A Poverty Profile for Zambia Based on the 2002-03 Living Conditions Monitoring Survey

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Abstract

This paper offers an examination of the profile of the poor in Zambia using data from the 2002-03 Living Conditions Monitoring Survey. A new poverty line and corresponding poverty figures are generated based on the consumption data in the survey. The analysis finds that more than half of Zambians have consumption levels insufficient to meet their basic needs, and more than a third are severely poor. Due to various changes in both survey design and poverty methodology, the poverty figures cannot be compared with estimates from past surveys. Broadly, however, the poverty numbers in tandem with non-economic indicators confirm the general picture painted by the macroeconomic data of a country still dominated by dire poverty.

In rural areas, differences in various indicators show relatively small differences between rich and poor. Both the poor and the better-off in rural areas are chiefly occupied with agriculture, own few assets and household amenities, and have poor access to services. The average rural household in all ranges of the economic distribution subsists chiefly on consumption of its own agricultural production. In terms of household services and consumer goods, urban households have far more than rural households. Along these same indicators and in terms of aggregate consumption, there is much higher inequality in urban areas.

The statistics suggest that Zambia still has untapped potential, not only in its natural resources, but also in its people. The nation's average education levels have remained relatively high for sub-Saharan Africa. And the economic activity analysis suggests a diverse and thriving informal sector in urban areas that may be underappreciated in official analyses. Zambia's hope for the future may lie in harnessing that potential.

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1 Introduction

Zambia's transition to multi-party democracy in 1991 stoked optimism that its dormant economic potential would be wakened and that revived economic growth would improve the lot of the nation's poor. Unfortunately, Zambia's hopes for a sustained economic recovery during the 1990s have remained unrealized. The continued deterioration in the international price of copper, the scourge of HIV/AIDS, and acute governance and policy failures have conspired to stifle the nation's progress. At the macro level, the disappointments of the decade are reflected in the decline of GDP per capita by 1.5 percent per year over the 1991-2002 period. A number of studies have examined the implications of this poor growth at the micro level and more generally assessed Zambia's poverty and social conditions during the last decade. These studies have relied chiefly on a series of household surveys conducted during the 1990s, most prominently the 1998 Living Conditions Monitoring Survey (LCMS). This paper updates past analyses, using data from the 2002-03 LCMS. A key element of the analysis is the identification of poverty rates for the nation as a whole and various subgroups. A new poverty line and corresponding poverty figures are generated based on the consumption data in the survey.

This paper also offers a detailed examination of the profile of the poor. For this analysis, rather than divide the population simply by poor and non-poor, we examine the characteristics of the rural and urban populations, grouping individuals by quintiles of the national distribution of household consumption. This approach offers a broader view than a simple poor/non-poor split.

The analysis finds that more than half of Zambians have consumption levels insufficient to meet their basic needs, and more than a third are severely poor. Specifically, 56 percent of Zambians have consumption below the basic poverty line of 73394 Kwacha, and 36 percent have consumption below a lower "core poverty" line. Due to various changes in both survey design and poverty methodology, the poverty figures cannot be compared with estimates from past surveys. Broadly, however, the poverty numbers in tandem with non-economic indicators confirm the general picture painted by the macroeconomic data of a country still dominated by dire poverty.

The poverty profile's snapshot view of life in Zambia shows patterns largely similar to those from studies in the early 1990s. In rural areas, there is a remarkable homogeneity; the large bulk of people, including those who rank high in terms of consumption, are chiefly engaged in subsistence agriculture. . Few possess any substantial assets, and access to public services other than a school and health clinic is meager. Urban areas present a more complex picture, and people are occupied in a large variety of activities.

The paper is structured as follows. Section 2 describes the 2002-03 LCMS data, highlighting changes from past surveys and explains the difficulties in comparing figures based on this data with earlier poverty estimates. Section 3 describes the methodology behind the calculation of the poverty figures. Section 4 presents the poverty figures at aggregated levels: province, urban vs. rural, time-of-year, and household type. Section 5 provides a rural poverty profile, examining how a number of household and individual characteristics vary by nationally-defined quintiles of household consumption. An urban poverty profile is given in Section 6. An additional look at school attendance is presented in Section 7, and Section 8 concludes.

2 Data

The 2002-03 LCMS is a national household survey that was carried out by the Zambia Central Statistical Office (CSO) over a period between November 2002 and October 2003. The survey included questions on household demographics, education, health, and economic activity, along with a detailed consumption questionnaire. The consumption module was designed to capture both cash expenditure and consumption of the household's own production. The survey

covered approximately 9700 households and was stratified at the level of rural/urban areas within each of the country's nine provinces.

The 2002-03 survey differed from past household expenditure surveys in several critical aspects. Most importantly, the data was collected over the course of a calendar year. Previous surveys carried out by the Central Statistical Office collected data during just one or two months. Collecting data during such a narrow time slice has two disadvantages. First, if there is seasonality in welfare, as is likely in a country like Zambia where a large fraction of the population works in agriculture and markets are undeveloped, information from such a survey will offer a distorted picture of overall welfare averaged over the course of the whole year. The 1998 LCMS in particular was conducted during November and December, at a time of the year when poverty rates tend to be relatively high, a few months before the main harvest. Second, if there is month-to-month variation in welfare due to short-term aggregate shocks, there is additional danger that the data collected will reflect the particular circumstances in a narrowly defined period of time.

The issue can be summarized in equation form. Suppose the value of social welfare in year *y* and month *m* can be approximated by the following equation:

$$W_{ym} = \omega_y + \alpha_m + \varepsilon_{ym}.$$

Here, ω_y is the overall welfare in year *y*, α_m is a fixed seasonal effect by month defined so as to average zero, and ε_{ym} is an additional mean-zero random term. The final term can be understood to capture short-term shocks. Assuming that ω_y is the "true" welfare measure we would like to measure, it is superior to collect data over the course of the entire year and estimate social welfare as an average across data from all periods. The error in the estimate will be smaller on average if it is based on a 12-month survey rather than a one- or two- month survey.

With such arguments in mind, CSO collected the 2002-03 survey over the course of an entire year. Administratively, the year was divided into ten "cycles" of 36 days each, and each household was interviewed multiple times over the course of one cycle.

A second major change in the 2002-03 survey was the manner in which consumption data was collected. Previous surveys used a standard recall questionnaire; survey enumerators asked respondents about their consumption in a previous period. For the 2002-03 survey, food consumption data was collected using a daily diary kept by a household respondent. Data was collected for both purchased goods and own produced goods. Information from the diary form was transferred to a survey form by the CSO enumerator, who reviewed the diary responses with the household respondent. On each of six visits to the household over the course of a month, the enumerator recorded consumption since the previous visit. The recorded information consists of the value of the amount consumed, recorded in terms of Kwacha, the Zambian currency. For own-produced goods, values in Kwacha were estimated by the enumerator and the respondent. Non-food consumption data was collected using the diary for frequent items and a separate survey using a 12-month recall period for less frequent items.

The two changes in the survey design raise problems for comparing poverty figures based on the 2002-03 LCMS to past poverty estimates. Wide experience in other countries has shown that changes in survey design can have large impacts on poverty figures. In principle, the comparability problem created by the extension of the survey period to 12-months could be overcome by comparing past poverty figures to the new poverty rates for only those households interviewed in a parallel time slice. However, the switch from a recall questionnaire to a diary cannot be addressed so easily. Consequently, the poverty and consumption figures in this paper should be viewed as not comparable to those from past surveys. Comparisons can still be carried out for variables not based on consumption data, like health, education, and access to services.

The 2002-03 LCMS survey also differs from past Zambia surveys in that it includes price

data collected at the local level. This makes it possible to adjust household-level consumption figures for differences in costs of living across space. With price data collected by cycle the consumption data can also be adjusted for variation in the cost of living over the course of the year.

The plan for the LCMS called for price data to be collected at the level of survey enumeration areas during each cycle. In practice, because markets for many goods are scarce in rural areas, there were often missing values in the collected data. Once these values were aggregated, price data was only available at the cycle-province level. In other words, for each item, a single price was available for all the households interviewed within a given province during a particular cycle. In most cases, the households interviewed in a particular cycle-province included a mix of rural and urban households. As a consequence, while the price data reflects differences in costs of living over time and across provinces, it does not capture urban-rural price differences.

3 Methodology for Poverty Estimation

This section details the methodology used to calculate the poverty estimates in this paper. It explains the construction of the consumption aggregate, the price index, and the poverty line, along with the parameters used for the calculation of the poverty figures. The final portion of this section explains differences in the approach used by the Zambia Central Statistical Office (CSO) for its parallel set of calculations.

3.1 Consumption Aggregate

The nominal household consumption aggregate was constructed following the guidelines in Deaton and Zaidi (2002). The World Bank and the Zambia CSO used identical procedures to construct their consumption aggregates. The consumption aggregate consists of four components: food, housing, consumer durable user fee, and other non-food. The aggregate was calculated on the basis of total monthly consumption. The consumption aggregate excluded water payments, remittances, and consumer durable purchases.

Housing rental costs were also collected in the survey. However, rental values were reported for less than two percent of rural households and only 34 percent of urban households. For households not reporting rent, rent was imputed using a single national-level regression of log rent on provincial dummies, an urban dummy, and housing characteristic variables. Actual rent values were used for those households reporting rent. Both reported and imputed rental values were trimmed at the bottom; monthly rent values below 10,000 Kwacha were set to 10,000.

A consumer durable user fee was calculated following the preferred procedure in Deaton and Zaidi (2002), using the average annual inflation rate, interest rate, age of assets, value at the time of purchase, and current value. User fees were calculated for the following items: bicycle, motorcycle, motor vehicle, tractor, television, video player, radio, electric iron, refrigerator, land telephone line, cellular phone, satellite dish, electric or gas stove, computer. The total consumer durable user fee was equal to the sum of the individual item user fees.

3.2 Price Index

Prices in Zambia vary widely over time and space. The LCMS survey was collected over the course of a calendar year, in ten separate survey periods referred to as "cycles." Consequently it was necessary to adjust not only for spatial price variation but also for variation over time. A price index was calculated with price data collected as part of the survey and used to adjust all consumption values to national median prices. The single price adjustment accounts for both

spatial and temporal differences in prices.

The food price index is a Paasche price index (with weights based on each household's consumption) to adjust consumption to national median prices. For each item, a single national median price was calculated across all households reporting consumption of the item, in all provinces and cycles.[1] The price index is a single-stage index which adjusts for spatial and temporal differences in one step. Specifically, the index for household *h* is defined as follows:

$$P^h = \frac{1}{\sum w_k^h \left(\frac{p_k^0}{p_k^h} \right)},$$

where w_k^h is the share of good *k* in household *h*'s total consumption, p_k^0 is the national median price of good *k*, and p_k^h is the price of good *k* reported for household *h*'s cycle-province. This can also be written in terms of a log approximation:

$$\log P^h = \sum w_k^h \log \left(\frac{p_k^h}{p_k^0} \right)$$

The set of household-level price index values is also summarized at the province and cycle levels using a regression procedure analogous to the Country-Product Dummy method proposed by Summers (1973). The household-level index is modeled as the product of a provincial-level index, a cycle-level index, and a household-specific term. If household *h* is surveyed in province *r* and during cycle *c*, the household-level value can be expressed as the produce of the three terms:

$$P_{hrc} = A_r B_c e_h,$$

In log terms, this is

$$\ln P_{hrc} = \ln A_r + \ln B_c + \ln e_h$$

Defining $\alpha_r = \ln A_r$, $\beta_c = \ln B_c$, and $\varepsilon_h = \ln e_h$, this becomes

$$\ln P_{hrc} = \alpha_r + \beta_c + \varepsilon_h .$$

The provincial- and cycle-level food price indices can then be estimated from the household level index values with a regression of the log of the index on a set of nine provincial and ten cycle dummies:

$$\begin{aligned} \ln P_{hrc} = {} & \alpha_2 * PROV2_{hrc} + \alpha_3 * PROV3_{hrc} + \ldots + \alpha_9 * PROV9_{hrc} + \ldots \\ & + \beta_2 * CYCLE2_{hrc} + \beta_3 * CYCLE3_{hrc} \ldots + \beta_{10} * CYCLE10_{hrc} + \varepsilon_h \end{aligned}$$

Note that this regression includes no constant term. The province- and cycle-level index values are defined as equal to one for the omitted province and cycle dummies (province 1 and

[1] Prices for each item were only recorded for province-cycles that included households consuming the item. The medians were taken across households reporting consumption of the item, rather than across province-cycles. Weights were not used in the calculation of median prices.

cycle 1 as written here).[2] The province- and cycle-level values of the index are equal to the antilogs of the estimated coefficients.

A separate housing price index was calculated at the stratum (province-urban/rural) level based on the coefficients from the housing imputation regression described in section 3.1. First, national means of all the explanatory variables were calculated. The imputation coefficients were then used to calculate a value for national predicted rent at the national means of all variables, including the province and urban/rural dummies. A predicted rent value was also calculated for each of the 18 strata using the national means of housing characteristics, *excluding* the province and urban/rural dummies. (For each prediction calculation, province and urban/rural dummies were set appropriate to the stratum in question.) The housing index was calculated at stratum level as the ratio of the stratum-level predicted rent to national predicted rent. This index captures differences in housing price across strata, holding housing characteristics constant at national means.

The total price index was constructed using Paasche-type (household-level) weights and the corresponding price indices for the four components: food, housing, durable good use fee, and other non-food. Data was not available to calculate a price index for non-food items and durable good user fees. The price index treats the nominal values for these components as the real values.

3.3 Poverty line

A new poverty line was calculated from the 2002-03 LCMS, using the cost-of-basic-needs method outline in Ravallion (1998). Calculation of the poverty line involves determining a calorie requirement, creating a food basket, evaluating the cost of meeting the calorie requirement using that food basket, and then developing a non-food component of the poverty line. All calculations for the poverty line were done on a per-adult-equivalent basis. Both the adult equivalents and the calorie requirement underlying the poverty line were determined using a widely used analysis of energy intake needs from the World Health Organization (1985). The WHO figures are shown in Table 1 below.

[2] The omitted dummies are for cycle 1 and Lusaka province.

Table 1
Recommended Calories by Age, Sex and Workload and Adult Equivalents by Age

Age	Workload	Male	Female	Average of male and female	Implied Adult Equivalent (based on 2464 per adult)
<1		820	820	820	0.33
1-2		1150	1150	1150	0.47
2-3		1350	1350	1350	0.55
3-5		1550	1550	1550	0.63
5-7		1850	1750	1800	0.73
7-10		2100	1800	1950	0.79
10-12		2200	1950	2075	0.84
12-14		2400	2100	2250	0.91
14-16		2650	2150	2400	0.97
16-18		2850	2150	2500	1.0
18-30	Light	2600	2000	2300	
30-60	Light	2500	2050	2275	
>60	Light	2100	1850	1975	
18-30	Medium	3000	2100	2550	
30-60	Medium	2900	2150	2525	
>60	Medium	2450	1950	2200	
18-30	Heavy	3550	2350	2950	
30-60	Heavy	3400	2400	2900	
>60	Heavy	2850	2150	2500	
Adult Averages		2817	2111	2464	

Source: World Health Organization (1985) "Energy and Protein Requirements." WHO Technical Report Series 724. Geneva: World Health Organization.

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The calorie requirement was taken to be 2464, the unweighted average of the calorie requirements for adult men and women in the three workload categories and three age groups. For those under 18, the average calorie requirement of males and females by age group was calculated. The adult equivalent for each child age group was then calculated by dividing by the adult requirement of 2464. Gender was not used in assigning adult equivalents.

In general, constructing a food basket requires detailed food consumption by quantity at the household level. Although households in the 2002-03 LCMS did report quantities in their household diaries, quantity data was not recorded by enumerators or transferred to the electronic data files. Because actual quantities at the household level were not available, item quantities were estimated by dividing household consumption (in Kwacha) by reported prices. To generate a preliminary food basket, average quantities were calculated for households in the middle (3rd) quintile.[3] The items in this food basket were ranked in descending order by cost for the average quantity, at national median prices. The final food basket was defined as the top 44 items, which accounts for 90% of the cost of the preliminary basket.

Quantity-calorie conversions were done using a conversion table of calorie values for African foods from the Food and Agriculture Organization. The final food basket was found to amount to 2120 calories per day. The quantities were scaled upwards so that the total calories equaled 2464 calories per day. The price of this scaled food basket, in terms of national median

[3] Quintiles were calculated on the basis of price-adjusted consumption per adult equivalent, using weights equal to household sampling weights multiplied by household size. Thus, these are properly viewed as quintiles of individuals in the population.

prices, was multiplied by 31 to produce the food poverty line in monthly terms.

The non-food component of the poverty line was determined by estimating the average non-food share in consumption for households with food consumption in the third quintile of consumption. This was found to be 0.28. The food poverty line was multiplied by 1/(1-0.28) to scale up to the total poverty line. A single poverty line was calculated for urban and rural areas.

What Does a Poor Person Eat in Zambia?

The typical poor person receives more than 70% of his or her calories from grains, chiefly various forms of maize, and most of the remainder from vegetables. The daily food consumption of a typical poor Zambian adult with consumption level at the core poverty line would be roughly as follows:[4]

- *2-3 plates of nshima*
- *a medium-sized vegetable such as a sweet potato or tomato*
- *a few spoonfuls of oil*
- *every 3-4 days, a small serving of chicken, beef, or fish*
- *every 3-4 days, a piece of fruit such as a banana or mango*
- *a handful of groundnuts*
- *a couple teaspoons of sugar*

3.4 Poverty Measure Calculations

The headcount, poverty gap, and poverty severity indices were calculated using the price-adjusted consumption aggregate. The poverty measures calculated are those of the Foster-Greer-Thorbecke (1984) class. Calculations were weighted using weights equal to household size multiplied by household sampling weights. All poverty measures were calculated based on total household consumption per adult equivalent terms. Standard errors were calculated taking into the account both the sample stratification and cluster design.

Poverty figures were calculated primarily using the "total" poverty line, which is equal to the consumption level sufficient to meet basic needs for both food and non-food consumption. Additionally, "core" poverty rates were determined using a lower core poverty line, which is defined as the food component of the total poverty line. In analyses conducted in other countries, core poverty rates are sometimes referred to as rates of extreme or severe poverty.

[4] The food basket underlying the poverty line consists of 44 items, reflecting the much wider variation in foods consumed across the whole country than is consumed by a typical individual. This stylized food basket was determined by scaling the poverty-line food basket down to the food consumption level of someone with total consumption at the core poverty level, grouping the foods into major categories, adding up the basket's food quantities by weight in those categories, and then determining corresponding quantities among the most common foods.

How Can the Core Poverty Line Be Interpreted?

Like many other poverty studies, this analysis defines a basic poverty line and a second core poverty line equal to the food poverty line. A problem with the idea of a core poverty line (also sometimes called an "extreme" poverty line) is that core poverty does not correspond to any underlying welfare concept. It is simply a lower line, without any clear basis. It is sometimes referred to as the minimum expenditure required to meet basic food needs. However, this is a misleading interpretation. Because some non-food consumption is a part of basic needs and all individuals will have some non-food consumption, someone with total consumption equal to the food poverty line is not meeting his or her basic food needs.

An alternative core poverty line could be constructed by revisiting the underlying calorie requirement. The calorie requirement used here is taken from the WHO's recommended calorie intakes. An alternative core poverty line could reasonably be constructed with food and non-food components, but basing the food component on a calorie requirement of, for example, 70-80% of the WHO's recommended calories.

It is also possible to interpret the usual core poverty line as if it were a basic poverty line calculated from a lower calorie requirement. Given the mathematics of the poverty line calculations and the particular non-food consumption share in Zambia, the core poverty line used in this report is equal to a total poverty line (with food and non-food components) based on a calorie requirement of 72% of the WHO's recommendations. This lower calorie requirement amounts to 1774 calories per adult and correspondingly lower figures for children. This is similar to the lower calorie requirements used in some poverty studies and sometimes associated with "minimum" calorie requirements rather than the WHO's more generous "recommended" calories. Thus the core poverty rates in this paper can be viewed as poverty rates which account for both food and non-food needs but assume a lower calorie requirement. This provides an alternative way of interpreting the core poverty figures.

3.5 Comparison with Methodology Used By Zambia Central Statistical Office

In analyzing the same data, the Zambia Central Statistical Office (CSO) implemented a similar methodology in a different manner. The differences are detailed in Appendix 1. As a consequence of these differences, CSO finds slightly higher poverty rates, e.g. a national headcount of 67 percent compared to the 56 percent found using the methodology in this report. It is important to note that the differences in methodology are relatively minor, and that the differences in poverty estimates are largely inconsequential. The ranking of subpopulation and the overall profile of both urban and rural poverty in this report differs little from what is presented in CSO's own analysis of the survey data, CSO (2004). The small differences in poverty point estimates should not distract from the larger picture of poverty in Zambia, which is largely the same whether one uses CSO's figures or those in this report.

4 Poverty Estimates

4.1 Basic Poverty Estimates

This section presents the basic poverty estimates by the main subgroups. The complete estimates for all three Foster-Greer-Thorbecke measures—the headcount rate, poverty gap index, and poverty severity index—with associated standard errors are shown in Table 2, Table 3, and Table 4.[5] A graphical presentation of the estimates and a discussion follows, focusing on the headcount poverty estimates.

Table 2
Headcount Poverty Estimates, 2002-03 LCMS

	Poverty	Std. Err.	Core Poverty	Std. Err.
National	0.56	0.01	0.36	0.01
Rural	0.62	0.01	0.40	0.01
Urban	0.45	0.02	0.28	0.02
Type of Household				
Small Farm	0.63	0.01	0.41	0.01
Mid-Size Farm	0.47	0.04	0.24	0.03
Large Farm	0.30	0.12	0.13	0.10
Rural Nonagricultural	0.46	0.05	0.34	0.04
Urban Low Cost	0.53	0.02	0.33	0.02
Urban Mid-Cost	0.28	0.04	0.13	0.03
Urban High Cost	0.12	0.03	0.06	0.02
Province				
Central	0.54	0.04	0.32	0.03
Copperbelt	0.52	0.04	0.35	0.03
Eastern	0.56	0.03	0.34	0.03
Luapula	0.67	0.03	0.47	0.04
Lusaka	0.47	0.03	0.29	0.03
Northern	0.75	0.03	0.54	0.03
Northwestern	0.61	0.03	0.37	0.03
Southern	0.47	0.03	0.25	0.03
Western	0.52	0.04	0.35	0.04
Time of Survey (Cycle)				
Nov-Dec 02 (1)	0.59	0.04	0.40	0.04
Dec-Jan 03 (2)	0.59	0.04	0.40	0.04
Jan-Feb 03 (3)	0.54	0.03	0.34	0.04
Feb-Mar 03 (4)	0.48	0.04	0.27	0.03
Mar-Apr 03 (5)	0.50	0.04	0.29	0.03
Apr-May 03 (6)	0.51	0.04	0.33	0.04
May-Jun 03 (7)	0.53	0.03	0.32	0.03
Jun-Jul 03 (8)	0.61	0.04	0.38	0.03
Jul-Aug 03 (9)	0.59	0.04	0.39	0.04
Sep-Oct 03 (10)	0.63	0.04	0.45	0.04

[5] Standard errors were calculated taking into account the survey's two-stage sampling design.

