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Smallholder income and land distribution in Africa: implications for poverty reduction strategies

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Abstract

This paper provides a micro-level foundation for discussions of land allocation and its relation to income poverty within the smallholder sectors of Eastern and Southern Africa. Results are drawn from nationally-representative household surveys between 1990 and 2000 in five countries: Ethiopia, Kenya, Rwanda, Mozambique, and Zambia. The paper shows that farm sizes are declining over time; that roughly a quarter of the agricultural households in each country are virtually landless, controlling less than 0.10 hectares per capita, including rented land; that non-farm income shares are below 40% even for the households in the bottom land quartile; and that because of this, there is a strong relationship between access to land and household income, particularly for farm sizes below 1.0 hectares per capita. Land distribution within these small-farm sectors appears to be becoming more concentrated over time, and their Gini coefficients are comparable to those of many Asian countries at the time of their green revolutions. Lastly, the largest part of the variation in per capita farm sizes within the small-farm sectors is, in every country, predominantly within-village rather than between-village. Realistic discussions of poverty alleviation strategies in Africa need to be grounded in the context of these land distribution patterns and trends.

JEL classification: O15; Q15; N970

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Background

For at least four decades, African governments and donors have experimented with a series of alternative approaches for redressing rural poverty, each giving way to a new paradigm as the persistence of poverty created disillusionment with prevailing approaches.[1] In 2000, more than 45 percent of sub-Saharan Africa's population were estimated to be in poverty, and this situation has not improved in at least the last 15 years (World Bank, 2000a).[2]

The swelling number of Africans living in poverty has increasingly focused the attention of governments, international donors, and researchers toward development strategies that are "pro-poor". This view reflects the understandable concern that income and productivity growth on their own are very inadequate if the gains are realized only by households in the top half of the income distribution. Strategic plans for poverty reduction have been prepared since 1998 by at least 15 African governments with support from the World Bank. However, most of them provide only scant attention to the role of land access and land distribution in rural poverty.[3]

This paper argues that meaningful discussions of rural poverty alleviation must be grounded within the context of prevailing farm size distribution patterns and provides a micro-level empirical foundation for such discussions. We determine the relationship between access to land and income poverty at the household level, and explore the implications of these findings for poverty alleviation strategies in the region. Results are drawn from landholding size models using nationally-representative survey data in five countries between 1990 and 2000: Ethiopia, Kenya, Rwanda, Mozambique, and Zambia. The paper addresses three major points: (1) why geographically-based targeted approaches to poverty reduction—e.g. focusing on marginal areas—is likely to miss a significant share of the poor in any particular country regardless of targeting efficiency; (2) why sustained income growth for the poorest strata of the rural population will depend on agricultural growth, even though the poor generally lack the land, capital and education to respond quickly to agricultural market opportunities and technical innovation; and (3) why increased access to land is likely to improve the poverty-reducing effects of agricultural growth.

[1] These broad strategies included "growth and trickle down" in the 1960s; integrated rural development and basic human needs in the 1970s; structural adjustment and economic liberalization in the 1980s and 1990s; and most recently participatory poverty reduction strategies. See Staatz and Eicher (1998) for an historical review of agricultural development ideas.

[2] The percentage of people living in poverty, defined as income of less than US$1 a day, increased in the mid-1990s before it slightly improved in the late 1990s to the level prevailing during the late 1980s (World Bank, 2000b).

[3] For example, neither of the World Bank's (2000a) synthesis chapters on "Addressing Poverty and Inequality" or "Spurring Agriculture and Rural Development", contain any references to the role of constrained access to land or land distribution inequalities in contributing to poverty.

Growth, poverty reduction, and land allocation: arguments from the literature

Substantial research has been focused on the nature of rural poverty in Africa. Some key themes are: (1) growth and distributional linkage effects between agriculture and the rest of the economy (Mellor, 1976; Reardon et al., 2000); (2) how to stimulate development in areas considered disadvantaged by agro-ecological or geographic criteria (Hazell and Haddad, 2001; Fan and Hazell, 1999); (3) the relationship between the distribution of rural assets, economic growth, and poverty reduction (Deininger and Squire, 1998; Ravallion and Datt, 2002); and (4) recent advances in poverty mapping (Benson, 2002; Simler and Nhate, 2002).

The model of structural transformation has demonstrated that in countries where 70–80% of the rural population derive the bulk of their income from agriculture, poverty reduction typically depends on agricultural productivity growth.[4] But, clearly, growth alone is not sufficient for poverty reduction; the distribution of assets makes a difference. Johnston and Kilby (1975); Mellor (1976), and more recently Quan and Koo (1985) and Deininger and Squire (1998) have demonstrated that relatively egalitarian land distribution patterns have tended to generate higher rates of economic growth than highly concentrated ones. The basic reason for this is that broad-based agricultural growth tends to generate second-round expenditures in support of local non-tradable goods and services in rural areas and towns. These multiplier effects tend to be much weaker when the source of agricultural growth is concentrated in relatively few hands. Thus the rate of growth is likely to be affected by the distribution of assets in the agricultural sector, particularly land.

However, evidence is emerging that not only does the initial distribution of assets affect the rate of economic growth, but it also affects the poverty-reducing effects of the growth that does occur. For example, Ravallion and Datt (2002) found that the initial percentage of landless households significantly affected the elasticity of poverty to non-farm output in India. In a sample of 69 countries (Gugerty and Timmer, 1999) found that, in countries with an initial "good" distribution of assets, both agricultural and non-agricultural growth benefitted the poorest households slightly more in percentage terms. In countries with a "bad" distribution of assets, however, economic growth was skewed toward wealthier households, causing the gap between rich and poor to widen. It is especially noteworthy that in this latter group of countries, agricultural growth was associated with greater increases in inequality than was non-agricultural growth. This reverses what has been considered the more typical pattern, wherein agricultural growth is seen to contribute more to poverty reduction than growth outside the agricultural sector. These findings reinforce the idea that where access to land is highly concentrated and where a sizable part of the rural population lack sufficient land or education to earn a livelihood,

[4] The genesis of this literature is the pioneering work of Johnston and Mellor (1961); Johnston and Kilby (1975); and Mellor (1976). See also Lipton (1977); Haggblade et al. (1991); Delgado et al. (1994); and Datt and Ravallion (1998).

then special measures will be necessary to tackle the problem of persistent poverty (Ravallion, 1997).

Discussions of feasible and sustainable rural growth strategies must be grounded within the context of prevailing farm size distribution patterns and trends. Available evidence indicates that most of Africa is facing increasing rural population densities and person-to-land ratios. FAO data since 1960 indicate that the ratio of land under crop cultivation to agricultural population (a rough proxy for farm size per capita) has been shrinking gradually but consistently in Africa. The FAO data indicate that relatively densely populated countries such as Kenya and Ethiopia have seen this ratio cut in half over the past 40 years (Table 1). And even in countries widely considered to be land abundant, such as Zambia and Mozambique, the data also show a clear trend in declining farm sizes. The overall conclusion that the agricultural labor force is increasing faster than the area under crop cultivation appears to be very robust in all cases.[5]

Country data sets

The agricultural household survey data sets used in this study were generally derived from national statistical agencies. In every country, the surveys are confined to smallholder farm households. The defining characteristics of the sample are rural households having rights to some amount of land, involved in crop production, and

Table 1
Land-to-person ratio (10 year average) in selected countries

	1960–69	1970–79	1980–89	1990–99
Sub-Saharan Africa				
Ethiopia	0.508	0.450	0.363	0.252
Kenya	0.459	0.350	0.280	0.229
Mozambique	0.389	0.367	0.298	0.249
Rwanda	0.215	0.211	0.197	0.161
Zambia	1.367	1.073	0.896	0.779
Zimbabwe	0.726	0.664	0.583	0.525

Sources: FAO STAT.
Note: Land-to-person ratio = (land cultivated to annual and permanent crops)/(population in agriculture).

