ENVIRONMENTAL DEGRADATION AND INTRAHOUSEHOLD LABOUR TIME ALLOCATIONS IN RURAL SOUTH PARE HIGHLANDS, TANZANIA

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Paper prepared for presentation at the 12th EAAE Congress
'People, Food and Environments: Global Trends and European Strategies',
Gent (Belgium), 26-29 August 2008

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Congress topic(s): **Environment and Resources/Rural Development**

Abstract:

We assess the influence of environmental degradation on intrahousehold labour time allocations in rural south Pare, Tanzania. We distinguished three types of areas, namely, severely degraded, medium degraded and non-degraded environmental conditions. The unit of analysis is the household composed of both parents and at least one schoolchild. The results, among others, show that environmental products collection and/or grazing time by the household members is, almost in all groups and in accordance to gender-biased activity, significantly influenced by the environmental conditions.

Keywords:

Environmental degradation, intrahousehold labour time allocations, rural south Pare highlands.

1. INTRODUCTION

Rural south Pare highlands in Tanzania experience a deteriorating environmental situation (Semgalawe and Folmer, 2000). Factors such as population growth, deforestation, poor farming techniques, and weak forestry regulatory frameworks are cited as the cause of environmental degradation (Bjorndalen, 1992). Of particular importance, however, is the disappearance of original forests (Newmark, 1998). The consequence of this is declining amounts and reliability of rainfall, declining amounts of water levels, fuel wood shortages and loss of biodiversity (Rodgers, 1993).

Deterioration of environmental resources increases costs of collecting environmental products, which in many respects have no feasible close substitutes (Chopra, et al. 1990). One of the major components of the increased costs is labour time allocated by household members to collecting environmental products and/or grazing activities. This reallocation of intra-household labour resources may have different effects on welfare for different members of a household. In less developed communities like rural Tanzania where private property rights are ill-defined or are biased against women, and where some of the markets are non-existent, degradation of the local environmental resource base is expected to adversely affect women (wife, daughters) and children more than men. Furthermore, labour time reallocation may interfere with labour allocated to other agricultural activities in the area. In addition, it could drain much of the time children allocate to schooling activities, which may have negative implications on their performance in schools and the quality of their human capital in the long run.

In this poster, we assess whether increased collection and/or grazing time due to environmental degradation alters the time-use patterns of each of the household members. Using primary data from the south Pare highlands in the northern highlands of Tanzania, we examine the consumption of environmental products and the allocation of time across tasks. The work focuses on the allocation of time to environmental goods collection and/or grazing to determine how time spent is affected by scarcity of environmental products. If scarcity has an effect, projects that allow households to save time by increasing the availability of environmental products (e.g., forestry projects) or by allowing more efficient use of them (e.g., improved stove programs) may be quite beneficial. An additional goal of this chapter is to determine whether there are gender differences with regard to time reallocation, as is frequently assumed.

II. OBJECTIVES

- Assessing whether increased collection and/or grazing time due to environmental degradation alters the time-use patterns of each of the household members, and,
- examining the consumption of environmental products and the allocation of time across tasks and household members by the rural south Pare households.

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III. MATERIALS AND METHODS

- We apply the neo-classical model of an agricultural household as described by Singh, Squire and Strauss (1986) developed after the work of Becker (1965) and Lancaster (1966) on consumer theory.
- We use the primary data collected between October 2006 and June 2007 in the south Pare highlands, Tanzania. The survey households are composed of couples and primary school age children.
- The survey was structured so as to collect information about, among others, household composition, income, human capital, and time allocation to various productive activities and leisure.
- To analyse how variations in the environmental degradation affect intra-household labour allocation, three types of areas are distinguished: severely degraded, degraded, and non-degraded environments.
- Since many individuals spend zero hours on some activities, we correct for selection bias by using the Heckman's two-steps estimation technique.

