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Landlessness within the vicious cycle of poverty in Ugandan rural farm households: Why and how is it born?

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Abstract

Income poverty levels are increasingly getting worse among the majority (84%) of rural Ugandans who derive their livelihood primarily from agriculture. Mostly driven by declining land productivity resulting from waning soil fertility, limited use of land augmenting technologies and increasing disposal of land to meet urgent household needs. However, limited research has been done to establish why the per capita land holding has been decreasing over time. This necessitated the need to provide better understanding of the complex inter-linkages between landlessness and poverty alongside identifying effective strategies and land policy guidance to address the increasing landlessness in rural Uganda.

Using panel household data collected in 2003 and 2005, results show that the landless households are headed by younger males with significantly lower levels of primary education and smaller household sizes than the landed households. Reduction in household poverty substantially reduces the risk of becoming landless. Land endowment and intergeneration transmission of resources by parents to their children at their household establishment strongly reduces the probability of falling into the current state of landlessness. Thus, polices providing for proportionate resource transmission by parents to their children at the time of household establishment along side provision of development pathways that reduce poverty levels may be an escape route from worsening levels of landlessness.

I. Introduction

Nearly all of Ugandan poor (96%) live in rural areas, and 84% of these depend primarily on agriculture for their livelihood (MFPED, 2001). However, following structural adjustments in macro and micro-economic policies since the early 1990s, absolute poverty in Uganda decreased from around 56 percent of the population in 1992 to 34 percent in 1999/00 (Appleton, 2001a). Despite the progress made in the past years, poverty has since increased to about 38 percent in 2002/03, driven mostly by worsening poverty in rural areas, especially among crop farmers (Appleton & Ssewanyana, 2003).

The predominance of poverty in rural areas has been linked to agricultural productivity, which has stagnated or declined for most farmers (Deininger & Okidi, 2001; Pender *et al*., 2001; Nkonya *et al*., 2004), as a result of declining soil fertility and limited use of land augmenting technologies (Pender *et al*., 2001; MAAIF & MFPED, 2000) and increasing disposal of land to meet urgent household needs, evictions among others (MFPED, 2003).

Several studies in Uganda (Deininger & Okidi, 2001; Pender *et al*., 2001; Pender e*t al.*, 2004; Nkonya *et al*., 2004) have been done highlighting the determinants of agricultural productivity, adoption of land management technologies and soil fertility aimed at reducing poverty. However, limited research has been done to establish why the arable land acreage, has been decreasing over time. Landlessness is an increasing phenomenon in Uganda. Landlessness and severely restricted access to land lead to excessive pressure on land resulting into land degradation (Devereux & Sabates-Wheeler, 2003). Studies done elsewhere indicate that such degradation discourages the capital poor smallholders from investing in land on which their future livelihoods depend (Reardon & Vosti, 1995; Barrett, 1996; Carter & May, 1999; Barrett & McPeak, 2001) and accelerates the process of landlessness forcing families out of their area in search of employment (Okidegbe, 2001).

Empirical evidence from other countries shows that a large proportion of the rural poor suffers from chronic rather than transitory poverty (Grootaert *et al*., 1997, Carter & May, 1999). Chronic poverty, among other factors, seems to result from low initial endowments of productive assets (Barrett, 2005) such as land. Besides, Haddad & Ahmed (2003) affirm that amount of land owned suitable for cultivation is negatively associated with total and chronic poverty. On the contrary, evidence also shows that landlessness is highly correlated with high poverty incidence and severity (Lipton, 1988).

The stark contrast between landlessness and land productivity alongside rural poverty leaves agricultural transformation under the Plan for Modernization of agriculture (PMA) strategy debatable. Poverty reduction is the overarching development goal of the Ugandan government. To achieve this goal, the government has laid a strategy for addressing poverty through the Poverty Eradication Action Plan (PEAP), which set a target of reducing the proportion of the population living in absolute poverty from 44 percent in 1997 to below 10 percent in 2017. The PEAP key strategies for poverty reduction include modernization of agriculture among others (MFPED, 2001). The PMA is one of the central pillars of the government's poverty reduction strategy. PMA emphasizes the critical need for the poor subsistence farmers to become more productive and promote sustainable use and management of natural resources (Government of the Republic of Uganda, 2000).