[5] This trend does not hold in parts of Asia that have displayed the main demographic and economic features of structural transformation. See Jayne et al. (2001) for empirical trends.

cropping less than some specified amount of land.[6] In no cases are large-scale farmers included in the samples.

In Ethiopia, data are derived from two linked surveys undertaken in 1995 and 1996 by the Central Statistical Authority. These are the National Agricultural Survey of 1995 and the Food Security Survey, jointly designed by the Ministry of Economic Development and Cooperation, and the Grain Market Research Project. The data set contains 2658 households and is representative to the zone level. The Kenya Agricultural Monitoring and Policy Analysis Project 1997 survey, a joint undertaking by Tegemeo Institute/Egerton University and Michigan State University, contains 1416 households and is designed to be representative of 24 purposively chosen agricultural districts of the country. These districts were chosen to be representative of the major crop producing provinces of the country, but excluded pastoral areas. The data from Mozambique come from the 1996 Ministry of Agriculture and Rural Development (MADER) Smallholder Survey, a nationally-representative survey of 3851 households. The Rwanda results are derived from the 1990 DSA/Ministry of Agriculture Survey, containing 1108 households and which is also nationally representative. Selected parts of the nationally-representative DSA/Ministry of Agriculture Surveys from 1984 and 2000 were also available for analysis in this study. The Zambia results are derived from two linked surveys covering the 1999/2000 crop year. The Central Statistical Office (CSO)'s Post-Harvest Survey contains 6330 agricultural households and is nationally-representative at the Province level. The CSO revisited these 6330 households in May 2000 to obtain additional household-level information. Lastly, we drew from a comprehensive nationally-representative survey of smallholder farmers in Malawi (National Economic Council, 2000) to make comparisons with the other countries where possible. The survey instruments for Zambia, Kenya, Rwanda, and Mozambique and other details of these data sets can be viewed and downloaded at: www.aec.msu.edu/agecon/fs2/

Our analysis focuses on access to land at the household level. "Land access" refers to land which is under the household's use rights, so long as it is regularly utilized, including rented land. This generally includes all cropped land, wood lots, fallow land, land under tree crops, gardens and rented land. Land used under common property right was not included. We measure poverty in terms of income relative to a poverty line. Although income is generally considered less desirable than consumption-based measures of welfare, income is the only welfare indicator that was consistently available across these data sets. Income is nevertheless accepted as a key indicator of household economic activity and welfare.

Because these are agricultural household surveys, by definition, they contain no households without any access to land. However, initial village listings to prepare

[6] There were some variations in decision rules employed by the various national statistical agencies. In most cases, households farming more than 10 hectares were excluded from the sample. The lower bound for inclusion in the sample is that the household had to be engaged in at least some form of crop production. We excluded pastoral areas from the sample so as to focus on income and land allocation patterns in areas where crop production is important. See Jayne et al. (2001) for other procedures in defining the samples.

the sample frames for these surveys enumerated all households in these villages. These listings were made available in several of our case countries, and the percentage of households who engaged in neither crop nor animal production on their own land was found to be low, less than 4% in each case. Landlessness is undoubtedly higher in areas closer to towns, where a higher proportion of households are engaged in exclusively off-farm activities. In Kenya's case, 18% of households were landless according to the 1994 Welfare Monitoring Survey, but this sample included households in district towns (GOK, 1994). The samples reported in this study are designed to be representative of rural households engaged at least to some extent in agricultural production.

Rural incomes: levels and distribution

Table 2 presents the level and variability of rural per capita household income in the five countries. Strict comparisons across countries are problematic because of differences in survey methods and variable definitions. Mean annual per capita household incomes varied from $337 in Kenya to $43 in Mozambique. Yet these mean figures hide great variations across the sample. After ranking all households in each country sample according to per capita income, and then dividing them into four equal groups, we find that mean per capita incomes of the top quartile are typically 15 to 25 times higher than that of the bottom income quartile (Table 2, column c). In absolute terms, about 75% of the rural population is below each country's poverty lines as established from various sources, but the bottom 25% of the distribution is very much worse off in terms of income than the middle or third quartile.

To examine the income distribution more carefully, we present various Gini coefficient estimates from the household data. According to Deininger and Squire (1996), the average income Gini coefficient in Sub-Saharan Africa, based on 40 surveys that passed their data-quality criteria, is 0.45, while it is 0.50 in Latin America, where income inequalities are generally considered to be relatively severe. We find Gini coefficients of 0.52 for Kenya, 0.59 for Ethiopia, and 0.60 for Zambia, considerably higher than the averages for Latin America. In Rwanda and Mozambique, the Gini coefficients are slightly lower than the other two countries, but still considerably higher than those reported for rural areas by Haggblade and Hazell (1988) for a group of African countries in the 1970s. These Gini estimates are also generally higher than Haggblade and Hazell's estimates for rural Asia from the 1960s and 1970s (p. 23). This might be considered especially surprising given that the large-scale farming sectors in countries such as Kenya and Zambia are not even included in the samples. In two of the countries for which estimates are reported both in Haggblade and Hazell and in Table 2—Zambia and Kenya—the distribution of rural incomes appear to have widened over the past two decades, although differences in survey design and samples warrant caution in these comparisons. But at least there is *prima facie* evidence that income distribution may be worsening in these countries over time, and that rural income distribution is actually worse in these African countries in the late 1990s than in most of Asia at the time of the green revolution there.

Table 2
Smallholder income and poverty in selected African countries

Country	(a) Number of sample households	(c) Household per capita income (US$) (non-farm share)					(d) Income distribution	(e) Poverty	
		Ave.	Income quartile 1	2	3	4	Gini	Headcount	Poverty gap
		US$ in survey year						%	
Kenya 1997	1416	336.9 (40.0)	52.7 (33.1)	159.9 (38.7)	306.5 (44.6)	827.6 (44.4)	0.52	55.2	0.3
Ethiopia 1995	2658	71.6 (7.3)	10.8 (14.1)	29.8 (11.0)	57.2 (6.1)	183.1 (3.2)	0.59	75.1	0.4
Rwanda 1990	1128	78.7 (24.8)	25.6 (27.6)	46.7 (22.2)	71.4 (22.1)	171.3 (27.5)	0.41	n.a.	n.a.
Mozambique[a] 1996	2168	43.1 (12.7)	7.2 (6.8)	20.7 (8.8)	37.8 (11.6)	103.6 (22.8)	0.52	97.1	0.763
Zambia 2000	6801	57.7 (27.3)	8.4 (21.3)	23.6 (21.3)	47.8 (23.7)	151 (43.0)	0.6	n.a.	n.a.

