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Determinants of Rural Poverty in Africa: The Case of Small Holder Farmers in Kenya

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Abstract: Sub-Saharan Africa is likely to hold large numbers of very poor rural people in the near future unless sustainable intervention measures are undertaken. Although both history and theory point to the important role of agriculture in poverty reduction, such growth today faces even more difficulties. This study uses a probit model on a sample of 600 smallholder farmers to establish factors that influence probability of households' escaping chronic poverty. Results show that access to micro-credit, education, participation in agricultural seminars, livestock assets and location in high potential areas significantly influence the probability of households exiting chronic poverty. On the other hand, female gender and distance to the market increases the probability of persistence in chronic poverty. Present findings reveal that micro-credit access, gender, education and market access are key determinants of exit from rural poverty. Therefore through intensified micro-credit provision, education, women empowerment via legal rights to property and improvement of rural access roads, the poverty status could be ameliorated.

Key words: Chronic poverty, smallholder farmers, rural agriculture, Kenya

INTRODUCTION

Although predicted poverty reduction scenarios vary greatly depending upon the rate and nature of poverty related policies, actual evidence suggests that the depth and severity of poverty is still at its worst in sub-Saharan Africa and South Asia (Hanmer and Naschold, 2000; Barbier, 2000). Within these regions, poverty is largely a rural phenomenon with an average of between 62 and 75% of the population living on less than a dollar a day (Pinstrup-Anderson *et al*., 2001). Rural poverty also tends to be deeper than urban poverty in these regions (Bird *et al*., 2002).

Besides, it has become increasingly evident that within the African region the poor are heterogeneous and that some element of dynamics does exist with a clear distinction between chronic and transitory poverty (Barrett *et al*., 2000). Chronic poverty is considered the component of total poverty that is static and transitory poverty is the component that is attributable to inter-temporal variability (Jalan and Ravallion, 1996). The isolation of the process underlying chronic and transitory poverty is considered essential in understanding the extent to which each poverty type may obscure the other or even distort the effects of government anti-poverty programmes.

In Kenya rural poverty levels are relatively high. For example, a national poverty survey carried out in 2005 indicates that the high tropic areas have poverty levels estimated at 46% while the low tropics' have poverty levels that are as high as 60% (Gamba *et al*., 2006; RoK, 2005). The average national poverty incidence stands at 56% (Rok, 2005). Besides, evidence indicates that this situation has not improved in the last 15 years in a majority of Sub-Saharan countries; Kenya included (World Bank, 2000; Barbier, 2000). The main problem lies in the fact that despite the high poverty rates in Kenya little is documented on policy related determinants of rural poverty, making it very difficult to effectively set and implement sustainable anti-poverty policy programmes. The objective of this study was therefore to empirically determine factors that influence households' exit from chronic poverty (living below a dollar per day) as a guide for policy intervention among rural smallholder farmers.

MATERIALS AND METHODS

Sampling design: The study covered a total sample of 600 households randomly drawn from rural smallholder farmers (with less than 10 hectares) in Kenya. The survey was carried out in 2006 between January and May covering two districts, namely Kakamega and Nakuru,

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with each district constituting half of the sample. Kakamega District falls in the low tropics and is characterized by low yields with elevation ranging between 1100 and 1500 m. Besides its low potential, the district also represents zones where traditional technologies still coexist with modern farming methods. Nakuru District on the other hand falls within the highland tropics. The zone has high yields with elevation ranging between 1600-2900 m. Nakuru is one of the districts in the high tropics that harbor many different cropping and livestock activities and is viewed as the bedrock of food security in Kenya. Therefore, it also serves as a representative cosmopolitan agricultural area where land subdivision has gained great interest.

Variables and hypothesized effects: The questionnaire was presented through face to face interviews with questions ranging from household specific characteristics such as age, gender, education, household size, income levels and asset endowments. Farm specific questions addressed issues such as land ownership, farm size and related production activities, while market factors included distance to the local market and access to credit market. The dependent variable was a dummy with those households living below a dollar per day per person represented with (1) implying that they are chronically poor and those living above a dollar a day represented with (0) for the converse. Thus, factors that negatively influence the dependent variable are those that reduce poverty, while those with positive effects increase prevalence of poverty.