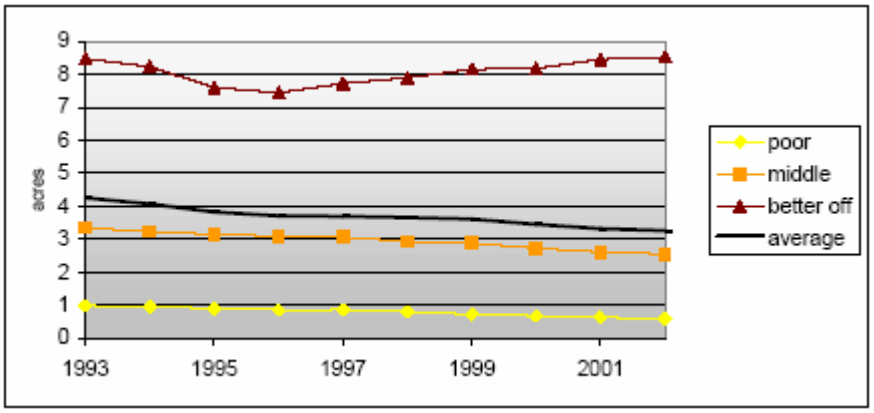
However, the challenge is to achieve the PMA objectives while the rural poor are increasingly getting landless with little or no immediate alternatives. This necessitates the need to identify the key determinants of landlessness among the rural poor. Understanding how and why landlessness emerges under rural socio-economic conditions provides the basis for designing guiding principles to address the land redistribution policy. Appropriate land resdistribution policies lead to secure land tenure, an incentive to adoption of land augmenting technologies resulting into a productive land.

Thus, this study was designed to provide a better understanding of the complex inter-linkages between landlessness and poverty alongside identifying effective strategies and land

policy guidance to address the increasing landlessness in rural Uganda. More specifically, to provide better understanding of the emerging rural landlessness in rural Uganda; and to identify the inherent and current determinants of landlessness.

There is a general lack of attention in both literature and policy to quantifying land distribution patterns, poverty and their effects on landlessness in Uganda. Available literature shows that a sizable proportion of the rural population is landless. The situation seems to be deteriorating in Uganda as the population increases. For example, using the Village Census data, MFPED (2002) revealed that households were not accumulating land; rather significantly diminishing the land size. Figure 1 shows the overall trends in land ownership per wealth category. Better-off households owning sizable land in 2002 had the same acreage as in 1993 having recovered from a dip in 1996. The middle and poorest categories on the other hand had their acreage decreasing significantly. Mainly because of gender inequalities, large families, distress sales, insurgency, land evictions, and failure to derive benefits from land.

Figure 1: Changes in land ownership from 1993 to 2002 among households



Source: MFPED (2002), pp 17

In addition, available data on land distribution show a highly unequal pattern in Uganda, with the land Gini coefficient in excess of 0.50 where the arable land (ha) per head of agricultural population declined from 0.33 to 0.31 between 1995 to 1997, suggesting a decline in the access of the rural poor to land, which eventually results in landlessness

(Okidegbe, 2001). Since majority of the rural population in Uganda derives the bulk of its income from agriculture (MFPED, 2001) and yet previous research done in rural India shows that initial distribution of assets affects the poverty-reduction and the initial percentage of landless households significantly affects the elasticity of poverty (Ravallion & Dalta, 2002).

II. Research questions and hypotheses

Research questions

The ambiguity whether poverty leads to landlessness or vice versa poses plausible and salient research questions. How does rural landlessness arise? Is it because rural households are inherently poor? Is amount of land endowment at the start of household responsible for the current state of landlessness? To what extent has poverty contributed to landlessness? Who are the landless rural poor? What policy measures are urgently needed to secure the landless poor?

Research hypothesis

This study is built on the hypothesis that household welfare depends upon land holding as a key resource asset and that the amount of land owned is dependent on initial endowments, household poverty level, land productivity, household characteristics, the parental demographic family structure at the start of household and community level factors (market access, agricultural potential and population density). Thus, the problem of landlessness and appropriate means of addressing it in a given land constrained household is hypothesized to depend upon factors that determine household welfare which in turn determine the returns to livelihood strategies aimed at solving the problem of landlessness.

III. Literature review and expected factor-effects

Factors affecting resource endowment

Households have varying complementarities in terms of resource endowment. Rich households can have access to capital markets and borrow to overcome liquidity constraints, unlike the poorer households that are locked out of capital markets thereby creating a resource degradation poverty trap (Lybbert *et al*. 2001, Barrett & McPeak, 2001). The poor are, thus, caught in poverty traps that lead them to de-accumulate natural capital (Shepherd & Soule, 1998). This creates strong incentives to deplete natural capital in order to sustain human capital (Perrings, 1989) and limited interest in long-term investments for land improvement (Pender, 1996; Holden *et al*., 1998).

Binswanger & Singh (1994) argue that increased value of inherited capital increases farm profits, total income and total wealth. Inheritance adds significantly to an individual's wealth and is an important determinant of the capacity to accumulate additional wealth. Other previous work indicates that the likelihood of escape from poverty is dependent on the initial asset position, largely by the amount of land owned (Sen, 2003) and that land transfer from the land-rich to the land-poor has positive productivity effects (Binswanger *et al*., 1995). However, in the intergenerational process of land fragmentation, poorer quality land may be handed down so that households can make an adequate living from it (Ravallion & Sen, 1994).

An increase in the amount of land cultivated significantly increases the per capita monthly expenditure (Bigsten *et al*., 2003, Mukherjee & Benson, 2003). Since land rental demand is highest among the rural landless households (Deininger *et al*., 2003), increasing amount of arable land through land rental markets reduces pressure on land and may result in improved land productivity and asset accumulation. However, asset accumulation is far less important than returns to endowments (Glewwe & Hall, 1998). Increased land rental market activities lower importance of household assets in favor of

agricultural assets provided initial physical assets needed to enter into land markets are available (Deininger & Mpuga, 2003).