Note: Numbers for Ethiopia, Rwanda, Mozambique, and Zambia, including Gini coefficients, are weighted. Numbers for Kenya are sample statistics. Poverty line for Kenya: Ksh 14,868 (US$256.3) (Welfare Monitoring Survey). Poverty line for Ethiopia: Birr 603.6 (US$97.4) (Dercon and Krishnan, 1998). Poverty line for Mozambique: Mtc 1,929,360 (US$170) (The Survey of Households and Living Conditions, 1995/96). Comparable poverty line information for the Rwanda and Zambia surveys used in this paper is not available.

[a] North-Central Mozambique only.

The conventional wisdom about Asia is that there is a strong negative relationship between the share of income derived from non-farm sources and total household income. However, of the five African countries in Table 2, we find this negative relationship holds only for Ethiopia, where non-farm shares declined from 14.1% in the bottom income quartile to 3.2% for households in the highest income quartile. In absolute terms though, non-farm income is roughly constant across the income quartiles. In Kenya, Zambia, and Mozambique, non-farm income share increases steadily with income. In Zambia's case, for example, non-farm share rose from 21.3% among the bottom income quartile to 43.0% in the top income quartile. These findings were also observed in most of the 23 field studies in Africa surveyed by Reardon (1997). As will be shown later, there appears to be strong correlations between landholding size, education levels, and income, indicating that most households with small landholdings have limited potential to break out of poverty through high-return off-farm activities.

To examine the spatial pattern of income poverty, we regress per capita incomes on geographic categorical variables of varying size. This is equivalent to an ANOVA test measuring the extent of inter-zone vs. intra-zone variation. When provincial-level dummy variables are used, the R^2 of these models never exceeds 0.10 for any of the five countries (Table 3). When smaller geographic variables (districts) are used, the R^2 of these models only rises to the range of 0.05 to 0.15 for all five countries. And when using the smallest administrative unit available in each of the data sets (villages or standard enumeration areas), the R^2 of these models indicates that only 15–35% of the variation in per capita incomes across these countries is between villages; the most important sources of variations in household incomes is

Table 3
Percentage of total variations in household per capita income explained by geographic factors

Country	Between province differences (a)	Between district differences (b)	Between village differences (c)	Between province differences (d)	Between district differences (e)	Between village differences (f)
	% of total variation in household per capita income			% total variation in household land access per capita		
Kenya	6.4	14.3	23.5	7.7	15.9	33.3
Ethiopia	1.6	3.1	35.8	2.9	8.2	21.9
Rwanda	7.9	11.3	19.2	5.2	8.6	17.1
Mozambique	1.3	5.2	20.3	6.5	8.5	18.2
Zambia	2.1	5.9	15.5	7.7	11.4	21.8

Notes: These figures are the adjusted R^2's from regressing household per capita income and land access per capita on geographic categorical variables. The specific administrative units used in each country for column (a) and (d); (b) and (e); and (c) and (f) were as follows: Kenya: Province, District, village; Ethiopia: Killil, Zone, Wereda; Rwanda: Prefecture, ID, Stratefication; Mozambique: Province, District, village; Zambia: Province, District, Standard Enumeration Area.

within villages. There are indeed significant regional differences in incomes. But despite such regional differences, the largest source of variation in household incomes is to be found within villages.

Land distribution within small-scale farming sectors

It is well recognized that severe land inequalities persist in many African countries between smallholder, large-scale, and state farms. In the Eastern and Southern Africa region, the smallholder farm sector is typically characterized as small but relatively "unimodal" and equitably distributed land holdings situated within a "bi-modal" distribution of land between large-scale and small-scale farming sectors. Redressing these inequalities is likely to be an important element of an effective rural poverty reduction strategy in countries such as Zimbabwe and Kenya. Within the small farm sectors in Africa, land-related research has mainly focused on the effects of land property rights and tenure structure (e.g. Maxwell and Wiebe, 1999; Platteau, 1996; Place and Hazell, 1993; Bassett and Crummy, 1993) and village case studies of rural differentiation that have included landholding assets (e.g., Hill, 1968; Matlon, 1981). Some research (e.g., Block and Foltz, 1999) refers to a skewed distribution of land in Sahelian countries. Yet despite widespread acceptance that "pro-poor" agricultural growth is strongly associated with equitable asset distribution, surprisingly little attention has been devoted to quantifying land distribution patterns within Africa's small-scale farming sector.[7]

Table 4 presents basic information on land access size and distribution within the smallholder farm sector in the five countries. As shown in column b, average land holdings in the small farm sector range from 2.7 hectares in Kenya and Zambia to 0.71 hectares in Rwanda in 2000. The three Rwanda surveys indicate that mean household land access has declined significantly over the past 15 years,[8] a finding which appears to be consistent with the general trend evident in Table 1.

On a per capita basis, farm sizes range from 0.56 hectares per person in Zambia to 0.16 hectares per person in Rwanda in 2000 (Table 4, column c). Mean farm size figures mask great variations in land access within the smallholder sector. After ranking all smallholders by household per capita land size, and dividing them into four equal quartiles, households in the highest per capita land quartile controlled between eight to 20 times more land than households in the lowest quartile. In Kenya, for example, mean land access for the top and bottom land quartiles were 1.10 and 0.08 hectares per capita, respectively. These figures already include rented land,

[7] Some notable exceptions include Matlon, 1981; Crawford and Thorbecke, 1978; Ghai and Radwan, 1983; Haggblade and Hazell, 1988; and Tschirley and Weber, 1994.

[8] Andre and Platteau (1998) present an in-depth case study which shows acute competition over land and suggest a connection between land disputes and the civil war in 1994.

Table 4
Smallholder land distribution in selected African countries

Country	(a) sample size	(b) Ave. land access per hh	(c) Household per capita land access					(d) Gini coefficients		
			Ave.	Quartile				Land per household	Land per capita	Land per adult
				1	2	3	4			
		- ha -	- ha -			- ha -				
Kenya	1416	2.65	0.41	0.08	0.17	0.31	1.10	0.55	0.56	0.54
Ethiopia	2658	1.17	0.24	0.03	0.12	0.22	0.58	0.55	0.55	0.55
Rwanda 1984	2018	1.2	0.28	0.07	0.15	0.26	0.62	--	--	--
Rwanda 1990	1181	0.94	0.17	0.05	0.10	0.16	0.39	0.43	0.43	0.41
Rwanda 2000	1584	0.71	0.16	0.02	0.06	0.13	0.43	0.52	0.54	0.54
Malawi[a]	5657	0.99	0.22	0.08	0.15	0.25	0.60	--	--	--
Zambia	6618	2.76	0.56	0.12	0.26	0.48	1.36	0.44	0.50	0.51
Mozambique	3851	2.1	0.48	0.1	0.23	0.4	1.16	0.45	0.51	0.48

Note: Numbers for Ethiopia, Rwanda, Mozambique, and Zambia, including Gini coefficients, are weighted. Numbers for Kenya are sample statistics.
[a] Results from the “Profile of Poverty in Malawi, 1998”, National Economic Council, Malawi, 2000.

which is marginal in most of the countries examined.[9] In each country, the bottom 25 percent of small-scale farm households are approaching landlessness, controlling less than 0.12 hectares per capita. In Ethiopia and Rwanda, the bottom land quartile controlled less than 0.03 hectares per capita. As explained in the section entitled 'Country data sets', we re-emphasize that these surveys contain only households engaged in agricultural production; households not engaged in farming are not in the sample.