Table 3
Poverty Gap Index Estimates, 2002-03 LCMS

	Poverty	Std. Err.	Core Poverty	Std. Err.
National	0.21	0.01	0.11	0.01
Rural	0.23	0.01	0.12	0.01
Urban	0.17	0.01	0.09	0.01
Type of Household				
Small Farm	0.24	0.01	0.13	0.01
Mid-Size Farm	0.15	0.02	0.07	0.01
Large Farm	0.09	0.04	0.02	0.01
Rural Nonagricultural	0.19	0.02	0.11	0.02
Urban Low Cost	0.20	0.01	0.11	0.01
Urban Mid-Cost	0.08	0.02	0.04	0.01
Urban High Cost	0.03	0.01	0.01	0.00
Province				
Central	0.19	0.02	0.09	0.01
Copperbelt	0.20	0.02	0.11	0.01
Eastern	0.19	0.02	0.09	0.01
Luapula	0.28	0.02	0.17	0.02
Lusaka	0.18	0.02	0.10	0.01
Northern	0.32	0.02	0.19	0.02
Northwestern	0.22	0.02	0.11	0.01
Southern	0.15	0.02	0.07	0.01
Western	0.19	0.02	0.10	0.01
Time of Survey (Cycle)				
Nov-Dec 02 (1)	0.24	0.02	0.14	0.02
Dec-Jan 03 (2)	0.24	0.02	0.14	0.02
Jan-Feb 03 (3)	0.20	0.02	0.10	0.01
Feb-Mar 03 (4)	0.16	0.02	0.08	0.01
Mar-Apr 03 (5)	0.18	0.02	0.09	0.01
Apr-May 03 (6)	0.19	0.02	0.10	0.02
May-Jun 03 (7)	0.18	0.02	0.09	0.01
Jun-Jul 03 (8)	0.22	0.02	0.11	0.01
Jul-Aug 03 (9)	0.23	0.02	0.12	0.02
Sep-Oct 03 (10)	0.26	0.03	0.15	0.02

Table 4
Poverty Severity Index Estimates, 2002-03 LCMS

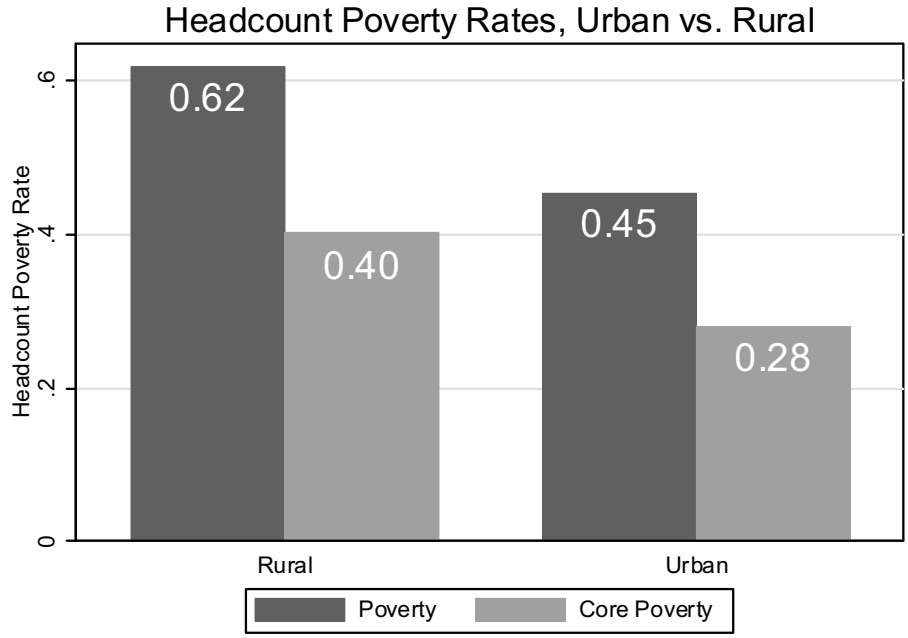
	Poverty	Std. Err.	Core Poverty	Std. Err.
National	0.10	0.00	0.05	0.00
Rural	0.12	0.01	0.05	0.00
Urban	0.08	0.01	0.04	0.00
Type of Household				
Small Farm	0.12	0.01	0.06	0.00
Mid-Size Farm	0.07	0.01	0.04	0.01
Large Farm	0.03	0.01	0.01	0.01
Rural Nonagricultural	0.10	0.01	0.05	0.01
Urban Low Cost	0.10	0.01	0.05	0.00
Urban Mid-Cost	0.04	0.01	0.02	0.00
Urban High Cost	0.01	0.00	0.00	0.00
Province				
Central	0.09	0.01	0.03	0.01
Copperbelt	0.10	0.01	0.05	0.01
Eastern	0.09	0.01	0.03	0.01
Luapula	0.15	0.02	0.08	0.01
Lusaka	0.09	0.01	0.04	0.01
Northern	0.17	0.02	0.09	0.01
Northwestern	0.10	0.01	0.04	0.01
Southern	0.07	0.01	0.03	0.01
Western	0.09	0.01	0.04	0.01
Time of Survey (Cycle)				
Nov-Dec 02 (1)	0.13	0.02	0.07	0.01
Dec-Jan 03 (2)	0.12	0.01	0.06	0.01
Jan-Feb 03 (3)	0.09	0.01	0.04	0.01
Feb-Mar 03 (4)	0.07	0.01	0.03	0.01
Mar-Apr 03 (5)	0.08	0.01	0.04	0.01
Apr-May 03 (6)	0.09	0.01	0.04	0.01
May-Jun 03 (7)	0.08	0.01	0.04	0.01
Jun-Jul 03 (8)	0.10	0.01	0.04	0.01
Jul-Aug 03 (9)	0.11	0.01	0.05	0.01
Sep-Oct 03 (10)	0.14	0.02	0.07	0.02

The national headcount estimates are 0.56 for poverty and 0.36 for core poverty. In other words, over half of Zambians have levels of consumption that are insufficient to meet basic needs, and more than a third have consumption levels that would be inadequate to meet basic food needs alone, even if the individual were able to forego all non-food consumption. Figure 1 shows poverty and core poverty rates for urban and rural households separately. Due to weaknesses in the price data, it was not possible to satisfactorily adjust the consumption data for urban-rural price differences. As a result comparisons in poverty figures across the urban-rural divide do not reflect differences in the cost of living between urban and rural areas. Poverty comparisons between rural and urban areas should therefore be treated with caution.

The estimates show a higher level of poverty in terms of the headcount in rural areas, where 62 percent are below the standard poverty line and 40 percent fall below the core poverty

line. In urban areas, 45 percent of Zambians are in poverty, and the core poverty rate is 28 percent.

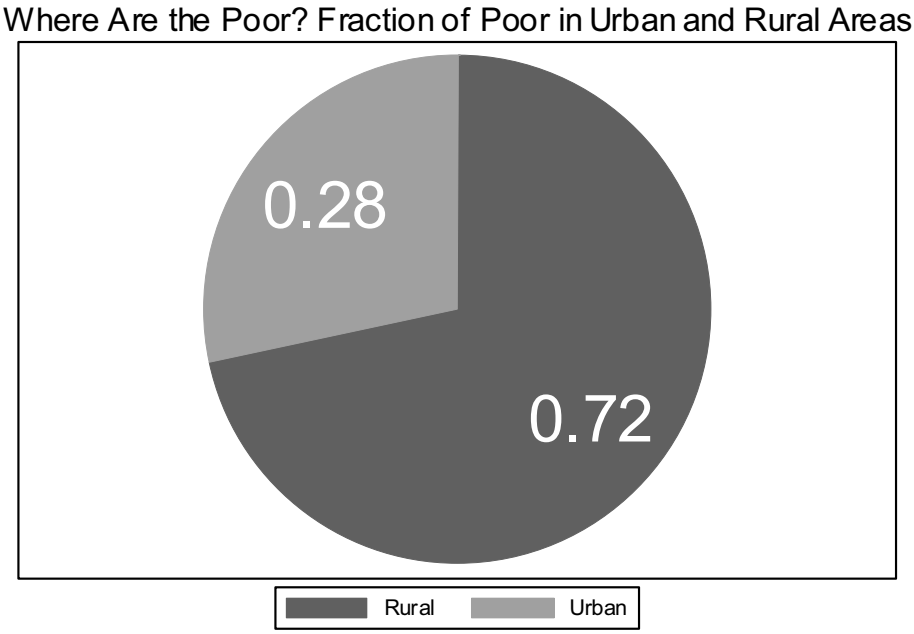
Figure 1



4.2 Poverty Estimates by Province and Urban-Rural Subcategories

Although Zambia is much more urbanized than most African countries, it is still predominantly a rural country. In the 2000 national census, from which the LCMS sampling frame and weights are derived, 6.5 million of its nearly 10 million residents lived in rural areas. This fact combined with the higher poverty rate in rural Zambia means that poverty is concentrated in rural areas. As Figure 2 shows, 72 percent of the poo r live in rural zones.

Figure 2



Households within each survey enumeration area were broken down into household categories. For rural areas these were small-scale farmers, medium-scale farmers, large-scale farmers, and non-agricultural. For urban areas, the categories were high, medium, and low cost. Households were categorized this way in order to stratify the sampling within enumeration areas, to ensure adequate coverage of a diverse set of households.

The headcount poverty rates by household category are shown in Figure 3. Unsurprisingly, urban poverty is highest among "low cost" households. In rural areas, poverty is highest among the small farm households that form the bulk of the rural population, while non-agricultural households in rural areas have poverty rates similar to those of medium-size households.

Across provinces, there is substantial variation in poverty. Provincial figures are shown in Figure 4. The lowest poverty rates are found in Lusaka and Southern Provinces, but even there 47 percent of the population has consumption insufficient to meet basic needs. Northern Province stands out as having the highest poverty rate.

Figure 3

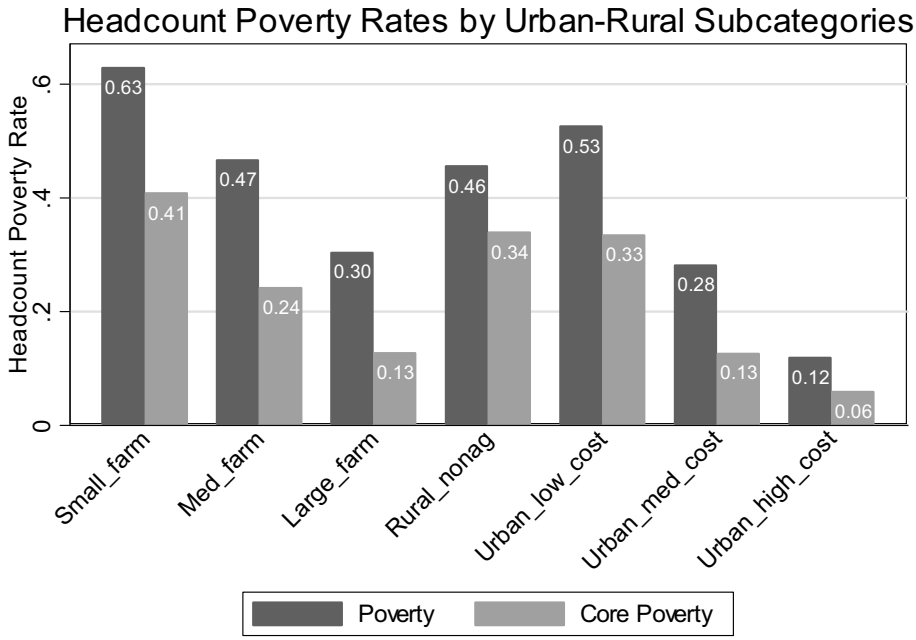


Figure 4

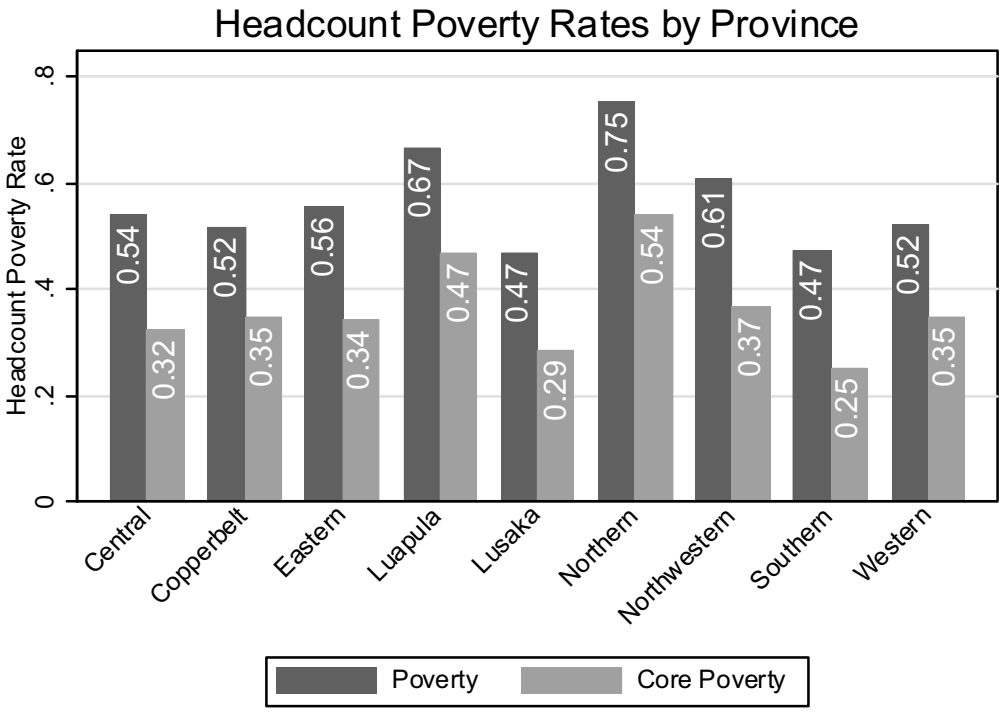


Figure 5 show a breakdown of the location of the poor by province. The largest fraction of the poor on a national basis—17 percent—is found in Northern, which is also the province with the highest poverty headcount rate. The second highest fraction is found in Copperbelt province, which has the fourth lowest provincial poverty rate.

Figure 5

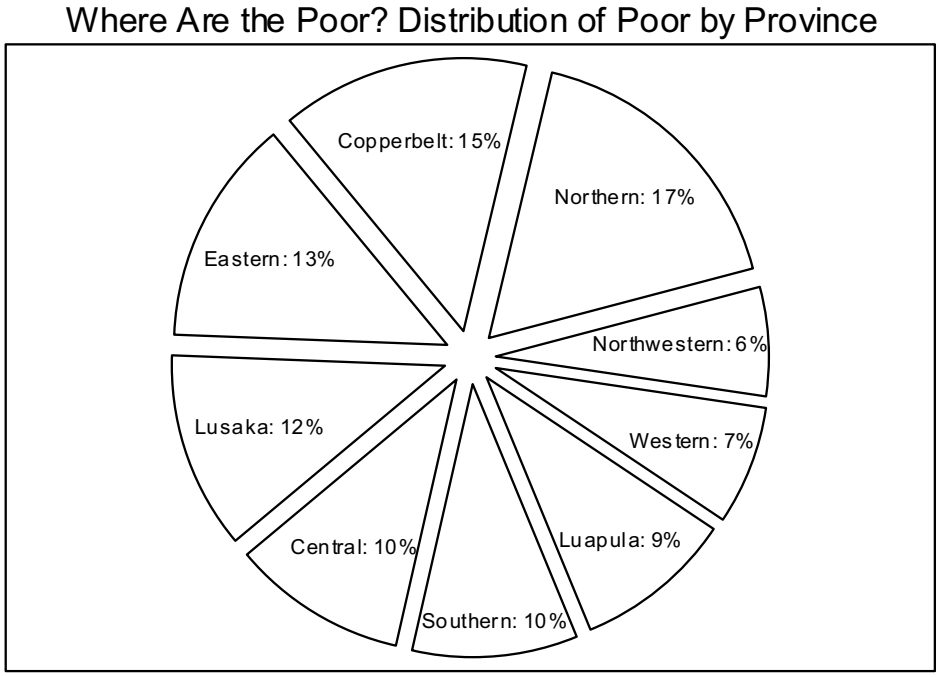


Table 5 shows separate headcount rates by urban and rural areas within each province, and Table 6 displays a corresponding breakdown of where the poor are located. The urban poor are highly concentrated in just two provinces, Lusaka and Copperbelt. The urban areas of just those two provinces are home to 20 percent of Zambia's poor, while the smaller urban areas of the remaining provinces account for only an additional eight percent. The rural poor are more widely distributed. They are most concentrated in Eastern and Northern Provinces, the rural areas of which are home to 28 percent of the nation's poor.

Table 5
Headcount Poverty Estimates by Province and Urban/Rural

	Rural	Std. Err.	Urban	Std. Err.
Central	0.55	0.04	0.52	0.07
Copperbelt	0.65	0.05	0.48	0.04
Eastern	0.58	0.03	0.34	0.09
Luapula	0.70	0.04	0.48	0.08
Lusaka	0.63	0.08	0.43	0.04
Northern	0.78	0.03	0.59	0.07
Northwestern	0.64	0.03	0.37	0.08
Southern	0.51	0.03	0.32	0.05
Western	0.53	0.04	0.40	0.08

Table 6
Where Are the Poor? Fraction of National Poor by Province and Urban/Rural

Province	Fraction of National Poor Living in Province	Fraction of National Poor Living in Province's Rural Areas	Fraction of National Poor Living in Province's Urban Areas
Central	0.10	0.08	0.02
Copperbelt	0.15	0.04	0.11
Eastern	0.13	0.13	0.01
Luapula	0.09	0.08	0.01
Lusaka	0.12	0.03	0.09
Northern	0.17	0.15	0.02
Northwestern	0.06	0.06	0.01
Southern	0.10	0.09	0.02
Western	0.07	0.06	0.01
Total	1.00	0.72	0.28

4.3 Poverty Estimates by Female Headship and Female Labor Dependence

Poverty rates can be examined for a variety of population subgroups. We consider here two categorizations of interest: male- vs. female-headed households, and households dependent on female labor vs. those not dependent on female labor. A household that is dependent on female labor has no male adults in the household. Table 7shows fraction of the national population by these categories, and Table 8 displays corresponding poverty rates. Female-headed households, which make up 20 percent of the population nationally, are poorer on average than male-headed households. The difference is starker for those living in urban areas, where the headcount poverty rate is 52 percent for female-headed households and 44 percent for male-headed households. In contrast, households dependent on female labor are no worse off than

those with adult males. In fact, in rural areas, headcount rates are five points higher for households *not* dependent on female labor. This partially reflects the fact that households with no adult males are smaller on average, and smaller households are less likely to be poor than wealthier households.

Table 7
Fractions of Population by Headship and Female Labor Dependence

	All	Urban	Rural
Male-Headed Households	0.80	0.81	0.79
Female-Headed Households	0.20	0.19	0.21
	1.00	1.00	1.00
Not Dependent on Female Labor	0.90	0.93	0.89
Dependent on Female Labor	0.10	0.07	0.11
	1.00	1.00	1.00

Notes: Figures shown are fractions of individuals living in households of a particular type. Calculations were weighted by the produce of household size and household sampling weights.

Table 8
Headcount Poverty Rates by Headship and Female Labor Dependence

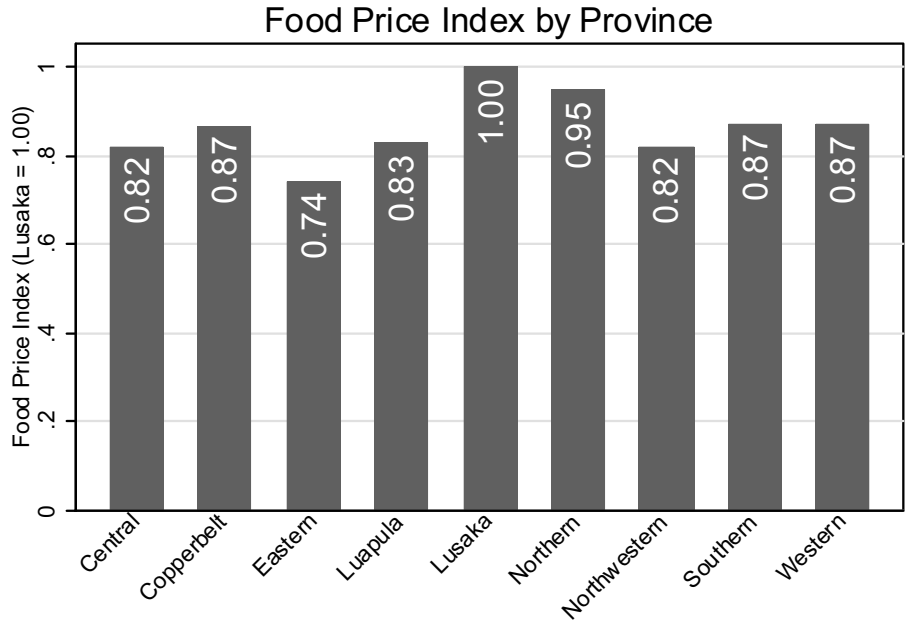
	All	Urban	Rural
Male-Headed Households	0.55	0.44	0.61
Female-Headed Households	0.60	0.52	0.64
Not Dependent on Female Labor	0.56	0.45	0.62
Dependent on Female Labor	0.53	0.44	0.57

Notes: Poverty rates shown are for the population of individuals living in households of a particular type. Calculations were weighted by the produce of household size and household sampling weights.

4.4 Price Index by Province

Previous household consumption and expenditure surveys in Zambia did not include sufficient price data to correct for spatial variation in costs of living. Consequently, comparisons of welfare across provinces did not reflect differences in the cost of living. The 2002-03 LCMS did collect food price data, and the provincial poverty figures reflect these differences in food prices. The food price index is shown graphically in Figure 6. Food prices are highest in Northern and Lusaka Provinces, which have, respectively, the highest and one of the lowest poverty rates in the country.

Figure 6



4.5 Poverty Estimates by Time of Year

Unlike previous surveys in Zambia, the data for the LCMS III was collected over the course of a full year. This makes it possible to consider the seasonal pattern in poverty.[6] Operationally, the survey year was divided into ten "cycles," each of which spans 31 days. Figure 7 shows headcount poverty rates by cycle. For comparison, the Zambia crop calendar, taken from the Food and Agriculture Organization (1999), is shown in Figure 8. Poverty rates are highest in September and October, which corresponds to the beginning of the planting season for maize, the main staple. Surprisingly, poverty rates are lowest in February, March, and April, although the harvest period does not begin until mid-April.

[6] These results should be viewed with caution, as the survey was not explicitly designed to be representative for different months of the year. The set of households interviewed in any given time period was determined by operational convenience, not a randomized design. Nonetheless the time profile of poverty across the year of the survey can be taken as broadly suggestive of the seasonal pattern of poverty.