The growth of the non-farm economy in Uganda was found to have a significant and positive impact on land rental markets. Making it easier for the landless households to gain access to land but more difficult to acquire land through purchase markets because some initial wealth is needed in order to enter the land purchase market (Deininger & Mpuga, 2003). In addition, other evidence elsewhere shows that involvement in off-farm activities significantly decreases per capita expenditure, off-farm activities seem to be a coping mechanism for the poorer people, rather than a way of escaping poverty (Bigsten *et al*., 2003). At the same time, the steadily increasing land values through land markets are a great incentive for peasants to sell their fields which deprive them of their basis of production in the long run (Foli, 1986). Consequently, active land markets and different rental systems have evolved by increasing landlessness (Neef & Neidhues, 1994), especially among older households (Deininger & Mpuga, 2003).

Household factors are also expected to have indefinite effects on landlessness and poverty. Previous studies show that larger household sizes put extra burden on household resource base and are likely to be poorer (Lanjouw & Ravallion, 1995; McCulloch & Baulch, 2000). Besides, larger households tend to have higher dependency ratio, which is associated with lower productivity and incomes (Deininger & Okidi, 2001; Nkonya *et al*., 2004). Dependency ratio increases per capita expenditure and it underscores the importance of adult labor in the welfare of rural households (Bigsten *et al*., 2003, Haddad & Ahmed, 2003, Mukherjee & Benson, 2003).

Households headed by older individuals in rural area tend to be poorer than those headed by younger individuals (Mukherjee & Benson, 2003). Equally, increase in household age (which is expected to be correlated with age of household head) is significantly linked with increased landlessness (Quasem, 2001).

Education of the household head is a determinant of poverty and landlessness. Evidence shows that per capita expenditure is positively related to the level of education (Bigsten *et al*., 2003) and education has substantial and positive impact on agricultural productivity (Fan *et al*., 2004; Nkonya *et al*., 2004) and household incomes (Deininger & Okidi, 2001; Schultz, 1988).

Village level factors such as markets access, population pressure and agro-climactic zones have ambiguous impacts on land productivity, poverty and landlessness. Although rural population pressure increases land degradation (Pender *et al*., 2001; Nkonya *et al*., 2004), farmers may intensify and improve land management in response to population pressure leading to land productivity improvement (Tiffen *et al*., 1994; Pender, 2001). High population densities may be area specific, such as in more fertile areas based on agro-climatic zones (Voortman *et al*. 2000). Population pressure may result in land disposal for households with limited resources, but at the same time population growth leads to conversion of reserve and marginal land to agricultural use (Place *et al*., 2001).

IV. Research Methodology

Data sources

The analysis used panel data collected by Research on Poverty, Environment, and Agricultural Technologies (REPEAT), a joint project that was under taken by Foundation for Advanced Studies on International Development (FASID), Graduate Institute for Policy Studies (GRIPS) and Makerere University. REPEAT project conducted research in the same households and commuties[2] studied by International Food Policy Research Institute (IFPRI) in 1999-2001.

[2]The districts in the project study area included Apac, Bugiri, Bushenyi, Busia, Iganga, Jinja, Kabale, Kabarole, Kamuli, Kapchorwa, Kasese, Katakwi, Kibale, Kiboga, Kisoro, Kumi, Lira, Luwero, Masaka, Mbale, Mbarara, Mpigi, Mubende, Mukono, Nakasongola, Ntungamo, Pallisa, Rakai, Rukungiri, Sembabule, Soroti, and Tororo.

IFPRI survey involved communities from more densely populated and more secure areas of southwest, central, eastern and parts of nothern Uganda representing seven of nine major farming systems of Uganda. Because of insurgency in the northern region, Katakwi, Apac and Lira districts were excluded in the REPEAT surveys. REPEAT project conducted panel studies in 29 out of 32 districts and in 94 out of 107 Local Council ones (LC1s) studied by IFPRI. The communities were selected using a stratified random sampling, with the stratification based on development domains defined by the different agro-ecological and market access zones and on differences in population density (Pender *et al*., 2001).

A community-level survey was conducted with a group of representative individuals from each selected community to collect information on access to infrastructure and services, local markets and prices, and other factors. A random sample of households was selected (four households per community in IFPRI survey and 10 households per community in REPEAT surveys). For each household selected, a household-level questionnaire was used to collect information about household asset endowments, household demographics, income and expenditures, and adoption of agricultural and land management technologies.

IFPRI household survey involved a random sample of 451 households. Efforts to trace households that participated in IFPRI – 2001 survey to include them in REPEAT surveys were minimal. Only 334 out of 451 households participated in REPEAT survey. REPEAT project conducted two panel studies, one in 2002/3 (hereafter 2003) and another one in 2004/5 (hereafter 2005). The 2005 survey involved 894 households out of 940 in 2003 survey. The 46 households could not be traced because either the households dissolved or moved from the area. All the 94 Local Council ones (LC1s) studied by IFPRI in 2001 were involved in the 2003 and 2005 surveys. This research report uses only REPEAT household data sets of 2003 and 2005 in analysis. This is because these data sets capture the necessary data relevant to the study.