Nevertheless, it is possible that the bottom land quartile may contain mostly "Sunday farmers" who are engaged primarily in off-farm activities for their livelihoods. To examine this possibility, we compute income shares from crop production, animal and animal-derived production, and off-farm income for each land quartile (Table 5). As expected, off-farm income shares are highest for the bottom land quartile and decline as landholding size rises. However, in none of the five countries do households in the bottom land quartile earn more than 50% of their total income, on average, from off-farm activities, despite their very small farms. In Zambia, Rwanda, Mozambique and Ethiopia, the off-farm income shares for households in the bottom land quartile were 38.5%, 34.5%, 15.9% and 12.7%, respectively. By contrast, this figure was 50% in Kenya, which can be attributed to that country's relatively developed and diversified economy, and which affords land-constrained rural households greater opportunity to earn a livelihood through the labor market. Mean per capita incomes of households in the bottom land quartile in Kenya was $209, three times higher than for the bottom land quartile in any of the other four countries.

In all countries, the various Gini coefficients displayed in Table 4 column (d) also indicate a high degree of dispersion in land holdings. The Ginis are comparable to those estimated for much of Asia during the 1960s and 1970s (Haggblade and Hazell, 1988). Given relatively homogeneous production technology, if land is allocated according to household size or labor availability, we should find more equal land distribution in household *per capita* or *per adult* land holdings than *per household* land holdings. This would imply that the Gini coefficients of land holding by per capita and per adult measures should be smaller than those of landholding per household. This is not the case in any of the five countries examined. The Gini coefficients of per capita and per adult land holdings are virtually unchanged in Kenya, Ethiopia, and Rwanda, and are even higher in Mozambique and Zambia when family size is accounted for in the estimates of land distribution inequality.

What is the evidence on trends in landholding inequality over time within the small-farm sectors? This is very difficult because of inevitable differences in sample design and variable definitions across surveys; results must therefore be interpreted cautiously. However, Haggblade and Hazell's (1988) survey of available landholding Gini estimates for Africa, Asia, and Latin America during the 1960s and 1970s provides some grounds for comparison. They report that the basic sampling unit is

[9] Mean net land rented in for households in the bottom land quartile was 0.52 hectares in Kenya, but was only 0.01 hectares in Zambia. In Mozambique, Ethiopia, and Rwanda, only land rented (not loaned out) was measured; these figures for the bottom land quartile were 0.01, 0.03, and 0.15 hectares, respectively.

Table 5
Household attributes by per capita land access quartile

Country	Dimension		Quartiles of per capita land access			
		Aver.	1	2	3	4
Kenya	Land access (ha)	2.65	0.58	1.26	2.11	6.69
	Per capita income (1996 US$)	336.7	209.9	275.3	312.4	550.3
	Crop income share (%)	34.0	29.5	31.4	35.0	39.2
	Livestock prod. income share (%)	26.0	20.5	27.6	27.2	30.2
	Off-farm income share (%) of which:	40.0	50.0	41.1	37.8	30.6
	remittances	6.7	7.2	5.4	6.0	7.9
	business income	12.3	15.2	12.9	13.1	8.0
	wage labor	21.0	27.6	22.8	18.7	14.7
Ethiopia	Land access (ha)	1.17	0.20	0.67	1.15	2.58
	Per capita income (1996 US$)	71.6	53.1	52.1	88.3	91.0
	Crop income share (%)	91.9	86.3	91.6	94.6	95.4
	Livestock prod. income share (%)	na	na	na	na	na
	Off-farm income share (%)	8.1	13.7	9.0	5.4	4.6
Rwanda[a]	HH Land access (ha)	0.94	0.32	0.63	1.00	1.82
	Per capita income (1991 US$)	78.7	54.5	59.4	79.3	121.7
	Crop income share (%)	70.3	61.7	70.6	72.9	75.8
	Livestock prod. income share (%)	4.9	3.8	5.0	4.9	6.0
	Off-farm income share (%) of which:	24.8	34.5	24.4	22.2	18.2
	gifts received (%)	3.4	3.9	3.6	3.3	2.8
	own business (%)	5.9	5.6	5.1	5.6	6.2
	wage labor (%)	15.6	25.1	14.8	13.4	9.3
Mozambique[b]	HH land access (ha)	1.80	0.55	1.17	1.92	3.46
	Per capita income (1996 US$)	43.1	26.2	34.1	42.7	69.2
	Crop income share (%)	84.5	79.2	85.8	83.4	89.7
	Livestock prod. income share (%)	2.8	4.9	1.9	3.5	1.1
	Off-farm income share (%) of which:	12.7	15.9	12.3	13.1	9.2
	remittances	Na	Na	Na	Na	Na
	business income	10.5	12.5	10.8	10.9	7.7
	wage labor	2.2	3.4	1.5	2.2	1.5
Zambia	HH Land access (ha)	2.81	0.79	1.61	2.68	6.16
	Per capita income (2000 US$)	62.9	48.2	53.3	65.9	84.2
	Crop income share (%)	67.2	57.2	69.5	69.2	72.8
	Livestock prod. income share (%)	4.4	4.3	4.8	4.2	4.3
	Off-farm income share (%) of which:	28.4	38.5	25.7	26.6	22.9
	remittances	5.2	5.5	4.3	4.8	6.0
	business income	13.8	16.4	12.6	14.0	12.3
	salary/wage labor	9.4	16.6	8.7	7.8	4.6

Note: All numbers are weighted except for Kenya where weights are not available. Exchange rates: Kenya 58Ksh-1997 US$; Ethiopia 6.2birr-1996US$; Rwanda 125.1FRW-1991 US$; Mozambique 11,294 Meticais-1996 US$; and Zambia 2811Kw-2000 US$.

[a] Income figures include gross income derived from crop production on rented land.

[b] North-Central Mozambique only where income data is available.

landholdings, not households, and thus landless households are excluded from these calculations. At least in this way, their estimates are consistent with the data reported in this study. Their sample includes three of the same country/farm sector combinations as in this study: Ethiopia, from 1976/77 survey data; Kenya's small-scale farming sector, from 1960; and Mozambique's smallholder sector from 1970.

On the basis of these comparisons, it appears that landholding concentration within the small-scale farm sector has increased slightly to moderately over the past 20–30 years. The Gini coefficients for landholdings per farm increased from 0.50 to 0.55 between 1960 and 1997 in Kenya; from 0.41 to 0.45 between 1970 and 1997 in Mozambique; and from 0.44 to 0.55 between 1976/77 and 1995/96 in Ethiopia. Ethiopia's case in particularly intriguing because it had undergone a radical land reform program during the 1970s there, yet land concentration appears to have increased.