Figure 7

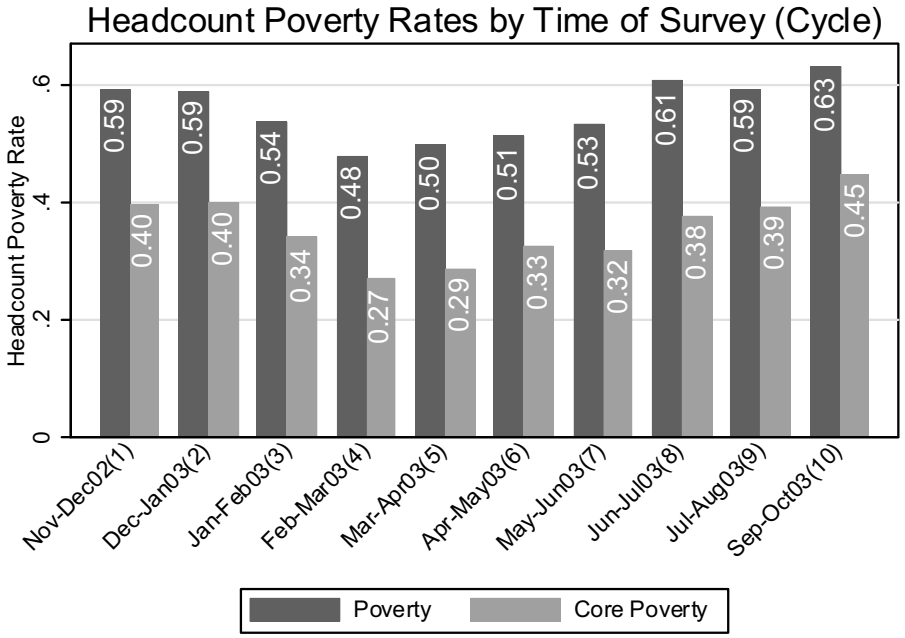
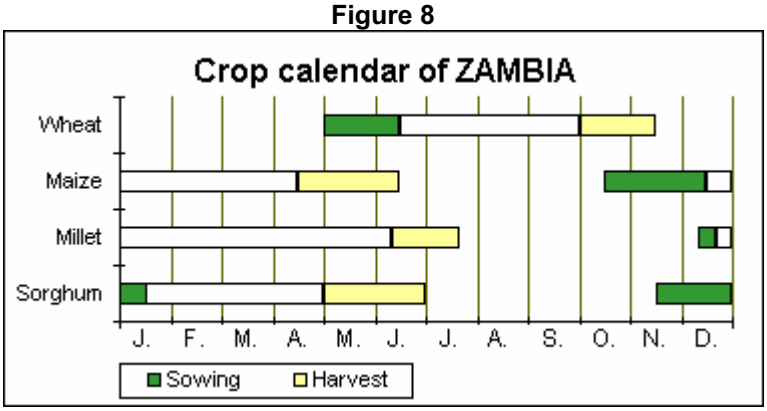
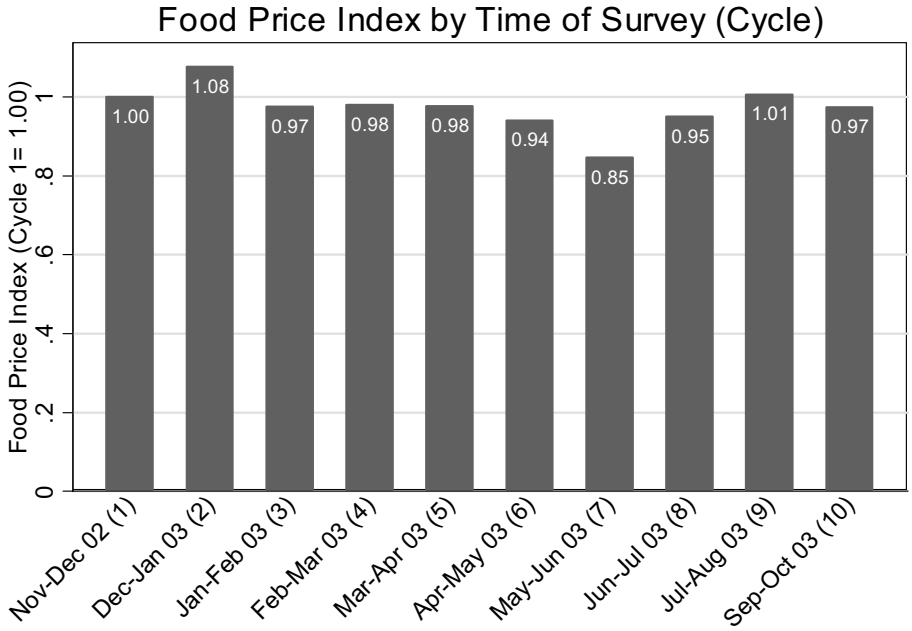


Figure 8



The food price index can also be examined by cycle. Because the survey was not designed to provide representative information by cycle, this data should be interpreted with caution. It should also be noted that the price index was constructed to adjust prices within the sample rather than to estimate the true average prices in the population. (Weights were not used in the price index calculation.) The food price data, plotted in Figure 9, shows a spike in food prices in December 2002 and January 2003. Food prices were lowest April-July 2003, the months during and immediately following the main harvest.

Figure 9



4.6 Inequality

Finally, Table 9 presents estimates of various inequality indices. Like the poverty figures, these are based on household data for consumption per adult equivalent, using weights equal to the household sampling weights multiplied by household size. Inequality is high overall in Zambia and much higher within urban areas than rural areas.

Table 9
Inequality Indices, by Rural and Urban

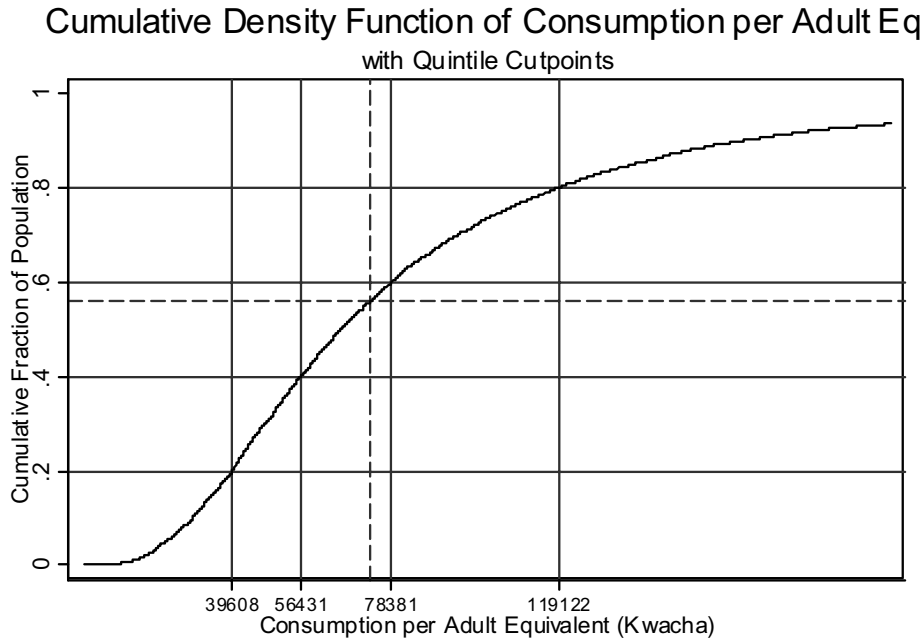
Inequality measure	National	Rural	Urban
Gini Coefficient	0.41	0.35	0.46
Generalized Entropy, alpha=0 (mean log deviation)	0.28	0.21	0.36
Generalized Entropy, alpha=0.5	0.30	0.21	0.37
Generalized Entropy, alpha=1 (Theil index)	0.35	0.22	0.44
Atkinson, epsilon=1	0.25	0.19	0.30
Atkinson, epsilon=2	0.40	0.33	0.46

4.6 Defining Quintiles of Consumption

The following two sections describe in more detail the distribution of poverty in Zambia. In order to present a more vivid distribution of the entire population, indicators are presented by quintiles of consumption, calculated at the national level.

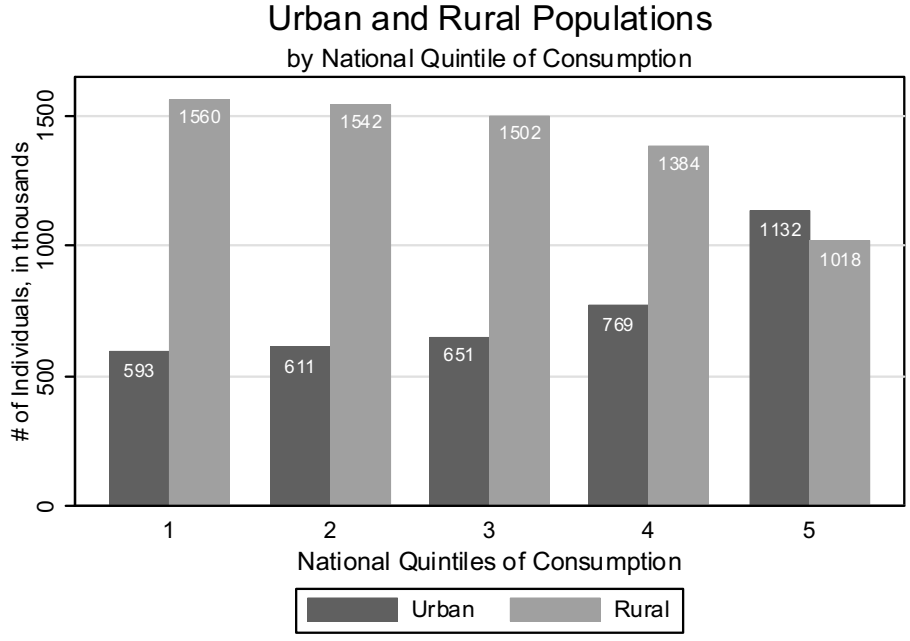
The values of the quintile cutoffs can be seen in Figure 10, which shows the cumulative density function of consumption for the entire country. The figure shows that the poorest fifth of individuals have consumption levels under 39608 Kwacha per month, the next poorest fifth have consumption levels between 39608 and 56431 Kwacha, etc. The poverty line of 73394 Kwacha and the corresponding poverty rate of 0.56 are represented by dashed lines.

Figure 10



The quintiles at the national level are used as consumption groups to examine how characteristics vary by consumption within the rural and urban zones. Because rural areas as a whole are poorer than urban areas, the rural population is concentrated in poorer quintiles of the national distribution. This is apparent in Figure 11 which shows the urban and rural populations by quintile. Although urban residents represent a minority of the poorest 80 percent of the population (and are just over one-third of the total population), they comprise a majority of the richest 20 percent.

Figure 11



In what follows, the quintiles groups are used as the categories to examine the

distribution of various characteristics in urban and rural areas separately. It is important to recognize that while by definition the quintiles contain equal shares of the *national* distribution, relative few rural residents are found in the top quintile, and likewise the top quintile contains a disproportionate share of urban households. Specifically, only 15 percent of rural residents are in the top quintile, while 30 percent of urban residents are in this group.

Because this is such a key part of the form in which information is presented in this paper, it merits emphasis. In a table showing characteristics by quintiles of the national distribution for rural (or urban) areas, within rural (or urban) areas there are not equal numbers of people in each quintile. The quintiles were defined without reference to the distribution *within* rural or urban areas. It may be helpful to think about the quintiles as simply the ranges of income values shown in Figure 10.

The analysis is set up in this way in order to make it possible to perform urban-rural comparisons with reference to the quintiles. Individuals in a given quintile in urban areas have consumption in the same range of values as individuals in the same quintile in rural areas.

5 Rural Poverty

Although Zambia is more urbanized than most African nations, two-thirds of its people and 72 percent of the poor live in rural areas. Rural areas have suffered from years of developmental neglect. Before the international price of copper took its final plunge in the 1990s, copper revenue fueled government intervention in rural intervene markets, offering a guaranteed price for the maize staple and supplying agricultural inputs at subsidized prices. At the same time, workers in the copper industry sent home remittances. The combination of personal and government transfers helped support rural consumption levels, but the government intervention arguably discouraged diversification into cash crops and substituted for sorely needed infrastructure investments.

Since liberalization in the 1990s, government intervention in agricultural markets has not ceased entirely but has continued haphazardly, no longer providing consistent support for maize-growers. The cash-strapped government has largely pulled out of rural development and hoped the private sector would step in to fill its place.

The picture painted by the statistics in this section is of extremely poor areas with very little government presence other than a school and health clinic. Other public services are largely nonexistent. For households in every quintile, consumption of their own agricultural production accounts for half of consumption.

Nonetheless, there are some reasons for optimism. Education levels have remained relatively high and the fact that only small number of households engaged in cash crop agriculture means that there is potential for growth through agricultural diversification.

5.1 Household Demographics

This section reviews the characteristics of rural households, contrasting poorer households with wealthier households. Some basic mean characteristics of households are shown in Table 10. The same data is summarized in graphical form in a series of figures. For this table and most others in the paper, calculations of the mean were done at the household level, weighted by household sampling weights. Consequently, the figures are means of households rather than means of individuals.

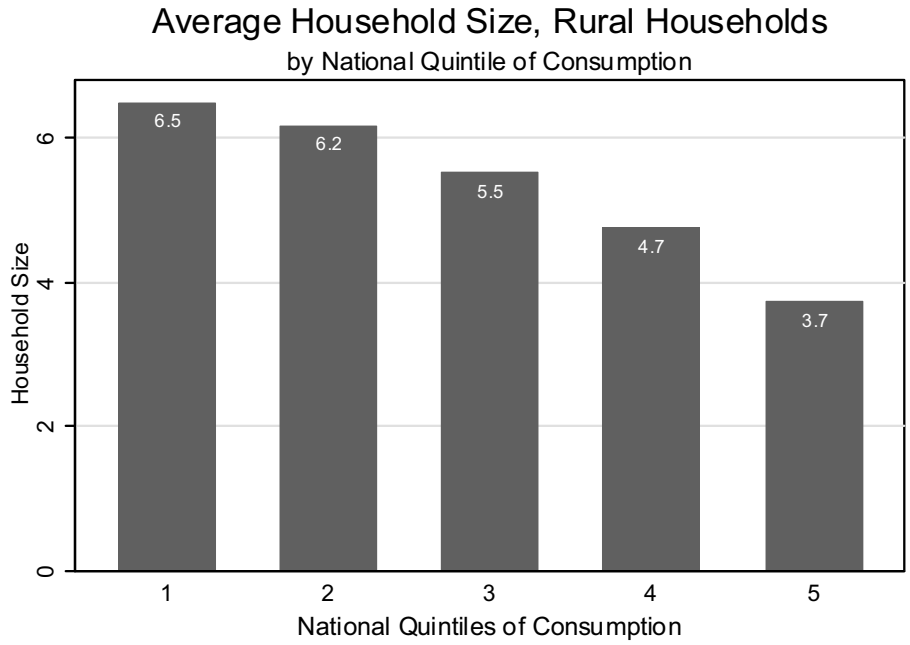
Table 10
Mean Characteristics of Households by Quintile of Consumption, Rural Areas

		Quintile of National Distribution				
	All	Poorest 20%	2	3	4	Richest 20%
Mean household size	5.3	6.5	6.2	5.5	4.7	3.7
Median age of household head	40	44	43	39	37	35
Fraction with female household heads	0.24	0.27	0.23	0.23	0.25	0.24
Mean years schooling of household head	5.3	4.4	4.9	5.1	5.5	6.2

Notes: Calculations are weighted by household sampling weights. Thus, the statistics are by household rather than individual. The quintiles, however, are defined for individuals based on consumption per person using the national distribution. Within rural areas, the population is concentrated in poorer quintiles.

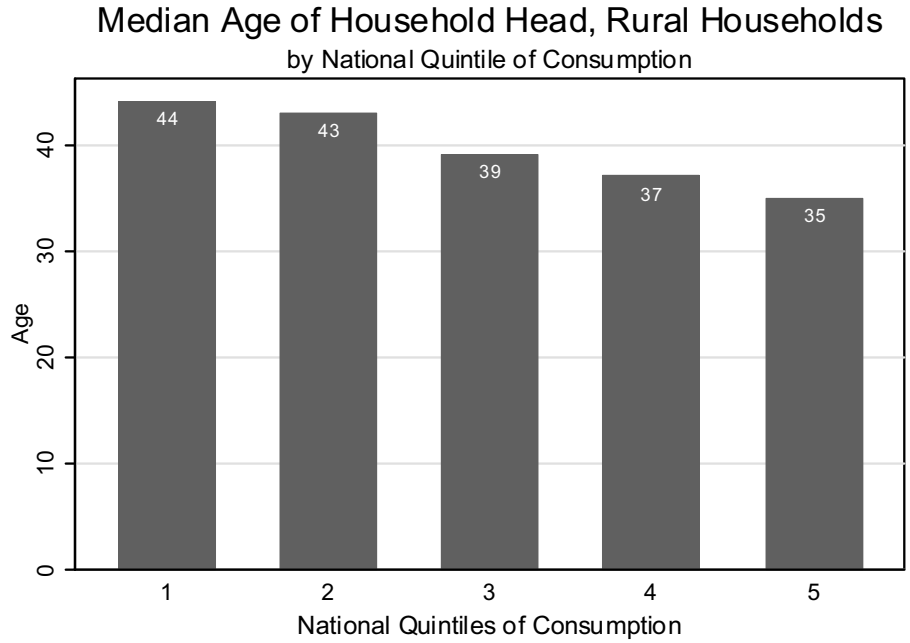
Figure 12 shows average household size by national quintile. Household size is highest among poorer households, averaging 6.5 for the poorest quintile, and is sharply lower in the richest quintile.

Figure 12



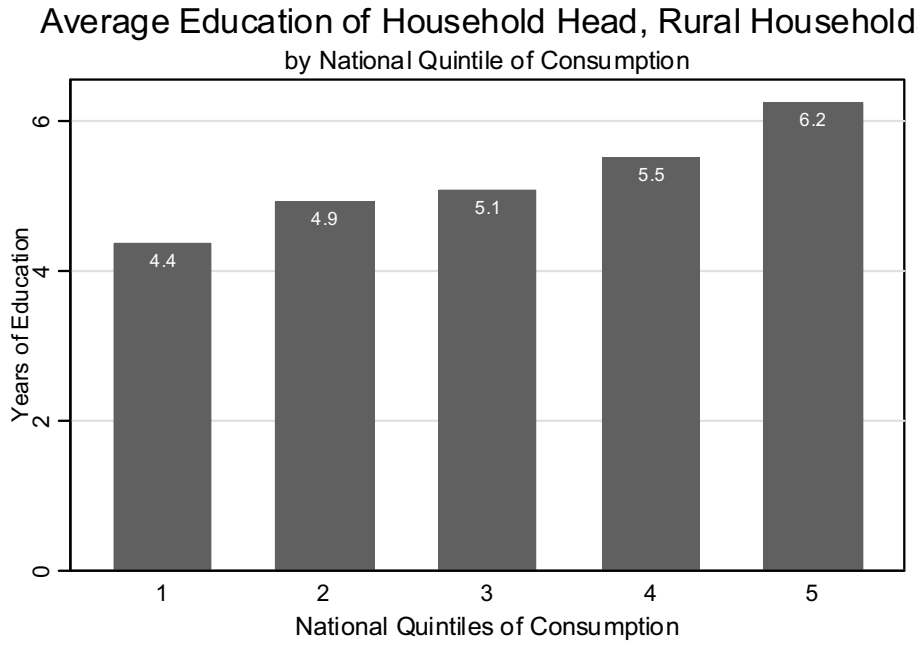
Poorer households also tend to be headed by older individuals, as seen in Figure 13. The median age of household heads in the poorest quintile is 44 years, compared to 35 for heads of the richest rural households.

Figure 13



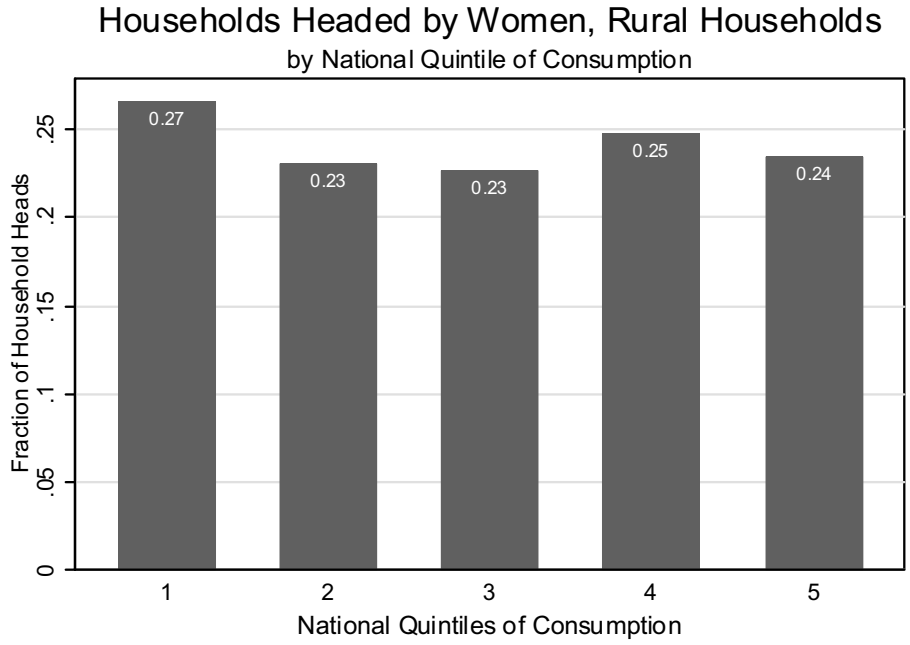
There is a strong association between education levels of household heads and household consumption. The relationship is consistent across the distribution. It is strongest at the top: households in the top quintile have an average of 0.7 year of schooling more than those in the next quintile. These numbers are shown in Figure 14.

Figure 14



The frequency of female-headed households varies much less consistently by consumption level. Although female headship is highest among the very poorest—among whom women make up 27 percent of household heads—Figure 15 shows that moving up the distribution there is no clear relationship between the two variables.

Figure 15



Additional information about household demographics is shown in Table 11 and Table 12, which summarize dependency ratios and the number of generations found in each household. The denominator for the dependency ratios is the number of adults in the household, defined as those age 15-64. The youth dependency ratio is the mean number of children per adult, the old-age dependency ratio is the number of elderly per adult, and the sum of the two is the simple dependency ratio. The youth dependency ratio is high; the average rural Zambian household has 1.07 children per adult, and the ratio is highest for the poorest households. The old-age dependency ratio is only 0.08 and varies little by quintile.

As shown in Table 12, nearly all rural Zambians live in multi-generational households. Two-thirds live in households with two generations, and 23 percent live in households with three or more generations present. The richest rural households, which are smaller on average, also are less likely to have three and more likely to have just one generation.

Table 11
Mean Dependency Ratios by Quintile of Consumption, Rural Areas

		Quintile of National Distribution				
	All	**Poorest 20%**	**2**	**3**	**4**	**Richest 20%**
Dependency ratio	1.15	1.35	1.33	1.25	1.06	0.80
Youth dependency ratio	1.07	1.26	1.24	1.17	0.98	0.72
Old-age dependency ratio	0.08	0.09	0.09	0.08	0.09	0.08

Notes: Calculations are weighted by household sampling weights. Thus, the statistics are by household rather than individual. The quintiles, however, are defined for individuals based on consumption per person using the national distribution. Within rural areas, the population is concentrated in poorer quintiles.

Table 12
Number of Family Generations Living in Households by Quintile, Rural Households

# of Generations	All	Quintile of National Distribution				
		Poorest 20%	2	3	4	Richest 20%
1	12	3	5	6	15	29
2	65	65	67	72	66	58
3	22	29	27	21	18	13
4	1	2	2	1	1	0
	100	100	100	100	100	100

Notes: Calculations are weighted by household sampling weights. Thus, the statistics are by household rather than individual. The quintiles, however, are defined for individuals based on consumption per person using the national distribution. Within rural areas, the population is concentrated in poorer quintiles. Family generations are determined from reported relationship to household head. A household with just one generation has no one who is a child, step child, grandchild, niece, nephew, parent, or parent-in law of the household head. A household with two generations has at least one related individual who is one generation removed from the head. A household with three generations either has a grandchild of the household head or has a parent/parent-in-law of the head along with at least one child, step-child, niece, or nephew of the head. A household with four generations has both a parent/parent-in-law of the head and a grandchild of the head.

