

A Poverty Profile for the Southern States of Sudan

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The World Bank
Poverty Reduction and Economic Management Unit, Africa Region



CURRENCY EQUIVALENTS

Currency Unit = Sudanese Pound

US\$1 = 2.68 Sudanese Pounds

(As of March 2, 2011)

ACRONYMS AND ABBREVIATIONS

CBS	Central Bureau of Statistics
NBHS	National Baseline Household Survey
SHHS	Sudan Household Health Survey
SSCCSE	Southern Sudan Centre for Census, Statistics and Evaluation
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This poverty profile was prepared principally by Gabriel Demombynes (TTL) and Alessandro Romeo (consultant), with valuable inputs from Kristen Himelein (DECPI) and Paul Gubbins (consultant).

The analysis presented here is based mainly on the 2009 National Baseline Household Survey, which was funded by the African Development Bank.

1. POVERTY PROFILE

INTRODUCTION

1.1 This poverty profile has been prepared as part of the World Bank's Sudan Poverty Assessment. The Poverty Assessment is being prepared with the key objective of informing policy planning by Sudanese authorities. The poverty profile presents an overview of poverty, demographics, livelihoods, education, and health in the Southern states of Sudan. Other forthcoming work conducted as part of the Poverty Assessment will present more detailed analysis of health, education, employment, and migration in Sudan. This poverty profile has been prepared on an accelerated schedule in advance of the remainder of the Poverty Assessment in order to provide government authorities with initial findings to inform immediate policy planning needs.¹

1.2 Poverty profiles have been prepared separately for the Northern and Southern states because each is based on a different dataset. The poverty profiles are based principally on the 2009 National Baseline Household Survey (NBHS), the first nationally representative household consumption survey conducted in Sudan. The NBHS was carried out jointly by the Central Bureau of Statistics (CBS) and the Southern Sudan Centre for Census, Statistics and Evaluation (SSCCSE). The survey data was collected separately in the Northern and Southern states, generating two different datasets. Unifying and harmonizing the two datasets will require additional, forthcoming work. This document presents the profile for the Southern states. A separate document with a parallel structure is in preparation and will present the profile for the Northern states.

1.3 It is important to emphasize that the poverty rates found in this document and the separate poverty profile for the Northern states cannot be compared to one another. This is chiefly a consequence of the fact that they were prepared using different poverty lines. Comparable poverty rates will be prepared in the future once a comparable poverty line is generated and a unified, harmonized dataset is prepared. These issues are discussed further at the beginning of Section 2 of this document.

1.4 Several of the figures and tables show indicators calculated for consumption quintiles. The quintiles are determined by ranking the entire population from lowest consumption level to highest consumption level and then creating groups each consisting of 20 percent of the population. Thus, the first quintile consists of the poorest 20 percent of the population, the second quintile is the next 20 percent, the third quintile is the middle 20 percent, the fourth quintile is the second wealthiest 20 percent, and the fifth quintile is the wealthiest 20 percent of the population.

¹ The following publications produced by the Southern Sudan Centre for Census, Statistics and Evaluation SSCCSE are available on the SSCCSE website (<http://ssccse.org>) and are recommended as additional resources: *Poverty in Southern Sudan*, *Southern Sudan Fast Facts*, and *2010 Statistical Year Book*.

1.5 The poverty profile is presented in two parts: 1) a set of 11 key figures, accompanied by explanatory text, and 2) an annex with a series of tables with more detailed results.

POVERTY LEVELS AND DEMOGRAPHICS

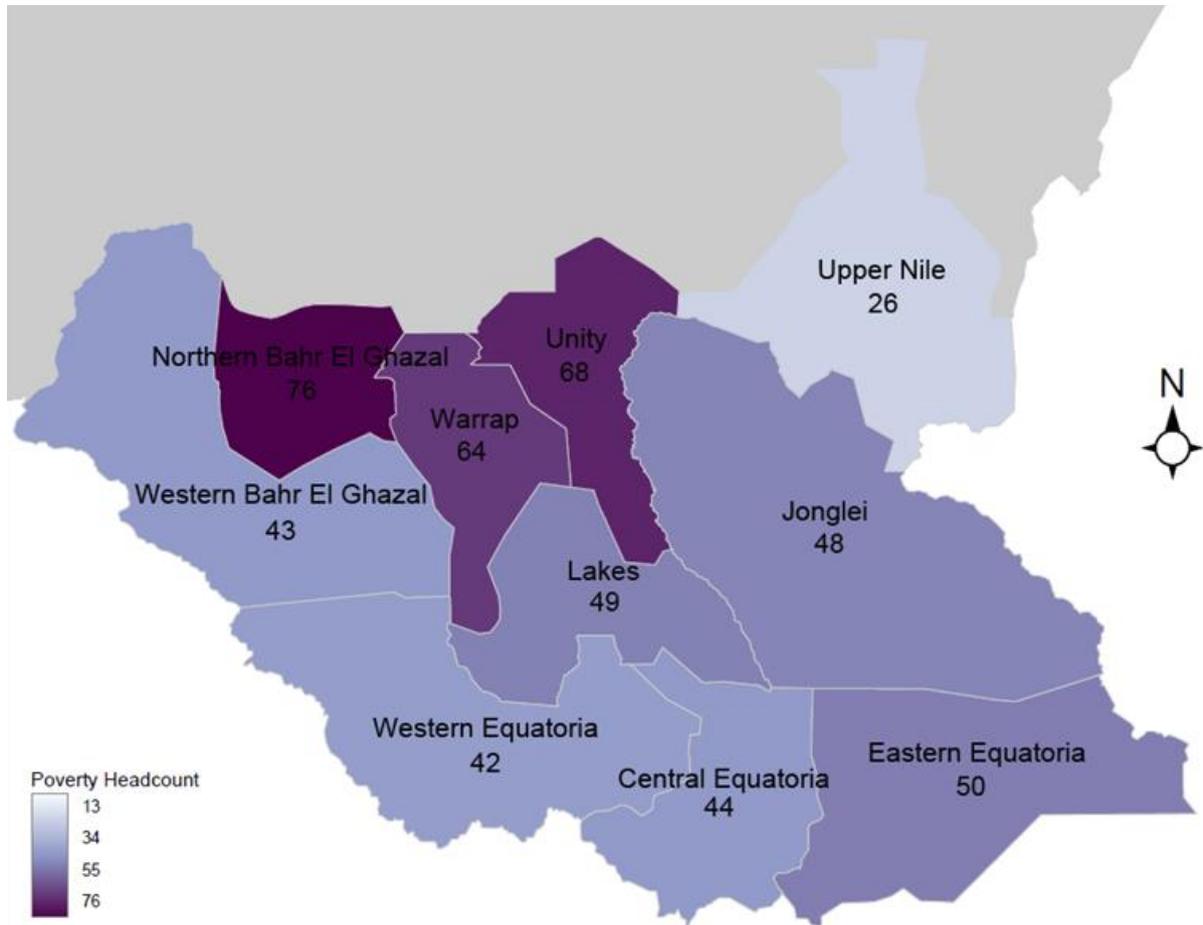
1.6 **This poverty profile uses the approach to poverty measurement which reflects the consensus view of researchers and has become the standard for analyzing poverty worldwide.** This approach recognizes the multidimensionality of poverty and takes a consumption-based welfare measure as the starting point for an analysis of poverty. In brief, this approach involves using detailed consumption data from a household survey to generate a “consumption aggregate” at the household level, calculating a poverty line which reflects the monetary value of consumption needed to fulfill basic needs, and then applying the consumption aggregate values to the poverty line to estimate various poverty measures.

1.7 **The poverty line and poverty estimates were calculated separately for the Northern and Southern states by the Central Bureau of Statistics and the Southern Sudan Centre for Census, Statistics, and Evaluation with the assistance of an experienced international consultant who has done similar work in a number of countries.** The full methodology employed, which is detailed in the reports prepared for the Government of Sudan and the Government of Southern Sudan, matches closely the methodology that the World Bank advises countries around the world to use.

1.8 **Overall, 50.6 percent of the population in the Southern states is below the poverty line.** Poverty rates are substantially lower in urban areas, where 24.4 percent are below the poverty line, compared to 55.4 percent of the rural population. Figure 1 shows the poverty headcount rate—the fraction of the population living below the poverty line—for each of the Southern states. The poverty rate is highest in Northern Bahr El Ghazal and lowest in Upper Nile.

1.9 **The poverty line used to calculate the poverty rates is 72.9 SDG per person per month.** At *market* exchange rates at the time of the survey used to calculate the poverty rates (April-May 2009), this was equivalent to US\$32 per person per month, or just over US\$1 per person per day. The standard practice of the World Bank for international poverty comparisons is to use a US\$1.25-a-day poverty line, calculated using not market exchange rates but 2005 *purchasing power parity* (PPP) exchange rates. PPP exchange rates reflect country-specific costs-of-living and can differ substantially from market exchange rates. There is no existing estimate of the PPP exchange rate for Southern Sudan. The World Bank team is currently working on developing a PPP exchange rate estimate and intends to publish an estimate of the \$1.25-a-day poverty rate for purposes of international comparison later in 2011.