Probably the most robust case for examining changes in land concentration is in Rwanda, where relatively consistent survey methods were used by the Ministry of Agriculture across three surveys for 1984, 1990, and 2000. Changes in the distribution of land access in Rwanda are shown in Table 4. Civil disruption undoubtedly has had a critical effect on land distribution over this period. We find that mean household land access (use rights plus rented land) has declined by 57% over this 16-year period, from 0.28 to 0.16 hectares per capita. In absolute terms, the decline in farm size has been borne mostly by the relatively large farms. Mean land access for households in the highest land quartile declined from 0.62 to 0.43 hectares per capita, while it declined from 0.07 to 0.02 hectares per capita for the bottom land quartile. In relative terms, however, the dispersion in land access across the distribution has widened. There was a nine-fold difference in mean land access per capita between the top and bottom land quartiles in 1984, but this has worsened to a 21-fold difference in 2000. While Gini coefficients from 1984 are not available, the Gini coefficients of household access to land between 1990 and 2000 increased from 0.43 to 0.52. These results, though tentative, provide some indication that land concentration may be worsening over time in many of the region's small-scale farming sectors.

Importance of geographic factors in explaining the variation

Households in densely populated areas generally have smaller per capita land sizes than households in less populated areas. Geographic factors obviously should affect land holding size but by how much? To investigate these questions, we employ a similar technique as before, regressing land per capita on geographic administrative units of differing size, using OLS. If all households in each province have the same amount of land per capita but there are differences between provinces, then provincial effects should explain the entire variation in per capita land holdings. On the other hand, if mean land holdings are the same across provinces, then the province variable should not explain any of the variation.

Results in Table 3, column d, indicate that the province variables explain only

between 3 and 8 percent of the variation in household per capita land sizes across the national samples. We then examine geographic differences at successively smaller units of administrative dis-aggregation: districts and villages. As we use smaller units, the proportion of variation explained by geographic units naturally increases, but only moderately so. In Kenya, Zambia and Ethiopia, between 22% and 33% of the total variation in per capita landholding sizes can be attributed to between-village effects (column f). In Mozambique and Rwanda, village-level effects explain less than 20% of total variation in per capita landholding sizes. Despite the low R^2s of these models, many of the district and village dummies are highly statistically significant, with mean landholding sizes often, but not always, inversely correlated with population densities and agro-ecological potential. Yet the bulk of the variation in landholding size (largely unexplained) is within-village.

To explain these intra-village variations, we re-estimate the landholding size models with village dummies and also include available household characteristics, such as the number, sex, and age of household members, the age and education level of the household head, dummy variables for whether the household is female-headed with and without a male partner living off the farm, and the value of animal assets.[10] If land were allocated to households according to productive assets and family size, the inclusion of these household characteristics should greatly increase the explained variation in landholding sizes. The results for the five countries are shown in Table 6.

The model results consistently show, as expected, that the number of adult males and females in the household is associated with larger farm sizes but smaller farm sizes per capita. The number of small children is not associated with farm size, except in Zambia, but is significantly associated with smaller farm sizes in per capita terms. For countries where the age of the household head was available (Ethiopia and Zambia), we find a non-linear relationship between age and land access, corresponding to theories of household life cycles (Low, 1986). In the case of Ethiopia, for example, households with heads that are 50 years of age have roughly 0.12 hectares more land than those with heads of 30 years old. But as the household head ages beyond roughly 55 years of age and tends to lose family labor as sons and daughters leave home, mean land access declines back down to about the same levels as at age 30, other factors constant.

In Zambia, Kenya, and Ethopia, female-headed (unmarried) households have, on average, 1.05, 1.03, and 0.25 hectares less land than male-headed households, which is a huge relative difference considering that mean farm sizes in these countries are only 2.76, 2.65, and 1.17 hectares. Female-headed households in which a male partner resides off-farm also tend to have less land than male-headed households, although the effect is weaker than for female-headed unmarried households, except in the case of Mozambique. Education levels of the household head is also positively correlated with access to land, again except for Mozambique, where the proportion of household heads with over eight years of education is rare. Lastly, we find very

[10] The amount of inherited land and other assets at the time of household formation would have been useful exogenous variables to include in these models, but such data was not available in these surveys.

strong and typically non-linear associations between animal assets and land access, both total and per capita.

In most cases, therefore, it can be concluded that productive assets and adult labor are correlated with the amount of land allocated to small-scale farm households. While empirical studies typically treat family labor and assets as fixed in the short-run, these are clearly endogenous variables in a longer-term dynamic sense, so these relationships are best viewed as correlations, without implying too much about the direction of causality.

As statistically significant as many of these socio-demographic household characteristics are, their inclusion with village-level dummy variables in most cases provides only modest increases in the explained variation of the per capita land access models, over and above the models containing only village dummies. The inclusion of the household variables raises the adjusted R^2 of the per capita land models from 0.333 to 0.531 for Kenya, and from 0.171 to 0.486 for Rwanda, but in Zambia, Mozambique, and Ethiopia, the inclusion of these household covariates adds at most 0.12 percentage points to the explained variation in land access per capita. Our point in highlighting this is to show that most of the variation in household per capita landholding size within the smallholder farm sector must be contained in factors other than village-level differences and observable household information on assets and socio-demographic factors. Since the results in Table 6 include village-level dummy variables, the unexplained residual cannot be explained in terms of unobserved spatial differences between villages. Some intra-village geographical factors clearly remain unaccounted for. Our household variables also obviously do not capture the full representation of households' socio-demographic differences. Research in other disciplines has highlighted the importance of the period of the clan's settlement in a particular area in determining land allocated to the clan, which is subdivided among families within the clan (Kajoba, 1994; Block and Foltz, 1999). Late migrants into an area typically are eligible for relatively small tracts of land for subdivision within the areas controlled by their clans. Marrule (1998) argues that kinship ties and power relationships within traditional governance structures also partially explain the observed disparities in land allocation, variables that are not included in these models. These hypothesized processes are related to the recently emerging literature on kinship ties, trust, and social capital (e.g., Fafchamps, 1992; Platteau, 1994; Gabre-Madhin, 2001). In an attempt to test these hypotheses, Zulu et al. (2003) using nationally-representative small- and medium-scale farm survey data from Zambia, show that both the period of family settlement and the blood relationship between the male and female head-of-household's family and the local chief at time of the family's settlement are positively and significantly associated with currently landholding size. These emerging findings lead us to speculate that, more generally, there may be important institutional and governance factors operating within local systems for allocating land that may be accounting for at least some of the unexplained variation in per capita landholding size within the smallholder farm sector.

The importance of these findings for rural growth and poverty alleviation strategies depends in part on the degree to which land allocation patterns influence household income and poverty. If non-farm activities are able to compensate for small landhold-

Table 6
Household land access and land access per capita model Results: OLS analysis

