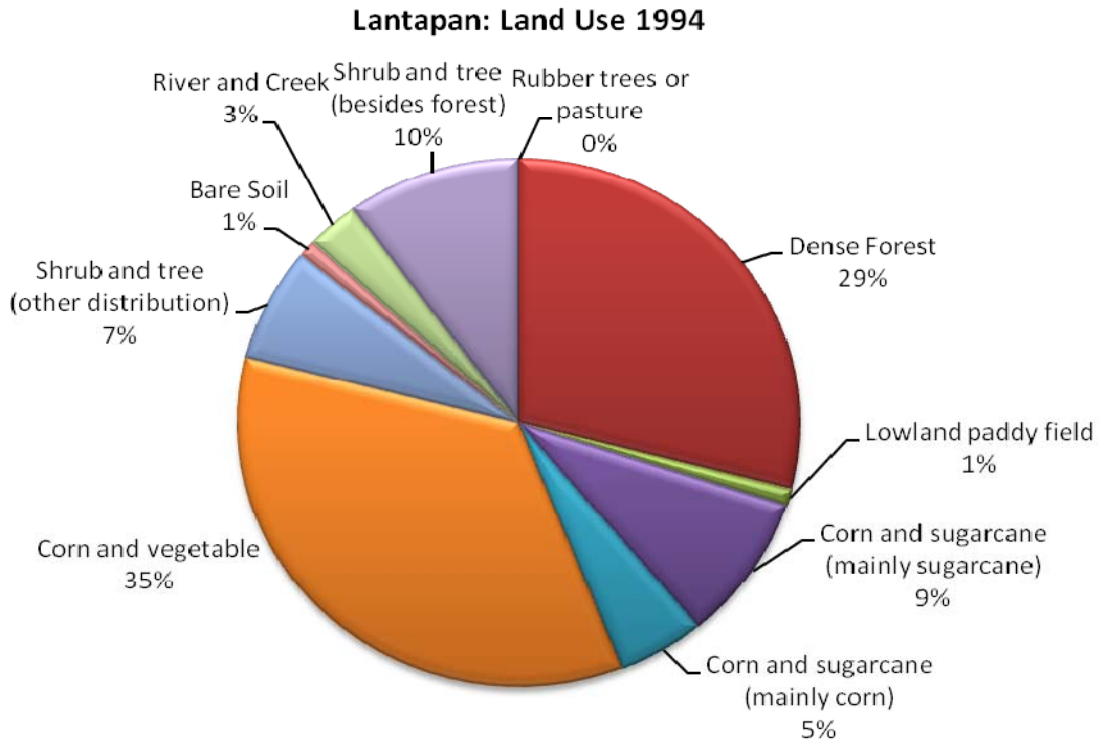
Land Use Decisions (area devoted to particular crop), input data, output data,

Farm and family characteristics

Soil conservation practices, price expectations

Weekly farm,wholesale and retail prices for corn,coffee,vegetables (potatoes, cabbage), rice, abaca and timber, if available





LAND USE CHANGES, MUNICIPALITY OF LANTAPAN, 1973-1994
Source; Li, 1994. Tables 5.9 and 6.12

SUMMARY OF RESULTS OF GRANGER CAUSALITY TESTS FOR CORN AND VEGETABLE PR

Crop	Test[a]	R^2	DW[b]	F(N; d.f.)	P-value[c]	Comments
Weekly Data						
Yellow Corn	Agora → Lantapan	0.75	1.97	3.22 (182;2,176)	0.042	One-way
	Lantapan → Agora	0.86	2.04	0.91 (182;2,176)	0.403	Causation
White Corn	Agora → Lantapan	0.89	1.95	8.25 (162;2,176)	0.004	One-way
	Lantapan → Agora	0.95	1.96	0.39 (162;2,176)	0.68	Causation
Avg. Potato	Agora → Lantapan	0.81	1.95	6.61 (157;2,151)	0.002	Two-way
	Lantapan → Agora	0.84	2.08	7.17 (157;2,151)	0.001	Causation
Cabbage	Agora → Lantapan	0.86	1.97	2.88 (170;2,151)	0.005	Two-way
	Lantapan → Agora	0.68	1.96	5.60 (170;2,151)	0.004	Causation
Monthly data						
Avg. Potato[d]	Agora → Lantapan	0.75	2.05	13.8 (83;2,76)	0.001	One-way
	Lantapan → Agora	0.83	2.12	0.77 (83;2,76)	0.470	Causation
Cabbage	Agora → Lantapan	0.61	1.90	3.36 (41;2,35)	0.046	One-way
	Lantapan → Agora	0.56	1.99	0.34 (41;2,35)	0.710	Causation

[a] Arrows indicate the direction of causation being tested, so for example "Agora→Lantapan" indicates a test that Agora price Granger causes Lantapan Price.
[b] Durbin-Watson test Statistic
[c] $P < 0.01$ indicates rejection of the null hypothesis (no causation) at 1% significance; $0.01 < P < 0.05$ indicates rejection at 5%; $0.05 < P < 0.1$ indicates rejection at 10 %.
[d] Biweekly data for average prices of large and medium potatoes.