Figure 1: Poverty Headcount by State (Percentage of Population with Consumption Below the Poverty Line), Southern States



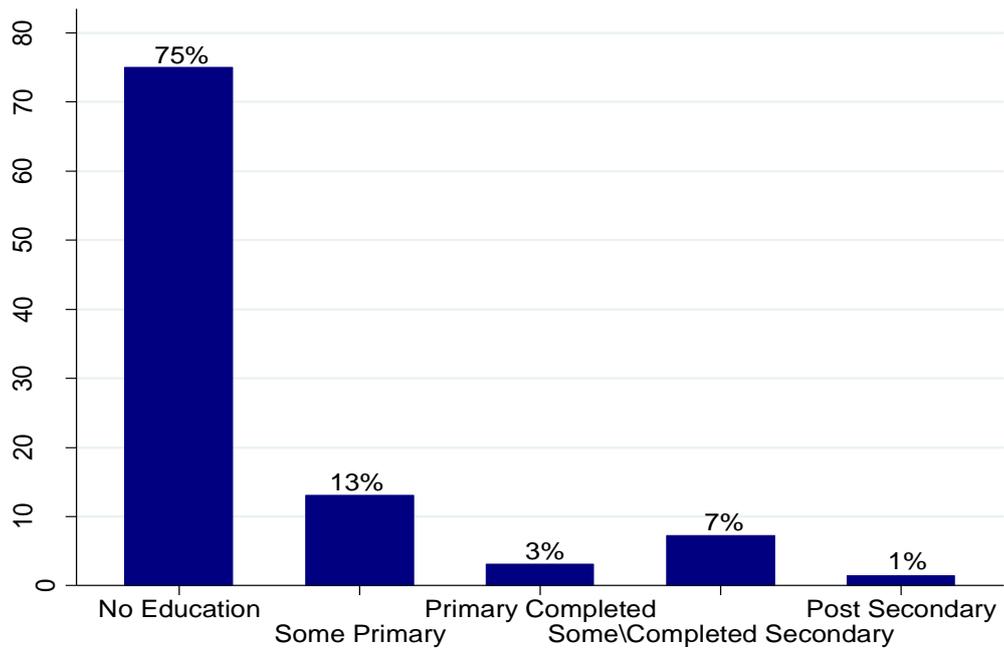
Source: World Bank analysis of NBHS 2009.

Note: The boundaries shown do not imply any judgment on the part of the World Bank concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

1.10 Poverty rates are slightly higher for households headed by women. Just over one-quarter (28.6%) of households are headed by women. Among these households, 56.9 percent are below the poverty line, compared to 48.1 percent of households headed by men.

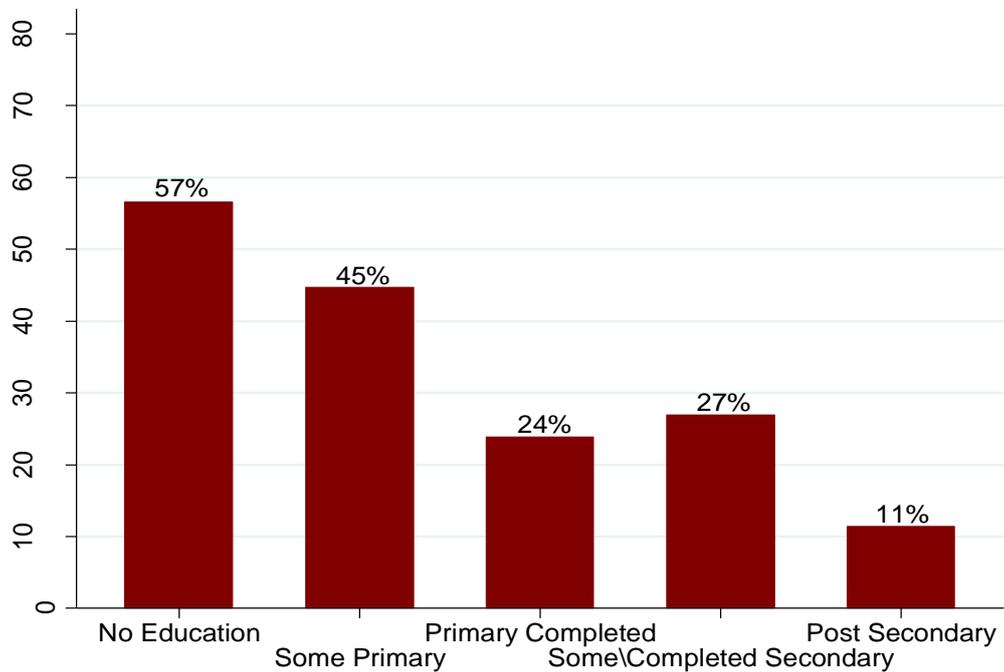
1.11 Education levels in the Southern states are extraordinarily low, and poverty rates correlate highly with education. Three out of four household heads have completed no formal education. Poverty rates are highest for those living in households whose head has no education or only some primary education, and they are much lower for households where the head has more education.

Figure 2: Education Level of Household Heads, Southern States



Source: World Bank analysis of NBHS 2009.

Figure 3: Poverty Headcount Rates by Education of Household Heads, Southern States

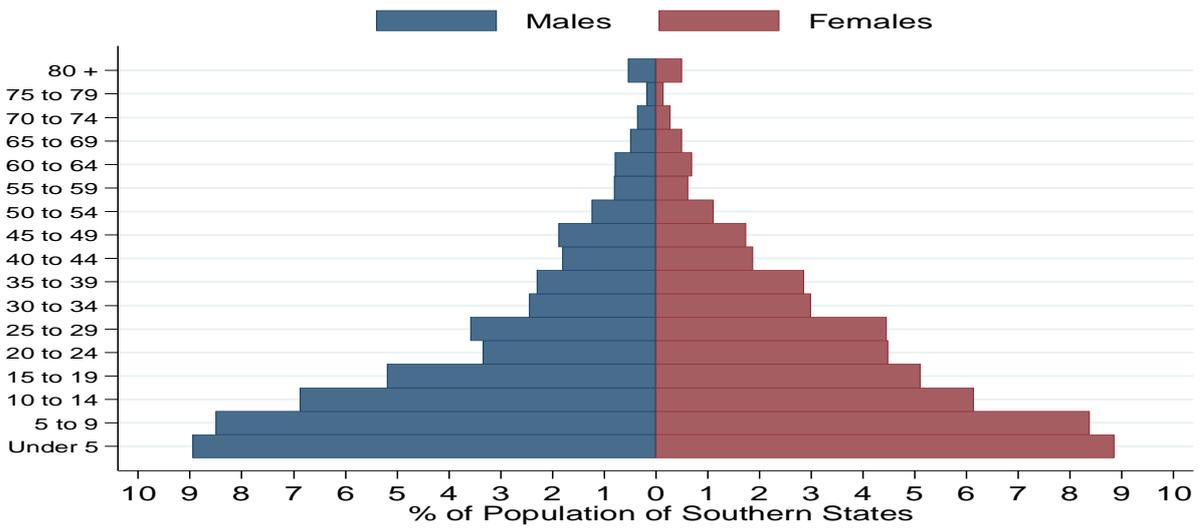


Source: World Bank analysis of NBHS 2009.

Note: Figures shown are percentages of individuals below the poverty line, by education of their household heads.

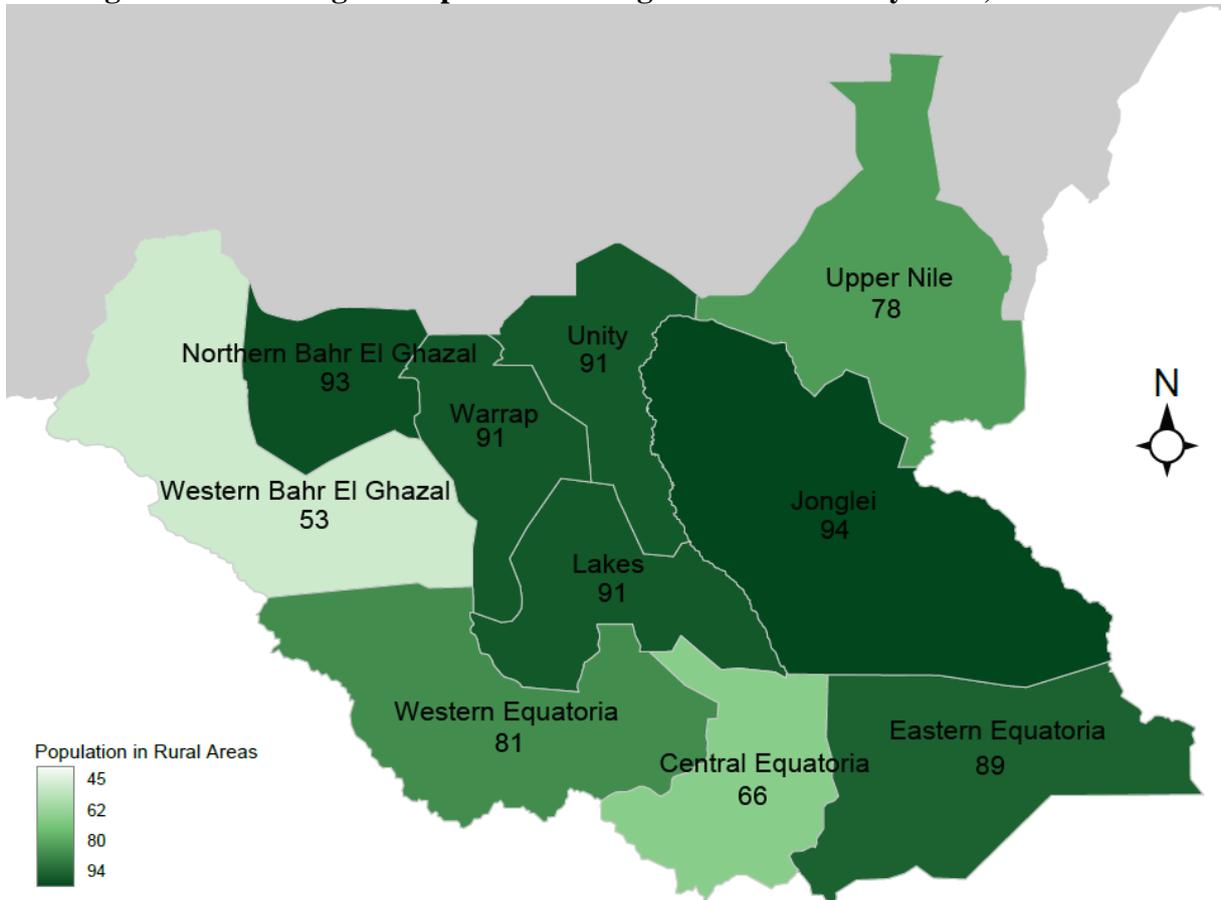
1.12 The wide base to the population pyramid indicates that the Southern states have a very young population. Figure 4 shows the population pyramid. The pyramid also shows that the sex ratio is very low for the population 20-39, i.e. the population of men is substantially smaller than the population of women.