5.2 Housing Conditions

Next, we consider access to basic household services: water, fuel for lighting and cooking, and toilet facilities. Table 13 shows access to sources of water during the dry season by quintile, and these are summarized in Figure 16. Only 34 percent of rural Zambian households have access to what would generally be considered a safe source of water: a water tap, a borehole, or a protected well. The remaining households rely on water taken directly from a river or lake, piped from a river or lake, or taken from an unprotected well. Even among rural households in the top quintile, only 44 percent have access to safe water.[7]

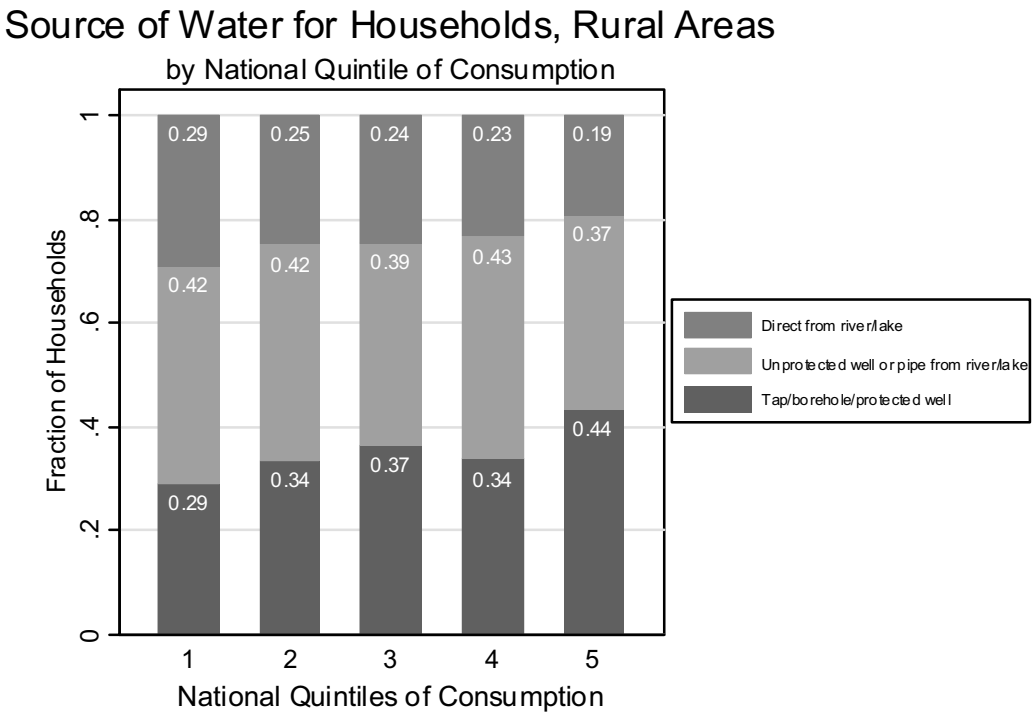
[7] "Other" water sources, mostly a water seller or bottled water, are included here as "safe" water sources.

Table 13
Main Sources of Water During the Dry Season, Rural Areas
Percentages of Households by Quintile of Consumption

		Quintile of National Distribution				
	All	**Poorest 20%**	**2**	**3**	**4**	**Richest 20%**
Direct from river/lake	24	29	25	24	23	19
Unprotected well	38	39	39	37	40	34
Piped from river/lake	3	3	3	2	3	4
Protected well	12	11	13	11	12	14
Borehole	17	13	15	20	16	19
Public tap	3	1	3	3	2	6
Own tap	1	0	0	0	1	1
Other tap	1	1	1	1	1	1
Other	2	4	1	2	2	2
	100	100	100	100	100	100

Notes: Calculations are weighted by household sampling weights. Thus, the statistics are by household rather than individual. The quintiles, however, are defined for individuals based on consumption per person using the national distribution. Within rural areas, the population is concentrated in poorer quintiles.

Figure 16



The sources of energy used for lighting by quintile are shown in Table 14 and in summary form in Figure 17. The majority of rural Zambian households in all quintiles use either kerosene or diesel as their main source of lighting, and 16 percent report an open fire to be their main source of lighting.

Table 14
Main Sources of Energy for Lighting, Rural Areas
Percentages of Households by Quintile of Consumption

		Quintile of National Distribution				
	All	**Poorest 20%**	**2**	**3**	**4**	**Richest 20%**
Kerosene/paraffin	63	66	64	68	62	58
Electricity	3	0	2	2	3	7
Candle	5	3	5	3	6	8
Diesel	9	8	9	8	11	9
Open fire	16	20	17	15	14	14
Solar panel	0	0	0	0	0	1
Other	3	2	3	3	3	3
None	1	1	1	1	1	1
	100	100	100	100	100	100

Notes: Calculations are weighted by household sampling weights. Thus, the statistics are by household rather than individual. The quintiles, however, are defined for individuals based on consumption per person using the national distribution. Within rural areas, the population is concentrated in poorer quintiles.

Figure 17

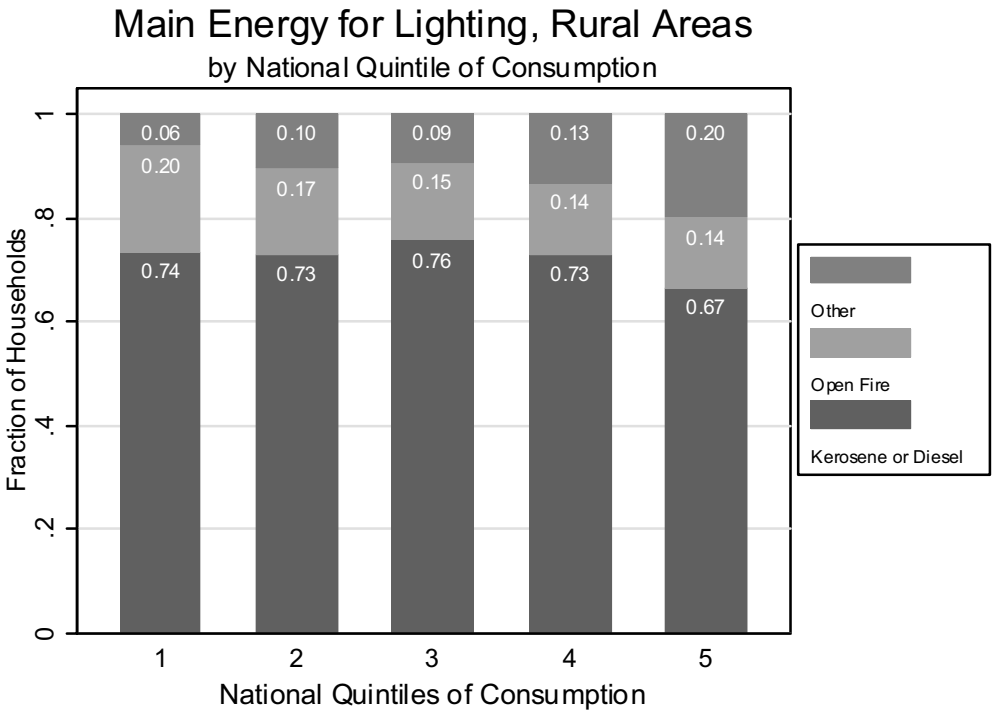


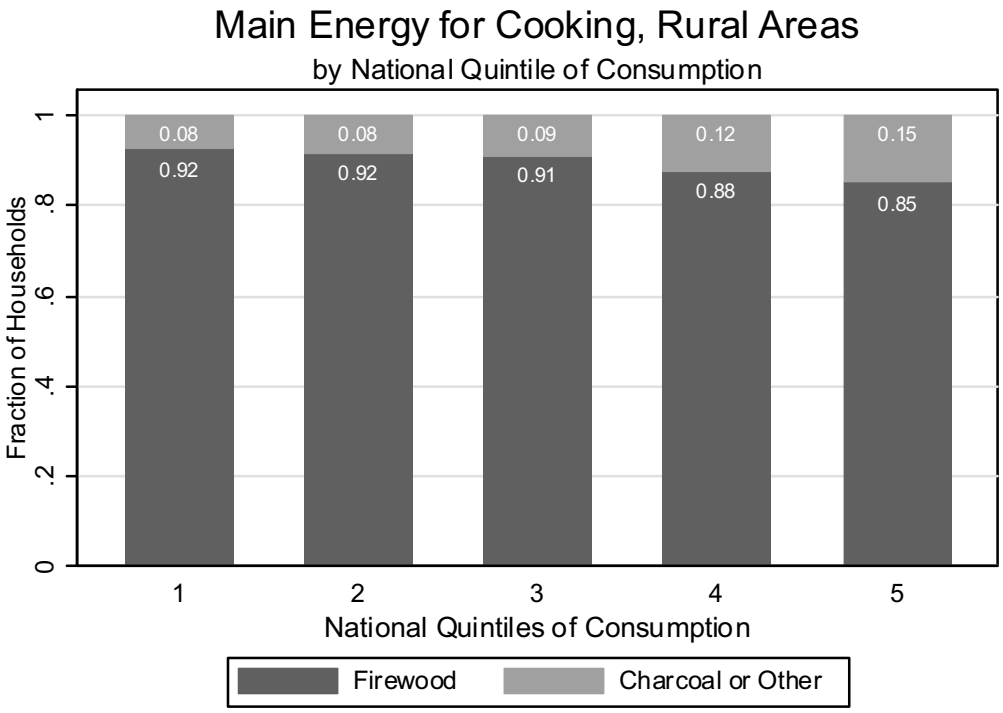
Table 15 and Figure 18 show the main sources of energy used for cooking. The overwhelming majority of rural households use firewood they collect for cooking. Wealthier households are slightly more likely to use other fuels, chiefly charcoal.

Table 15
Main Sources of Energy for Cooking, Rural Areas
Percentages of Households by Quintile of Consumption

		Quintile of National Distribution				
	All	**Poorest 20%**	**2**	**3**	**4**	**Richest 20%**
Collected firewood	88	91	90	89	86	82
Purchased firewood	2	1	1	2	2	3
Own-produced charcoal	3	3	3	3	3	2
Purchased charcoal	6	3	4	5	7	8
Electricity	1	0	0	0	1	4
Crop/livestock residues	1	1	1	0	1	0
	100	100	100	100	100	100

Notes: Calculations are weighted by household sampling weights. Thus, the statistics are by household rather than individual. The quintiles, however, are defined for individuals based on consumption per person using the national distribution. Within rural areas, the population is concentrated in poorer quintiles.

Figure 18



Toilet facilities available to rural households are shown in Table 16. Two-thirds of rural residents use a pit latrine, and almost all others have no toilet facilities at all. Surprisingly, households in the poorest quintiles are slightly more likely than wealthier households to have their own pit latrines.

Table 16
Type of Toilet Facility, Rural Areas
Percentages of Households by Quintile of Consumption

		Quintile of National Distribution				
	All	Poorest 20%	2	3	4	Richest 20%
Flush toilet inside	1	0	0	0	1	2
Flush toilet outside	0	0	0	0	0	0
Communal flush	0	0	0	0	1	0
Own pit latrine	56	61	58	55	55	52
Communal latrine	3	1	3	3	4	4
Neighbor latrine	6	8	5	6	4	7
Other	1	1	0	1	1	1
None	33	28	33	34	35	35
	100	100	100	100	100	100

Notes: Calculations are weighted by household sampling weights. Thus, the statistics are by household rather than individual. The quintiles, however, are defined for individuals based on consumption per person using the national distribution. Within rural areas, the population is concentrated in poorer quintiles.

Fig

Next, we examine the materials used for household roof and walls. Table 17 shows the materials used for roofs by quintile. Wealthier homes are more likely to have roofs made of iron or asbestos, rather than grass or straw. But even among those in the richest quintile nationally, 80 percent have grass or straw roofs.

Table 17
Material Used for Roof, Rural Areas
Percentages of Households by Quintile of Consumption

		Quintile of National Distribution				
	All	Poorest 20%	2	3	4	Richest 20%
Asbestos sheets	3	2	2	3	4	5
Asbestos tiles	1	1	1	0	1	1
Iron sheets	10	7	9	9	13	14
Grass/straw	85	90	88	88	82	80
	100	100	100	100	100	100

Notes: Calculations are weighted by household sampling weights. Thus, the statistics are by household rather than individual. The quintiles, however, are defined for individuals based on consumption per person using the national distribution. Within rural areas, the population is concentrated in poorer quintiles.

Table 18 shows the materials used for walls and Table 19 presents the breakdown for floor material. While there is diversity in the type of material used for walls, there is only slight differentiation between rich and poor. Homes of households in the wealthiest quintiles are slightly more likely to be made of concrete brick and less likely to be made of mud brick. Mud floors are found in the homes of most rural Zambians at all consumption levels. Nineteen percent of households in the wealthiest quintile have concrete floors, compared to 8 percent of those in the poorest quintile.

Table 18
Material Used for Walls, Rural Areas:
Percentages of Households by Quintile of Consumption

		Quintile of National Distribution				
Wall Material	**All**	**Poorest 20%**	**2**	**3**	**4**	**Richest 20%**
Pan brick	2	1	2	2	3	2
Concrete brick	3	1	2	2	4	7
Mud brick	38	43	41	42	34	32
Mud burnt brick	18	20	20	16	20	17
Pole	1	2	2	0	0	1
Pole & dagga	16	14	13	16	17	20
Mud	16	13	17	16	16	17
Grass/straw	5	5	3	5	5	5
Other	0	1	0	0	1	1
	100	100	100	100	100	100

Notes: Calculations are weighted by household sampling weights. Thus, the statistics are by household rather than individual. The quintiles, however, are defined for individuals based on consumption per person using the national distribution. Within rural areas, the population is concentrated in poorer quintiles.

Table 19
Material Used for Floor, Rural Areas
Percentages of Households by Quintile of Consumption

		Quintile of National Distribution				
	All	**Poorest 20%**	**2**	**3**	**4**	**Richest 20%**
Concrete only	6	4	4	5	8	8
Covered concrete	7	4	5	6	8	11
Mud	85	91	90	87	82	79
Wooden only	0	0	0	0	0	0
Other	2	1	2	1	2	2
	100	100	100	100	100	100

Notes: Calculations are weighted by household sampling weights. Thus, the statistics are by household rather than individual. The quintiles, however, are defined for individuals based on consumption per person using the national distribution. Within rural areas, the population is concentrated in poorer quintiles.

We also consider access to markets, public transport, and key public services. Median distances overall and the fraction by quintile living within five kilometers of various facilities is shown in Table 20. There is surprisingly little variation in median distances to markets and public transport by quintiles. This suggests that wealthier households are not highly concentrated by community but rather that rich and poor households are fairly interspersed.

Access to public services is mixed. While median distances to a middle-level basic school (grades 1-7) and a health facility are five kilometers, median distances to a police station (19 km) and post office (25 km) are much higher.

The extent to which markets are accessible to rural households is unclear. More than half report being within five kilometers of public transportation, but it is not possible to evaluate whether available transportation could serve to transport agricultural products to a market. The median distance to a food market is only 9 kilometers, but it is unclear to what extent these markets are integrated with the national economy. Median distances are large for the nearest bank (48 km), public phone (40 km), and agricultural input markets (25 km) selling equipment and fertilizer needed for modern agriculture.

Table 20
Percentages of Households Within 5 Km of Various Facilities, Rural Areas

		Quintile of National Distribution					
Asset	**All**	**Poorest 20%**	**2**	**3**	**4**	**Richest 20%**	**Median Distance (km)**
Food market	36	36	36	35	39	36	9
Post office	12	11	14	12	11	12	25
Community school	25	24	28	24	26	23	44
Lower basic school	16	22	17	15	14	12	N/A*
Middle basic school	58	57	58	60	57	59	5
Upper basic school	46	45	43	46	49	46	6
High school	3	3	3	4	3	3	90
Secondary school	8	8	9	8	9	9	31
Health facility	54	57	52	52	55	53	5
Hammer mill	65	65	66	66	64	65	3
Input market	16	15	17	16	17	16	25
Police station	15	15	14	15	14	16	19
Bank	4	4	4	3	3	5	48
Public transport	55	54	52	53	57	56	5
Public phone	8	8	8	7	7	11	40
Internet cafe	1	1	2	1	1	3	>90

Notes: Median calculations include zero values. Calculations are weighted by household sampling weights. The quintiles are defined for individuals based on consumption per person, using the national distribution. Within rural areas, the population is concentrated in poorer quintiles.

*A majority of respondents reported "Don't Know" for the distance to lower basic school. A "lower basic school" covers only grades 1-4, while a more common middle basic school covers grades 1-7, and an upper basic school includes grade 1-9.

5.3 Health and Health Facilities

Additional information on use of health facilities, along with self-reported illness, is shown in Table 21. These figures are calculated across all individuals. Sixteen percent of rural Zambians reported an illness or injury within the previous two weeks. Wealthier rural Zambians are more likely both to report being sick or injured and to see a health care provider. Half of those with an illness or injury (8 percent of the population) consulted a health care provider, in almost all cases a government-run hospital, clinic, or health post. Eleven percent of those who consulted health care providers did so at a church mission institution. There is little differentiation by quintile for type of provider consulted.

Table 21
Health Consultations and Type of Health Provider Consulted, by Quintile, Rural Areas

		Quintile of National Distribution				
	All	**Poorest 20%**	**2**	**3**	**4**	**Richest 20%**
% reporting sickness or injury in previous 2 weeks	16	15	15	15	18	20
% seeing health care provider in previous 2 weeks	8	6	8	7	10	12
Type of provider consulted (among those consulting a provider)						
Govt. hospital	23	17	26	21	26	23
Govt. clinic	50	52	46	52	51	49
Govt. health post	9	13	10	9	6	6
Mission institution	12	11	11	13	10	12
Industrial institution	0	0	0	0	0	1
Private institution	1	0	1	0	1	3
Outside Zambia	0	0	0	0	0	0
Personnel not in institution	1	2	0	1	1	2
Traditional healer	1	2	1	1	1	2
Spiritual healer	0	0	1	0	0	0
Church healer	0	0	0	0	0	0
Other	3	4	3	3	3	2
	100	100	100	100	100	100

Notes: Calculations are done over individuals using household sampling weights. The quintiles are defined for individuals based on consumption per person using the national distribution. Within rural areas, the population is concentrated in poorer quintiles.

Table 22 presents health payment information for those consulting a provider in rural areas. Half paid directly, and most of the rest did not pay at all. Poorer households were slighly less likely to pay. The amount paid varied greatly, as is reflected in the wide gap between the mean and median values. The overall mean expenditure among those consulting a provider was 2439 Kwacha, while the mean was just 300 Kwacha. Note that while these figures are only for those who consulted a provider in the previous two weeks, they include expenditures on both consultations and medication. Figures are not shown for those who did not consult a provider but took self-administered medication.

Table 22
Method of Health Consultation Payment and Payment Amounts by Quintile, Rural Areas

		Quintile of National Distribution				
	All	**Poorest 20%**	**2**	**3**	**4**	**Richest 20%**
Method used to pay (among those consulting a provider)						
Low cost pre-payment scheme	2	1	1	3	2	6
High cost pre-payment scheme	1	1	1	0	1	1
Employer-paid	0	0	1	0	0	0
Insurance-paid	0	0	0	0	0	1
Mix of self and other source	0	0	0	0	0	0
Paid directly	49	47	44	56	45	53
Didn't pay	43	47	50	38	43	35
Paid for by other	5	4	4	3	8	5
	100	100	100	100	100	100
Amount paid for medication/ consultation (among those consulting a provider)						
Mean (including zeros)	2439	1280	1728	3771	1892	3565
Median (including zeros)	300	0	0	500	500	500

Notes: Calculations are done over individuals using household sampling weights. The quintiles are defined for individuals based on consumption per person using the national distribution. Within rural areas, the population is concentrated in poorer quintiles.

5.4 Household Assets

Table 23 shows asset ownership by quintile. Ownership of basic agricultural tools—an axe and hoe— is nearly universal among households in all quintiles, and 77 percent report owning a residential building. Most durable consumer goods are owned by only a small fraction of households. Exceptions are a bicycle (owned by 35% overall), brazier (43%), non-electric iron (23%), and radio (34%). What is most striking in the table is that there are few assets with sharply differentiated ownership rates among rich and poor. Assets that are owned by the households of at least five percent of individuals overall and are more likely to be held by the relatively rich are the following: crop sprayer, non-electric iron, radio, and scotch cart.

Table 23
Percentages of Households in Rural Areas Owning Particular Assets, by Quintile

		Quintile of National Distribution				
Asset	**All**	**Poorest 20%**	**2**	**3**	**4**	**Richest 20%**
Axe	88	87	90	90	89	85
Bicycle	35	27	37	37	38	35
Brazier	43	39	46	44	42	42
Canoe	8	13	8	8	8	6
Cell phone	0	0	0	0	0	1
Computer	0	0	0	0	0	1
Crop sprayer	6	4	4	7	7	9
Donkey	0	0	0	0	0	0
Electric iron	2	0	1	1	2	5
Electric or gas stove	1	0	0	0	1	3
Fishing boat	1	1	2	2	2	1
Fishing net	13	16	13	13	12	10
Hammer/grinding mill	1	0	1	2	2	1
Hoe	97	94	98	98	97	96
Hunting gun	2	2	2	1	2	3
Knitting machine	0	0	0	0	0	0
Motor vehicle	1	0	0	0	0	3
Motorcycle	0	0	0	0	0	0
Non-electric iron	23	19	24	22	23	29
Non-residential building	3	1	2	3	3	6
Plough	15	9	13	17	16	19
Radio	34	25	34	36	35	38
Refrigerator	1	0	0	0	1	4
Residential building	77	77	80	78	76	73
Satellite dish	0	0	0	0	0	0
Scotch cart	5	3	3	6	7	7
Sewing machine	4	3	4	3	5	6
Telephone line	0	0	0	0	0	0
Tractor	0	0	0	0	0	1
TV	4	1	2	3	5	9
Video player	1	0	1	0	2	3

Notes: Calculations are weighted by household sampling weights. Thus, the statistics are by household rather than individual. The quintiles, however, are defined for individuals based on consumption per person using the national distribution. Within rural areas, the population is concentrated in poorer quintiles.

5.5 Economic Activity

Agriculture is the overwhelmingly dominant activity in rural areas. In four out of five rural Zambian households, the principal activity of the household head is farming. People at the top of the distribution are slightly less likely to be engaged in agriculture; 71 percent of heads in the richest quintile report farming as their main activity. Activities by quintile are shown in Table 24. Only nine percent of individuals live in households where the head is engaged mainly in wage work, with a smaller percentage among the poorest households.

Table 24
Principal Economic Activity of Household Head, Rural Areas
Percentages of Household Heads by Quintile of Consumption

		Quintile of National Distribution				
	All	Poorest 20%	2	3	4	Richest 20%
Wage work	9	6	6	9	9	13
Self-employed	6	4	4	4	6	10
Farming	79	82	84	80	79	71
Fishing	2	4	2	3	3	1
Forestry	0	0	0	0	0	0
Piecework	2	2	2	1	1	3
Not working & looking for work	0	0	0	0	0	0
Not working & not looking for work	0	0	0	0	0	0
Student	0	0	0	0	0	0
Productive unpaid family labor	0	0	0	0	0	0
Unproductive unpaid family work	0	0	0	0	0	0
Retired	0	0	0	0	0	0
Too old to work	1	1	1	1	1	1
Other	1	1	0	0	1	1
	100	100	100	100	100	100

Notes: Calculations are weighted by household size. The quintiles are defined for individuals based on consumption per person, using the national distribution. Within rural areas, the population is concentrated in poorer quintiles.

Table 25 shows a breakdown of principal activities for *all* individuals over age 20 in rural areas by sex. Sixty-seven percent of all adult men and 71 percent of all women are mainly working in agriculture. The bulk of remaining women are reported to be involved in "productive unpaid family labor."

Table 25
Principal Economic Activity of All Individuals Age 20+ by Sex, Rural Areas

	Men	Women
Wage work	8	2
Self-employed	5	4
Farming	67	71
Fishing	3	0
Forestry	0	0
Piecework	2	0
Not working & looking for work	1	0
Not working & not looking for work	0	0
Student	4	1
Productive unpaid family labor	6	16
Unproductive unpaid family work	1	1
Retired	0	0
Too old to work	1	2
Other	1	1

Notes: Calculations are weighted by household sampling weights.

Another way to look at economic activity is to examine household sources of income. Table 26 shows a breakdown of the various income sources. The total income measure includes the value of the household's own production consumed. Consumption of own production accounts for just over half of average rural household income for rich and poor households alike. The other large categories of income are food crop sales, salary, and remittances (each 6 percent of income in the average household), non-farm business income (10 percent), and "other

income" (11 percent.) Salary and non-farm business income are more important for wealthier households.