IV. ESTIMATION RESULTS AND DISCUSSION

- Environmental products collection and/or grazing activities in south Pare are gender biased with husbands specializing in grazing while wives and children working mainly on fetching both water and fuel wood.
- Environmental products collection and/or grazing time by the household members is, almost in all groups and in accordance to gender-biased activity, significantly influenced by the environmental conditions.
- If a spouse or a schoolchild participated in the intrahousehold activity, his/her time in the work has a significant impact on the time spent by other spouse in that particular activity, especially in water and fuel wood fetching works for the household use.
- Individual characteristics like occupation, e.g. being a farmer or government employee; and ethnicity, e.g. being a Pare or Chagga; mostly do not have significant impacts on the intrahousehold time-use of the household members in all collection and/or grazing activities.

V. CONCLUSIONS

- Policies geared towards implementing projects that allow households to save time by increasing the availability of environmental products (e.g., forestry projects) or by allowing more efficient use of them (e.g., improved stove programs) may be quite beneficial.
- Had there been more variations in ethnicity, education levels and occupations, probably the household and individual characteristics might have been significant determinants of intrahousehold labour time allocations.

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VII. APPENDIX

- **Study area**

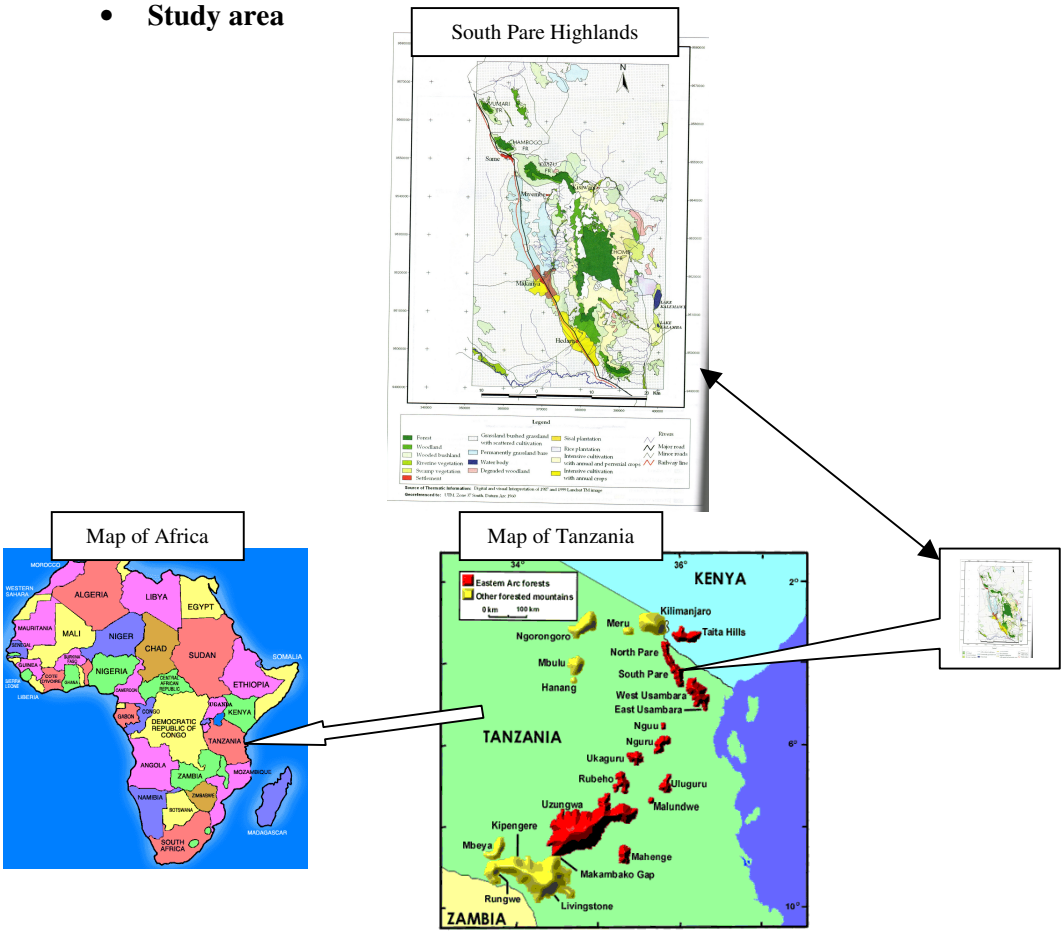

Figure 1: Location of the South Pare Highlands

- **Intrahousehold labour time allocations**

Water fetching | Fuel wood collection | grazing

Figure 2: Intrahousehold labour works examined

- **The estimation results:**

Part one and two (among three) of the results obtained showing the econometric estimates of the labour time allocations by the husband and wife in water, fuel wood collection and grazing activities.

Table 1a: Heckman selection model : Two-step estimates. Dependent variable: Log collection/grazing time

	Water		Fuel wood		Grazing	