Figure 4: Population Pyramid, Southern States



Source: World Bank analysis of NBHS 2009.

Figure 5: Percentage of Population Living in Rural Areas by State, Southern States



Source: World Bank analysis of NBHS 2009.

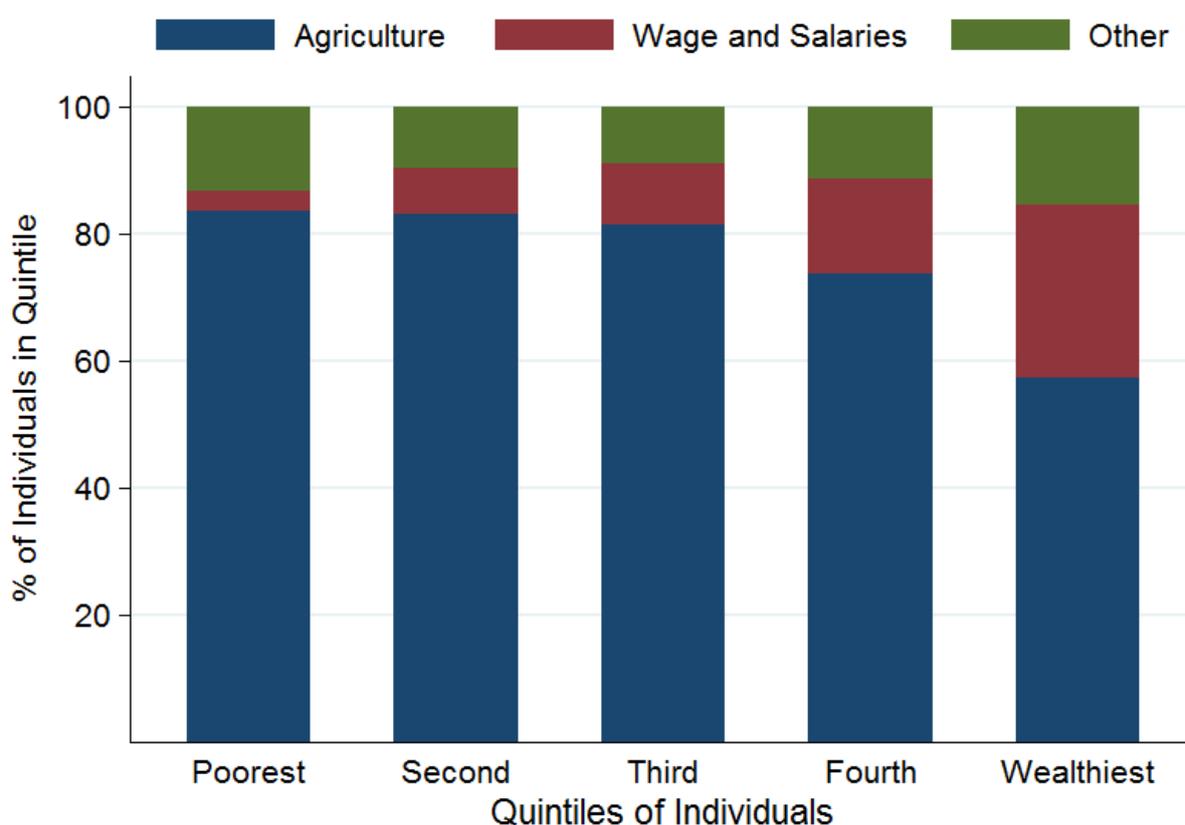
Note: The boundaries shown do not imply any judgment on the part of the World Bank concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

1.13 **The majority of the population of every Southern state is rural.** Overall, 84.4 percent of the population of the Southern states lives in rural areas. The largest rural population (as a percentage of the state’s population) is in Jonglei, where 94.3 percent of the population is rural. The least rural state is neighboring Western Bahr El Ghazal, where 53 percent of the population is rural.

LIVELIHOODS AND SHOCKS

1.14 **A broad measure of the main sources of livelihoods indicates that households across the economic spectrum are chiefly engaged in farming and the raising of livestock.** Figure 6 shows the breakdown of main livelihoods for each quintile (group of 20%) of the population among three main categories: agriculture (including crop farming and animal husbandry), wages and salaries, and other (business enterprise, property income, remittances, pension, aid, and other.) Of households in the poorest 20 percent of the population, 83.7 percent live in households that are chiefly occupied in agriculture. The household activities of the wealthiest 20 percent are more diverse: 57.4 percent work chiefly in agriculture, and 27 percent live mostly on wages and salaries.

Figure 6: Main Livelihoods by Quintiles, Southern States

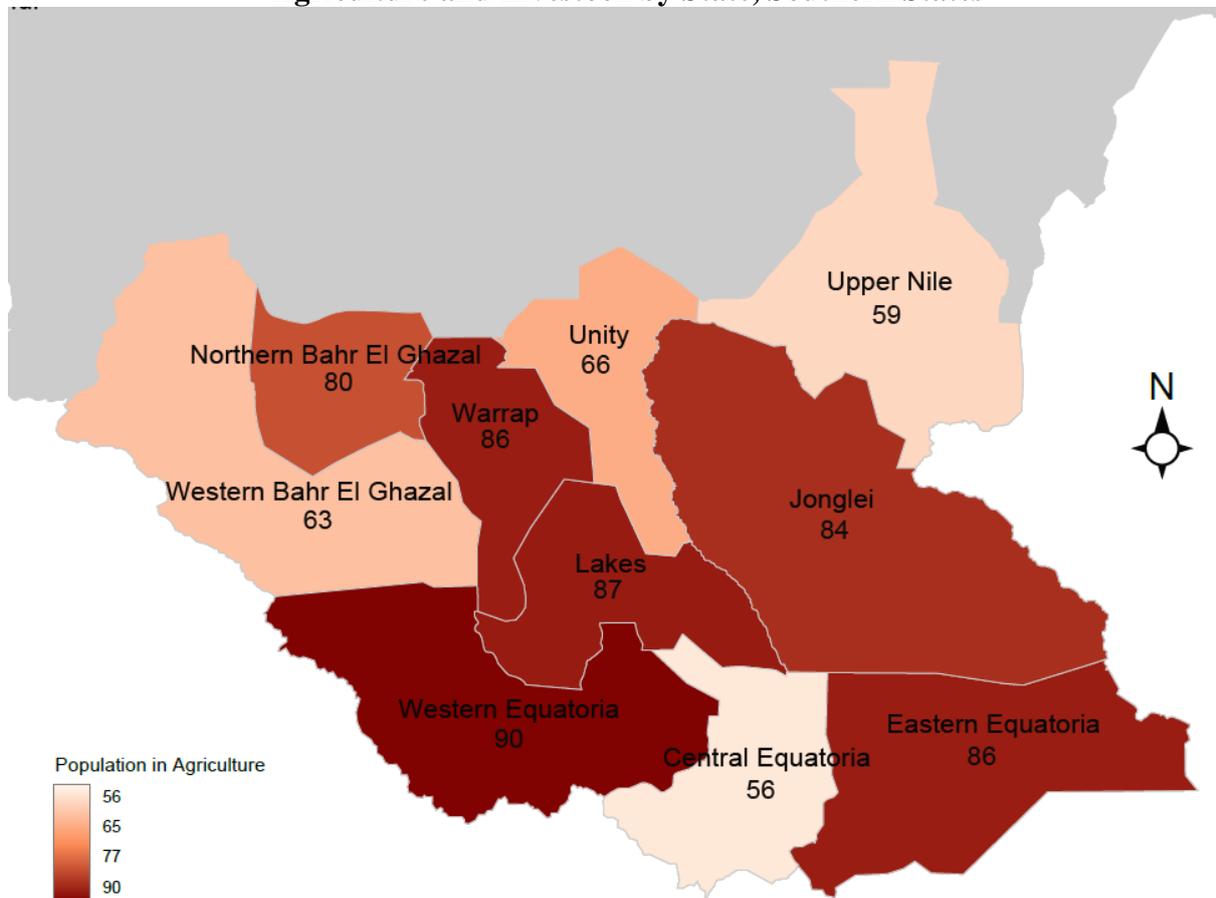


Source: World Bank analysis of NBHS 2009.

Note: Figures shown are the main livelihoods of the households of individuals, by quintiles of individuals. The poorest 20% of individuals are in the poorest quintile, the next poorest 20% are in the second quintile, etc.

1.15 **Agriculture (including livestock raising) is the dominant activity of households in all of the Southern states.** Figure 6 shows the percentage for each of the Southern states. The smallest number of individuals living in households that have agriculture as their principal activity is in Central Equatoria, where 56 percent of individuals' households report that agriculture is their principal activity

Figure 7: Percentage Population Living in Households Whose Main Livelihood is Agriculture and Livestock by State, Southern States