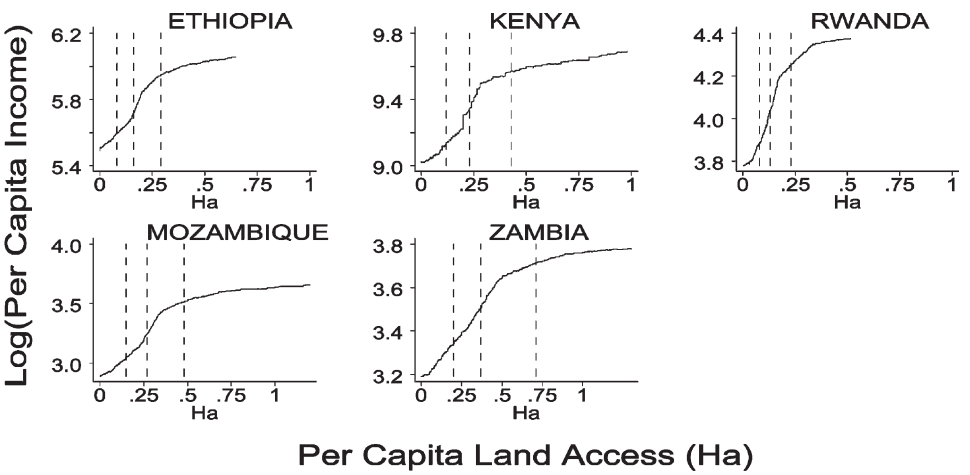
	Kenya		Ethiopia		Rwanda		Mozambique		Zambia	
	hectares (1)	hectares per capita (2)	hectares (3)	hectares per capita (4)	hectares (5)	hectares per capita (6)	hectares (7)	hectares per capita (8)	hectares (9)	hectares per capita (10)
Head Characteristics										
Head's age			0.028	0.007					0.076	0.017
			(1.88)*	(2.23)**					(2.87)**	(3.06)**
Head's age squared			−2.9×E-4	−7.2×E-5					−3.7×E-4	−1.1×E-4
			(1.96)*	(−2.23)**					(−1.40)	(−1.91)*
Head has some education	0.424	0.013	0.027	0.006	0.153	0.044	0.081	−0.132	0.496	0.081
	(1.48)	(0.30)	(0.36)	(0.31)	(3.76)**	(4.30)**	(0.82)	(−0.44)	(1.91)*	(1.51)
Head has high education	0.73	0.059					−0.557	−0.098	1.077	0.176
	(2.76)**	(1.43)					(−2.05)**	(−1.20)	(3.81)**	(3.01)**
Female headed	−1.034	−0.121	−0.255	−0.072	0.004	−0.016	−0.012	(−0.01)	−1.048	−0.161
	(−1.85)*	(−1.39)	(−2.06)*	(−2.63)**	(−0.08)	(−1.15)	(−0.04)	(−0.07)	(−6.12)**	(−4.54)**
Female headed, married	−0.469	−0.101	−0.175	−0.059			−0.297	−0.057	−0.608	−0.145
	(−1.05)	(−1.46)	(−1.98)*	(−1.54)			(−2.28)**	(−1.45)	(−1.95)*	(−2.24)**

Household Composition										
# of young children	−0.139	−0.088	0.024	−0.043	0.012	−0.043	0.056	−0.07	0.202	−0.085
	(−1.56)	(−6.36)**	(0.61)	(−5.01)**	(0.54)	(−7.97)**	(1.67)	(−7.11)**	(5.73)**	(−11.7)**
# of boys over 6 yrs	0.327	−0.026	0.128	−0.022	0.059	−0.026	0.073	−0.057	−0.01	−0.047
	(4.36)**	(−2.24)**	(2.82)**	(−2.25)**	(2.60)**	(−4.57)**	(1.67)	(−4.34)**	(−0.07)	(−2.18)**
# of girls over 6yrs	0.288	−0.03	0.05	−0.03	0.065	−0.021	0.119	−0.056	0.164	−0.035
	(3.86)**	(−2.61)**	(−1.01)	(−2.82)**	(3.07)**	(−4.00)**	(2.53)**	(−3.93)**	(1.56)	(−1.62)
# of male adults	0.323	−0.033	0.091	−0.025	0.193	−0.006	0.148	−0.033	0.111	−0.019
	(3.98)**	(−2.62)**	(1.96)*	(2.46)**	(8.74)**	−1.07	(2.92)**	(−2.17)	(2.93)**	(−2.36)**
# of female adults	0.436	−0.021	0.101	−0.022	0.174	−0.013	0.351	−0.029	0.104	−0.028
	(5.21)**	(−1.63)	(1.83)*	(−1.80)*	(7.54)**	(−2.29)**	(7.03)**	(−1.93)	(2.48)**	(−3.27)**
Household Characteristics										
Value of animals x 0.001	0.151	0.003	0.229	0.074	0.12	0.016	0.03	0.006	5.424	0.846
	(13.8)**	(16.4)**	1.51	(2.22)**	(9.40)**	(4.89)**	(7.35)**	(5.22)**	(8.54)**	(6.43)**
Value of animals, squared	1.9×E-7	3.3×E-8	−2.4×E-4	−5.4×E-5	−0.002	0.001	−6.8×E-5	−1.2×E-5	−1.1×E-3	−1.7×E-4
	(8.61)**	(9.45)**	−0.49	−0.5	(−2.91)**	(4.08)**	(−6.81)**	(−3.80)**	(−5.43)**	(−4.06)**
Regional Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Constant	−0.763	0.468	−0.073	0.175	0.055	0.25	0.89	0.61	−0.956	0.426
	(-2.27)**	(8.95)**	(0.22)	(2.34)**	(0.97)	(17.5)**	(1.49)	(3.36)**	(−1.51)	(3.25)**
Number of observations	1441		3903		1128		2147		6921	
Adjusted R^2	0.506	0.531	0.262	0.237	0.452	0.486	0.206	0.304	0.314	0.258

Note: *t*-statistics are in parentheses. Land access defined as land under use rights plus rented land. * indicates 10 % significance level; ** indicates 5% significance level. Regional fixed effects are in terms of weredas (Ethiopia), districts (Kenya and Mozambique), census enumeration unit (Zambia), and prefecture (Rwanda).

ings and provide land-poor households with adequate alternative income sources, then disparities in land ownership should not necessarily be a policy problem. To examine these issues, we present simple bivariate graphs relating household per capita landholding size to household per capita income, including non-farm income and crop income from rented land (Fig. 1). The three dashed vertical lines show the 25th, 50th, and 75th percentiles of sampled households along the *x*-axis. For example, 25% of the sample households in Kenya have between zero and approximately 0.10 hectares per capita, while the top quartile owns on average 1.1 hectares per capita.

In each country, we find a positive association between household per capita land holdings and per capita income (the sum of crop, livestock, and off-farm income). The association between household income and land is especially steep among households whose land size is below the median level in each country (the middle dotted line in Fig. 1). Because the vertical axis showing per capita income is in log form, we can read differences in numbers as percent changes. For instance, the line for Kenya starts at the log of per capita income at 9.2 and has a kink at 9.6. The difference between these two points is 0.4, which indicates a 40 percent increase in per capita income when household per capita land size increases from zero to 0.25 hectares. The same increase in land holdings (from zero to 0.25 hectares) increases per capita income by more than 40 percent in Rwanda, just less than 40 percent in Mozambique, and about 30 percent in Ethiopia. In all four countries, the association between land and income becomes weaker somewhere within the third land size quartile, and nearly disappears in the fourth quartile.



Note: The vertical lines are drawn at 25th, 50th, and 75th percentiles of per capita land owned for each country. The top 5 percent of observations are excluded from the graphs because lines are sensitive to a few extreme cases.

The locally-weighted regression lines in Figure 1 are created using locally weighted smoothed scatter plots (LOWESS) with window length set at .6 or .7 of the neighboring observations (Cleveland, 1979).

Fig. 1. Log of per capita income by per capita land owned.