Table 27 displays complementary figures comparing income to consumption, along with consumption of own production to total consumption. Consumption of own production enters in the calculation of total consumption as well as total income. Reported consumption is higher than reported income in all quintiles.

Table 26
Mean Shares of Household Income by Source, by Quintile, Rural Areas

		Quintile of National Distribution				
	All	Poorest 20%	2	3	4	Richest 20%
Food crop sales	6	7	6	6	6	5
Nonfood crop sales	2	1	2	3	2	2
Non-farm business	10	11	10	10	13	11
Livestock and other agricultural income	2	2	2	3	2	3
Salary	6	3	5	6	7	11
Remittances	6	7	6	6	7	5
Pension	0	0	0	0	0	0
Nonagricultural rent	0	0	0	0	0	0
Other income	11	13	12	12	11	9
Consumption of own production	55	57	55	54	55	52
	100	100	100	100	100	100

Notes: Calculations are weighted by household sampling weights. The quintiles are defined for individuals based on consumption per person, using the national distribution. Within rural areas, the population is concentrated in poorer quintiles.

Table 27
Own Production as Share of Consumption and Income, by Quintile, Rural Areas

		Quintile of National Distribution				
	All	Poorest 20%	2	3	4	Richest 20%
Mean own production as % of income	55	57	55	54	55	52
Mean own production as % of consumption	45	48	47	46	44	40
Median ratio of consumption to income (*100)	115	112	113	114	116	119

Notes: Calculations are weighted by household sampling weights. The quintiles are defined for individuals based on consumption per person, using the national distribution. Within rural areas, the population is concentrated in poorer quintiles.

Next we consider the distribution and usage of crop land. The LCMS survey does not provide information on land ownership. Land is generally plentiful in Zambia and quantity of land is unlikely to be a binding constraint on production. Additionally, land ownership may be poorly defined in areas where land access is defined by traditional rather than legal private property regimes. Instead of land owned, the survey collected information on the amount of land *used* by each household.

Figure 19 and Figure 20 show cumulative density functions for food crop land and non-food crop land used by households in rural areas. The data is comprised of all rural households, including those that report zero crop land and are not involved in agriculture. Ninety-three percent farm some land for food crops, but there is wide variation in the amount of land farmed. Only 13 percent farm any non-food crops, and the typical area devoted to non-food crops is small. The median non-food plot size among those who have some non-food land is 0.6 hectare.

Figure 19

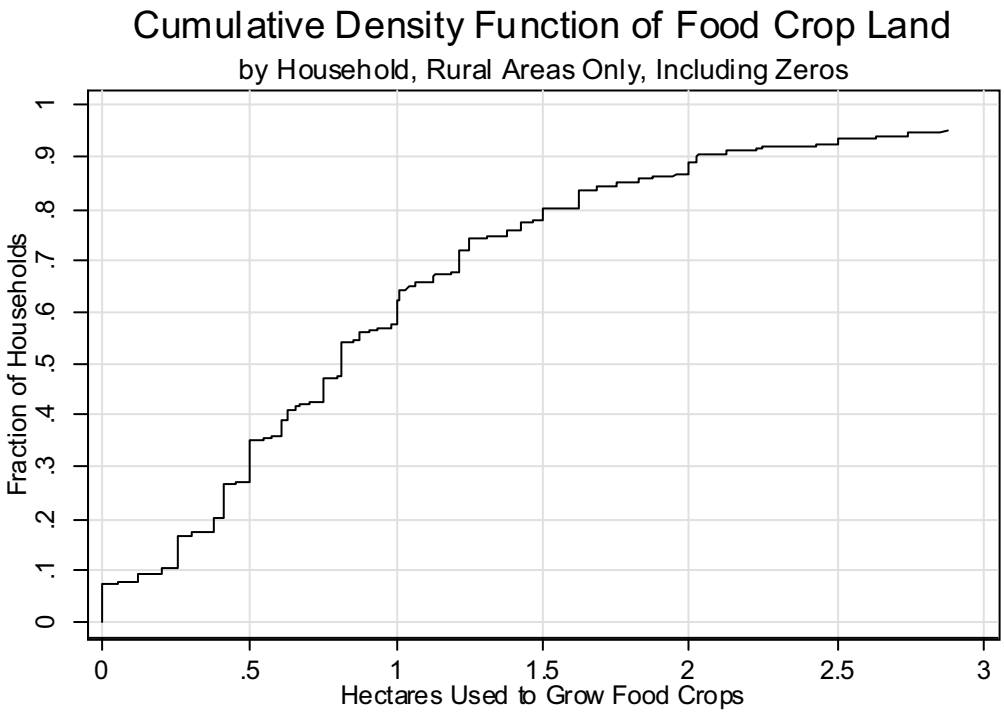


Figure 20

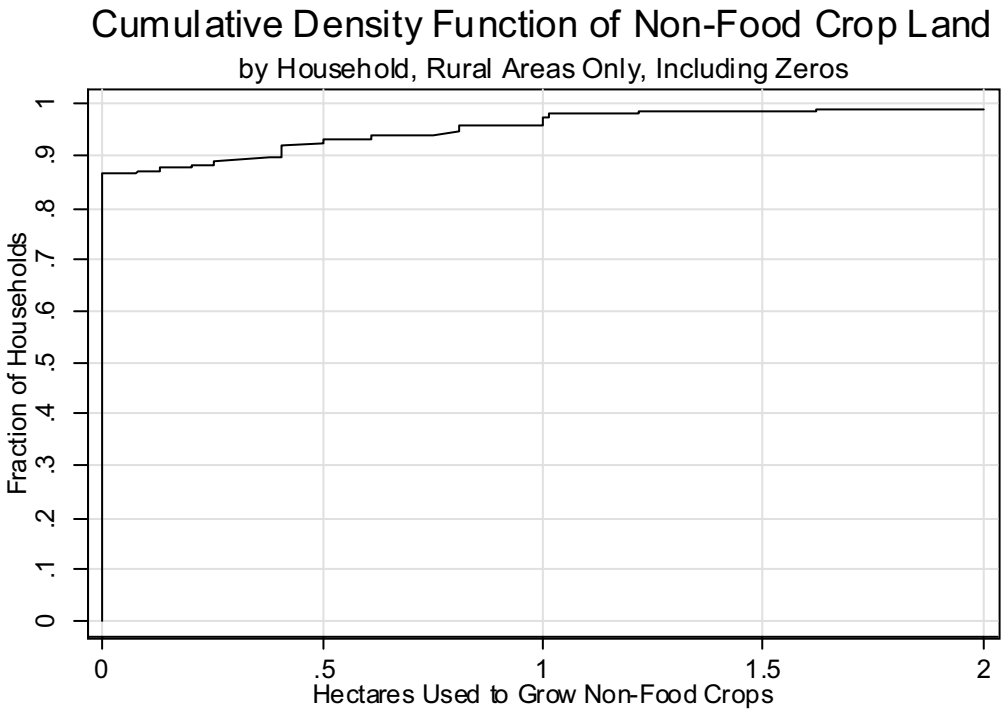


Table 28 shows a breakdown of crop area by quintile. These tabulations include zero values. Average total land worked varies little by quintile, but wealthier households average more than twice as much non-food cropland as the poorest households. The smaller households in the wealthiest quintile also work twice as much total land *per capita* as the poorest households.

Table 28
Mean Area of Crop Land Used for Food and Non-food Crops, by Household

		Quintile of National Distribution				
	All	Poorest 20%	2	3	4	Richest 20%
Hectares of food crops	1.08	0.97	1.11	1.11	1.05	1.16
Hectares of non-food crops	0.11	0.05	0.09	0.14	0.12	0.12
Hectares of all crops	1.19	1.02	1.20	1.26	1.16	1.28
Hectares of all crops per capita	0.25	0.16	0.21	0.24	0.28	0.36

Table 29 gives a further breakdown of whether or not the household had any land in each crop. Most households in all quintiles grow at least some maize. Substantial fractions of households also grow cassava, millet, sweet potatoes, and ground nuts. There is substantial differentiation in crop choices by rich and poor for cassava, which is grown by half of the poorest households but just over a quarter of the richest households, and hybrid maize, grown by 11 percent of the bottom quintile and 28 percent of the top. Among the relatively few households with non-food crops, cotton and sunflower are dominant. Nine percent of those in the poorest quintile grow at least some non-food crops, compared to 13 percent overall.

We may be interested not just in the particular crops grown by each household but also the diversity of crop portfolios, in order to understand households' vulnerability to weather and disease patterns which affect individual crops. The number of crops grown per household by quintile is shown in Table 30. Households are approximately equally distributed between those that grow 1, 2, 3, and 4 or more crops. There is little variation in crop diversity by quintile.

Table 29
Crops by Quintile, Rural Households
Percentages of Households Growing Each Crop

		Quintile of National Distribution				
	All	Poorest 20%	2	3	4	Richest 20%
At least one food crop	93	94	96	95	92	89
Local maize	59	54	63	62	62	54
Hybrid maize	19	11	15	19	21	28
Cassava	38	50	45	39	33	28
Millet	16	24	20	16	12	11
Rice	5	4	4	3	6	6
Mixed beans	16	18	18	16	15	12
Soya beans	2	2	3	3	2	2
Sweet potatoes	30	30	33	32	29	26
Irish potatoes	2	2	2	1	2	2
Groundnuts	40	40	44	45	38	32
Sorghum	8	7	9	6	8	8
At least one non-food crop	13	9	14	16	15	13
Cotton	9	6	7	10	10	9
Tobacco	1	0	2	2	1	1
Sunflower	5	3	6	5	5	4
Paprika	0	0	0	0	0	1
Flowers	0	0	0	0	0	0

Table 30
Number of Crops Grown per Household, by Quintile, Rural Households

Number of Crops	All	Quintile of National Distribution				
		Poorest 20%	2	3	4	Richest 20%
0	7	6	4	5	7	11
1	22	24	20	20	19	25
2	26	23	28	26	30	25
3	22	22	21	25	23	19
4	13	14	13	14	12	12
5	7	7	9	7	5	6
6	3	3	4	2	3	2
7 or more	1	1	2	1	1	1
	100	100	100	100	100	100

Next we consider livestock ownership by quintile, shown in Table 31. Seventy-one percent of rural households reported the ownership of some livestock. A clear difference by quintile is seen only for cattle ownership: 19 percent of households in the top quintile compared to 11 percent of those in the bottom quintile. Table 32 shows the same breakdown by province.

Table 31
Livestock Ownership and Fish Farming, Rural Households, by Quintile
Percentages of Households Owning Each Type of Livestock

	All	Quintile of National Distribution				
		Poorest 20%	2	3	4	Richest 20%
Any livestock	71	69	73	74	72	66
Cattle	16	11	13	18	19	19
Goats	18	17	20	18	17	16
Pigs	8	7	10	8	8	8
Sheep	1	1	1	1	2	1
Chickens	64	64	69	66	65	58
Ducks & geese	5	6	4	7	6	5
Guinea fowls	4	3	3	4	5	4
Other poultry	3	2	3	3	3	3
Fish farming	0.4	0.3	0.6	0.2	0.6	0.3

Table 32
Livestock Ownership and Fish Farming, Rural Households, by Province
Percentages of Households Owning Each Type of Livestock

	All	Central	Copperbelt	Eastern	Luapula	Lusaka	Northern	Nwestern	Southern	Western
Any livestock	71	77	53	74	68	60	76	69	73	66
Cattle	16	20	4	23	1	15	7	6	31	27
Goats	18	21	7	18	13	23	19	16	33	3
Pigs	8	2	2	17	2	6	11	6	10	4
Sheep	1	2	0	2	1	1	1	2	0	1
Chickens	64	70	51	67	61	54	72	63	63	58
Ducks & geese	5	6	5	5	12	6	4	3	3	5
Guinea fowls	4	5	0	5	2	4	3	3	8	1
Other poultry	3	4	2	3	1	4	3	1	6	1
Fish farming	0.4	0.0	0.1	0.3	0.3	0.0	1.1	1.0	0.0	0.0

5.6 Multivariate Regression Analysis

Finally, we examine the correlates of poverty using a multivariate regression. In the absence of a well-specified household model, the coefficient estimates from a regression are difficult to interpret, and results are necessarily sensitive to the choice of variables in the regression. Despite these problems, a regression can offer a concise summary of poverty correlates and potentially highlight variables with particular power in explaining variation in consumption.

Table 33 presents results from an OLS regression of log consumption per adult equivalent on a limited set of household characteristics, distances to facilities, and province dummies. For the most part, the signs of the coefficients parallel the results from the bivariate comparisons. Larger households have lower levels of consumption. Consumption is lower for female-headed households, but households dependent on female labor (with no male adults) actually have higher consumption than those not dependent on female labor.

Education is strongly correlated with consumption levels. Both the maximum education level in the household and the household head's education are significantly associated with higher consumption, even with both entering as explanatory variables.

Both the dependency ratio and household size are significant in the regression and inversely correlated with consumption, again echoing the univariate analysis. None of the dummies for having a greater than median distance to key facilities show up as significant. Finally, none of the provincial dummies are significant at the 95 percent level.

Table 33
Regression of Log Consumption on Potential Poverty Correlates, Rural Areas

Dependent variable = ln(consumption per adult equivalent)	Coefficient	Standard Error	t statistic
Ln(age of household head)	-0.084	0.041	-2.1
Female household head	-0.102	0.033	-3.1
Household dependent on female labor	0.130	0.037	3.5
Maximum years of education in household	0.030	0.006	4.8
Years of education of household head	0.023	0.006	3.6
Dependency ratio	-0.025	0.013	-1.9
Ln(household size)	-0.561	0.029	-19.1
Distance to health clinic greater than median	0.035	0.039	0.9
Distance to police station greater than median	0.027	0.040	0.7
Distance to phone greater than median	-0.026	0.039	-0.7
Distance to public transport greater than median	-0.013	0.036	-0.4
Central Province	0.210	0.157	1.3
Copperbelt Province	-0.060	0.158	-0.4
Eastern Province	0.194	0.150	1.3
Luapula Province	-0.130	0.157	-0.8
Northern Province	-0.187	0.159	-1.2
Northwestern Province	0.114	0.152	0.8
Southern Province	0.246	0.155	1.6
Western Province	0.240	0.159	1.5
Constant	11.960	0.171	69.8
Number of observations: 4525			
R-squared: 0.32			

Notes: Variables other than age, education, dependency ratio, and household size are dummy variables.
The omitted province dummy is Lusaka.
Standard errors are adjusted for the cluster sampling design of the survey.

Overall, in both the regression analysis and the univariate comparisons, it is surprising how few variables show a clear correlation with consumption levels. This is partially a consequence of the flatness of the distribution of consumption in rural areas. But the dispersion that does exist is also not well explained by the variables that have been examined here. This is reflected, for example, in the relatively low R-squared of 0.28 in the regression.

5.7 Changes Over Time in Rural Areas

It would desirable to have not just a snapshot picture of conditions in Zambia in 2002-03 but also a sense of changes that have taken place over time. This is particularly the case looking back over the 1990s, a period of dramatic events for Zambia, including the economic liberalization program that began in 1991 and also the explosion of HIV incidence. Unfortunately, changes in survey and poverty analysis methodology make it impossible to compare earlier poverty figures with the estimates in this paper. It is, however, possible to examine changes in other household characteristics.

This section compares figures for rural areas from the 2002-03 survey to similar figures from the 1990 and 2000 censuses. The survey figures presented below are taken from the previous section of the paper and are in some cases aggregated so that the response categories from the survey and censuses align. The census figures were tabulated from the raw census data.

Figures derived from the census data have the advantage that they are not subject to sampling error.[8]

A general sense of the shifts in rural employment over the decade is provided by Table 34, which shows reported industries for those reported working in the 1990 and 2000 censuses in rural areas. The "health and welfare" category includes many public employees, whose numbers shrunk as part of policy changes in the early 90s. The result of declining public employment in the public sector and non-farm industries has been relative growth in the broadly defined farming sector (which includes fishing and forestry as well as agriculture.)[9]

Table 34
Industry of Working Individuals, Rural Areas

	Men and Women		Men Only		Women Only	
	1990	2000	1990	2000	1990	2000
Farming	88.2	93.5	85.8	91.5	92.1	95.5
Mining	0.5	0.2	0.8	0.3	0.0	0.0
Manufacturing	1.9	1.0	2.2	1.1	1.3	0.9
Electricity, Gas, Water	0.2	0.1	0.2	0.1	0.0	0.0
Construction	1.0	0.5	1.5	1.0	0.1	0.0
Trade	1.1	1.9	1.1	2.0	1.2	1.9
Transport & Communication	0.7	0.3	1.2	0.5	0.0	0.0
Finance	0.6	0.2	0.6	0.2	0.6	0.1
Health & Welfare	5.9	2.4	6.6	3.2	4.7	1.6
	100.0	100.0	100.0	100.0	100.0	100.0

Table 35 shows household demographic data for rural areas over time. According to the census figures, there was a substantial decline in average household size in rural areas, from 5.8 to 5.2, a decline in the median age of the household head from 44 to 40, and an increase in the mean household dependency ratio from 1.04 to 1.11.

[8] Figures presented here differ somewhat from those found in published census statistics. Most likely, the differences stem from the concepts used to analyze the census data. The difference between a *de jure* and *de facto* population concept merits explanation at this point. The *de facto* population of a household is the number of people physically present in the dwelling on the night of a census or survey, including visitors and excluding household members who are away. The *de jure* population of a household is the number of "usual members," excluding visitors and including those away at the time of the census or survey.

The 2002-03 LCMS uses a *de jure* concept, and censuses typically use a *de facto* concept. Zambian censuses collect information on usual members present, visitors, and usual members absent, and consequently it is possible to analyze the census population on either a *de jure* or a *de facto* basis. In order to ensure maximum comparability to the survey, the census data was analyzed employing a *de jure* concept in tables which include survey numbers as well. Additionally, non-residential institutions like prisons and schools were excluded from the census analysis. While it is unclear from the documentation, published statistics may have used a *de facto* household concept and included non-residential institutions.

[9] The 1990 census does not provide employment information for household members not present at the time of the survey. To maintain comparability between the two sets of industry figures, figures for the industry table were calculated for both censuses using only household members present at the time of the survey, excluding both visitors and those away at the time of the survey. Also, due to changes in a separate employment question, many more women are defined as "working" in 2000 than was the case in 1990. This is explained in greater detail in Appendix 2.

Table 35
Household Demographics, Rural Areas

	1990 Census	2000 Census	2002-03 LCMS
Mean household size	5.8	5.2	5.3
Median age of household head	44	40	40
Fraction with female household heads	0.19	0.20	0.24
Mean dependency ratio	1.04	1.11	1.15
Mean youth dependency ratio	0.96	1.03	1.07
Mean old-age dependency ratio	0.08	0.08	0.08

Table 36 displays the main sources of water used by rural households over time. The figures show an increase in access to water from a well or borehole over the decade between the censuses and a continued increase in 2002-03. Although this figure includes unprotected wells, it does suggest that access to safe water sources in rural Zambia is improving.

Table 36
Main Source of Water, Rural Areas
Percentages of Households

	1990 Census	2000 Census	2002-03 LCMS
Pipe or tap	7	5	5
Well or borehole	52	62	67
River/stream/lake	37	31	27
Other	4	2	2
	100	100	100

Note: Because response options in the LCMS differed substantially from those in the two censuses, survey and census responses were grouped into approximately corresponding categories.

Main sources of energy for light and cooking are shown in Table 37 and Table 38. The census figure appears to show a dramatic increase in the use of candles between the two censuses and a large decline in the use of paraffin/kerosene. Likewise, the survey shows that nine percent of rural households reported using diesel fuel for light, while almost no households reported using gas in the censuses ("diesel" was not a response option in the censuses.) The differences may more reflect the changes in response categories than actual changes in energy use. For cooking energy sources, the story is much clearer: almost no change has taken place, and nearly 90 percent of households use wood for cooking.

Table 37
Main Sources of Energy for Light, Rural Areas
Percentages of Households

	1990 Census	2000 Census	2002-03 LCMS
Electricity	2	2	3
Gas or Diesel	1	0	9
Paraffin/Kerosene	82	66	63
Candle	1	9	5
Wood and Other	15	23	20
	100	100	100

Notes: Because response options in the LCMS were not identical to those in the two censuses, survey responses were grouped so as to approximately map to the census response options.

Table 38
Main Sources of Energy for Cooking, Rural Areas
Percentages of Households

	1990 Census	2000 Census	2002-03 LCMS
Electricity	1	1	1
Gas	0	0	N/A
Paraffin/Kerosene	2	1	N/A
Wood	89	87	89
Charcoal	7	10	9
Coal	0	0	N/A
Other	1	1	1
	100	100	100

Notes: Because response options in the LCMS were not identical to those in the two censuses, survey responses were grouped so as to approximately map to the census response options.

The figures for toilet facilities, shown in Table 39, demonstrate a modest but notable improvement in facilities in rural areas over time. Sixty-five percent of households had pit latrines in 2002-03, compared to just 55 percent in 1990.

Table 39
Type of Toilet Facility, Rural Areas
Percentages of Households

	1990 Census	2000 Census	2002-03 LCMS
Flush	2	1	1
Pit latrine	55	59	65
Aqua privy	0	N/A	0
Bucket	0	0	N/A
Other/None	44	40	34
	100	100	100

Notes: Because response options in the LCMS were not identical to those in the two censuses, survey responses were grouped so as to approximately map to the census response options.

Table 39, Table 40, and Table 41 display materials used for rural roofs, walls, and floors of homes over time. The roof and floor tables show no changes since 1990. The data on wall materials appears to show an improvement over time, with a larger percentage of homes with burnt brick walls in the survey and the 2000 census than in 1990.

Table 40
Main Material Used for Roof, Rural Areas
Percentages of Households

	1990 Census	2000 Census	2002-03 LCMS
Concrete/cement	1	0	N/A
Asbestos sheet	3	3	3
Iron	9	9	10
Grass/thatch	86	87	85
Tiles	0	0	1
Other	0	1	
	100	100	100

Note: Because response options in the LCMS were not identical to those in the two censuses, survey responses were grouped so as to approximately map to the census response options.

Table 41
Main Material Used for Wall, Rural Areas
Percentages of Households

	1990 Census	2000 Census	2002-03 LCMS
Burnt bricks	11	16	20
Mud bricks	40	46	38
Concrete blocks/slab	4	4	3
Stone	0	0	N/A
Iron	0	0	0
Pole and dagga/mud	37	29	33
Grass	4	3	5
Other	2	2	0
	100	100	100

Notes: Because response options in the LCMS were not identical to those in the two censuses, survey responses were grouped so as to approximately map to the census response options.

Table 42
Main Material Used for Floors, Rural Areas
Percentages of Households

	1990 Census	2000 Census	2002-03 LCMS
Concrete/Cement	13	12	13
Mud	84	85	85
Wood	0	0	0
Other	2	3	
	100	100	98

Note: Because response options in the LCMS were not identical to those in the two censuses, survey responses were grouped so as to approximately map to the census response options.

Finally, we consider how asset ownership has changed over time in rural areas. The 2000 census included questions about a long list of assets, and the percentages reporting ownership of those assets are nearly identical to the figures from the 2002-03 survey. Unfortunately, the 1990 census only asked about ownership of a radio and television. Limited by lack of rural

electrification, TV ownership has held steady at three percent of households. Radio ownership, however, has increased from 23 percent of households to 34 percent in 2002-03.

Table 43
Asset Ownership, Rural Areas
Percentages of Households

	1990 Census	2000 Census	2002-03 LCMS
Radio	23	32	34
TV	3	3	4
Bicycle	N/A	33	35
Canoe	N/A	8	8
Donkey	N/A	0	0
Motorcycle	N/A	0	0
Plough	N/A	14	15
Refrigerator	N/A	1	1
Scotch cart	N/A	5	5
Telephone line	N/A	0	0
Vehicle	N/A	1	1

As a whole, two conclusions can be drawn from the comparisons over time. First, the 2000 census figures closely track with the survey data, which confirms the validity of the survey data. Second, since 1990 there have been modest but notable improvements in the material conditions of rural residents, as measured by access to higher quality water and sanitation facilities and radio ownership.