Analytical framework

The sum total consumption expenditure including education and health services depends on the overall resource base for the household welfare improvement. As previously noted that majority of rural poor Ugandans derive their livelihood from agricultural production, land being the single most critical resource (Okidegbe, 2001; MFPED, 2003). The productivity of land is in turn dependent on land augmenting technologies that are dependent on access and amount of land owned currently which is also somewhat dependent on the initial land endowment. Thus, a household with sufficient and productive land is likely to meet household demands and save on the resources (land). Where as a household with meager and unproductive land is likely to face declining agricultural productivity resulting in increasing poverty levels. While poverty in turn not only contributes to worsening land productivity, but also leads to disposing of land by desperate households lacking alternatives, in order to meet household urgent demands. They will do so not by chance but by choice whether to dispose part of the land or all of it. This implies that the dependent variable is either 0 for those households that disposed of all the land (landless households) or greater than 0 for households that have insufficient land. This necessitates the use of the Tobit model. The Tobit model will measure the probability and intensity of landlessness. The model is preferable to binary landlessness model when the decision to dispose land involves simultaneously the decision regarding the intensity of landlessness.

Direct inclusion of the 2005 poverty levels and land productivity in the land holding model for 2005 would produce biased estimates, due to the correlation of the error term with the endogenous explanatory variables. The available data hardly had any appropriate instruments to correct for endogeneity problems. Instead, the 2003 land productivity and poverty levels were used as regressors. This is because land productivity and monthly consumption expenditure per adult equivalent were predetermined in 2003 (and so exogenous) and expected to influence the level of land holdings in 2005. Following Maddala (1983) and Wooldridge (2002), the summarized theoretical Tobit model (equation 1) can be presented as

$$Pl_d = l(L_{P03}, P_{m03}, X_c, X_p, X_v) + e^{ld} \quad if\ RHS > 0 \quad \text{.....} 1$$

$$= 0, otherwise$$

Where *RHS* is right hand side. Pl_d is the observed amount of arable land owned by the household in 2005. L_{P03} and P_{m03} are the land productivity and monthly consumption expenditure per adult equivalent in 2003 respectively. X_c is a vector of current household level factors. X_p is a vector of factors relating to demographics and land endowment (and land transmission) of parents of the current household. e^{ld} is the random error term. The study uses monthly consumption expenditure per adult equivalent as a proxy for household well-being (see Appendix A); the approach used in previous poverty studies in Uganda (Appleton, 2001b).

Regression diagnostics for heteroscedasticity, multicollinearity and endogeneity preceded the final analysis. Descriptive analysis was used to contrast household characteristics of land constrained households (i.e., landless households) with landed households.

V. Results and discussion

Comparison of household characteristics by land status and poverty classes

Results in Table 1 show the household characteristics between land constrained households and those with plenty of arable land as well as comparison across poverty classes. Poverty status classes were constructed based on the poverty line (see Appendix A). Chronically poor households are households that had their monthly consumption expenditure per adult equivalent permanently below the poverty line in 2003 and 2005; transiently poor households are households that, at one period, had their monthly consumption expenditure per adult equivalent below or above the poverty line in either 2003 or 2005 period; and never poor households are those ones whose monthly

consumption expenditure per adult equivalent was permanently above the poverty line in both periods.

Below are characteristics distinguishing these different categories of households highlighted above:

- Over 83% of all sampled households were male headed. Older household heads significantly owned more land than the younger heads. However, household poverty appeared to be more aching in older-headed households than the younger-headed households.
- Landed household heads attained marginally higher levels of primary education than the landless household heads. In a similar wave, education of household head plays a bigger role in curbing poverty. Heads of the chronically poor households attained lower level of education than those of transiently poor, which in turn had lower level of education than that achieved by those heading never poor households.

Table 1: Selected household characteristics of land constrained Vs landed households

Variable	Land status		Poverty classes		
Current household characteristics	Land constrained	Landed	Chronically poor (30.8%)	Transiently poor (38.4%)	Never poor (30.8%)
Current household and parental characteristics					
Age of household head	43.5 (15.7)	47.8 (15.0)	48.2[a] (16.3)	48.5[a] (14.9)	44.3[b] (14.0)
t-test value		-3.092***			
Education of household head (years)	4.7 (3.6)	5.8 (3.8)	4.7[a] (3.5)	5.5[b] (3.7)	6.7[c] (4.0)
t-test value		-3.006***			
% of households from polygamous parents	48.2	63.1	57.5[a]	59.8[ab]	65.8[b]
Pearson Chi2 value		10.911***			
Proportion of male siblings at the start of household	0.46 (0.18)	0.48 (0.16)	0.47[a] (0.17)	0.48[ab] (0.15)	0.49[b] (0.16)
t-test value		-1.108			
Land owned by parents (acres)	10.5 (11.2)	11.9 (11.0)	10.2[a] (10.3)	12.2[b] (11.4)	12.5[bc] (11.2)
t-test value		-1.303			
Land inherited from parents (acres)	1.2 (2.6)	1.8 (3.0)	1.5[a] (2.7)	1.7[a] (2.9)	1.9[a] (3.0)
t-test value		-2.130**			
Land owned at start of household (acres)	2.1 (3.0)	2.4 (2.8)	2.2[a] (2.8)	2.4[a] (2.8)	2.4[a] (2.8)
t-test value		-1.156			