Improving access to land among the most land-constrained smallholder households would be a seemingly effective way to reduce poverty. For small farms, a very small incremental addition to land access is associated with a large relative rise in income. Yet improving land access for smallholders is fraught with difficulties: even in "land abundant" countries, it is questionable whether much unclaimed land is available in settled areas to distribute, expropriative land reform is politically difficult, expensive, and subject to rent-seeking, and "market-assisted" or "community-based" approaches have met with very little success to date.[11] We discuss alternative policy options in next section.

Implications for poverty reduction and economic growth strategies

The findings presented in this paper hold several implications for the design of poverty reduction strategies. The first relates to targeting the poor. While some areas experience significantly higher rates of poverty than other areas, the findings from these five countries—Ethiopia, Kenya, Mozambique, Rwanda, and Zambia—suggest that income poverty among smallholder households is not primarily a geographic phenomenon. Most of the variations in smallholder incomes tend to be within-village rather than between village. This has implications for targeting vulnerable groups, assuming that income is the basis for targeting. Geographically-based poverty reduction strategies—e.g. focusing on marginal areas—are likely to miss a large fraction of the poor in any particular country.[12] Targeting of vulnerable, resource poor households requires greater emphasis on intra-community targeting, as a complement to regional targeting. Within villages, households with small farm sizes and low education are especially likely to be at the low end of the income distribution. In the long run, there is probably no substitute to broad based agricultural growth in primarily agrarian societies to appreciably lift the poor—who tend to be widely scattered geographically—out of poverty (Mellor, 1976).

Second, we find across all five countries serious disparities in incomes and land allocation at the local level. The bottom 25% of rural agricultural households are virtually landless, having access to 0.10 hectares per capita or less in each country examined. Notwithstanding our earlier conclusion about the importance of agricultural growth, under existing conditions the ability of this bottom land quartile to escape from poverty directly through agricultural productivity growth is constrained by their limited access to land and other resources. Viewed in a static way, one could conclude that the only way out of poverty for the severely land-constrained rural poor is to increase their access to land. Viewed within a dynamic structural transformation framework, this group's brightest prospect for escape from poverty

[11] See the draft World Bank document on land allocation for the electronic forum on land policy at www2.worldbank.org/hm/hmlandpolicy, especially Alain de Janvry's posting on 20 March 2001 and follow-up comments to it. See also Bassett and Crummy, 1993.

[12] Findings from India (Fan and Hazell, 1999) even find that, on average, districts considered to be "marginal lands" have a lower proportion of households below the poverty line that high-potential districts.

may involve being pulled off the farm into productive non-farm sectors. Abundant evidence of the transformation process elsewhere indicates that growth in non-farm sectors typically starts from a robust stimulus to agriculture, which generates rural purchasing power for goods and services. During this process, there will be high payoffs to education, as the most highly skilled households have the best access to the well-paying non-farm jobs. Therefore, while greater equity in land holding is key to rural poverty reduction in the short run, an important long run goal may be to move the rural poor out of agriculture and into skilled off-farm jobs through investments and policies that support the processes of structural transformation. The problem is that rising education for everyone will quickly saturate the market for skilled jobs unless the demand for such jobs is stimulated through broad-based economic growth. This once again points to the importance of equitable agricultural growth.

Aggregate trend data indicate that the ratio of arable land to agricultural population has declined steadily over the past 40 years. In Kenya, Ethiopia, and Zambia, for example, this ratio is about half as large as it was in the 1960s. These trends are consistent with the multiple year survey data from Rwanda, indicating that landholding size is declining for all strata of the rural population, with the decline being largest in absolute terms for households in the top end of the land access distribution, and being largest in percentage terms for households at the bottom end of the land access distribution. These trends suggest that farming will be increasingly unable to sustain the livelihoods of many land-constrained households without substantial shifts in labor from agriculture to non-farm sectors. Education, which played an important role in Asia by allowing households to exit agriculture into more lucrative off-farm jobs, is relatively low in most areas of rural Africa by world standards. Investments in rural education and communications are likely to become increasingly important to facilitate structural transformation.

What are the implications of these findings in the context of recent empirical studies indicating a negative relationship between the concentration of rural assets and the contribution of economic growth to poverty reduction? It may be necessary to ask whether structural transformation processes may be retarded in situations in which the distribution of rural assets are so highly skewed that a large strata of the rural population may be unable to benefit from agricultural growth incentives that would otherwise generate broad-based growth multipliers. In the five countries examined in this study, the distribution of land and other productive assets within the smallholder sector appears to be at least as skewed as in much of Asia at the time of their green revolutions. Estimates of land concentration would be worse after accounting for the large-scale farm sectors in Kenya, Zambia, and Mozambique. The literature on growth linkages indicates that the first-round beneficiaries of agricultural growth generate important multiplier effects by increasing their expenditures on a range of local off-farm and non-farm activities that create second-round benefits for a wide-range of other households in the rural economy (Johnston and Mellor, 1961; Mellor, 1976). In much of Africa, the consumption growth linkages have been found to be especially important (Delgado and Minot, 2000). The extent and magnitude of these second round effects depend on how broadly spread the first round growth is

(Delgado and Minot, 2000; Fan and Hazell, 1999). The initial distribution of land and other productive assets will clearly affect the size of these multipliers. If dynamic labor and services markets can be developed, then other employment opportunities should be easier to create in the very locations where the larger smallholders are investing and raising their output and productivity. Pro-active public sector investment and policy support in developing these labor and service markets will be a key determinant of the magnitude of the growth linkages to be derived from agricultural growth.

Future research

The findings of this paper draw out several major issues for further investigation. First, what are the costs and benefits of alternative approaches for redressing in the short run the acute land constraints being faced by a significant portions of small-scale farmers? Some of the issues might include (a) analyzing institutional arrangements for encouraging the development of land markets (for sale in addition to rent/share cropping) and attracting greater long-term land investments; (b) assessing the potential for land redistribution between state, large-scale, and small-scale farmland; (c) identifying specific educational skills and investments that make for a mobile labor force that facilitates structural transformation; and (d) identifying cost-effective public investments to induce migration into relatively sparsely populated areas in a manner that is supportive of rural productivity growth.

Many of these are not new questions, but the need to focus on them is given new importance in the face of the empirical evidence presented as to the disparities in access to land within the smallholder sectors in many African countries, and the difficulties of nurturing other avenues to rural income growth for households lacking access to sufficient land to ensure a decent livelihood.

References

Andre, C., Platteau, J.-P., 1998. Land relations under unbearable stress: Rwanda caught in the Malthusian trap. Journal of Economic Behavior and Organization 34, 1–47.

Bassett, T., Crummy, D., 1993. Land in African Agrarian Systems. University of Wisconsin Press, Madison.

Benson, T. 2002. Correlates of Poverty Measures in Malawi: An Application of Poverty Mapping at the Sub-District Scale. Paper presented at the Conference on Understanding Poverty and Growth in Sub-Saharan Africa, St. Catherine's College, Oxford University, March 17-20, 2002.

Block, P., Foltz, J., 1999. Recent Tenure Reforms in the Sahel: Assessment and Suggestions for Redirection, BASIS Project, Madison, Land Tenure Center.

Cleveland, W., 1979. Robust locally-weighted regression and smoothing scatterplots. Journal of the American Statistical Association 74, 829–836.