6 Urban Poverty

Urban Zambia before the decline of copper was dominated by government and parastatal industry. Today, the urban economy presents a more complex picture. Government continues to be a major employer, particularly for those in the top echelons of the income distribution, but there is also a diverse private sector as well. The overall sense is of a highly heterogeneous urban sector, in terms of both household conditions and economic activities.

6.1 Household Demographics

Table 44 summarizes basic household characteristics by quintile. These figures are also shown graphically in a series of figures. Figure 21 shows average household size by national quintile. As with rural households, household size is highest among poorer households.

Table 44
Mean Characteristics of Households by Quintile of Consumption, Urban Areas

		Quintile of National Distribution				
	All	Poorest 20%	2	3	4	Richest 20%
Mean household size	5.6	6.8	6.5	5.9	5.5	4.6
Median age of household head	39	45	43	39	38	36
Fraction with female household heads	0.21	0.27	0.23	0.20	0.19	0.21
Mean years schooling of household head	9.3	6.6	7.5	8.5	9.4	11.1

Notes: Calculations are weighted by household sampling weights. Thus, the statistics are by household rather than individual. The quintiles, however, are defined for individuals based on consumption per person using the national distribution. Within urban areas, the population is concentrated in wealthier quintiles.

Figure 21

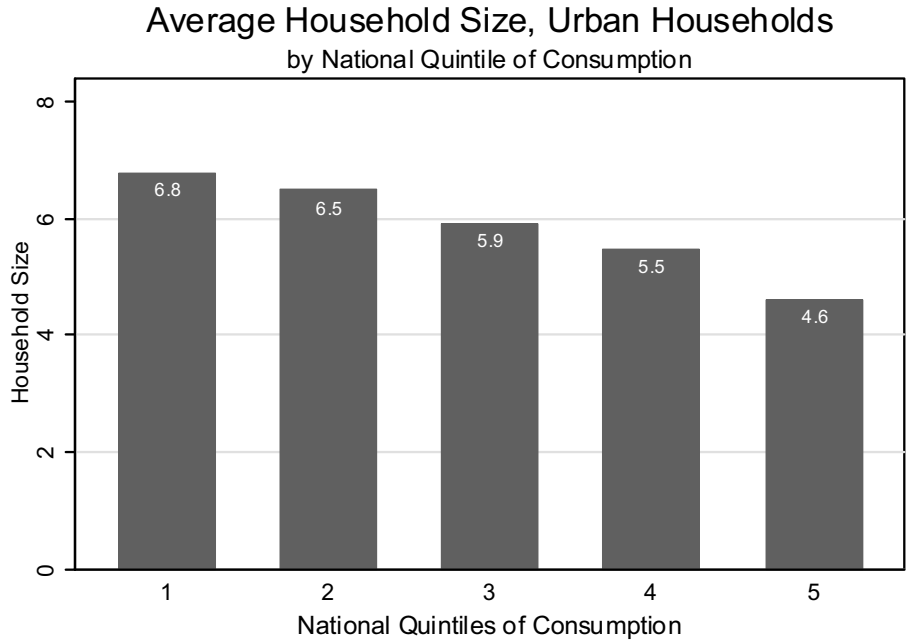


Figure 22 shows that the poorest households tend to have older household heads. Median age of household head moves steadily downward as household consumption increases.

Figure 22

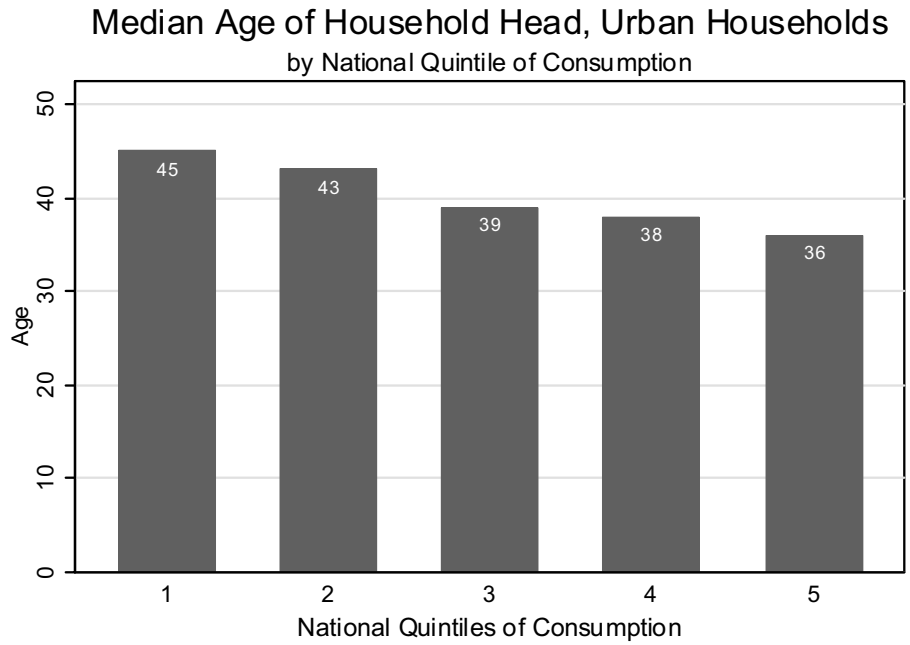


Figure 23 illustrate that there is a very strong association between education and consumption in urban areas. While the difference in average education is just 1.8 years between those in the bottom and top quintiles in rural areas, it is 4.7 between the same quintile groups in urban areas. People in urban areas are also much more educated than rural residents. Urban Zambians in the bottom quintile average 6.6 years of schooling, which is higher than the 6.2 years of schooling of rural Zambians in the *top* quintile.

Figure 23

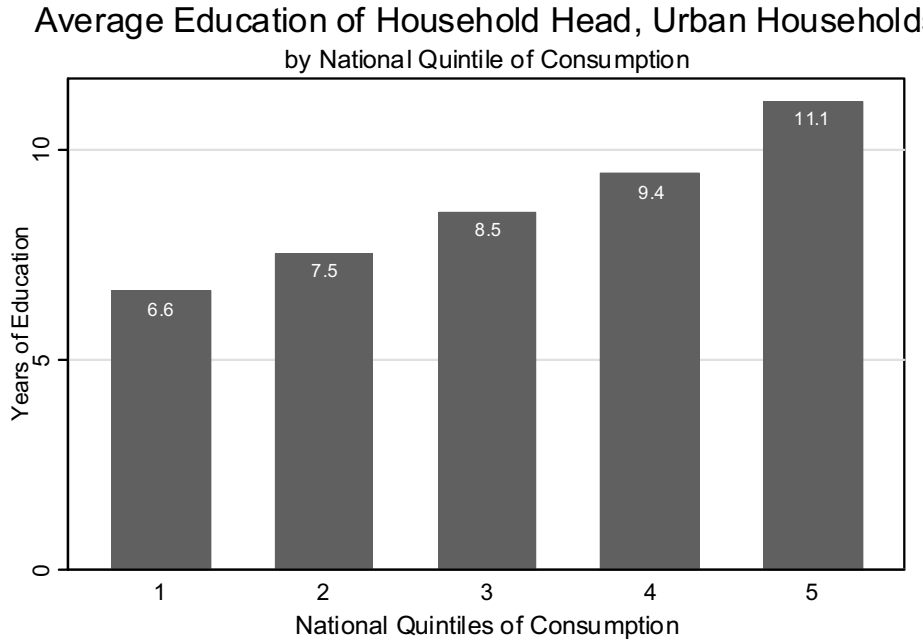


Figure 24 shows that among urban households, the poorest are more likely to live in households headed by women. In each of the top three quintiles, which account for the great bulk of urban Zambians, the fraction of female households is approximately 20 percent.

Figure 24

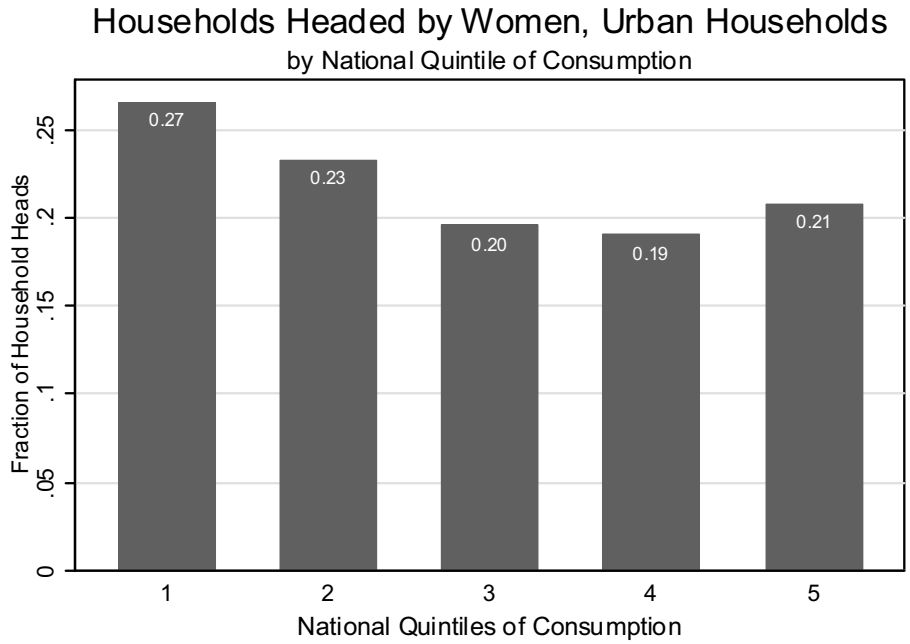


Table 45 and Table 46 provide additional information about household structure by quintile. Dependency ratios, while lower than in rural areas, are still high. The average urban household has 0.89 dependent per adult. Dependency ratios are much higher for the households of Zambians in the poorest quintile as compared to those in the wealthiest 20 percent: 1.18 as compared to 0.66.

The bulk of urban Zambian households at all socioeconomic levels (70 percent) include

two generations. A substantial number of those in the poorest quintile (31 percent) live in households with three or more generations, while such arrangements are much less common among the wealthy.

Table 45
Mean Dependency Ratios by Quintile of Consumption, Urban Areas

		Quintile of National Distribution				
	All	Poorest 20%	2	3	4	Richest 20%
Dependency ratio	0.89	1.18	1.09	1.02	0.88	0.66
Youth dependency ratio	0.86	1.12	1.03	0.99	0.86	0.65
Old-age dependency ratio	0.03	0.06	0.06	0.03	0.02	0.02

Notes: Calculations are weighted by household sampling weights. Thus, the statistics are by household rather than individual. The quintiles, however, are defined for individuals based on consumption per person using the national distribution. Within urban areas, the population is concentrated in wealthier quintiles.

Table 46
Number of Family Generations Living in Households by Quintile, Urban Households

		Quintile of National Distribution				
# of Generations	All	Poorest 20%	2	3	4	Richest 20%
1	12	2	4	7	11	23
2	70	67	68	76	74	68
3	16	29	26	16	15	9
4	1	2	1	1	1	0
	100	100	100	100	100	100

Notes: Calculations are weighted by household sampling weights. Thus, the statistics are by household rather than individual. The quintiles, however, are defined for individuals based on consumption per person using the national distribution. Within urban areas, the population is concentrated in wealthier quintiles. Family generations are determined from reported relationship to household head. A household with just one generation has no one who is a child, step child, grandchild, niece, nephew, parent, or parent-in law of the household head. A household with two generations has at least one related individual who is one generation removed from the head. A household with three generations either has a grandchild of the household head or has a parent/parent-in-law of the head along with at least one child, step-child, niece, or nephew of the head. A household with four generations has both a parent/parent-in-law of the head and a grandchild of the head.

6.2 Housing Conditions

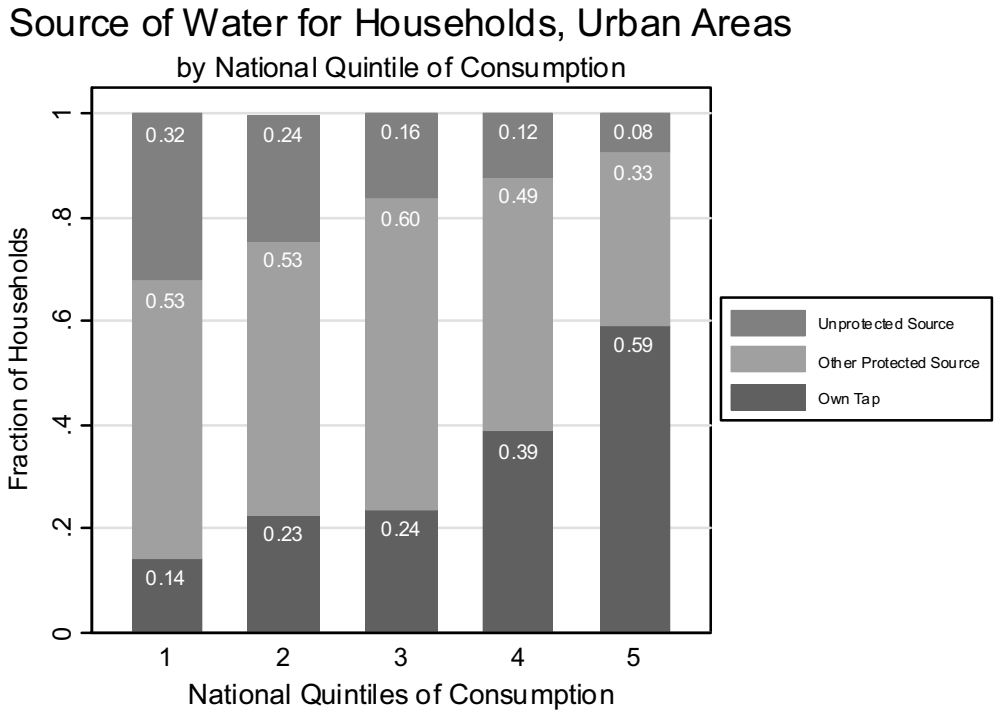
Next we examine the housing conditions of urban households. Water sources are detailed in Table 47 and summarized in Figure 25. There is a sharp gradient in the quality of water sources by quintile. Access to a household's own tap increases sharply going from poorer to richer quintiles, and nearly all of those in the top quintile have access to safe sources of water. These figures are in stark contrast to rural areas, where a majority of households in each quintile lacks access to safe water.

Table 47
Main Sources of Water During the Dry Season, Urban Areas
Percentages of Households by Quintile of Consumption

		Quintile of National Distribution				
	All	**Poorest 20%**	**2**	**3**	**4**	**Richest 20%**
Direct from river/lake	1	1	1	1	1	1
Unprotected well	12	25	19	13	10	5
Piped from river/lake	2	6	4	2	1	1
Protected well	3	5	4	6	3	2
Borehole	3	3	2	4	2	3
Public tap	33	37	39	39	37	24
Own tap	38	14	23	24	39	59
Other tap	7	8	8	11	8	5
Other	0	0	0	0	0	0
	100	100	100	100	100	100

Notes: Calculations are weighted by household sampling weights. The quintiles are defined for individuals based on consumption per person, using the national distribution. Within urban areas, the population is concentrated in wealthier quintiles.

Figure 25



Next we consider the main sources of energy used for cooking and light. These are shown in Table 48 and Table 49 and graphically in Figure 26 and Figure 27. Both show that use of electricity for both functions, while rare among the poorest households, is very prevalent among wealthier households. As with water sources, there are substantial differences between rich and poor.

Table 48
Main Sources of Energy for Lighting, Urban Areas
Percentages of Households by Quintile of Consumption

		Quintile of National Distribution				
	All	**Poorest 20%**	**2**	**3**	**4**	**Richest 20%**
Kerosene/paraffin	27	58	41	31	22	11
Electricity	48	11	27	35	51	73
Candle	24	30	30	33	27	15
Diesel	0	0	1	0	0	0
Open fire	0	1	1	0	0	0
	100	100	100	100	100	100

Notes: Calculations are weighted by household sampling weights. The quintiles are defined for individuals based on consumption per person, using the national distribution. Within urban areas, the population is concentrated in wealthier quintiles.

Figure 26

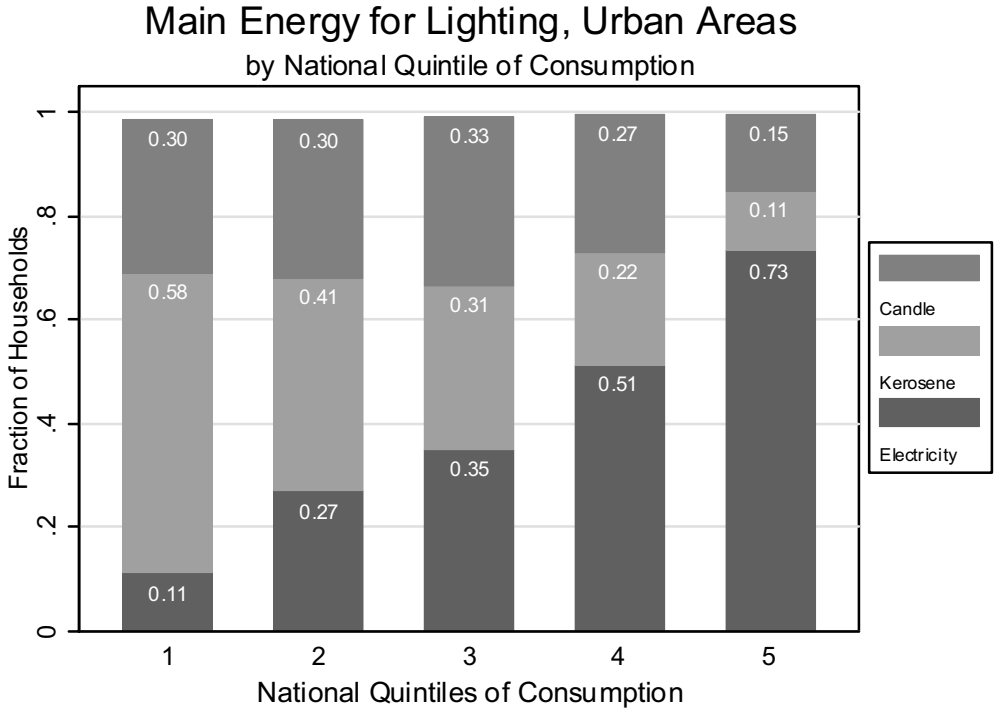
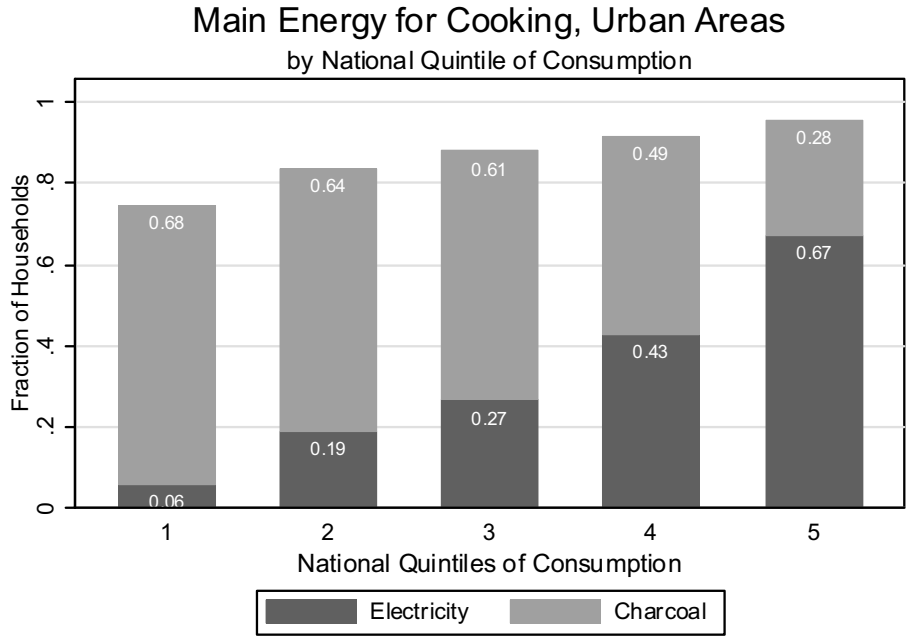


Table 49
Main Sources of Energy for Cooking, Urban Areas
Percentages of Households by Quintile of Consumption

		Quintile of National Distribution				
	All	**Poorest 20%**	**2**	**3**	**4**	**Richest 20%**
Collected firewood	6	19	10	7	4	1
Purchased firewood	3	4	4	4	3	2
Own-produced charcoal	1	3	2	1	1	1
Purchased charcoal	48	68	64	61	49	28
Electricity	41	6	19	27	43	67
	100	100	100	100	100	100

Notes: Calculations are weighted by household sampling weights. The quintiles are defined for individuals based on consumption per person, using the national distribution. Within urban areas, the population is concentrated in wealthier quintiles.

Figure 27



Toilet facilities by quintile are detailed by type and location in Table 50 and summarized in Figure 28, where categories are collapsed into just "flush toilet" and "pit latrine." In urban areas, nearly all households have access to either a pit latrine or a flush toilet, with the latter being much more prevalent among wealthier households

Table 50
Type of Toilet Facility, Urban Areas
Percentages of Households by Quintile of Consumption

		Quintile of National Distribution				
	All	Poorest 20%	2	3	4	Richest 20%
Flush toilet inside	25	5	11	13	22	44
Flush toilet outside	13	11	13	10	13	14
Communal flush	3	1	4	3	4	3
Own pit latrine	40	59	53	50	39	24
Communal latrine	13	13	11	14	16	11
Neighbor latrine	5	8	6	6	4	3
Aqua privy	1	0	1	2	1	1
None	1	3	1	1	1	1
	100	100	100	100	100	100

Notes: Calculations are weighted by household sampling weights. The quintiles are defined for individuals based on consumption per person, using the national distribution. Within urban areas, the population is concentrated in wealthier quintiles.

Figure 28

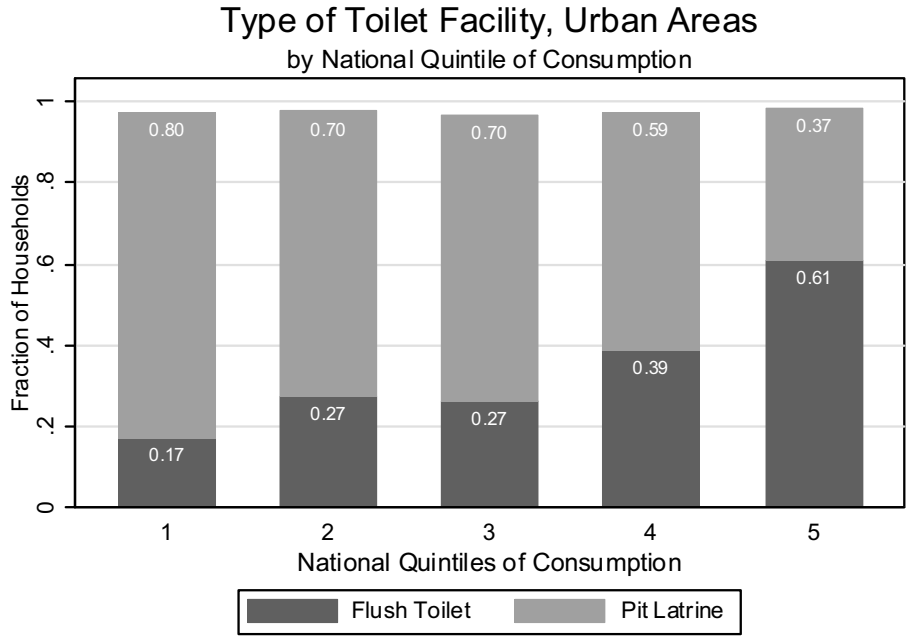


Table 51, Table 52, and Table 53 show the materials used for roof, walls, and floors by quintile in urban households. It is again notable that households in the poorest quintile in urban areas have higher quality homes on average than those in the wealthiest quintile in rural areas. While grass and straw are the dominant roof materials in rural areas, even the poorest in urban areas often have roofs made of asbestos or iron. Likewise, roughly half of even the poorest urban Zambians live in homes with concrete walls and concrete floors.