Land owned by current household in 2005 (acres)	0.13 (0.19)	5.9 (7.8)	4.2[a] (7.2)	4.9[a] (6.5)	6.1[b] (8.7)
t-test value		-8.679***			
Average household size in 2005	7.6 (3.6)	9.1 (4.4)	9.4[a] (4.4)	9.1[a] (4.3)	8.1[b] (4.0)
t-test value		-3.880***			
Average household size in 2003	6.6 (3.9)	9.1 (5.2)	9.3[a] (5.8)	9.0[a] (5.0)	7.6[b] (4.3)
t-test value		-5.635***			
t-test value between periods	-2.285**	-0.026	-0.115	-0.197	-1.421
Dependence ratio in 2005	0.50 (0.24)	0.48 (0.22)	0.50[a] (0.22)	0.47[a] (0.22)	0.49[a] (0.22)
t-test value		0.685			
Dependence ratio in 2003	0.45 (0.22)	0.46 (0.20)	0.47[a] (0.20)	0.44[b] (0.21)	0.46[ab] (0.20)
t-test value		-0.511			
t-test value between periods	-1.778*	-2.402**	-1.721*	-1.921*	-1.404
Production and farm income					
Crop area in 2005 (acres)	2.5 (2.2)	5.7 (5.8)	3.9[a] (3.4)	5.3[b] (5.6)	6.4[c] (6.7)
t-test value		-6.543***			
crop area in 2003 (acres)	2.0 (2.4)	5.5 (5.8)	4.2[a] (4.8)	5.2[b] (5.9)	5.2[bc] (5.8)
t-test value		-7.165***			
t-test value between periods	-1.657*	-0.757	0.846	-0.264	-2.187**
Crop production in 2005 (kgs)	3233.3 (4399.6)	7433.1 (14453.8)	4231.2[a] (6176.9)	7182.5[b] (17184.4)	8868.2[bc] (13252.2)
t-test value		-3.372***			
Crop production in 2003 (kgs)	2087.4 (2627.1)	5769.8 (8505.1)	3310.7[a] (4311.4)	5315.5[b] (9824.9)	6800.5[c] (7796.5)
t-test value		-5.233***			
t-test value between periods	-2.698***	-2.711***	-2.026**	-1.747*	-2.230**
Proportion of farm income (crops & livestock) in 2005	0.61 (0.34)	0.69 (0.30)	0.70[a] (0.29)	0.69[a] (0.31)	0.66[a] (0.31)
t-test value		-3.153***			
Proportion of farm income (crops & livestock) in 2003	0.61 (0.30)	0.65 (0.33)	0.67[a] (0.33)	0.66[a] (0.34)	0.61[b] (0.35)
t-test value		-1.401			
t-test value between periods	0.121	-2.543**	-0.919	-1.173	-1.814*
Per capita real monthly expenditure in 2005 (deflated using 2003 prices)	20521.0 (12174.9)	25349.1 (14420.4)	14331.9[a] (4317.9)	25149.4[b] (13457.1)	34210.3[c] (14589.8)
t-test value		-3.687***			
Per capita real monthly expenditure in 2003 (Ushs)	19554.8 (15093.7)	28886.8 (29029.2)	11416.2[a] (5053.8)	25558.5[b] (26851.7)	45452.5[c] (30568.0)
t-test value		-			
t-test value between periods	-0.593	3.8208***	-7.274***	0.252	5.504***
		2.996***			
Number of observations in 2005	137	757	275	343	275

Figures in parentheses are standard deviations

***, ** and * represent significance levels at 1%, 5% and 10% respectively

Note: "t-test value between periods" refers to comparative analysis between 2003 and 2005 periods

The superscripts a, b, c represent statistically significant ($p<0.10$) differences in means. Same superscripts represent no significant differences in means