Crawford, E., Thorbecke, E., 1978. Employment, income distribution, poverty alleviation and basic needs in Kenya, Report of an ILO consulting mission, Cornell University, Ithaca.

Datt, G., Ravallion, M., 1998. Farm productivity and rural poverty in India. Journal of Development Studies 34 (4), 62–95.

Deininger, K., Squire, L., 1996. A new data set measuring income inequality. The World Bank Economic Review 10, 565–591.

Deininger, K., Squire, L., 1998. New ways of looking at old issues: inequality and growth. Journal of Development Economics 57, 259–287.

Delgado, C., Hazell, P., Hopkins, J., Kelly, V., 1994. Promoting intersectoral growth linkages in rural Africa through agricultural technology and policy reform. American Journal of Agricultural Economics 76, 1166–1171.

Dercon, S., Krishnan, P., 1998. Changes in Poverty in Rural Ethiopia 1989–1995: Measurement, Robustness Tests and Decomposition, WPS/98-7. Centre for the Study of African Economies, Oxford University, Oxford, UK.

Delgado, C.L., Minot, N., 2000. Agriculture in Tanzania Since 1986: Follower or Leader of Growth. A World Bank Country Study. The World Bank.

Fan, S., Hazell, P., 1999. Are Returns to Public Investment Lower in Less-Favored Rural Areas? An Empirical Asnalysis of India. EPTD Discussion Paper No. 43, International Food Policy Research Institute, Washington D.C.

Fafchamps, M., 1992. Solidarity networks in pre-industrial societies: rational peasants with a moral economy. Economic Development and Cultural Change 41 (1), 147–174.

Gabre-Madhin, E. 2001. Market Institutions, Transaction Costs and Social Capital in the Ethiopian Grain market. Research Report 124, International Food Policy Research Institute, Washington, D.C.

Ghai, D., Radwan, S., 1983. Agrarian Policies and Rural Poverty in Africa. International Labour Office, Geneva.

GOK (Government of Kenya). 1994. Kenya Welfare Monitoring Survey, Second Round, Central Bureau of Statistics, Nairobi.

Gugerty, M., Timmer, C.P., 1999. Growth, inequality and poverty alleviation: Implications for development assistance. Mimeo.

Haggblade, S., Hammer, J., Hazell, P., 1991. Modeling agricultural growth multipliers. American Journal of Agricultural Economics May, 361–374.

Haggblade, S., Hazell, P., 1988. Prospects for Equitable Growth in Rural Sub-Saharan Africa, AGRAP Economic Discussion Paper 3, World Bank, Washington D.C.

Hazell, P., Haddad, L., 2001. Agricultural Research and Poverty Reduction, IFPRI 2020 Vision Discussion Paper 34, 2001. Downloadable.

Hill, P., 1968. The myth of the amorphous peasantry: A Northern Nigerian case study. Nigerian Journal of Economic and Social Studies 10, 239–260.

Jayne, T.S., Yamano, T., Weber, M., Tschirley, D., Benfica, R., Neven, D., Chapoto, A., Zulu, B., 2001. Smallholder Income and Land Distribution in Africa: Implications for Poverty Reduction Strategies. International Development Paper 24, Department of Agricultural Economics, MSU, East Lansing.

Johnston, B.F., Mellor, J., 1961. The role of agriculture in economic development. American Economic Review 51 (4), 566–593.

Johnston, B.F., Kilby, P., 1975. Agriculture and Structural Transformation: Economic Strategies in Late-Developing Countries. Oxford University Press, New York.

Kajoba, G., 1994. Changing Perceptions on Agricultural Land Tenure under Commercialization among Small-scale Farmers: The Case of Chinena Village in Chibombo District (Kabwe Rural), Central Zambia. Reprinted from the Science Reports of the Tohoku University, 7th Series (Geography), Vol. 44. No. 1, Institute of Geography, Sendai, Japan.

Lipton, M., 1977. Why Poor People Stay Poor: Urban Bias in World Development. Temple Smith, London.

Low, A., 1986. Agricultural Development in Southern Africa: Farm Household-Economics and the Food Crisis. James Curry, London.

Matlon, P., 1981. The structure of production and rural incomes in northern nigeria: results of three village case studies. In: Bienen, H., Diejomaoh, V.P. (Eds.), Inequality and Development in Nigeria. Holmes and Meier Publishers, New York, pp. 261–310.

Marrule, H., 1998. Land-Poor in a 'Land-Abundant' Setting: Unraveling a Paradox in Mozambique. Masters thesis. Michigan State University.

Maxwell, D., Wiebe, K., 1999. Land tenure and food security: exploring dynamic linkages. Development and Change 30, 825–849.
Mellor, J., 1976. The New Economics of Growth: A Strategy for India and the Developing World. Cornell University Press, Ithaca.
National Economic Council of Malawi, 2000. Profile of Poverty in Malawi, 1998. National Economic Council of Malawi, Lilongwe.
Place, F., Hazell, P., 1993. Productivity effects of indigenous land tenure systems in Sub-Saharan Africa. American Agricultural Economic Review 75, 10–19.
Platteau, J.-P., 1994. Behind the market stage where real societies exist, Part 1: The role of public and private order institutions. Journal of Development Studies 30 (3), 533–577.
Platteau, J.-P., 1996. The evolutionary theory of land rights as applied to Sub-Saharan Africa: a critical assessment. Development and Change 27, 29–86.
Quan, N., Koo, A.Y.C., 1985. Concentration of land holdings: an empirical exploration of Kuznets' conjecture. Journal of Development Economics 18, 101–117.
Ravallion, M., 1997. Can high-inequality developing countries escape absolute poverty? Economic Letters 56, 51–57.
Ravallion, M., Datt, G., 2002. Why has economic growth been more pro-poor in some states of India than others? Journal of Development Economics 68 (2002), 381–400.
Reardon, T., 1997. Using evidence of household income diversification to inform study of the rural nonfarm labor market in Africa. World Development 25 (5), 735–748.
Reardon, T., Taylor, J.E., Stamoulis, K., Lanjouw, P., Balisacan, A., 2000. Effects of non-farm employment on rural income inequality in developing countries: an investment perspective. Journal of Agricultural Economics 51 (2), 266–288.
Simler, K., Nhatem, V., Poverty, Inequality, and Geographic Targeting: Evidence from Small-area Estimates in Mozambique. Paper presented at the Conference on Understanding Poverty and Growth in Sub-Saharan Africa, St. Catherine's College, Oxford University, March 17–20, 2002.
Staatz, J., Eicher, C., 1998. Agricultural development ideas in historical perspective. In: Eicher, C., Staatz, J. (Eds.), Agricultural Development in the Third World. Johns Hopkins University Press, Baltimore.
Tschirley, D., Weber, M., 1994. Food security strategies under extremely adverse conditions: the determinants of household income and consumption in rural Mozambique. World Development 22 (2), 159–174.
World Bank, 2000a. Can Africa Claim the 21st Century? The World Bank, Washington D.C.
World Bank, 2000b. The Quality of Growth. World Bank, Washington D.C.
Zulu, B., Jayne, T., Kajoba, G., 2003. Determinants of Access to Land within the Small- and Medium-Scale Farming Sector in Zambia: Implications for the Design of Poverty Reduction Strategies. Working Paper 9, Lusaka, Zambia Food Security Research Project.