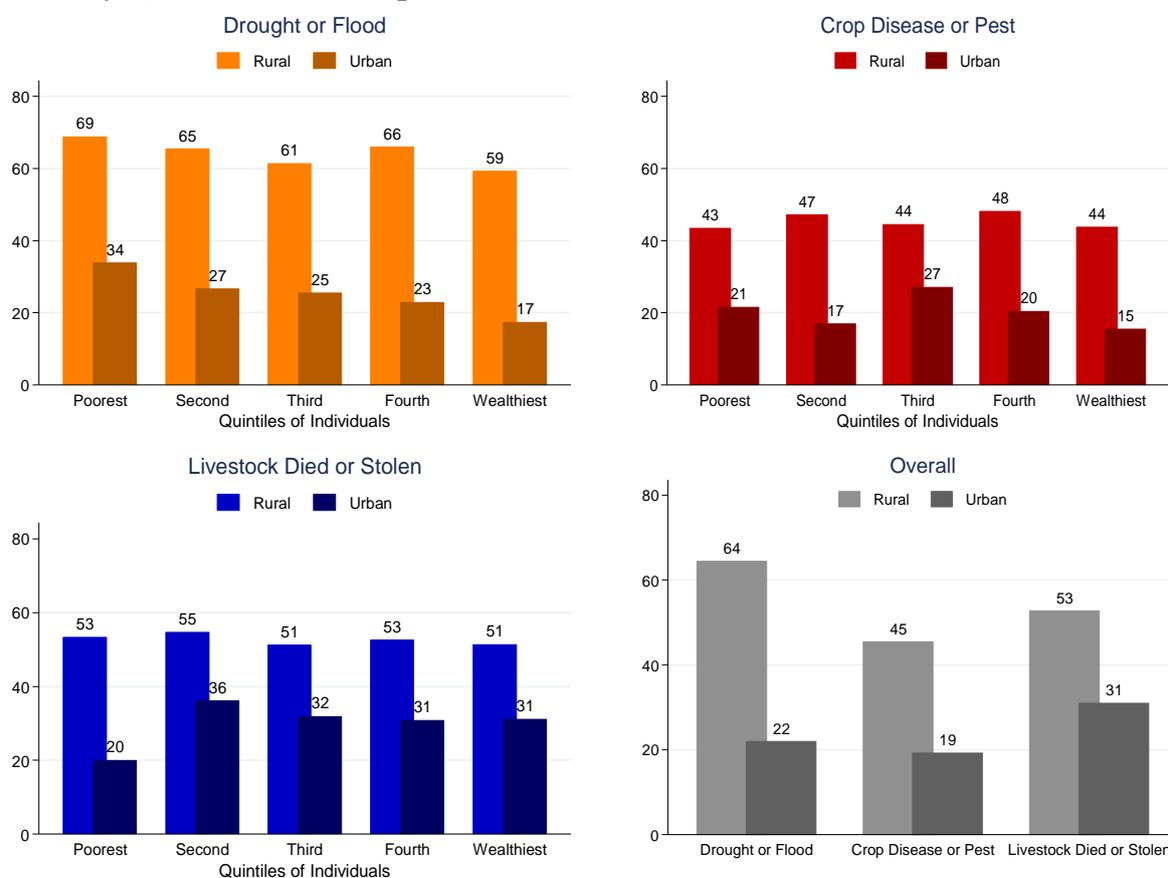


Source: World Bank analysis of NBHS 2009.

Note: The boundaries shown do not imply any judgment on the part of the World Bank concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

1.16 The most common shocks reported by households are drought, flood, crop diseases, pests, and the death or theft of livestock. Individuals living in rural areas are more likely to experience these shocks, particularly drought or flood. However, no striking differences arise by quintiles of wealth. Figure 8 shows the percentage of individuals in each quintile experiencing the most common shocks.

Figure 8: Percentage of Individuals Living in Households Affected by Shocks in the Last 5 Years by Quintile of Consumption in Southern States

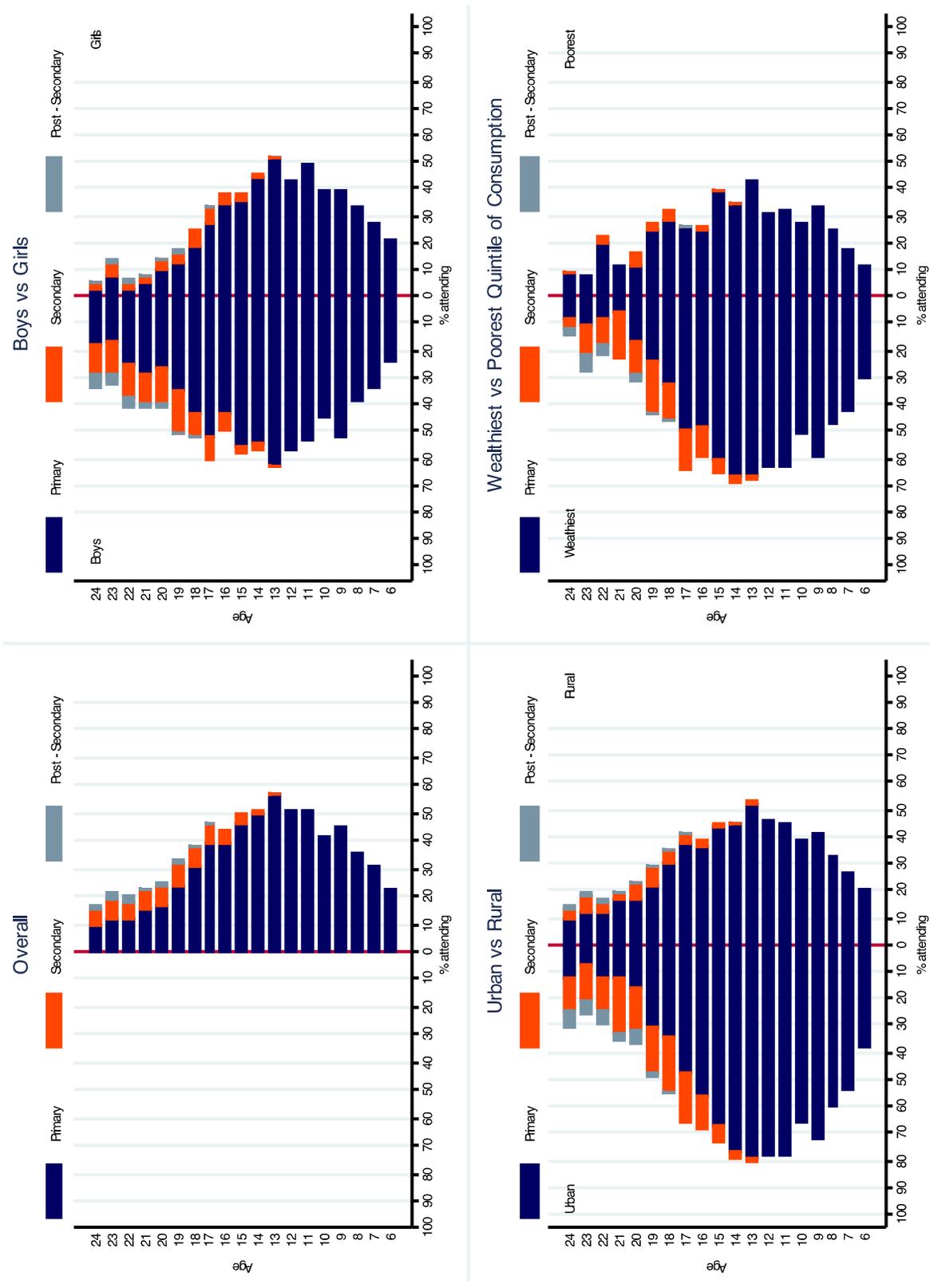


Source: World Bank analysis of NBHS 2009.

EDUCATION

1.17 As indicated in the poverty section of this profile, completed education levels are very low in the Southern states. Three-quarters of household heads have no education. Figure 9 shows school attendance profiles: the percentage attending by age group for those currently ages 6-24. The upper left graph shows the overall profile. It indicates that while very few are attending secondary school, there are large numbers attending primary school above the normal primary school age (6-13). For example, almost 40 percent of 17 year-olds are attending primary school.

Figure 9: School Attendance by Age, Southern States



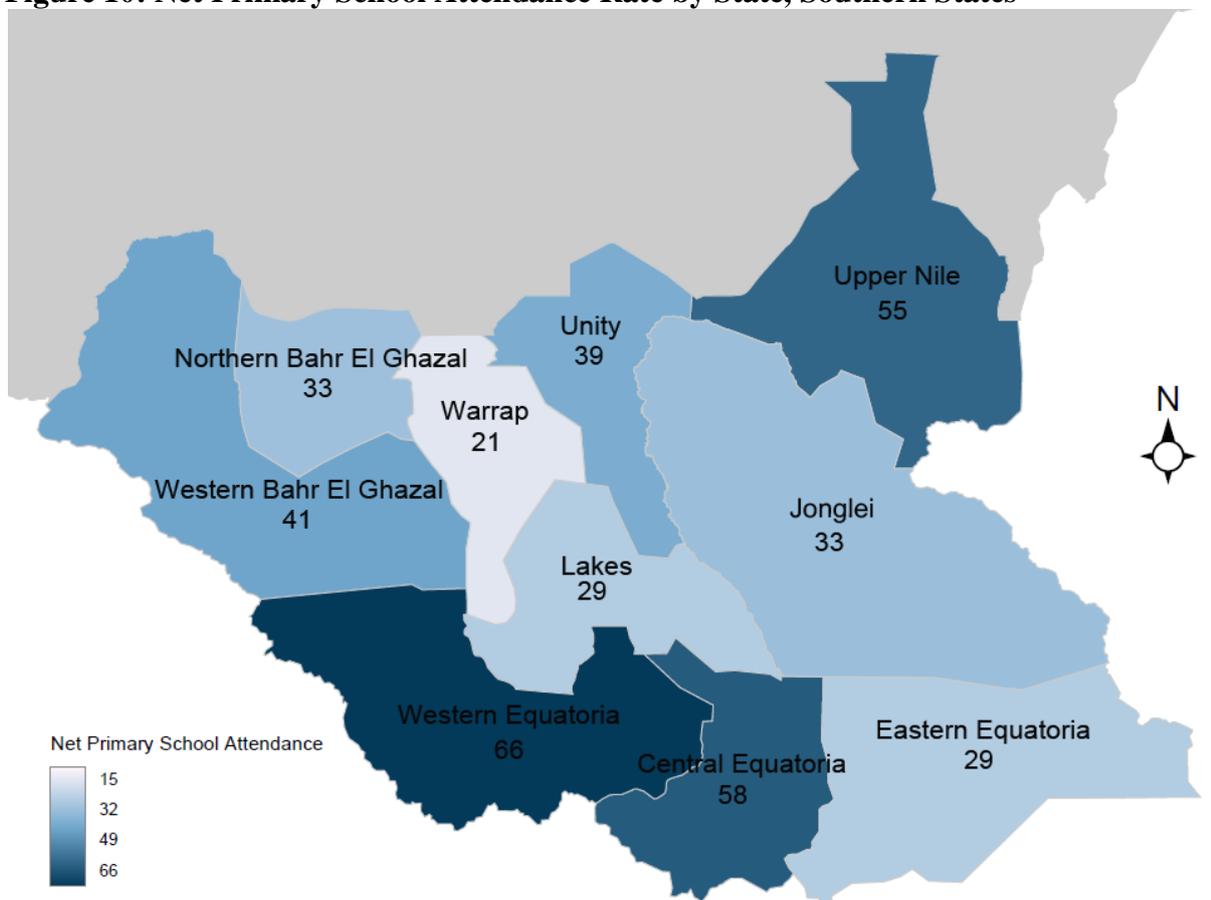
Source: World Bank analysis of NBHS 2009.