- Landed households had significantly bigger family size (9 members on average) than the landless households (8 members on average) in 2005. Across poverty classes; the chronically and transiently poor had same household size (9 members), which was larger than the never poor households in 2005. Similar family size results characterized respective households under land and poverty classes in 2003. A part from land constrained households that had an increase in family size from 7 to 8 members between 2003 and 2005, the rest of the land and poverty categories had insignificant change in family size.
- Like the minimal differences in family sizes, there were slim statistical differences in the dependence ratios between land status categories and across land poverty classes in both 2003 and 2005. However, the dependence ratios increased rather substantially between 2003 and 2005 for all land status classes and the chronically and transiently poor households. Never poor households had inconsequential increase in dependence ratio over the same period. More interestingly, the most deprived households, the land constrained and chronically poor, had 50% of their family size as dependants.
- Results show that 63.1% of household heads with sufficient land compared to 48.2% of land constrained household heads descended from polygamous parentage. Similarly, 65.8% of never poor households descended from polygamous families compared to chronically poor households (57.5%). This is not surprising in Ugandan tradition. Rural polygamous households tend to have adequately more resource endowments than monogamous families. This perhaps translates into larger resource transfer to their offspring from polygamous families than those from monogamous families.
- The parents of sampled households owned almost the same amount of land (12 acres on average), but with unequal land size bequeathed to household heads under the study. The land constrained heads inherited 1.2 acres that were somewhat significantly lower than that inherited by the landed household heads (1.8 acres). There were no significant differences across poverty classes in the land owned by the parents and their subsequent acreage bequests to the current household heads.

- The total amount of land owned at the start of the household was not significantly different between households with sufficient land and the land constrained households and across all poverty classes. However, at the time of the study, the land constrained households had reduced their startup acreage from 2.1 acres to almost zero (0.13 acres), while the landed households had more than doubled their startup acreage. This implies that the landless households had inadequate wealth alternatives to offset urgent needs and wants other than disposing the available land.
- As a result, the land constrained households cover up the desired land for cultivation by engaging into land rental markets. Results (not shown) indicate no significant differences in area rented in between land constrained and landed households.
- Expectedly, landed households operated a substantial larger acreage (5.7 acres) than the land constrained households that operated 2.5 acres in 2005[3]. Similarly, the never poor households operated a substantially larger acreage (6.4 acres) than the transiently poor (5.3 acres), which also cropped bigger area than the chronically poor households. Almost the same trend appeared in 2003, although there were marginal changes in the operated area by land constrained and landed households. The former increased operated area from 2.0 acres in 2003 to 2.5 acres in 2005 while the latter operated the same area (about 6 acres) over the same period. However, crop production was generally and largely higher among the landed and never households than the land constrained and poor households in both periods.
- Landed households had slightly higher per capita real monthly income in 2003 and 2005 (results not shown) than the land constrained households; 69% of income share of the former was largely derived from farm production in 2005 after a significant rise from 65% in 2003 compared to the latter with constant farm income share of 61%. Correspondingly, the monthly expenditure per adult equivalent among the land constrained households was constant between 2003 and 2005 but significantly lower than that of the landed households. Although the landed households had a considerable decrease in their monthly expenditure per adult equivalent from Ushs. 28,887 in 2003 to Ushs. 25,349 in 2005.

[3] The operated crop area included rented in (borrowed in) land both in 2003 and 2005

Determinants of land holding

A Tobit model was used to identify the determinants of land holding. The joint F-statistic results in Table 2 indicate that current and parental household level factors, and the village level factors significantly explain the variation in the current land holding.

Monthly consumption expenditure per adult equivalent (a proxy for household poverty level) and land productivity significantly underscore the gravity of land holding. Everything else fixed, an increase in monthly consumption expenditure per adult equivalent (i.e., a reduction in poverty level) increases the likelihood of holding more land. This implies that a poverty stricken household perhaps faces low purchasing power and is likely to be locked out of credit market – land is a major collateral asset in rural poor areas. Accumulation of land holding in a poor household is thus limited, since any proceeds from whatever source will be allocated to the household welfare sustenance.

Household characteristics responsible for increasing land holding include age and education of the household head and the number of children (both male and female). Older household heads are likely to hold more land than younger ones. It is possible for older heads to accumulate land holding over time and are expectedly to have less dependants than young household heads. Household heads who attained higher levels of education have significantly lower chances of facing land shortages. This could perhaps be due to gainful employment associated with higher level of education that reduces pressure on the other household income sources. An increase in the number of children increases the household labor force and probably results in increased labor productivity whose returns can be used to sustain the land holding or acquire more land. However, an increase in dependence ratio, though weakly, is significantly associated with a reduction in land holding.

Apart from current household level characteristics, initial land holding and parentage factors were also found to affect current land holding. Resource endowment at the establishment of the household and resource inheritance, *inter alia*, are the key determinants of current land holding. The amount of land owned and capital acquired at

the start of the household and the inherited land significantly lessens the probability of a household falling into the current state of landlessness. Thus, households that emerge from resource poor parents are likely to be in perpetual resource poverty.