Table 1 presents explanatory variables with their hypothesized effects on chronic poverty and as indicated, access to credit is theoretically expected to reduce poverty through cash investment in productive activities and also in smoothing consumption, while the older the decision maker the less productive and consequently chronically poor such household is expected to be. Access to education as well as exposure to agricultural workshops was also hypothesized to reduce chronic poverty, implying that the more educated the decision maker the better skilled and productive he or she is and consequently the less poor the household. Female involvement in decision making was hypothesized to have either positive or negative effects on chronic poverty. Traditionally, no theoretical foundations exist on gender and poverty. Nonetheless, in Africa more women than men are involved in rural economic activities such as farming, pointing at possible negative effect of female gender on poverty. However, at the same time majority of women in Africa have no rights to property, a factor that infringes on their access to either input or credit markets which drags their households towards poverty.

Land holding on the other hand releases the binding land constraint for all enterprises and is also an asset which enables households to easily access both input and credit markets. Literature on land ownership indicates that land enhances the chances of diversification into a variety of enterprises with the effect of improving on the overall farm profitability and reducing poverty levels.

Constant access to transfers, livestock assets and engagement in off-farm activities presents households with additional income for productive investment and or consumption smoothing, both of which are expected to have a negative impact on chronic poverty.

Farmers located in the high tropics where rainfall is more reliable are hypothesized to perform better in agricultural production and experience lower poverty levels as compared with their counterparts in marginal areas. However, with respect to distance to the market, farmers located far a way from both input as well as product markets are expected to be poorer due to high transactions costs that infringe on their farm incomes.

Analytical method: Universally chronic poverty is defined as a condition whereby the average per adult income in a given household is less than 1 US$ per day. Denoting per person income (or expenditure) by X and chronic poverty line by Z, Chronic Poverty (CP) can then be expressed as:

Table 1: Hypothesized effects of explanatory variables on chronic poverty

Variables	Definition	Hypothesized effect on poverty
Access to MFI credit	If has access to MFI credit (Yes, No)	(+)
Access to other credit	If access other credit (Yes, No)	(+)
Age of head	Age of decision maker in years	(+, -)
Education of head	Formal education of decision maker in years	(-)
Attendance to seminars	If attended agric-seminar last year (Yes, No)	(-)
Gender of head	If decision maker is female (Yes, No)	(-)
Ownership of title	If owns title to farm land (Yes, No)	(-)
Access to transfers	If has constant access to transfers (Yes, No)	(-)
Off-farm engagement	Hours spent daily on off-farm activity (hours)	(-)
Group membership	If member of self-help group (Yes, No)	(+, -)
Distance to market	Distance to the local market (Kilometers)	(+)
Value of livestock assets	Value of livestock assets (ksh)	(-)
Agricultural potential	If farm is in high tropics (Yes, No)	(-)

$$CP = \int_0^z \lambda(Z,X) f(X) \delta x \quad (1)$$

where; λ (Z, X) is the deprivation suffered when household's income is X, whereby is zero when $X \geq Z$ (i.e., when income per person is above one dollar or above chronic poverty line) and 1 otherwise. Therefore, chronic poverty is equal to (1) if average per person income in a household is less than 1 US$ per day and (0), otherwise. This implies that factors with positive influence on CP are those that increase the probability for a given household to remain below chronic poverty line, while negative factors are those that reduce the probability of a household staying below poverty line. In Kenya, chronic poverty is equated to income per person per day that is below 75 Kenya shillings; thus, to arrive at the dollar rate, we compute the total household expenditure per day (an equivalent to daily full income) then divide by the number of household members. The probability estimation of these factors follows a binary probit model (Greene, 2003), as below:

$$\text{Prob}[D_i = j] = \frac{\exp(\beta_j X_i)}{s(j = 0 - j)\exp(\beta_j X_i)}, j = 0,1.....,J \quad (2)$$

where, X_i' is a vector of covariates that define household characteristics, with the log likelihood function expressed as:

$$\Pr(D_i = 1) = \frac{1}{1 + \sum_{k=1}^{j} \exp^{\beta_k^1 x_i}} \quad (3)$$

In its reduced form, the model becomes:

$$D(0,1) = \text{Log}\left(\frac{p}{1-p}\right) = \beta_0 + \beta_{ij} X_{ij} + \varepsilon, \quad (4)$$

where, D is the indicator for a household falling below chronic poverty line, P is the probability of event's occurrence, while X_i is a vector of household socio-economic characteristics, covering household specific factors such as age, education, household size, ownership of title to land, access to transfers, off-time employment, market characteristics such as distance to the market, credit markets and community based factors such as group memberships. β_0, β_{ij} are the corresponding vectors of parameters and ε is the disturbance term. Similar analytical methodology has been employed by Gamba *et al.* (2006).

RESULTS

The results of the model are shown in Table 2. The model log likelihood ratio X^2 (130.73) is significant at 1% level with 16 degrees of freedom, indicating that the explanatory variables included are significant in explaining changes in poverty incidence among the sampled households. Besides, the pseudo R^2 of 27% is also above the statistically minimum level of 20% confirming that a large proportion of changes in the poverty indicator are attributed to the exogenous factors considered.

Empirical results (Table 2) show that borrowing from micro-finance credit (0.141), other credit sources (0.056), age of the head (0.010), education (0.075), participation in agricultural workshops (0.548), constant access to transfer earnings (0.253), livestock assets (0.012) and location in high potential areas (0.336) significantly reduce the probability of the household staying below the poverty line. The coefficients are significant at the 5% significance level. On the contrary, female gender increases the probability of households remaining below poverty line. Although not significant, distance to the market and group memberships increase the probability of remaining below the poverty line.

Table 2: Probit MLE of Determinants of chronic poverty in Kenya

Log likelihood	-313.37			LR X^2	2(16)	130.73***
				pseudo R^2		0.273
	Coef.	Std. Err.	Z	p>|z|	(95% Conf. interval)	
If borrowed from MFI (1,0)	-0.141	0.073	-1.930	0.055	-0.440	0.158
If borrowed other credit (1,0)	-0.056	0.133	-0.420	0.672	-0.318	0.205
Age of head (years)	-0.010	0.006	-1.770	0.077	-0.022	0.001
Education of head (years)	-0.075	0.014	-5.200	0.000	-0.103	-0.047
If attended seminar (1,0)	-0.548	0.145	-3.780	0.000	-0.832	-0.264
If head is female (1,0)	0.238	0.125	1.900	0.057	-0.007	0.482
If owns title to land (1,0)	-0.263	0.187	-1.400	0.161	-0.630	0.105
If access to transfer (1,0)	-0.253	0.122	-2.080	0.038	-0.492	-0.014
Hrs on off-farm activity (1,0)	-0.022	0.051	-0.430	0.669	-0.121	0.078
If group member (1,0)	0.014	0.141	0.100	0.920	-0.262	0.290
Distance to market (km)	0.003	0.006	0.570	0.570	-0.008	0.015
Livestock assets (ksh)	-0.012	0.001	-2.990	0.003	0.000	0.000
AEZ (Nak = 0, Kaka = 1)	-0.336	0.133	-2.530	0.011	-0.596	-0.076
Intercept	1.298	0.360	3.600	0.000	0.592	2.004

N = 600, ***: Significant at the 1% significance level

In addition though not significant in reducing poverty, are ownership to land title and engagement in off-farm activity as measured in time spent daily on off-farm activity.

DISCUSSION

The coefficient of micro-credit (MFI credit) on reducing the probability of a household falling below poverty line is as expected and significant at 5%. The significant effects of micro-credit in lifting households out of chronic poverty is due to the ease with which such funds can be used in various activities in the household. The fungible nature of this credit allows borrowers to meet other consumption expenditures such as medical, school fees, food and social emergencies besides expenditures on productive inputs. A study by Panjaitan-Drioadisuryo *et al*. (1999) supports this finding. In their survey conducted in an island of Lombok in Indonesia, micro-credit was given to women who were under the poverty line and after one year, the average income of 90% of the beneficiaries had increased enough to move them out of the poverty line. Khandker (1998) also measured varying effects of three micro credit programs (Grameen, BRAC and RD-12) on participants in Bangladesh and found that informal borrowing reduces poverty by increasing per capita consumption among program participants. He also observed an increase in labour supply on farms, indicating that borrowers hired more labour.