1.18 **Attendance rates are higher at all ages for boys than girls.** This can be seen in the upper right graph in Figure 9. The gender difference is most acute at ages older than 17. While there are large numbers of men 20 and older attending primary or secondary school, there are few women attending school at those ages.

1.19 **At all ages, attendance rates are much higher in urban areas than in rural areas and among children in the wealthiest quintile.** The urban-rural comparison can be seen in the lower left graph of Figure 9. The comparison of the wealthiest quintile to the poorest quintile is shown in the lower right graph.

1.20 **Attendance rates vary markedly by state.** The net primary school attendance rate measures the fraction of children age 6-13 who are currently attending school. Given the very large number of overage students in the Southern states, the net primary school attendance rate presents only a partial picture of attendance patterns and should be considered jointly with the broader attendance profile. The net primary school attendance rate is lowest in Warrap state (21%) and highest in Western Equatoria (66%).

Figure 10: Net Primary School Attendance Rate by State, Southern States



Source: World Bank analysis of NBHS 2009.

Note: Figures shown are the percentage of children ages 6-13 who are currently attending school.

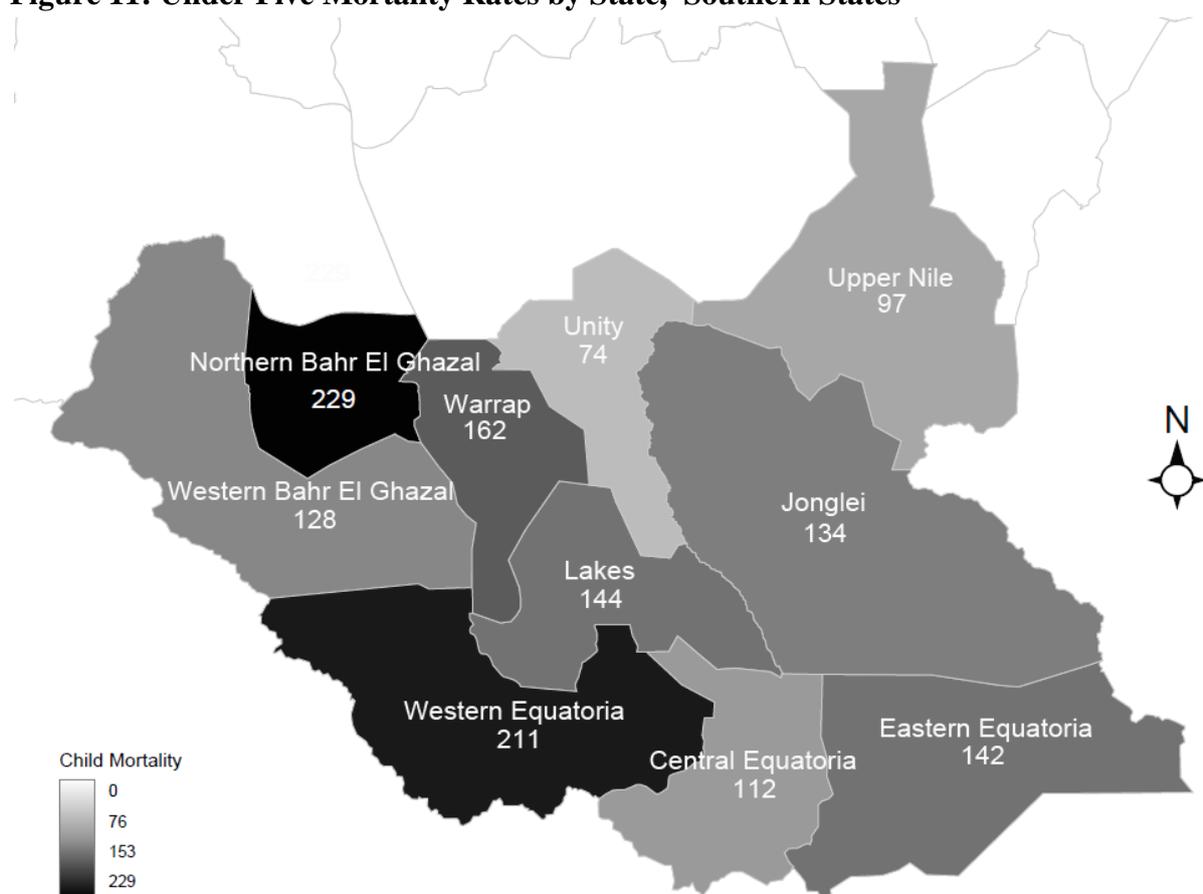
The boundaries shown do not imply any judgment on the part of the World Bank concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

CHILD MORTALITY

1.21 **Child mortality rates are high and vary considerably by state.** The child mortality rate is the fraction of children born alive expected to die before reaching age 5, based on recorded deaths of children during a five year period. Overall, the child mortality rate is 135 deaths per 1000 live births. The child mortality rate is highest in Northern Bahr El Ghazal (229) and lowest in Unity state (74).

1.22 **The child mortality figures presented here are based chiefly on a time period which pre-dates the 2005 peace agreement.** It is important to recognize that child mortality is inherently measured *retrospectively*. The figures presented here are based on data from the 2006 Sudan Household Health Survey and correspond to the mortality of children born 2001-2006. It is likely that child mortality has declined since then. Once data from the 2010 round of the Sudan Household Health Survey is available, it will be possible to estimate child mortality rates for the 2005-2010 period.

Figure 11: Under Five Mortality Rates by State, Southern States



Source: World Bank analysis of 2006 Sudan Household Health Survey.

Note: The boundaries shown do not imply any judgment on the part of the World Bank concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

Figures shown here differ slightly from those published in the Southern Sudan Household Health Survey report. There are various methods of calculating mortality rates, and estimates typically vary according to the method used and can be sensitive to the treatment of missing data. Figures shown here were calculated using a synthesis of estimates obtained from both direct and indirect mortality measurement methods. A detailed discussion of various methods will be included in the forthcoming paper on health in Sudan that is being prepared as part of the Poverty Assessment.

FINDINGS FROM POVERTY PROFILE

1.23 The 11 figures presented in this section provide a brief overview of socioeconomic conditions in the Southern states. The overall picture is of a rural society with households focused overwhelmingly on agriculture and livestock raising, with very low levels of human capital. The high infant mortality rates and the extremely low levels of education of household heads represent the legacy of decades of conflict. This report also provides a glimpse of improvements since the 2005 Sudanese Comprehensive Peace Agreement. Although school attendance rates are still low by international standards, they are substantial, particularly for the minority living in urban areas: half of all 13- and 14-year-olds and 80 percent of those living in urban areas are in school (Fig 9).

1.24 The tables presented in the annex to this report provide additional detail for presented in the 11 figures and also additional areas. Topics presented in the annex tables include the sensitivity of the headcount poverty rate to the choice of poverty line, asset ownership by quintile, additional information on shocks experienced by households, and a variety of housing information by quintile: dwelling type, sanitation facilities, energy for cooking, access to water, and time to collect water.

1.25 Annex Tables A3 and A4 also present results from simple regressions of consumption and poverty on household variables. These regressions provide a useful summary of the correlates of consumption. The results show that, holding other household characteristics constant, larger households, and those with household heads who are female, older, and less educated have lower average levels of consumption and are thus more likely to be in poverty. Table A4 shows the change in the likelihood of being in poverty for a hypothetical household experiencing a change in its household head characteristics by location. Changing from a male to a female household head would make a rural household 8 percent more likely to be poor, while a switch from a household head with no education to completed primary school would make a rural household 33 percent less likely to be poor.

1.26 This poverty profile represents the beginning of the World Bank's planned Poverty Assessment on Sudan. Much more detailed work on education, health, employment, and migration is forthcoming. It is hoped that this profile will provide a preliminary basis for policy planning by authorities while the other components of the Poverty Assessment are completed.

2. METHODOLOGY FOR POVERTY ANALYSIS

Note: the following is excerpted from the text of reports prepared for the Government of Sudan and the Government of Southern Sudan by consultant Martin Cumpa. The text is reproduced here to provide easy reference for those wishing to understand the methodology behind the poverty figures presented in the previous section. Mr. Cumpa was hired separately by the Government of Sudan and the Government of Southern Sudan to prepare the poverty analysis for the Northern and Southern states. He employed the same methodology for the Northern and Southern states analysis. His approach closely matches the general methodology for poverty analysis recommended by the World Bank.

Despite the fact that identical methodology was employed for North and South, the separate North and South poverty figures are not comparable. This is for two reasons: 1) the poverty lines are different, and 2) the consumption measures have not been adjusted to reflect North-South price differences.

First, as per the standard methodology recommended by the World Bank, the poverty lines were constructed based on 1) calorie requirements, 2) the food consumption patterns for typical households in the population, 3) food prices, and 4) the share of non-food items in overall consumption. Of these inputs, (2), (3), and (4) all differ between North and South. Consequently, the poverty lines differ markedly.

Second, as per the standard methodology recommended by the World Bank, the value of total consumption for each household was adjusted to take into account differences in prices across space within the North and within the South. To compare levels of consumption (and poverty) between the North and South, it will be necessary to further adjust for price differences between North and South.

It will be possible to directly compare poverty and consumption levels between North and South once an overall national poverty line is constructed, the consumption aggregate is adjusted for North-South price differences, and a unified North-South data is assembled.