	Outcome equation	Selection equation	Outcome equation	Selection equation	Outcome equation	Selection equation
Husband						
Nondegraded vs medium degraded dummy	0.038	-0.087	0.126	-1.559	0.482	0.264
	(0.133)	(0.294)	(0.157)	(0.396)***	(0.043)***	(0.218)
Nondegraded vs severely degraded dummy	0.209	0.706	-0.019	0.155	0.470	0.394
	(0.178)	(0.302)	(0.146)	(0.391)	(0.049)***	(0.233)
Other vs. Farmer dummy	0.137	1.296	-0.061	1.291	-0.109	0.635
	(0.282)	(0.725)	(0.220)	(0.689)	(0.082)	(0.388)
Other vs. Government employee dummy	-0.667	-0.154	-0.352	0.740	-0.235	-0.453
	(0.364)	(0.938)	(0.281)	(0.918)	(0.140)	(0.568)
Age	0.071	0.008	0.036	-0.093	0.029	0.141
	(0.056)	(0.129)	(0.047)	(0.152)	(0.019)	(0.100)
Age square	-1.071	-0.165	-0.584	1.299	-0.376	-2.006
	(0.785)	(1.844)	(0.664)	(2.173)	(0.272)	(1.424)
Log # males in the household	0.278	0.827	-0.282	1.606	0.118	1.916
	(0.228)	(0.564)	(0.219)	(0.632)	(0.143)	(0.46)***
Log # females in the household	-0.154	0.259	-0.119	0.891	-0.005	0.292
	(0.155)	(0.485)	(0.130)	(0.515)	(0.076)	(0.419)
Log # hours by wife per week	0.927	0.123	0.510	-1.435	0.161[a]	
	(0.104)***	(0.257)	(0.167)**	(0.449)**	(0.091)	
					0.325[b]	
					(0.135)	
Log # hours by schoolchild per week	0.045	-1.394	-0.018	-2.339	0.058[a]	
	(0.188)	(0.321)***	(0.104)	(0.549)***	(0.072)	
					0.036[b]	
					(0.085)	
Log hhold water/fuel in litres/kgs per week	0.330	-0.581	0.130	-2.339	0.016	
	(0.315)	(0.579)	(0.259)	(0.549)	(0.044)	
Log total hsehold income per week in Tshs.	-0.307	-0.452	-0.139	-0.636		0.223
	(0.121)	(0.250)	(0.114)	(0.294)		(0.209)
Other vs. Pare ethnicity dummy		-0.444		1.288		1.114
		(0.401)		(0.682)		(0.582)
Other vs. Chagga ethnicity dummy		-0.133		1.512		1.567
		(0.562)		(0.791)		(0.704)
Illiterate vs. Primary education dummy		-1.059		-1.456		-0.094
		(0.614)		(0.674)		(0.584)
Illiterate vs. Secondary education dummy		-0.539		-0.920		-0.046
		(0.676)		(0.715)		(0.630)
Constant	2.619	2.228	2.719	-1.408	2.120	4.398
	(2.812)	(6.753)	(2.334)	(7.931)	(0.902)	(4.942)
$Wald\ chi^2$	223.36		81.32		246.93	
$Prob > chi^2$	0.000		0.000		0.000	
ρ	0.572		-0.430		0.181	
σ	0.255		0.185		0.181	
λ	0.146		-0.079		0.033	
	(0.188)		(0.120)		(0.110)	