Table 51
Material Used for Roof, Urban Areas
Percentages of Households by Quintile of Consumption

		Quintile of National Distribution				
	All	Poorest 20%	2	3	4	Richest 20%
Asbestos sheets	49	35	38	44	53	59
Asbestos tiles	5	3	4	3	5	7
Iron sheets	29	31	34	35	29	25
Grass/straw	11	22	16	12	9	4
Other	6	9	8	5	3	5
	100	100	100	100	100	100

Notes: Calculations are weighted by household sampling weights. The quintiles are defined for individuals based on consumption per person, using the national distribution. Within urban areas, the population is concentrated in wealthier quintiles.

Table 52
Material Used for Walls, Urban Areas:
Percentages of Households by Quintile of Consumption

		Quintile of National Distribution				
Wall Material	All	Poorest 20%	2	3	4	Richest 20%
Pan brick	10	4	5	4	8	17
Concrete brick	60	45	49	61	65	67
Mud brick	23	44	39	29	18	9
Mud burnt brick	5	5	4	4	5	5
Pole & dagga	2	1	2	2	2	1
Mud	0	1	0	0	1	0
Other	1	1	0	1	1	1
	100	100	100	100	100	100

Notes: Calculations are weighted by household sampling weights. The quintiles are defined for individuals based on consumption per person, using the national distribution. Within urban areas, the population is concentrated in wealthier quintiles.

Table 53
Material Used for Floor, Urban Areas
Percentages of Households by Quintile of Consumption

		Quintile of National Distribution				
	All	Poorest 20%	2	3	4	Richest 20%
Concrete only	58	47	54	58	60	61
Covered concrete	23	11	16	20	23	32
Mud	19	41	29	22	16	7
Wooden only	0	0	0	0	0	0
Other	0	0	1	0	1	0
	100	100	100	100	100	100

Notes: Calculations are weighted by household sampling weights. The quintiles are defined for individuals based on consumption per person, using the national distribution. Within urban areas, the population is concentrated in wealthier quintiles.

6.3 Health and Health Facilities

Table 54 shows information on health and use of health facilities. Incidence of self-reported illness and use of a health care provider was nearly identical the same across quintiles. Nine percent of individuals reported being sick or injured, and 5 percent saw a health care provider. Most went to a government hospital or clinic. Among those in the wealthiest quintile, 19 percent saw a provider at a private institution, and 7 percent went to an industrial institution (presumably, an employer-provided clinic.)

Table 54
Health Consultations and Type of Health Provider Consulted, by Quintile, Urban Areas

		Quintile of National Distribution				
	All	Poorest 20%	2	3	4	Richest 20%
% reporting sickness or injury in previous 2 weeks	9	10	9	9	9	9
% seeing health care provider in previous 2 weeks	5	4	5	5	5	5
Type of provider consulted						
Govt. hospital	36	29	36	34	37	39
Govt. clinic	43	61	54	51	40	30
Govt. health post	1	1	0	2	0	1
Mission institution	2	3	0	2	3	2
Industrial institution	4	1	2	2	4	7
Private institution	11	2	6	8	12	19
Outside Zambia	0	0	0	0	0	0
Personnel not in institution	0	0	0	1	0	0
Traditional healer	0	0	0	0	0	0
Spiritual healer	0	0	0	0	0	0
Church healer	0	0	0	0	0	0
Other	2	4	2	1	3	2
	100	100	100	100	100	100

Notes: Calculations are done over individuals using household sampling weights. The quintiles are defined for individuals based on consumption per person using the national distribution. Within urban areas, the population is concentrated in wealthier quintiles.

Table 55 presents health payment information for those consulting a provider in urban areas. Just over half paid directly, while one-quarter did not pay at all. In comparison, in rural areas, nearly half did not pay. The remainder of payments were a mix pre-payment schemes, employer payments, and other sources. Essentially no one reported that their costs were paid for by "insurance." Presumably those with insurance responded that they had "pre-payment schemes." Those in the poorest quintile were most likely not to pay at all.

As in rural areas, there was considerable variation in payment amounts. A small number of large payments elevated the overall mean payment to 9710 Kwacha, while the median payment was just 1000 Kwacha. Mean and median payments were much higher in the wealthier quintiles.

Table 55
Method of Health Consultation Payment and Payment Amounts by Quintile, Urban Areas

		Quintile of National Distribution				
	All	**Poorest 20%**	**2**	**3**	**4**	**Richest 20%**
Method used to pay (among those consulting a provider)						
Low cost pre-payment scheme	8	5	9	9	8	9
High cost pre-payment scheme	2	2	2	2	1	4
Employer-paid	3	1	1	2	5	5
Insurance-paid	0	0	0	0	0	0
Mix of self and other source	1	0	0	0	1	3
Paid directly	55	52	58	56	54	56
Didn't pay	25	35	25	24	27	21
Paid for by other	4	5	4	6	5	2
	100	100	100	100	100	100
Amount paid for medication/ consultation (among those consulting a provider)						
Mean (including zeros)	9710	3759	7225	6609	10142	15051
Median (including zeros)	1000	700	1000	1000	1500	1500

Notes: Calculations are done over individuals using household sampling weights. The quintiles are defined for individuals based on consumption per person using the national distribution. Within rural areas, the population is concentrated in poorer quintiles.

6.4 Household Assets

Next we consider households assets in urban areas. What is most striking in Table 56 is the diversity of ownership patterns by quintile. While many of the poorest urban Zambians have not much more than tools and a radio (36%) or TV (18%), the wealthiest have an array of consumer goods: cell phone (27%), motor vehicle (17%), refrigerator (51%) and video player (29%).

Table 56
Percentages of Households in Urban Areas Owning Particular Assets, by Quintile

		Quintile of National Distribution				
Asset	**All**	**Poorest 20%**	**2**	**3**	**4**	**Richest 20%**
Axe	35	40	40	36	33	32
Bicycle	19	13	16	22	20	21
Brazier	91	93	94	92	93	86
Canoe	1	2	1	1	1	1
Cell phone	12	0	1	2	6	27
Computer	2	0	0	0	0	4
Crop sprayer	2	0	0	1	1	3
Donkey	0	0	0	0	0	0
Electric iron	36	6	14	22	35	61
Electric or gas stove	34	5	15	21	34	57
Fishing boat	0	0	0	0	0	0
Fishing net	1	3	1	2	1	1
Hammer/grinding mill	1	0	0	0	1	2
Hoe	54	63	60	54	51	51
Hunting gun	1	0	0	0	0	2
Knitting machine	0	0	0	0	0	1
Motor vehicle	7	0	0	1	2	17
Motorcycle	1	0	0	0	0	1
Non-electric iron	28	41	35	35	29	18
Non-residential building	2	0	1	3	2	4
Plough	2	1	0	1	1	3
Radio	62	36	45	58	66	78
Refrigerator	28	3	9	15	27	51
Residential building	46	49	56	49	44	42
Satellite dish	2	0	0	0	0	5
Scotch cart	0	0	0	1	0	1
Sewing machine	9	5	5	7	9	14
Telephone line	4	0	0	1	2	11
Tractor	1	0	0	0	0	1
TV	51	18	31	43	54	72
Video player	20	1	4	9	16	39

Notes: Calculations are weighted by household sampling weights. Thus, the statistics are by household rather than individual. The quintiles, however, are defined for individuals based on consumption per person using the national distribution. Within urban areas, the population is concentrated in wealthier quintiles.

Unsurprisingly, the principal activities of household heads in urban areas are markedly different from those in rural areas. Most heads in wealthier quintiles are involved in wage work. Approximately a quarter of heads in all quintiles report themselves to be self-employed. Unlike in rural areas, there are a fair number of unemployed; in the poorest quintile, they are 8 percent of households heads, not including the 5 percent who report themselves retired or too old to work. Summary information on household head activities is shown in Table 57.

Table 57
Principal Economic Activity of Household Head, Urban Areas
Percentages of Household Heads by Quintile of Consumption

		Quintile of National Distribution				
	All	**Poorest 20%**	**2**	**3**	**4**	**Richest 20%**
Wage work	53	30	41	48	56	67
Self-employed	23	25	25	24	25	21
Farming	7	14	12	9	6	3
Fishing	0	1	1	1	0	0
Forestry	0	0	0	0	0	0
Piecework	6	11	9	9	5	2
Not working & looking for work	2	5	2	3	2	2
Not working & not looking for work	1	3	0	0	1	0
Student	0	0	0	0	0	0
Productive unpaid family labor	1	2	1	2	1	1
Unproductive unpaid family work	1	1	1	0	1	1
Retired	2	2	3	2	3	2
Too old to work	2	3	4	2	1	0
Other	1	3	2	1	1	1
	100	100	100	100	100	100

Notes: Calculations are weighted by household sampling weights. The quintiles are defined for individuals based on consumption per person, using the national distribution. Within urban areas, the population is concentrated in wealthier quintiles.

Next we examine the activities of all urban Zambians over age 20. Table 58 summarizes information drawn from responses to three different survey questions, on principal economic activity, type of employer, and detailed occupation category. Percentages of individuals in each activity are shown by quintile. A substantial number—14 percent overall and 18 percent in the poorest quintile—are unemployed, and 21 percent report family labor as their main activity. Even after the liberalization push of the 1990s, government continues to employ a substantial portion of the urban population. Nine percent of all urban Zambian adults work for the government. (These figures exclude those working for parastatals.) Notably, government employees are concentrated in the top quintile.

Definitions of the informal sector vary and only correspond imperfectly to the occupation codes in the survey data. The bulk of people employed in the final four activities listed in the table—comprising "elementary" and service workers—would likely fall within most definitions of the informal sector. Twenty-one percent of urban Zambian adults work in these sectors, including seven percent who work in the narrow occupation category of stall and market salesperson. Substantial numbers of people in higher quintiles are found in these activities, suggesting that informal activities can provide a viable path out of poverty.

Table 58
A Breakdown of Activities for Individuals Age 20+, by Quintile Urban Areas

		Quintile of National Distribution				
	All	**Poorest 20%**	**2**	**3**	**4**	**Richest 20%**
Unemployed	14	18	16	14	14	13
Engaged in family labor	21	21	23	25	22	18
Student	5	2	4	4	6	7
Retired/too old to work	4	5	5	4	4	3
Government employee	9	3	3	6	9	16
NGO or International Organization Employee	1	0	0	0	0	1
Working in Private Sector						
Professionals	2	0	1	1	1	5
Technicians	2	0	0	1	2	3
Clerks	2	1	1	1	2	3
Skilled agricultural workers	7	14	11	8	6	3
Craft and related trade workers	8	8	9	10	8	6
Plant and machine operators	4	3	4	4	4	4
Elementary sales & service workers	6	9	8	7	6	4
Other elementary workers	2	3	1	1	2	1
Stall and market salesperons	7	5	7	8	9	5
Other service workers	6	5	6	5	7	6
	100	100	100	100	100	100

Table 59 shows the same breakdown by sex rather than quintile. Women are much more likely to report that family labor is their principal activity and much less likely to work as government employees, craft and related trade workers, or plant and machine operators. There are large numbers of women working as stall and market salespersons (7 percent) and as elementary sales and service workers (6 percent), a category which includes jobs like street vendor and domestic helper.

Table 59
A Breakdown of Activities for Employed Individuals Age 20+, by Sex, Urban Areas

	All	Men	Women
Unemployed	14	14	15
Engaged in family labor	21	7	36
Student	5	6	4
Retired/too old to work	4	4	4
Government employee	9	12	6
NGO or International Organization Employee	1	1	1
Working in Private Sector			
Professionals	2	3	1
Technicians	2	2	1
Clerks	2	2	2
Skilled agricultural workers	7	7	8
Craft and related trade workers	8	14	2
Plant and machine operators	4	7	1
Elementary sales & service workers	6	6	6
Other elementary workers	2	3	1
Stall and market salesperons	7	5	8
Other service workers	6	8	4
	100	100	100

Household activities can also be described in terms of sources of income. Table 60 shows a breakdown by income source and quintile, and Table 61 compares consumption to income and own production. Wages account for half of income for the average Zambian household, and 24 percent come from non-farm business income. Wage income is more important for households in the top quintile. Consumption of own production is just 5 percent of income (and 4 percent of consumption) but is more important for poorer households. Consumption tracks surprisingly well with income.

Table 60
Mean Shares of Household Income by Source, by Quintile, Urban Areas

		Quintile of National Distribution				
	All	Poorest 20%	2	3	4	Richest 20%
Food crop sales	1	2	2	2	1	1
Nonfood crop sales	0	0	0	0	0	0
Non-farm business	24	25	27	27	26	19
Livestock and other agricultural income	0	0	0	0	0	0
Salary	50	38	40	46	50	60
Remittances	6	8	6	5	6	5
Pension	1	0	1	1	1	1
Nonagricultural rent	3	3	4	4	2	2
Other income	10	14	13	9	10	9
Consumption of own production	5	9	7	7	4	3
	100	100	100	100	100	100

Notes: Calculations are weighted by household sampling weights. The quintiles are defined for individuals based on consumption per person, using the national distribution. Within urban areas, the population is concentrated in wealthier quintiles.

Table 61
Own Production as Share of Consumption and Income, by Quintile, Urban Areas

		Quintile of National Distribution				
	All	Poorest 20%	2	3	4	Richest 20%
Mean own production as % of income	5	9	7	7	4	3
Mean own production as % of consumption	4	6	5	4	3	2
Median ratio of consumption to income (*100)	97	93	95	102	102	95

Notes: Calculations are weighted by household sampling weights. The quintiles are defined for individuals based on consumption per person, using the national distribution. Within urban areas, the population is concentrated in wealthier quintiles.

6.5 Multivariate Regression Analysis

Finally, we examine the correlates of household consumption in a multivariate regression framework, regressing log consumption per adult equivalent on many of the variables examine above in the bivariate comparisons. Household head's age is not significant in the regression. Female-headed households do not have significantly lower consumption than male-headed households, and those dependent on female labor (with no adult males in the household) actually have higher consumption. The coefficients on household head's education and the maximum years of education in the household both show significant, positive coefficients. Both a larger household size and higher dependency ratio are associated with lower consumption. The coefficient on household size implies that consumption is 5.4 percent lower for each 10 percent increase in household size.

Table 62
Regression of Log Consumption on Potential Poverty Correlates, Urban Areas

Dependent variable = ln(consumption per adult equivalent)	Coefficient	Standard Error	t statistic
Ln(age of household head)	-0.022	0.052	-0.4
Female household head	-0.029	0.028	-1.1
Household dependent on female labor	0.242	0.047	5.1
Maximum years of education in household	0.090	0.009	9.7
Years of education of household head	0.052	0.007	7.8
Dependency ratio	-0.063	0.017	-3.7
Ln(household size)	-0.545	0.033	-16.5
Central Province	-0.060	0.068	-0.9
Copperbelt Province	-0.071	0.074	-1.0
Eastern Province	0.227	0.090	2.5
Luapula Province	-0.143	0.105	-1.4
Northern Province	-0.172	0.097	-1.8
Northwestern Province	0.039	0.088	0.4
Southern Province	0.037	0.069	0.5
Western Province	0.057	0.102	0.6
Constant	11.062	0.197	56.0

Number of observations: 4647
R-squared: 0.42

Notes: Variables other than age, education, dependency ratio, and household size are dummy variables.
The omitted province dummy is Lusaka.
Standard errors are adjusted for the cluster sampling design of the survey.

6.5 Changes Over Time

This section examines changes over time in urban areas. Issues related to the census-survey data comparison were discussed earlier in Section 5.7.

Table 63 shows changes in the industry of urban working adults over the decade between the censuses. The 1990s saw a substantial decline in the share working in the manufacturing and mining sectors. At the same time, employment in the health and welfare industry category, which is largely the public sector, also shrunk. There were relative shifts to the trade and to those who report that they are working in the farming sector. Much of the "trade" category includes informal employment. The general picture, then, is of a shift out of public sector and traditional heavy industry employment to more informal activities.[10]

Table 63
Industry of Working Individiduals, Urban Areas

	Men and Women		Men Only		Women Only	
	1990	2000	1990	2000	1990	2000
Farming	10.1	17.2	10.1	14.4	10.1	23.3
Mining	11.0	5.4	13.5	7.5	2.3	0.9
Manufacturing	14.7	9.3	16.0	10.8	10.2	6.1
Electricity, Gas, Water	1.8	1.6	2.1	2.2	0.5	0.5
Construction	4.8	4.3	6.0	6.0	0.6	0.6
Trade	11.4	24.1	8.7	20.2	20.9	32.2
Transport & Communication	8.8	7.9	10.4	10.7	2.9	1.9
Finance	6.0	4.1	5.3	4.1	8.4	3.9
Health & Welfare	31.5	26.2	27.9	24.1	44.1	30.5
	100.0	100.0	100.0	100.0	100.0	100.0

Notes: Values shown are percentages by industry of those age 15 and older who were reported working. Due to changes in the census questionnaire, the pool of women "working" in 2000 is substantially different from the pool of women reported "working" in 1990. Also, the overall response rate for the industry question was much higher in 2000 than in 1990: 95 percent vs. 83 percent.

The household demographic summary figures, shown in Table 64, show a decline in mean household size and an increase in the fraction of female headed households. Similar patterns were seen in rural areas. Unlike rural areas, urban areas also show a decline in the dependency ratio and no substantial change in the median age of household heads.

Table 64
Household Demographics, Urban Areas

	1990 Census	2000 Census	2002-03 LCMS
Mean household size	6.1	5.3	5.6
Median age of household head	38	36	39
Fraction with female household heads	0.13	0.18	0.21
Mean dependency ratio	0.95	0.88	0.89
Mean youth dependency ratio	0.92	0.85	0.86
Mean old-age dependency ratio	0.02	0.03	0.03

Table 65 shows water sources over time. The data show a decline in the percentage with access to piped water and an increase in the use of well or borehole water. This suggests a decline in the quality of the average urban household's water source. This is not completely clear,

[10] The 1990 census does not provide employment information for household members not present at the time of the survey. To maintain comparability between the two sets of industry figures, figures for the industry table were calculated for both censuses using only household members present at the time of the survey, excluding both visitors and those away at the time of the survey. Also, due to changes in a separate employment question, many more women are defined as "working" in 2000 than was the case in 1990. This is explained in greater detail in Appendix 2.

however, since in some cases a protected well or borehole would be superior to a pipe or tap delivering unsafe water.

Table 65
Main Source of Water, Urban Areas
Percentages of Households

	1990 Census	2000 Census	2002-03 LCMS
Pipe or tap	84	77	78
Well or borehole	13	18	18
River/stream/lake	2	2	3
Other	0	2	0
	100	100	100

Notes: Because response options in the LCMS differed substantially from those in the two censuses, survey and census responses were grouped into approximately corresponding categories.

Table 66 and Table 67 show changes over time in the sources of energy used for lighting and cooking. Both tables show substantial increases in the use of electricity

Table 66
Main Sources of Energy for Light, Urban Areas
Percentages of Households

	1990 Census	2000 Census	2002-03 LCMS
Electricity	35	44	48
Gas or Diesel	1	0	0
Paraffin/Kerosene	61	23	27
Candle	3	32	24
Wood and Other	1	1	0
	100	100	

Notes: Because response options in the LCMS were not identical to those in the two censuses, survey responses were grouped so as to approximately map to the census response options.

Table 67
Main Sources of Energy for Cooking, Urban Areas
Percentages of Households

	1990 Census	2000 Census	2002-03 LCMS
Electricity	23	37	41
Gas	1	0	N/A
Paraffin/Kerosene	3	0	N/A
Wood	16	10	9
Charcoal	57	52	50
Coal	0	0	N/A
Other	0	0	N/A
	100	100	100

Notes: Because response options in the LCMS were not identical to those in the two censuses, survey responses were grouped so as to approximately map to the census response options.

Table 68 shows types of toilet facilities available to urban households. The census data show a small decline in the percentage with access to flush toilets, with a corresponding increase in the percentage using pit latrines.

Table 68
Type of Toilet Facility, Urban Areas
Percentages of Individuals

	1990 Census	2000 Census	2002-03 LCMS
Flush	43	38	40
Pit latrine	52	57	58
Aqua privy	2	N/A	1
Bucket	0	0	N/A
Other/None	3	5	1
	100	100	100

Notes: Because response options in the LCMS were not identical to those in the two censuses, survey responses were grouped so as to approximately map to the census response options.

Tabulations of roof, wall, and floor material for urban households are given in Table 69, Table 70, and Table 71. Overall, they show negligible changes between 1990 and the time of the 2002-03 survey. One small exception is the fraction of households living in homes with concrete walls, which has increased slightly.

Table 69
Main Material Used for Roof, Urban Areas
Percentages of Households

	1990 Census	2000 Census	2002-03 LCMS
Concrete/cement	3	1	N/A
Asbestos sheet	46	50	49
Iron	36	33	29
Grass/thatch	13	13	11
Tiles	1	1	5
Other	2	2	6
	100	100	100

Note: Because response options in the LCMS were not identical to those in the two censuses, survey responses were grouped so as to approximately map to the census response options.

Table 70
Main Material Used for Wall, Urban Areas
Percentages of Households

	1990 Census	2000 Census	2002-03 LCMS
Burnt bricks	12	12	15
Mud bricks	27	23	23
Concrete blocks/slab	55	61	60
Stone	0	0	N/A
Iron	1	0	0
Pole and dagga/mud	4	2	2
Grass	1	0	0
Other	1	1	1
	100	100	100

Notes: Because response options in the LCMS were not identical to those in the two censuses, survey responses were grouped so as to approximately map to the census response options.

Table 71
Main Material Used for Floors, Urban Areas
Percentages of Households

	1990 Census	2000 Census	2002-03 LCMS
Concrete/Cement	78	77	81
Mud	20	18	19
Wood	1	0	0
Other	1	5	0
	100	100	100

Note: Because response options in the LCMS were not identical to those in the two censuses, survey responses were grouped so as to approximately map to the census response options.

Finally, Table 72 presents changes in asset ownership over time. The 2002-03 survey asset ownership figures are similar to those seen in the 2000 census. The table shows a slight increase between the censuses in the percentage of urban households owning a radio, from 53 to 63 percent, and a dramatic increase in the percentage owning a television, from 12 to 45 percent. The survey shows a further increase since 2000, with more than half of urban households owning a television in 2002-03.

Table 72

Asset Ownership, Urban Areas
Percentages of Households

	1990 Census	2000 Census	2002-03 LCMS
Radio	53	63	62
TV	12	45	51
Bicycle	N/A	18	19
Canoe	N/A	1	1
Donkey	N/A	0	0
Motorcycle	N/A	1	1
Plough	N/A	1	2
Refrigerator	N/A	24	28
Scotch cart	N/A	0	0
Telephone line	N/A	9	12*
Vehicle	N/A	7	7

* Figure for "telephone line" in 2002-03 LCMS is fraction owning cell phone.

Overall, as was the case for rural areas, the comparisons over time show a close correspondence between the recent survey data and the 2000 census, which lends confidence in the accuracy of the survey data. The figures generally show little change since 1990, except on two counts: the substantial increase in use of electricity for cooking and light, and the near-quadrupling of ownership of televisions.