2.1 Poverty refers to a pronounced deprivation in one or more dimensions of the welfare of an individual, such as limited access to health facilities, low human capital, inadequate housing infrastructure, malnutrition, lack of certain goods and services, inability to express political views or profess religious beliefs, etc. Each of these deserves separate attention as they concern different components of welfare, and indeed may help policy makers to focus attention on the various facets of poverty. Nonetheless, often there is a high degree of overlap. For instance, in most contexts, a malnourished person is also poorly educated and without access to health care.

2.2 Research on poverty over the last years has reached some consensus on using economic measures of living standards and these are routinely employed on poverty analysis. Moreover, monetary-based poverty indicators are the basis to monitor the first of the

Millennium Development Goals. This report focuses on consumption poverty, i.e. poverty will be measured in terms of total consumption per person. Although it captures a central component of any assessment of living standards, it does not cover all aspects of human welfare.

2.3 Poverty analysis requires three main elements:

1. A welfare indicator, both measurable and acceptable, to rank all population accordingly.
2. An appropriate poverty line to be compared against the chosen welfare indicator in order to classify individuals as poor and non-poor.
3. A set of measures that combine the individual welfare indicators and the poverty line into aggregate poverty figures.

2.4 This section explains all the steps involved in the construction of the consumption aggregate, the derivation of the poverty line and the poverty measures. It reviews the arguments for choosing consumption as the preferred welfare indicator, describes the estimation of the nominal household consumption, explains how we arrive at an individual measure of real consumption by correcting for differences in location, interview dates and demographic composition of households, describes spatial and temporal price adjustment, and clarifies the derivation of the poverty line.

THE CHOICE OF THE MONETARY INDICATOR

2.5 The main decision in poverty estimation is to choose between income and consumption as the welfare indicator to determine poverty. Consumption is the preferred measure because it is likely to be a more useful and accurate measure of living standards than income. This preference of consumption over income is based on both theoretical and practical issues.²

2.6 The first theoretical consideration is that both consumption and income can be approximations to utility³, even though they are different concepts. Consumption measures what individuals have actually acquired, while income, together with assets, measures the potential claims of a person. Secondly, the time period over which living standards are to be measured is important: if one is using a long term perspective as in a lifetime period, both should be the same and the choice does not matter. In the short-run though, say a year, consumption is likely to be more stable than income. Households are often able to smooth out their consumption, which may reflect access to credit or savings as well as information on future streams of income. Consumption is also less affected by seasonal patterns than income: for example, in agricultural economies, income is more volatile and affected by growing and harvest seasons, hence relying on that indicator might under or overestimate significantly living standards.

² See Deaton and Zaidi (2002), Haughton and Khandker (2009) and Hentschel and Lanjouw (1996).

³ “Utility” in economics refers, loosely speaking, to the satisfaction attained from the consumption of a basket of goods and services.

2.7 There are also practical arguments to take into account. First, consumption is generally an easier concept than income for the respondents to grasp, especially if the latter is from self-employment or family-owned businesses. For instance, workers in formal sectors of the economy will have no problem in reporting accurately their main source of income, i.e., their wage or salary. But self-employed persons in informal sectors, or engaged in agriculture, will have a harder time coming up with a precise measure of their income. Often in these cases, household and business transactions are intertwined. Besides, as was mentioned before, seasonal considerations are to be included to estimate an annual income figure. Finally, we also need to consider the degree of reliability of the information. Households are less reluctant to share information on consumption than on income. They may be afraid that income information will be used for different purposes, say taxes, or they may just consider income questions as too intrusive. It is also likely that household members know more about the household consumption than the level and sources of household income.

THE CONSTRUCTION OF THE CONSUMPTION AGGREGATE

2.8 Creating the consumption aggregate is also guided by theoretical and practical considerations. In the case of the NBHS, the focus will be on the consumption aggregate of the household in the last year. First, it must be as comprehensive as possible given the available information. Omitting some components assumes that they do not contribute to people's welfare or that they do not affect the rankings of individuals. Second, market and non-market transactions are to be included, which means that purchases are not the sole component of the indicator. Third, expenditure is not consumption. For perishable goods, mostly food, it is usual to assume that all purchases are consumed. But for other goods and services, such as housing or durable goods, corrections have to be made. Lastly, the consumption aggregate comprises five main components: food, non-food, durable goods, housing and energy. The specific items included in each component and the methodology used to assign a consumption value to each of these items is outlined below.

Food component

2.9 The food component can be constructed by simply adding up the consumption of all food items in the household, previously normalized to a uniform reference period. The NBHS records information on food consumption at the household level using a recall period for the last seven days. It collects data on 150 items, which are organized in 14 categories: bread and cereals; meat; fish and seafood; milk, cheese and eggs; oils and fats; fruits; pulses; sugar, jam and sweets; other food items; coffee, tea and cocoa; water and drinks; tobacco; restaurants and cafes; and food from street vendors.

2.10 A few general principles are applied in the construction of this component. First, all possible sources of consumption are included, which means that the food component comprises not only consumption out of purchases, or from meals eaten away from home, but also food from previous stocks, that was produced within the household or received as a gift. Second, only food that was actually consumed, as opposed to total food purchases or total home-produced food, enters in the consumption aggregate. Third, non-purchased food items need to be valued and included in the welfare measure. The survey collects information on food purchases, thus it is possible to estimate a unit value for each food item by dividing the

amount paid by the quantity purchased. Ideally food items will be disaggregated enough to be regarded as relatively homogeneous within each category, however these unit values will also reflect differences in the quality of the good. To minimize this effect and to consider spatial differences, median unit values were computed at several levels: urban and rural areas within states, state, urban and rural areas, and for the entire Southern Sudan. Hence if a household consumed a food item not purchased in the last week, the median unit value from the urban or rural area from that state would be used to value that consumption. If no other household consumed the same item in that area or if there were not enough observations to obtain a reliable unit value, the median unit value from the immediate upper level was used to estimate the value of that consumption.

2.11 A critical issue that had to be dealt with was the variety of quantity unit codes in which households could report their purchases and consumption. The questionnaire explicitly recognizes 18 different quantity unit codes, ranging from standard units as kilograms and litres to less standard units as heaps, bundles, cups, *rubus*, bottles and sacks. The way to address this matter was to conduct a supplementary survey and weight all these non-standard units for the 83 most consumed items. Even when the dispersion within each non-standard unit could be non-negligible (for instance, heaps could be small, medium or big), this allowed the conversion of all purchases and consumption into kilograms and litres and simplified the estimation of unit values to impute a monetary value to all food consumption that was not purchased.

Non-food component

2.12 As in the case of food, non-food consumption is a simple and straightforward calculation. Again, all possible sources of consumption must be included and normalized to a common reference period. Data on an extensive range of non-food items are available, 133 items arranged in groups such as clothing and footwear, education, health, beauty and toilet articles, recreational expenses, household goods, durable goods, housing expenditures, transportation, communication and insurance. The survey does not gather information on quantities consumed because most non-food items are too heterogeneous to try to calculate unit values. This subsection covers the consumption of most non-food items while durable goods, housing and energy will be dealt with later.

2.13 Practical difficulties arise often for two reasons: the choice of items to include and the selection of the recall period. Regarding the first issue, the rule of thumb is that only items that contribute to the consumption of the household are to be included. For instance, clothing, footwear, beauty articles and recreation are included. Others such as taxes are commonly excluded because they are not linked to higher levels of consumption, that is, households paying more taxes are not likely to receive better public services than, say, houses which paid lower taxes in the same community. Capital transactions like purchases of financial assets, debt and interest payments should also be excluded. The case for lumpy or infrequent expenditures like marriages, dowries, births and funerals is more difficult. Given their sporadic nature, the ideal approach would be to spread these expenses over the years and thus smooth them out; otherwise the true level of welfare of the household will probably be overestimated. Lack of information prevents us from doing that, and so they are left out from the estimation. Finally, remittances given to other households are also excluded. The rationale for this is to avoid double counting because these transfers almost certainly are

already reflected in the consumption of the recipients. Hence including them would increase artificially living standards.

2.14 Two non-food categories deserve special attention: education and health. In the case of education there are three issues to consider. First, some argue that if education is an investment, it should be treated as savings and not as consumption. Benefits from attending school are distributed not simply during the school period but during all years after. Second, there are life-cycle considerations as educational expenses are concentrated in a particular time of a person's life. Say that we compare two individuals that will pay the same for their education but one is still studying while the other finished several years ago. The current student might seem better-off due to higher reported spending on education but that result is just related to age and not to true differences in welfare levels. One way out would be to smooth these expenses over the whole life period but that option is not available for our data since we only observe the individuals at one point in time. Third, we must consider the coverage in the supply of public education. If all of the population can benefit from free or heavily subsidized education and the decision of studying in private schools is driven by quality factors, differences in expenditures can be associated with differences in welfare levels and the case for their inclusion is stronger. Standard practice was followed and educational expenses were included in the consumption aggregate. Excluding them would make no distinction between two households with children in school age, but only one being able to send them to school.

2.15 Health expenses share some of the features of education. Expenditures on preventive health care could be considered as investments. Differences in access to publicly provided services may distort comparisons across households. If some sectors of the population have access to free or significantly subsidized health services, whereas others have to rely on private services, differences in expenditures do not correspond to differences in welfare. But there are other factors to take into account. First, health expenditures are habitually infrequent and lumpy over the reference period. Second, health may be seen as a "regrettable necessity", i.e. the inclusion of health expenditures incurred due to the illness of a household member in the welfare indicator implies that the welfare of that household has increased when in fact the opposite has happened. Third, health insurance can also distort comparisons. Insured households may register small expenditures when some member has fallen sick, while uninsured ones bigger amounts; this is less of a concern in Sudan due to low penetration of health insurance. It was decided to include health expenses because, as in the case of education, their exclusion would imply making no distinction between two households, both facing the same health problems, but only one paying for treatment.