Table 2: Determinants of land holding

	Tobit model	
Explanatory variables	**Coef.**	**t-value**
Current household characteristics		
log of monthly consumption expenditure per adult equivalent in 2003	0.192	5.390***
Female headed household	-0.096	-1.020
log age of household head (years)	0.767	7.660***
Education of household head (years in school)	0.124	3.160***
log # of male children in a household	0.301	5.900***
log # of female children in a household	0.143	2.810***
Dependency ratio	-0.230	-1.740*
Parental characteristics		
log land owned at the start of household (acres)	0.114	2.600***
log land owned by parents at the start of current household (acres)	0.033	1.050
log land inherited from parents (acres)	0.138	3.160***
log capital acquired at the start of household (Ushs)	0.014	2.160**
log # of wives the parent had	0.065	1.770*
log # of male siblings of same biological parents	0.023	0.350
log # of female siblings of same biological parents	0.056	0.830
Birth order among siblings of same sex	0.105	1.690*
Village factors		
Low market access	0.062	0.880
Low population density	-0.130	-1.840*
Agro-climatic zones (cf. Bimodel high)		
Bimodel low	-0.094	-0.970
Bimodel medium	0.250	3.170***
Eastern highlands	-0.022	-0.210
Southwestern highlands	0.162	1.890*
Unimodel	-0.101	-0.930
Constant	-4.835	-8.250***
Wald chi2		259.98***
Pseudo R^2		0.108
Number of observations		885
Joint F-statistic for current household characteristics		25.44***
Joint F-statistic for parental characteristics		7.34***
Joint F-statistic for village factors		3.59***

***, ** and * represent significance levels at 1%, 5% and 10% respectively

Although the number of siblings at the start of the household appears to have almost no effect on the current amount of land holding, households from polygamous families are likely to hold more land. The implication is that, though the effect is weak, polygamy is associated with more resource endowments and thus offspring from such families stand higher chances of inheriting more land. This result collaborates well with descriptive statistics discussion alluded to earlier.

Similarly, though still with a weak effect, the order of birth among children of the same sex has an effect on the amount of land holding. Land resource distribution and bequest is dependent on the order of birth and the time a household is established. The order of birth increases the likelihood of current household becoming land sufficient. This is consistent with earlier work of Estudillo *et al*., 2001. They argue that earlier born children do not receive significantly more land than later-born children. That is, the higher the order of birth the higher the chances of bequeathing more land. This is possible in rural setting where household heads tend to be myopic about family planning and thus hold back bequeathing more land in early stages of a household growth.

Village level factors and agro-climatic zonal location that had significant effect on the level of land holding included: households living in the low population density areas were likely to hold more land than those living highly populated areas. Likewise, households settled in bimodel medium and Southwestern highlands agro-climatic areas of Uganda have higher chances of holding sufficient land than households living in bimodel high agro-climatic areas. Where as households settled unimodel agro-climatic zones have higher chances of becoming landless than households living in bimodel high agro-climatic areas.

Determinants of land disposal

Identifying the determinants of land holding *per se* does not adequately explain the central hypothesis of the study that household poverty is responsible for landlessness. To determine whether poverty levels among other factors lead to land disposal (land sales), a

probit model was used. The dependent variable taking on the value of one if a household disposed (sold) land between 2003 and 2005 and zero otherwise. Table 3 shows both simple probit results and instrumental variable probit (IV probit) including IV probit model with agricultural potential (agro-climatic zones) cluster dummies. The IV probit model was used to minimize endogeneity problems associated with land ownership variable and to compare with simple probit results. The simple probit and IV probit estimates are qualitatively similar and fairly comparable quantitatively. The discussion is based on the IV probit with cluster dummies with adjusted and robust standard errors and accounts for the possibility of differential intra-zonal correlation.

Table 3: Determinants of land disposal

	Probit model		**IV probit model**		**Cluster IV probit model**	
Explanatory variables	**Coef.**	**t-value**	**Coef.**	**t-value**	**Coef.**	**t-value**
log land owned (acres) in 2003[IV*]	0.807	10.110***	1.285	3.280***	1.223	5.050***
log consumption expenditure per adult equivalent per month in 2003	-0.142	-2.000**	-0.225	-2.270	-0.214	-3.160***
Female headed household	0.118	0.750	0.171	1.010	0.163	1.040
log age of household head (years)	-0.336	-1.690*	-0.462	-2.020**	-0.438	-3.190***
Education of household head (years in school)	-0.160	-2.250**	-0.207	-2.510**	-0.195	-2.560**
log credit value in 2003	0.006	0.700	0.008	0.860	0.007	0.620
log household size in 2003	-0.359	-3.070***	-0.618	-2.570*	-0.589	-2.760***
Dependency ratio in 2003	0.504	1.750*	0.778	2.100**	0.740	2.420**
Low market access	-0.107	-0.860	-0.095	-0.740	-0.089	-0.470
Low population density	0.022	0.180	0.021	0.170	0.020	0.110
Agro-climatic zones (cf. Bimodel high)						
Bimodel low	-0.224	-1.310	-0.313	-1.640*	-0.297	-8.790***
Bimodel medium	-0.362	-2.580**	-0.349	-2.410**	-0.327	-4.090***

Eastern highlands	0.184	0.930	0.258	1.210	0.245	8.170***
Southwestern highlands	-0.101	-0.680	-0.150	-0.940	-0.143	-4.450***
Unimodel	-0.002	-0.010	0.128	0.570	0.125	1.470
log value of cattle in 2003	-0.032	-3.610***	-0.042	-3.460***	-0.040	-7.600***
log value of other livestock in 2003	-0.019	-0.970	-0.023	-1.140	-0.022	-1.560
Constant	2.398	2.070**	3.603	2.340**	3.426	3.510***
LR chi2 / Wald chi2		137.46***		27.06***		
Pseudo R^2		0.133		-		
Wald test of exogeneity chi2		-		1.68		1.31
Number of observations		793		793		793