Legend:

- **Water**: number of observations: 279; censored observations: 222; uncensored observations: 57 ≅ 20.4%
- **Fuel wood**: number of observations: 296; censored observations: 243; uncensored observations: 53 ≅ 17.9%
- **Grazing**: number of observations: 301; censored observations: 115; uncensored observations: 186 ≅ 61.8%

  For **grazing**, because of the zero hours for wife and schoolchild, then the following technique was applied:
  [a] (Dummy x log (hours))
  [b] (1 – Dummy)
  Where if not observed log (hours) = 0. Dummy = 1 if wife/child is grazing and 0 if else.
- $P < .1,*\ \ P < .05,**\ \ P < .01***$ **;** Results in brackets are standard errors.

Table 1b: ***continued:-***

	Water		Fuel wood		Grazing	
	Outcome equation	Selection equation	Outcome equation	Selection equation	Outcome equation	Selection equation
Wife						
Nondegraded vs medium degraded dummy	-0.115	-6.011	-0.170	-0.088	0.479	1.071
	(0.069)	(0.523)***	(0.042)***	(0.647)	(0.243)	(0.552)
Nondegraded vs severely degraded dummy	0.132		0.170	6.11	0.659	2.324
	(0.068)		(0.048)***		(0.525)	(0.502)***
Other vs. Farmer dummy		-2.938		-5.806		5.206
		(49.014)		(86.767)		(9.387)
Age	0.056	1.261	0.060	1.349	0.020	-0.025
	(0.037)	(1.313)	(0.023)*	(1.817)	(0.111)	(0.217)
Age square	-0.691	-15.562	-0.803	-19.721	-0.466	0.384
	(0.482)	(16.106)	(0.290)*	(25.132)	(1.421)	(2.844)
Log # males in the household					0.159	1.561
					(0.484)	(0.829)
Log # females in the household	0.009		0.016	-0.093	-0.530	0.438
	(0.018)		(0.011)	(0.183)	(0.262)	(0.654)
Log # hours by husband per week	0.013	-0.065	-0.000	-0.150	0.102	-2.247
	(0.005)*	(0.021)**	(0.005)	(0.120)	(0.436)	(0.793)*
Log # hours by schoolchild per week	-0.001	0.082	0.006	-0.003	-0.220	-0.991
	(0.004)	(0.072)	(0.004)	(0.168)	(0.268)	(0.362)*
Log hhold water/fuel in litres/kgs per week	-0.000	0.000	0.001			
	(0.000)	(0.001)	(0.000)			
Log total hsehold income per week in Tshs.	-0.036	0.187	-0.036	-1.291	-0.177	-0.209
	(0.056)	(0.674)	(0.035)	(0.996)	(0.200)	(0.343)
Other vs. Pare ethnicity dummy						
Other vs. Chagga ethnicity dummy						0.478
						(0.542)
Constant	3.157		3.519	80.882	2.884	
	(1.534)		(0.921)***		(4.586)	
$Wald\ chi^2$	202.06		124.97		74.20	
$\Pr ob > chi^2$	0.000		0.000		0.000	
ρ	-0.655		0.215		0.755	
σ	0.374		0.230		0.327	
λ	-0.245		0.050		0.247	
	(0.402)		(0.319)		(0.341)	

Legend:

- **Water**: number of observations: 301; censored observations: 6; uncensored observations: 295 ≅ 98%
- **Fuel wood**: number of observations: 301; censored observations: 3; uncensored observations: 298 ≅ 99%
- **Grazing**: number of observations: 173; censored observations: 132; uncensored observations: 41 ≅ 23.7%
- $P < .1,^{*}\ P < .05,^{**}\ P < .01^{***}$; Results in brackets are standard errors.