2.16 The second difficulty regarding non-food consumption is related with the selection of the recall period. The key aspect to consider is the relationship between recall periods and frequency of purchases. Most non-food items are not purchased frequently enough to justify a weekly recall period, hence generally recall periods refer to the last month, the last quarter or the last year. The NBHS collects information with two reference periods: last 30 days and last 365 days. Those non-food items that are purchased or paid more frequently will fall into the last month recall period (toilet and personal care items, transportation, household utilities), whereas those less common will go into the last year reference period (clothing and footwear, purchase and repair of household appliances, educational expenses). It was not necessary to choose one recall period over the other because each item was asked only for one recall period. Thus non-food consumption involved adding up all non-food expenditures, previously normalized to a common reference period.

Durable goods

2.17 Ownership of durable goods could be an important component of the welfare of the households. Given that these goods last typically for many years, the expenditure on purchases is not the proper indicator to consider. The right measure to estimate, for consumption purposes, is the stream of services that households derive from all durable goods in their possession over the relevant reference period. This flow of utility is unobservable but it can be assumed to be proportional to the value of the good. The NBHS provides information on eight durable goods: televisions, radios, telephones, computers, refrigerators, fans, air conditioners and mosquito nets. The survey asks about the number of items owned by the household and their current market value, but unfortunately it does not ask about their age. Calculating this consumption component would have involved making assumptions about not only the depreciation rates for these eight durable goods but also the average age of each durable good owned by the household. This may result in an extremely imprecise estimation, thus it was decided to exclude this component from the consumption aggregate.

Housing

2.18 Housing conditions are considered an essential part of people's living standards. Nonetheless, in most developing countries limited or non-existent housing rental markets pose a difficult challenge for the estimation and inclusion of this component in the consumption aggregate. As in the case of durable goods, the objective is to try to measure the flow of services received by the household from occupying its dwelling. When a household rents its dwelling, and provided rental markets function well, that value would be the actual rent paid. If enough people rent their dwellings, that information could be used to impute rents for those that own their dwellings. On the other hand, if the household does not rent its dwelling, the survey asked how much they would be willing to pay if they had to rent it. Data on self-reported imputed rent can also be used as an alternative to data on actual rents. Unfortunately estimating a housing component in Sudan may be particularly difficult for two reasons. First, few households rent their dwellings, which means that rental markets are developed at all and more likely they are concentrated in a few cities. Second, even when the NBHS provides information on imputed rent, these data may not be that credible considering that renting a dwelling is not common in most of the country. This will be particularly more serious in rural areas, which account for the large majority of the population. It was decided to exclude this component from the consumption aggregate because its estimation may be quite imprecise. The exclusion of the imputed value of housing is not expected to significantly change the relative ranking of the population in terms of total consumption.

Energy

2.19 The final non-food component that justified special attention was energy consumption, that is, expenditures on energy sources for lighting and cooking such as electricity, gas, generator fuel, kerosene, charcoal and firewood. The NBHS collects information about the last 30 days on purchases, consumption out of these purchases, and

consumption out of previous stocks, own-production, gifts and other sources. Most households reported some energy consumption. In order to overcome this lack of information, a regression was run to impute energy expenditures to those households that did not report anything. Consumption on all energy sources was taken from households reporting expenditures and correlated with the type of dwelling, the number of household members, the per capita number of rooms in the dwelling, whether the area was urban or rural, the state and the main source for lighting and cooking. The predicted energy consumption was imputed for households not reporting any energy consumption.

PRICE ADJUSTMENT

2.20 Nominal consumption of the household must be adjusted for cost-of-living differences. A temporal and a spatial price adjustment are required to adjust consumption to real terms. In the case of the NBHS, it was decided not to adjust nominal consumption over time because the fieldwork took place over 6 weeks, thus the inflation during that period was considered negligible. In other words, the amount of goods and services a person could buy in week 1 of the fieldwork with, say, 100 Sudanese Pounds was assumed to be the same as in week 7. On the other hand, prices are expected to differ markedly across geographical domains. It was considered that that a spatial price index by urban and rural areas would capture properly the spatial price differences. In other words, the initial assumption is that the purchasing power of 100 Sudanese Pounds in cities and towns is different from that in the countryside.

2.21 A Laspeyres price index for urban and rural areas was constructed using information from the survey and employing the following formula:

$$L_i = \sum_{k=1}^n w_{0k} \left(\frac{p_{ik}}{p_{0k}} \right)$$

where w_{0k} is the national budget share of item k , p_{ik} is the median price of item k in urban or rural areas, and p_{0k} is the national median price of item k .

2.22 This price index compares the cost of a national bundle of goods and services using national prices with the cost of the same bundle in urban and in rural areas. Given that the bundle will be the same for both areas, it follows that this price index can vary only because of differences in prices.

2.23 The NBHS provides information on budget shares for all items. In the case of food, it is possible to estimate unit values for most food items and match them with their respective budget shares. However, in the case of non-food, it is not possible to calculate any sort of prices. Two assumptions were required to circumvent this problem. First, all non-food items were bundled together, that is, they were treated as a single good. Second, the price of this sole non-food item was the same in urban and rural areas. These two assumptions are not expected to have significant consequences.

THE POVERTY LINE

2.24 The poverty line can be defined as the monetary cost to a given person, at a given place and time, of a reference level of welfare.⁴ If a person does not attain that minimum level of standard of living, she will be considered poor. Implementing this definition is, however, not straight-forward because considerable disagreement could be encountered at determining both the minimum level of welfare and the estimated cost of achieving that level. In addition, setting poverty lines could be a very controversial issue because of its potential effects on monitoring poverty and policy-making decisions.

2.25 It will be assumed that the level of welfare implied by the poverty line should enable the individual to achieve certain capabilities, which include a healthy and active life and a full participation in society. The poverty line will be absolute because it fixes this given welfare level, or standard of living, over the domain of analysis. This guarantees that comparisons across individuals will be consistent, for instance, two persons with the same welfare level will be treated the same way regardless of the location where they live. Second, the reference utility level has been anchored to certain attainments, in this particular case to the attainment of the necessary calories to have a healthy and active life. Finally, the poverty line will be set as the minimum cost of achieving that requirement.

2.26 The Cost of Basic Needs method was employed to estimate the nutrition-based poverty line. This approach calculates the cost of obtaining a consumption bundle believed to be adequate for basic consumption needs. If a person cannot afford the cost of the basket, this person will be considered to be poor. First, it shall be kept in mind that the poverty status focuses on whether the person has the means to acquire the consumption bundle and not on whether its actual consumption met those requirements. Second, nutritional references are used to set the utility level but nutritional status is not the welfare indicator. Otherwise, it will suffice to calculate caloric intakes and compare them against the nutritional threshold. Third, the consumption basket can be set normatively or to reflect prevailing consumption patterns. The latter is undoubtedly a better alternative. Lastly, the poverty line comprises two main components: food and non-food.

Food component

2.27 The first step in setting this component is to determine the nutritional requirements deemed to be appropriate for being healthy and able to participate in society. Clearly, it is rather difficult to arrive to a consensus on what could be considered as a healthy and active life, and hence to assign caloric requirements. Besides, these requirements vary by person, by his/her level of activity, the climate, etc.⁵ Common practice is to establish thresholds of around 2,100 to 3,000 calories per person per day. The majority of the population lives in rural areas, thus it was decided to set the daily energy intake at 2,400 calories per person per day, which is not an uncommon threshold for the countryside.

⁴ Ravallion (1998) and Ravallion (1996).

⁵ Food and Agriculture Organization of the United Nations (2001, 2003).

2.28 Second, a food bundle must be chosen. In theory, infinite food bundles can provide that amount of calories. One way out of this is to take into consideration the existing food consumption patterns of a reference group in the country. It was decided to use the bottom 60% of the population, ranked in terms of real per capita consumption, and obtain its average consumed food bundle. It is better to try to capture the consumption pattern of the population located in the low end of the welfare distribution because it will probably reflect better the preferences of the poor. Hence the reference group can be seen as a first guess of the poverty incidence⁶. Third, calorific conversion factors were used to transform the food bundle into calories. Tobacco, residual categories and meals eaten outside the household were excluded from this calculation: the first because is not really a food item and the other two because it is very difficult to approximate calorific intakes for them. For all of the remaining food items, it was possible to assign a calorific factor. Fourth, median unit values were derived in order to price the food bundle. Unit values were computed using only market transactions from the reference group. Again, this will capture more accurately the prices faced by the poor. Fifth, the average calorific intake of the food bundle was estimated, so the value of the food bundle could be scaled proportionately to achieve 2,400 calories per person per day.

Non-food component

2.29 Setting this component of the poverty line is far from being a straightforward procedure. There is considerable disagreement on what sort of items should be included in the non-food share of the poverty line. However, it is possible to link this component with the normative judgment involved when choosing the food component. Being healthy and able to participate in society requires spending on shelter, clothing, health care, recreation, etc. The advantage of using the NBHS is that the non-food allowance can also be based on prevailing consumption patterns of a reference group and no pre-determined non-food bundle is required.

2.30 The initial step is to choose a reference group that will represent the poor and calculate how much they spend on non-food goods and services. This reference group will be the population whose food consumption is similar to the food poverty line. The rationale behind this reference group is that if an individual spends in food what was considered the minimum for being healthy and maintaining certain activity levels, it will be assumed that this person has also acquired the minimum non-food goods and services to support this lifestyle.

2.31 Different ways are suggested in the literature to determine the average non-food consumption of those with a food spending similar to the food poverty line. One option is to rely on econometric techniques to estimate the Engel curve, that is, the relationship between food spending and total expenditures. However, a simple non-parametric calculation as suggested in Ravallion (1998) was followed. The procedure starts by estimating the average

⁶ More precisely, using the consumption pattern of the bottom 60% of the population to calculate the food bundle implies that both the composition of consumption, i.e. the proportion of various items in total food consumption, and the food prices faced by the poor and the bottom 60% of the population are not significantly different.

non-food consumption of the population whose food expenditures lie within plus and minus 1% of the food poverty line. The same exercise is then repeated for the population lying plus and minus 2%, 3%, and up to 10%. Second, these ten mean non-food allowances are averaged and that will be the final non-food poverty line. Finally, the total poverty line can be easily estimated by adding the food poverty line with the non-food poverty line.⁷ The advantage of this method is that no assumptions are made on the functional form of the Engel curve and that weights decline linearly around the food poverty line; this means that the closer a household is to the food poverty line, the higher is its assigned weight.