***, ** and * represent significance levels at 1%, 5% and 10% respectively
[IV*] land owned in 2003 was instrumented to minimize the endogeneity effects

The land disposal model results show that consumption expenditure has negative and significant impact on land sales. The greater the monthly consumption expenditure per adult equivalent the less the probability of selling land. This implies that worsening household poverty levels are associated with increased likelihood of becoming landless. This is somewhat supported by the educational level of the household head that underscores reduced land sales. Higher educational level is associated with better gainful employment leading to increased earnings that are used to finance consumption expenditure and thus reduces the probability of selling land for the same purpose.

Older household heads are less liable to disposing land than the younger ones. As mentioned earlier under descriptive statistics results discussion, older-headed households may have minimal dependence ratio, which reduces the odds of land sales. Additionally, older households are likely to have bigger household sizes of productive age group that substantially reduces the possibility of land sales.

However, households with plenty of land in 2003 were more likely to sell land than those with less land holding all else fixed. This is possible in households that have attained

optimal desired land for cultivation, implying that those with more land will sell it. On the contrary, households well endowed with cattle were less likely to sell land than those with few or no cattle. This implicitly echoes on land sales as last resort entailing that resource poor households are prone to becoming landless in response to demands for welfare sustenance.

Village level factors that influenced land sales included only the agro-climatic zonal location factors. Households living in bimodal low, bimodel medium and Southwestern highlands agro-climatic areas had lower probability of disposing land than those living in bimodel high agro-climatic areas. Where as households settled Eastern highlands were more likely to sell land than those living in bimodel high agro-climatic areas.

VI. Summary, conclusions and policy implications

The predominance of poverty in rural areas in Uganda has been linked to declining agricultural productivity as a result of increasing land degradation attributable to increasing landlessness. The current research sought to establish the root causes of landlessness. Results indicate that landless households are characterized largely by productive-male household heads (44 years) that descended from 48% of polygamous background; with significantly lower levels of primary education; smaller household sizes of about 8 persons of whom about 50% are dependants.

Both landless households and those with sufficient land bequeathed almost equal land acreage from their parents and had the same amount of land at the start of the household. This implies that the landless households had inadequate wealth alternatives to offset urgent needs other than disposing the available land.

Econometric analysis results indicate that an increase in household poverty levels significantly increases the magnitude of landlessness. Similarly, worsening household resource endowment poverty, particularly livestock and human capital, exacerbate the probability of a household becoming landless.

Tobit results indicate that village level factors and characteristics of current household and those of the parents have a substantial influence in explaining the variation in current land holding. Most importantly, land endowment at the household establishment and intergenerational inheritance or transmission of resources from parents to children at the start of their households are antecedents of current state of land holding. That is, the amount of land owned at the start of the current household and the amount land and resource capital inherited significantly lessens the chances of falling into the current state of landlessness. Thus, polices providing for proportionate resource transmission by parents to their children at the time of household establishment are called for to retard worsening levels of landlessness. This will not only solve the problem of landlessness but will also enhance the use of family planning practices since parents will be aware of the resource distribution to their children during household formation.

In sum, failure to provide for development pathways and policies regarding intergenerational resource transmission that create an escape route from poverty, which in turn drives a household out landlessness, then landlessness will take its course to increased household poverty levels which accelerate reduction in resource productivity, consequently onto back to worsening poverty levels. Thus, the interdependence of household poverty levels along with limited land holding completes the vicious cycle of poverty-landlessness nexus.

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Appendix A

The advantages and disadvantages for using expenditure Vs income-based measure, or per capita consumption Vs per adult equivalent consumption, or a continuous function Vs an poverty index are fairly well explained in previous studies (Aline *et al*., 2002; Simler *et al*., 2004; Benson *et al*., 2004) and are not repeated here.

The monthly consumption expenditure per adult equivalent was estimated based on the food basket constructed by Appleton (2001b). Nonfood requirements were estimated based on expenditure to acquire services such medical care, education, clothing among others. Thus, the vector of monthly consumption expenditure per adult equivalent (W_i) for the household *i* normalized by poverty line (Z) was estimated as

$$W_i = \frac{\sum_{j=1}^{n} HW_j}{z}$$

HW_j is the household monthly expenditure per adult equivalent on consumer goods (j=1,…, n; n denotes different consumer goods). HW_j for 2005 was deflated using the consumer price index constructed based on the 2003 prices as the base year.

Since Uganda does not have an officially approved absolute poverty line (Z), the poverty line was estimated as median from the computed monthly consumption expenditure per adult equivalent. From calculations, the poverty line was estimated at Ushs. 21,013 per adult equivalent per month. This figure compares well with consumption expenditure per adult equivalent per month poverty line, Ushs. 21,120, computed by Appleton (2001b) using the 1997 prices based on 1993 food basket.

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