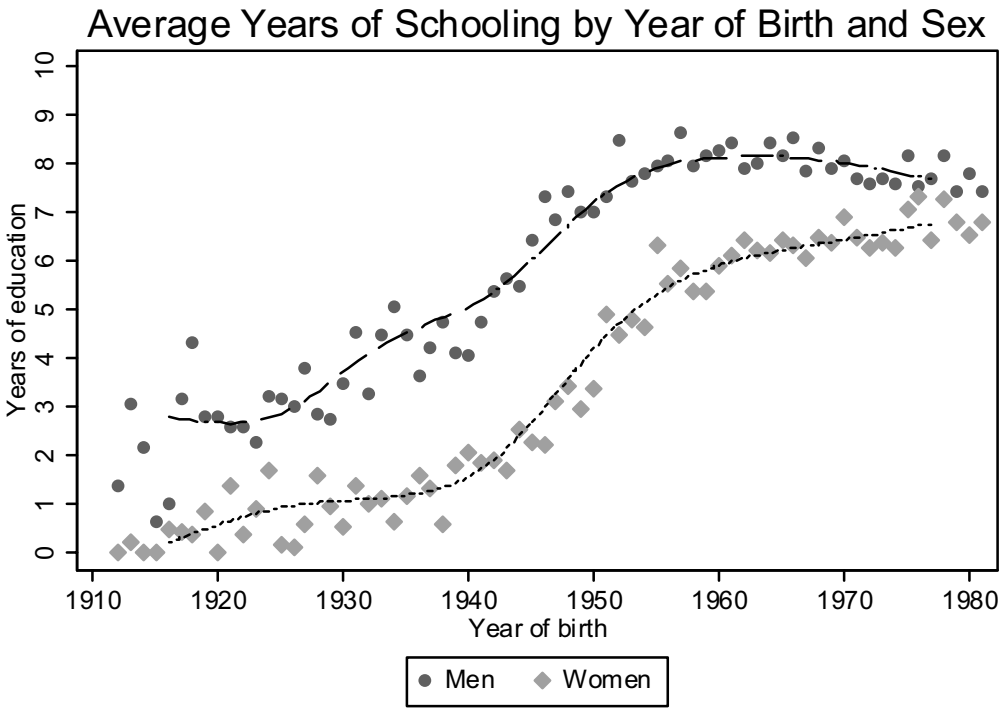
7 Education

In this section we examine school attendance and historical schooling patterns in the 2002-03 LCMS data. Figure 29 shows average years of education by year of birth, separately for men and women. Year of birth was calculated by subtracting reported age from 2003. The figure shows education levels for those born in 1982 and earlier. Figures are not shown for younger individuals because many in younger cohorts had not completed their education at the time of the survey.

It should be noted that these figures represent average education levels of the *surviving* members of each cohort. To the extent that there are differential mortality rates by education level, these figures will differ from the average education levels originally completed by all those born into the cohort.

Up through those born in the late 1950s (and thus typically completing their educations in the mid-1970s), there were continued gains in average education levels. Gains were particularly rapid for women. The average Zambian woman born in 1940 received just over one year of schooling, while women born in 1960 averaged over six years of education. Later cohorts of women showed continued modest gains, but average education levels for men have declined slightly. The dip for men at the far right of the graph partially reflects the fact that many young men at those ages have not completed their educations. Overall, however, it is clear that forward progress on education has stagnated since Zambia's economic woes intensified in the 1970s.

Figure 29



An alternative look at changes over time is given in Table 73, which shows mean years of completed education by age group and gender in 1990 and 2000, based on census data. Older Zambians in 2000 had substantially more education than those in corresponding age groups in 1990. This reflects the gains in schooling in the 1960s and 1970s. Likewise men age 25-34 in 2000 were no better educated than those 25-34 in 1990, a consequence of the stagnation in school enrollment growth in the 1980s. Young adults age 15-24, however, had completed more education on average than their counterparts in 1990, suggesting that school enrollment rates had increased in the later 1990s. Overall, mean education levels increased for both men and women as the oldest, least educated cohorts died off.

Table 73
Mean Completed Education by Age Group and Gender, 1990 and 2000 Censuses

	Men		Women	
Age Group	**1990**	**2000**	**1990**	**2000**
15-24	5.7	6.3	5.1	5.6
25-34	7.2	7.2	5.0	5.5
35-44	6.7	7.4	3.2	5.1
45-54	4.3	6.7	1.3	3.5
55-64	2.9	4.7	0.6	1.7
65+	1.6	3.1	0.3	1.0
All ages	5.6	6.4	4.0	4.9

A different story emerges when literacy rates are examined by age group. These are shown in Table 74 below. Overall literacy rates have remained constant at 77 percent for men and 57-58 percent for women. But literacy rates have actually declined among younger ages while increasing among older age groups as better educated Zambians age into the older categories. Most troubling is the drop in literacy rates among those age 15-24, from 80 to 75 percent for men and from 72 to 65 percent for women.

The recent small increases in mean education completion are not reflected in clearly higher literacy rates. There are two factors that could explain this phenomenon. First, it is possible that the quality of education has suffered due to budget cuts and the strain of teacher shortages, brought on in part by the strain of HIV. Second, it may be that while those who are literate are staying in school longer, fewer Zambians are achieving literacy. This hypothesis—that inequality in education achievement has increased—merits further analysis.

Individual cohorts can be tracked by comparisons along the diagonals of Table 74. For example, the group age 25-34 in 2000 was age 15-24 in 1990. The literacy rate for men in that age group remained stable for men at 80 percent. For women, the literacy rate for that cohort dropped from 72 to 64 percent. A similar drop occurred for the next oldest cohort, those who were 25-34 in 1990. This could occur if literate women were much more likely to die (and thus drop from the cohort) during that period. The census figures do in fact show large declines in the populations of younger cohorts. Given that both literacy rates and HIV infection rates are highest in urban areas, and that HIV rates are very high for young women, it is likely that the declines in literacy are due at least in part to HIV-related deaths.

Table 74
Literacy Rates by Age Group and Gender, 1990 and 2000 Censuses

	Men		Women	
Age Group	**1990**	**2000**	**1990**	**2000**
15-24	80	75	72	65
25-34	85	80	68	64
35-44	84	83	50	61
45-54	72	80	25	46
55-64	60	68	14	26
65+	41	53	7	14
All ages	77	77	57	58

Next, we consider current school attendance rates by age group, sex, urban/rural, and quintile. This information, taken from the 2002-03 survey, is summarized in Table 75. In both rural and urban areas, attendance rates are lowest in the poorest quintiles.

Table 75
School Attendance Rates by Age Group, Sex, Urban/Rural, and Quintile of Consumption

Age Group, Sex, and Urban/Rural	All	Quintile of National Distribution				
		Poorest 20%	2	3	4	Richest 20%
Rural, Male						
5-6	12	10	11	4	20	22
7-13	70	66	66	72	74	80
14-18	69	64	73	66	69	74
19-22	28	26	39	30	19	23
Rural, Female						
5-6	13	9	13	9	17	26
7-13	72	62	70	79	75	78
14-18	50	48	54	53	49	43
19-22	9	9	12	11	7	5
Urban, Male						
5-6	43	22	27	32	53	72
7-13	88	75	84	88	90	96
14-18	79	63	76	78	87	87
19-22	34	26	24	35	35	41
Urban, Female						
5-6	46	19	33	43	56	69
7-13	86	77	81	88	88	94
14-18	68	59	65	61	74	74
19-22	21	8	16	15	22	32

Notes: Calculations are weighted by household sampling weights. The quintiles are defined for individuals based on consumption per person, using the national distribution. Within rural areas, the population is concentrated in poorer quintiles.

Finally, Table 76 and Table 77 display the types of schools attended by quintile and urban/rural. In rural areas, almost all students attend schools run by the central government, with no substantial difference by quintile. In urban areas, 12 percent, chiefly those in the wealthier quintiles, attend private school.

Table 76
Type of School for Those Attending School, All Ages, by Quintile, Rural Areas

		Quintile of National Distribution				
Type of School	**All**	**Poorest 20%**	**2**	**3**	**4**	**Richest 20%**
Central government	90	87	90	94	88	90
Local government	2	1	3	1	3	1
Mission/religious	2	4	1	2	2	1
Industrial	0	0	0	0	0	0
Private	2	1	2	1	1	4
Other	4	6	4	2	5	3
	100	100	100	100	100	100

Notes: Calculations are weighted by household sampling weights. The quintiles are defined for individuals based on consumption per person, using the national distribution. Within rural areas, the population is concentrated in poorer quintiles.

Table 77
Type of School for Those Attending School, All Ages, by Quintile, Urban Areas

		Quintile of National Distribution				
Type of School	**All**	**Poorest 20%**	**2**	**3**	**4**	**Richest 20%**
Central government	79	78	86	84	81	71
Local government	3	6	1	2	2	3
Mission/religious	4	5	5	4	3	4
Industrial	0	0	0	0	0	0
Private	12	5	5	7	12	21
Other	2	5	3	3	1	0
	100	100	100	100	100	100

Notes: Calculations are weighted by household sampling weights. The quintiles are defined for individuals based on consumption per person, using the national distribution. Within rural areas, the population is concentrated in poorer quintiles.

8 Conclusions

The work presented here is one component of a wider assessment of poverty in Zambia. Additional work remains to more fully sketch the profile of the poor in Zambia. But the material here by itself suggests several observations.

First, poverty is very high in Zambia. The poverty figures presented here are slightly lower than those found in early analyses based on earlier surveys. To a substantial extent, this may reflect changes in survey design and the details of the poverty analysis methodology. It may also be due to some changes in actual conditions in the country. Unfortunately, it is not possible to isolate the different sources of this change. But there is no doubt that more than half of Zambians have consumption levels that are insufficient to meet their basic needs.

Second, in rural areas, differences in various welfare indicators show relatively small differences between rich and poor. For the most part, both rich and poor in rural areas are chiefly occupied with agriculture with few assets and household amenities and poor access to services. The average household in all ranges of the economic distribution subsists chiefly on

consumption of its own agricultural production.

Third, even those in the poorest quintile living in urban areas are better off in terms of many indicators than those in the wealthiest quintile living in rural areas. In terms of household services and consumer goods, urban households have far more than rural households. Along these same indicators and in terms of aggregate consumption, there is much higher inequality in urban areas.

Much of what is described in this paper can be understood in terms Zambia's past. The substantial homogeneity of rural areas reflects the long-standing lack of public investment in rural areas. Absent public infrastructure, even those of relative means in rural areas are unable to acquire higher quality services. Likewise, much of what we see in urban Zambia, e.g. the high fraction of homes with their own water taps and concrete walls, likely reflects the relative wealth Zambia had when it was flush with copper money and lavished funds on urban infrastructure.

Although a static view of the nation by itself cannot offer the way forward, the statistics presented here do suggest that Zambia still has untapped potential, not only in its natural resources, but also in its people. The nation's average education levels have remained relatively high for sub-Saharan Africa. And the economic activity analysis suggests a diverse and thriving informal sector in urban areas that may be underappreciated in official analyses. Zambia's hope for the future may be in harnessing that potential.

9 References

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Appendix 1: Comparison of Poverty Methodology with Zambia Central Statistical Office

The methodology employed in this paper is broadly similar to that used by the Zambia CSO in its own analysis of the 2002-03 LCMS data. However, the methodology differs in several key details:

A1.1 Reference prices: Median prices vs. Lusaka cycle 1 prices

As the reference prices for its price index, CSO used prices collected in Lusaka Province during the first of ten cycles, where a cycle corresponds to a data collection period lasting 36 days. The danger in using such a narrow set of prices is that the results will be sensitive to outliers in the data. The LCMS price data, like much price data from developing countries, is extremely noisy, with implausibly large variation in prices across time and space.

As Deaton and Zaidi (2002) note, "A good choice [for reference prices] is to take the median of the prices observed …." They argue that the use of medians reduces sensitivity to outliers. Furthermore, "[t]he use of a national average price vector ensures that the money metric measures conform as closely as possible to national income accounting practice, as well as eliminating results that might depend on a price relative that occurs only rarely or in some particular area."

An additional reason to favor the use of median prices is that for future comparisons over time with new data, it will be necessary to replicate the price concept underlying the 2002-03 poverty estimates. Because the timing and design of a future survey may differ somewhat, it may not be possible to collect prices that correspond well to the Lusaka cycle 1 prices in the 2002-03 survey. For these reasons, the analysis in this paper use a price index referenced to national median prices.

A1.2 Price index: Single-stage vs. two-stage

CSO employed a two-stage price index procedure rather than a single-stage index. First, consumption figures were adjusted over time, to cycle 1 within each province, using a province-specific temporal price index. Second, the consumption data was adjusted to Lusaka cycle 1 using a second spatial price index.

In the judgment of this author, the two-stage index unnecessarily doubles the number of calculations and involves the province-specific cycle 1 price data, which introduces new error into the calculations. The use of a single-stage price index, adjusting consumption directly from a province-cycle set of prices to national median prices, reduces the number of calculations and bypasses the province cycle 1 data. As explained above, this single-stage price index can be used to produce summary price indices at the province and cycle levels.

A1.3 Price index: Adjust non-food and durable goods components?

Like most developing country household consumption surveys, the LCMS includes price data for food but not non-food goods. The familiar question arises as to what price adjustment, if any, to apply to the non-food portion of consumption. Both for this paper and for the CSO analysis, a composite price index was constructed based on the food price index and a housing price index was constructed using the coefficients from the housing cost imputation. What price adjustment should be applied to the remaining non-food components, which are the durable

goods user fee and other non-food? CSO applied the food price index to these components. This is sensible, assuming that food and non-food prices tend to be correlated. However, it is not clear that they are correlated, and they may even be negatively correlated if, for example, transport costs are important so that in rural areas agricultural goods are cheaper and manufactured goods are more expensive. Given this uncertainty, for this paper the remaining non-food components are left in nominal terms.

A.1.4 Calorie requirement used to calculate poverty line

CSO reports that it has used a calorie requirement of 2094 calories per capita, although it calculated its poverty figures on a per adult equivalent basis. CSO employed the same adult equivalents used in an earlier study, Republic of Zambia (1997), based on calorie requirements established by the National Food and Nutrition Commission (1993).[11]

The analysis in this paper uses calorie requirements based on World Health Organization guidelines. The WHO figures were chosen so as to give the poverty line as solid a basis as possible in a widely recognized reference.

A.1.5 Determination of food basket underlying poverty line

In general, quantity data by food item is required to construct a food basket for a food poverty line. Because the 2002-03 LCMS did not include direct quantity data, it was necessary to use some sort of second best procedure.

CSO chose to calculate average item shares in expenditure for a group of households with expenditure per adult equivalent equal to the unweighted median plus or minus 20 percent. Next, representative expenditures by item were calculated by multiplying these shares by median expenditure. These expenditure values were then divided by Lusaka cycle 1 prices to generate quantities for a preliminary consumption basket.

Given the data imperfections, the first part of the CSO procedure is reasonable. The households in a range around the median provide a plausible set of nationally representative expenditure shares by item. However, because these expenditure shares are for the country as a whole, to convert these shares to quantities, some set of nationally representative prices should be used, rather than Lusaka cycle 1 prices. The obvious choice would be national median prices. Calculating quantities by dividing national average expenditure shares by Lusaka cycle 1 prices is inconsistent and distorts the composition of the food basket. The resulting basket is representative neither of the nation as a whole nor of Lusaka during cycle 1. Relative to a truly nationally representative food basket, CSO's resulting food basket has too little of foods that are expensive in Lusaka cycle 1 and too much of those that are cheap in Lusaka cycle 1.

For purposes of this paper, a different procedure was used to determine the food basket. Quantities were estimated at the household-item level by dividing reported expenditures by province-cycle prices. Because the price data is noisy and does not reflect the actual prices paid by individual households, this procedure is inferior to the use of true quantity data. Nonetheless, it is the best approximation available to household-level quantities. Next, average quantities were calculated for households in the middle (3rd) quintile nationally. These items were ranked in descending order by cost for the average quantity, at national median prices. The final food basket was defined as the top 44 items, which accounts for 90% of the cost of the preliminary basket.

Using the list of items produced by its method, CSO chose to use the top 61 food items, accounting for 94% of expenditure in the preliminary list. This cutoff (and the 90% cutoff used for this paper) is arbitrary.

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[11] The adult equivalent weights are 0.36 for a child aged less than 4, 0.62 for age 4-6, 0.78 for age 7-9, 0.95 age 10-12, and 1.0 for all others.

Separate from the question of how to determine the quantities in the food basket is the issue of the choice of prices used to cost the food basket when determining the poverty line. The price index is used to adjust nominal consumption values, and the adjusted consumption values are used to determine poverty rates. It follows that the food basket must be priced using the same set of prices which are the reference prices for the price index. Accordingly, CSO priced its basket using Lusaka cycle 1 prices, while for this paper the basket was priced with national median prices.

A.1.6 Determining the non-food share

To calculate the total poverty line, it is necessary to estimate the typical non-food share in consumption. CSO used 0.3, which is roughly the non-food share observed across the distribution. For purposes of this paper, the non-food component was determined by calculating the average non-food share for households in the third quintile of consumption. This non-food share is 0.28.

Appendix 2: Census Employment and Industry Figures

Comparisons of employment variables, such as industry of employment, between the 1990 and 2000 censuses is complicated by the fact that the question used to define who is working differs in the two censuses. Specifically, the 1990 response "Working for pay or profit" was replaced in 2000 with four different responses corresponding to paid/unpaid and seasonal/non-seasonal work. Summary figures for men and women are shown in Table 78 below.

Table 78
Main Economic Activity for Past 12 Months, Individuals Age 15+, 1990 and 2000 Census

	Men and Women		Men Only		Women Only	
	1990	2000	1990	2000	1990	2000
1a) Working - Paid non-seasonal (2000 only)		11.0		17.1		5.2
1b) Working - Unpaid non-seasonal (2000 only)		2.4		3.1		1.8
1c) Working - Paid seasonal (2000 only)		6.6		9.5		3.9
1d) Working - Unpaid seasonal (2000 only)		10.2		10.6		9.9
Total of all 2000 "Working" responses		*30.3*		*40.2*		*20.9*
1) Working for pay or profit (1990 only)	*23.1*		*37.6*		*9.3*	
2) On leave	0.2	0.1	0.3	0.1	0.2	0.1
3) Unpaid work on hhold holding or business	22.1	24.6	24.0	22.4	20.2	26.7
4) Unemployed and seeking work	3.8	5.1	5.1	7.3	2.6	3.0
5) Not seeking work but available for work	3.5	2.8	4.1	3.2	2.8	2.3
6) Full-time housewife/homemaker	22.8	15.0	2.1	1.6	42.5	27.8
7) Full-time student	12.8	14.1	15.6	16.9	10.2	11.5
8) Not available for work for other reasons	11.8	8.1	11.2	8.4	12.3	7.8
	100.0	100.0	100.0	100.0	100.0	100.0
% Working Paid (Response 1a, 1c, or 1)	23.1	17.6	37.6	26.6	9.3	9.1
% Working, On Leave, or Doing Unpaid Work (Response 1a, 1b, 1c, 1d, 1, 2, or 3)	45.4	55.0	61.9	62.7	29.6	47.7

Notes: Figures shown are percentages of individuals age 15+. In 2000, response options 1a, 1b, 1c, and 1d replaced response option 2 from the 1990 questionnaire. Only those reported to be working, on leave or performing unpaid work provided a response to the separate occupation question.

In principle, the sum of the four "working" categories in 2000 should be equivalent to the "working for pay or profit" category in 1990. Given that overall labor force participation rates are unlikely to change by more than a few percentage points over the course of the decade, if the sum of the four categories in 2000 is equivalent to the single 1990 category, the figures should roughly correspond. For men, the sum of the four categories in 2000 is 40.2 percent, versus 37.6 percent who were reported "working for pay or profit" in 1990. This gap is small enough that it might reflect an actual change in labor force participation rates. We can also take a broader measure of "working" and include in both census figures those reported to be on leave or performing "unpaid work on household holding or business." Totals for this broader work measure are shown on the last line of Table 78. By this measure, 61.9 percent of men in 1990 and 62.7 percent of men in 2000 were working. Given the close correspondence, it is reasonable to assume that for men the underlying concept of "working" is roughly equivalent for the two censuses.

For women, the comparison shows very different results. In 1990, only 29.6 percent of women were "working" by this broad measure, compared to 47.7 percent in 2000. The 2000 census also shows a sharp drop in the fraction of women reported to be fulltime housewives/homemakers. It is likely that as a result of the expansion of the work categories in 2000 to explicitly include unpaid and seasonal work, many women who would have previously reported their primary activities to be "housewife/homemaker" reported themselves to be in working categories.

Both censuses collected information on occupation and industry, but only for those who were reported to be working, on leave, or doing unpaid work. Due to the change in the employment question, a much higher fraction of women is in this pool in 2000 than was included in 1990. This complicates interpretation of occupation or industry data.

Table 79 shows industry by gender and year including all those who are working. (Corresponding figures for urban and rural areas separately can be found in the body of the paper.) Table 80 shows the same information, but for a more limited group of workers in both years who reported that they were paid. This corresponds to those who were "working for pay or profit" in 1990 and those in 2000 who were either "working – paid seasonal" or "working – paid, non-seasonal." Because many unpaid workers are in agriculture, the fraction reported to work in farming declines greatly when limiting the analysis to paid workers. However, the figures for both all workers and paid workers show broadly similar patterns over time for both men and women: increases in the percentages in farming and trade sectors, and decreases in the fractions working in mining, manufacturing, and health and welfare. The fact that the time trend is not sensitive to the choice of paid vs. non-paid workers suggests that the changes are real and not merely an artifact of the change in the census employment question.

Table 79
Industry of Working Individuals, National

	Men and Women		Men Only		Women Only	
	1990	2000	1990	2000	1990	2000
Farming	59.3	75.2	53.8	68.9	71.1	83.0
Mining	4.4	1.4	6.2	2.4	0.6	0.2
Manufacturing	6.6	3.0	8.0	4.0	3.6	1.8
Electricity, Gas, Water	0.7	0.4	1.0	0.7	0.1	0.1
Construction	2.4	1.4	3.4	2.5	0.2	0.1
Trade	4.9	7.3	4.3	7.3	6.2	7.2
Transport & Communication	3.7	2.1	5.1	3.5	0.8	0.3
Finance	2.6	1.1	2.6	1.4	2.6	0.8
Health & Welfare	15.3	8.1	15.6	9.4	14.7	6.6
	100.0	100.0	100.0	100.0	100.0	100.0

Notes: Values shown are percentages by industry of those age 15 and older who were reported working. Due to changes in the census questionnaire, the pool of women "working" in 2000 is substantially different from the pool of women reported "working" in 1990. Also, the overall response rate for the industry question was much higher in 2000 than in 1990: 95 percent vs. 83 percent.

Table 80
Industry of *Paid* Working Individuals, National

	Men and Women		Men Only		Women Only	
	1990	2000	1990	2000	1990	2000
Farming	31.9	43.1	31.9	42.1	32.3	45.7
Mining	8.1	4.4	9.7	5.6	1.7	0.8
Manufacturing	11.0	6.6	11.8	7.2	8.2	4.7
Electricity, Gas, Water	1.4	1.3	1.6	1.6	0.4	0.4
Construction	4.2	3.7	5.1	4.8	0.5	0.5
Trade	7.2	10.5	5.6	8.9	13.6	15.0
Transport & Communication	6.7	6.1	7.9	7.6	2.2	1.7
Finance	4.1	2.5	3.7	2.5	5.9	2.6
Health & Welfare	25.3	22.0	22.9	19.6	35.3	28.6
	100.0	100.0	100.0	100.0	100.0	100.0

Notes: Values shown are percentages by industry of those age 15 and older who were reported working. Due to changes in the census questionnaire, the pool of women "working" in 2000 is substantially different from the pool of women reported "working" in 1990. Also, the overall response rate for the industry question was much higher in 2000 than in 1990: 95 percent vs. 83 percent.