On household age present results show negative and significant effect of age at the 1% level of significance, implying that the older the decision maker the lower the probability of such households remaining in poverty. This indicates that older decision makers have accumulated more wealth over time making them relatively richer as compared to younger decision makers. Besides, age is conventionally used as a quasi for farming experience, whereby many years in farming is associated with better management and higher expected output. Over-time farmers undergo changing climatic and pest variations and eventually learn these patterns making them better crop and livestock managers with consequential high productivity.

On education, present findings indicate that better education have the effect of enabling households accessing and conceptualizing information on good farming methods, accessing better paying rural labour market and capable of profitably combining various enterprises. Therefore, education provides important indicators of household welfare and that raising poor households' access to education is likely to have beneficial effects on poverty alleviation and income distribution over the long run.

Households headed by females on the other hand had a higher probability of staying below poverty line, echoing the nature of structures of many rural communities in Africa. Majority of females in Africa have no legal right to property making them unable to offer asset securities in either credit or product markets. Such differential access to productive assets and inputs leads to inequality in welfare. Furthermore, with the rising migration of male decision makers to urban areas for higher paying jobs, this leads to a decline in agricultural production as women who are left to manage farms have less access to both improved inputs and credit markets given that they have lower access to collateral. Such gender gaps lead to static inefficiency and also reduce efficient investments in new technologies as well as in the maintenance and improvement of assets, particularly land. Consequently women led households continue to languish in poverty.

Results on involvement in off-farm activity translate to regular earnings from other labour employment such as off-farm employment and business investments. Given that agriculture is characterized by seasonal variations in production as well as a longer production cycles many households diversify into non-farm investments with regular incomes. Others also take off-farm employment as part time activities. For example a large proportion of farmers in the sample combine farming with some off-farm activities such as small itinerant kiosks at the market centers, a factor that ameliorates persistent poverty.

Evaluation of land ownership against poverty shows that there exists a strong association between constrained landholding and rural poverty, suggesting that ownership of property such as land title enables households to easily access credit markets, a factor that improves on cash investment in production with consequential reduction in poverty. An examination of access to land by different poverty categories in Kenya indicates that the area of land cultivated is strongly associated with household per capita income (Gamba *et al*., 2006). This also applies to assets such as livestock. In Africa livestock assets are widely used in preparation of land such as the case of ox-drawn ploughs which reduce expenditure on labour thus enabling timely land preparation.

Results on the effects of variability of agri-ecology indicate that agricultural productivity is important in ameliorating rural poverty. Thus improvement of dry areas through irrigation systems would be useful in ameliorating rural poverty in such areas as production would match high potential areas. Similar findings have been reported

in Latin America. In their evaluation of determinants and exit from rural poverty in Latin America, De Janvry and Sadoulet (2000) established that rural poverty has a strong association with rural development through agriculture production, implying that agricultural potential has a role to play in poverty incidences.

Last but not least, results indicate that constant access to transfers reduces the probability of the household staying below poverty line, pointing at the heavy reliance of households on transfer earnings particularly among the households residing in the low potential areas. Constant reliance on transfers is however not a good poverty intervention instrument as such transfers emanate mainly from siblings and other working relatives. The results however indicate constraints in access to external financial resources, a factor that calls for increasing credit availability.

CONCLUSION AND POLICY RECOMMENDATIONS

Access to micro-credit, age, education, participation in agricultural seminars, livestock assets and agri-ecology significantly reduce chronic poverty among rural households in Kenya. On the other hand, female headed households and households located far away from local markets have a high probability of staying below chronic poverty line. Present results thus are significant in capturing key rural poverty determinants such as gender disparities in property rights and consequently on poverty, education and poverty, micro-credit and transaction costs. Present findings thus suggest intensive micro-credit provision, education, women empowerment via legal rights to property and improvement of rural access roads as key chronic poverty ameliorating factors among the farming communities. Nonetheless, given the variability in prioritization of assets in different cultural backgrounds all over the world more research that takes into account other household assets in arriving at a poverty index as well as inclusion of factors such as customs and traditions in influencing relativity in poverty needs to be carried out.

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