Coxhead and Demeke, 2005

Random effects Tobit estimates.

Variable	Corn		Vegetable		Total Area	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Farm area	0.404***	0.020	-0.006	0.016	0.379***	0.014
Corn revenue	0.015**	0.008	-0.045***	0.009	0.006	0.007
Veg revenue	-0.005**	0.002	0.007***	0.002	-0.004*	0.002
Wage	-1.570	1.939	-7.440***	1.814	-2.855*	1.634
Slope	-0.015**	0.006	-0.009*	0.005	-0.021***	0.005
Distance	-0.116***	0.018	-0.024	0.015	-0.107***	0.014
Educ. of HH	0.005	0.018	0.017	0.015	0.011	0.015
Family labor	-0.026	0.027	0.057***	0.023	0.002	0.023
Age of HH	-0.011*	0.006	-0.009*	0.005	-0.013***	0.005
Constant	1.032**	0.464	1.695***	0.404	1.689***	0.385
σ_c	1.037***	0.080	0.479***	0.063	0.935***	0.048
σ_u	0.810***	0.036	0.585***	0.038	0.703***	0.027
ρ	0.621	0.045	0.402	0.070	0.639	0.032
Log likelihood	-754.824		-340.862		-738.162	
Wald stat ($\chi^2(9)$)	491.06***		48.76**		909.01***	
N. obs	580		580		580	

Note: *, **, and *** indicate significance at 1%, 5% and 10% levels respectively.

Labor supply function estimates and propensity to adopt soil conservation measures, Lantapan, Bukidnon, 1996-2000.

Independent Variable	Labor Supply Equation (OLS)Dependent Variable is L_NFE	Logit Model 1 = Practice soil conservation; 0 = does not practice soil conservation	
		Model 1	Model 2
Slope	-	0.76***	0.70***
		(0.15)	(0.11)
Tenure	0.20	0.93***	1.24***
	(0.38)	(0.26)	(0.21)
Age of Household Head	0.23**	0.13*	0.18***
	(0.12)	(0.08)	(0.06)
Age Square	-0.002*	-0.001*	-0.001***
	(0.001)	(0.001)	(0.001)
Log Wage	0.19***	-	-0.04
	(0.06)		(0.03)
NFE	-	-0.007*	-
		(0.004)	
Output Price Expectation	-	-0.004	-
		(0.14)	
Education of Household Head	-0.002	-0.18*	-0.15**
	(0.15)	(0.09)	(0.07)
Season dummy	-5.62***	-0.58*	-0.52***
wet season =0	(0.39)	(0.30)	(0.19)
dry season =1			
Year dummy	-2.94***	-	-
1998 = 0	(0.42)		
Otherwise = 1			
Constant	1.29	-4.92***	-6.56***
	(2.92)	(1.87)	(1.52)
R^2	0.328		
Log likelihood	-287.02	-255.43	-414.64

Note: Figures in parentheses are standard errors.
* Significant at $\alpha = 0.10$
** Significant at $\alpha = 0.05$
*** Significant at $\alpha = 0.01$

Source; Rola and Coxhead 2002.

Upland corn production with soil conservation under climate extremes (Rola, Sajise, Alpuerto and Harder, 2009)

Average treatment effects for treated (adopters) and untreated (non-adopters).

Treatment Measure	Whole Data (kg/ha)	Before 1998 (kg/ha)	After 1998 (kg/ha)
Average Treatment Effect on Treated	238	507	79
Average Treatment Effect on Untreated	1420	1432	1453
Difference	-1182	-925	-1374

Conclusions and Implications

- The margins are integrated into the markets for products and labor.
- Security of tenure influences conservation decisions.
- With intensive agricultural production at the margins, governance and its regulatory role becomes important.
- With extreme weather events, adaptation techniques may be incompatible with labor saving soil conservation techniques but more research is needed to confirm this result.

Thank you