2.32 The various assumptions explicitly made in this section should caution the reader against potentially erroneous comparisons of poverty measures across countries. Poverty estimates are sensitive to the specific methodological assumptions which are made, especially with regard to the calorific threshold, the adjustment for household size, the economies of scale and proportion of population chosen for selecting the food bundle. Additionally, because food bundles are different across countries, and may therefore imply a different cost to acquiring even the same number of calories, it is erroneous to immediately compare poverty incidence across countries. These considerations make comparison of poverty estimates, even with neighbouring countries, hazardous. For example, it may be cheaper to acquire 2,400 kcal if the main staple is sorghum, in comparison to “matooke” as in parts of Uganda. Similarly, Uganda uses 3,000 kcal as the calorific threshold instead of the 2,400 kcal applied here – clearly, estimates of poverty would increase with an increase in the calorific threshold. The major purpose of poverty estimation using the above methodology is to rank the various geographical and/or administrative domains, in this case states, according to the estimated incidence of poverty and to track the trends in poverty over time. While our analysis is suitable for the first purpose, and can be used as a basis for comparisons over time after successive rounds are completed, it may not be suitable for comparisons across countries.

POVERTY MEASURES

2.33 The literature on poverty measurement is extensive, but attention will focus on the class of poverty measures proposed by Foster, Greer and Thorbecke (1984). This family of measures can be summarized by the following equation:

$$P_{\alpha} = (1/n) \sum_{i=1}^q \left(\frac{z - y_i}{z} \right)^{\alpha}$$

where α is some non-negative parameter, z is the poverty line, y denotes consumption, i represents individuals, n is the total number of individuals in the population, and q is the number of individuals with consumption below the poverty line.

⁷ An equivalent way of estimating the total poverty line requires calculating the food share of the reference group. The total poverty line will be the ratio between the food poverty line and the food share of the reference group.

2.34 The headcount index ($\alpha=0$) gives the share of the poor in the total population, that is, it measures the percentage of population whose consumption is below the poverty line. This is the most widely used poverty measure mainly because it is very simple to understand and easy to interpret. However, it has some limitations. It takes into account neither how close or far the consumption levels of the poor are with respect to the poverty line, nor the distribution of consumption among the poor. The poverty gap ($\alpha=1$) is the average consumption shortfall of the population relative to the poverty line. Since the greater the shortfall, the higher the gap, this measure overcomes the first limitation of the headcount. Finally, the severity of poverty ($\alpha=2$) is sensitive to the distribution of consumption among the poor, a transfer from a poor person to somebody less poor may leave unaffected the headcount or the poverty gap but will increase this measure. The larger the poverty gap is, the higher the weight it carries.

These measures satisfy some convenient properties. First, they are able to combine individual indicators of welfare into aggregate measures of poverty. Second, they are additive in the sense that the aggregate poverty level is equal to the population-weighted sum of the poverty levels of all subgroups of the population. Third, the poverty gap and the severity of poverty satisfy the monotonicity axiom, which states that even if the number of the poor is the same, but there is a welfare reduction in a poor household, the measure of poverty should increase. And fourth, the severity of poverty will also comply with the transfer axiom: it is not only the average welfare of the poor that influences the level of poverty, but also its distribution. In particular, if there is a transfer from one poor household to a richer household, the degree of poverty should increase.⁸

REFERENCES

Deaton, A., 1997. *The Analysis of Household Surveys: A micro econometric Approach to development policy*. Baltimore and London: The World Bank, The John Hopkins University Press.

Deaton A. and Muellbauer J., 1986. On measuring child costs: with applications to poor countries. *Journal of Political Economy* 94, 720 -44.

Deaton A. and Zaidi S., 2002. *Guidelines for Constructing Consumption Aggregates for Welfare Analysis*. LSMS Working Paper 135, World Bank, Washington, DC.

Food and Agriculture Organization of the United Nations , 2003. *Human energy requirements*. Report of a joint FAO/WHO/UNU Expert Consultation, Rome.

Food and Agriculture Organization of the United Nations, 2003. *Food – energy methods of analysis and conversion factors*. Food and Nutrition Paper 77, Rome.

⁸ Sen (1976) formulated the monotonicity and the transfer axioms.

Foster J., Greer E. and Thorbecke E., 1984. A class of decomposable poverty measures. *Econometrica*, Vol. 52, No. 3, pp. 761-766.

Haughton, J. and Khander S., 2009. *Handbook on Poverty and Inequality*. The World Bank.

Hentschel J. and Lanjouw P., 1996. Constructing an indicator of consumption for the analysis of poverty: Principles and Illustrations with Principles to Ecuador. LSMS Working Paper 124, World Bank, Washington, DC .

Howes S. and Lanjouw J.O., 1997. Poverty Comparisons and Household Survey Design. LSMS Working Paper 129, World Bank Washington, DC.

Lanjouw P., Milanovic B., and Paternostro S., 1998. Poverty and the economic transition : how do changes in economies of scale affect poverty rates for different households?. Policy Research Working Paper Series 2009, The World Bank.

Ravallion M., 1996. Issues in Measuring and Modelling Poverty. *Economic Journal*, Royal Economic Society, vol. 106(438), pages 1328-43, September.

Ravallion M., 1998. Poverty Lines in Theory and Practice. Papers 133, World Bank - Living Standards Measurement.

Southern Sudan Centre for Census, Statistics and Evaluation (2010a). Poverty in Southern Sudan, available at http://ssccse.org/storage/Poverty_Southern_Sudan.pdf

Southern Sudan Centre for Census, Statistics and Evaluation (2010b). Southern Sudan Fast Facts, available at <http://ssccse.org/southern-sudan-fast-facts/>

Southern Sudan Centre for Census, Statistics and Evaluation (2010c) 2010 Statistical Year Book, available at <http://ssccse.org/statistical-year-book/>

ANNEX

Table A1: Poverty by Household Head Characteristics, Location, and State

	Poverty Headcount Rate	Distribution of the Population	Distribution of the Poor
<u>Household Head's Gender</u>			
Male	48.1%	71.4%	67.9%
Female	56.9%	28.6%	32.1%
Total		100.0%	100.0%
<u>Household Head's Education</u>			
No Education	56.6%	73.0%	81.7%
Some Primary School	44.7%	13.6%	12.0%
Primary School Completed	23.9%	3.2%	1.5%
Some Secondary/Secondary School Completed	26.9%	8.2%	4.3%
Post Secondary School	11.4%	1.9%	0.4%
Khalwa	4.7%	0.1%	0.0%
Total		100.0%	100.0%
Urban	24.4%	15.6%	7.5%
Rural	55.4%	84.4%	92.5%
Total		100.0%	100.0%
<u>State</u>			
Upper Nile	25.7%	12.6%	6.4%
Jonglei	48.3%	14.3%	13.7%
Unity	68.4%	6.4%	8.7%
Warap	64.2%	14.2%	18.0%
Northern Bahr Al Ghazal	75.6%	9.7%	14.5%
Western Bahr Al Ghazal	43.2%	3.7%	3.2%
Lakes	48.9%	8.1%	7.9%
Western Equatoria	42.1%	7.6%	6.3%
Central Equatoria	43.5%	13.1%	11.3%
Eastern Equatoria	49.8%	10.2%	10.1%
Total		100%	100%

Source: World Bank analysis of NBHS 2009.

Table A2: Anatomy of Poverty in Southern States

	Poverty headcount	Standard error	Poverty gap	Standard error	Squared poverty gap	Standard error
<u>Household Head's</u>						
<u>Gender</u>						
Male	0.481	0.016	0.225	0.010	0.137	0.008
Female	0.569	0.018	0.267	0.013	0.159	0.010
<u>Household Head's</u>						
<u>Education</u>						
No Education	0.566	0.015	0.274	0.010	0.167	0.008
Some Primary School	0.447	0.027	0.190	0.015	0.110	0.012
Primary School Completed	0.239	0.039	0.091	0.020	0.051	0.015
Some Secondary/Secondary School Completed	0.269	0.030	0.101	0.013	0.051	0.008
Post Secondary School	0.114	0.046	0.029	0.012	0.009	0.004
Khalwa	0.047	0.050	0.007	0.008	0.001	0.001
Urban	0.244	0.020	0.088	0.009	0.046	0.006
Rural	0.554	0.015	0.265	0.010	0.161	0.007
<u>State</u>						
Upper Nile	0.257	0.041	0.098	0.017	0.050	0.009
Jonglei	0.483	0.043	0.222	0.023	0.131	0.015
Unity	0.684	0.036	0.346	0.028	0.217	0.022
Warap	0.642	0.038	0.341	0.025	0.222	0.019
Northern Bahr Al Ghazal	0.756	0.027	0.368	0.022	0.219	0.018
Western Bahr Al Ghazal	0.432	0.033	0.176	0.020	0.095	0.014
Lakes	0.489	0.043	0.226	0.023	0.136	0.016
Western Equatoria	0.421	0.033	0.155	0.015	0.079	0.010
Central Equatoria	0.435	0.051	0.225	0.039	0.154	0.032
Eastern Equatoria	0.498	0.036	0.198	0.018	0.105	0.012
All	0.506	0.014	0.237	0.008	0.143	0.006

Source: World Bank analysis of NBHS 2009.

Table A3: Consumption Regression

Dependent variable: Log of household consumption per capita	Urban		Rural	
	Coefficient	Standard error	Coefficient	Standard error
<u>Household characteristics</u>				
Log of household size	-0.621***	0.11	-0.849***	0.10
Log of household size squared	0.053	0.04	0.087***	0.03
State				
Upper Nile				
Jonglei	-0.458***	0.11	-0.398***	0.06
Unity	-0.488***	0.10	-0.714***	0.06
Warap	-0.867***	0.09	-0.781***	0.06
Northern Bahr Al Ghazal	-0.563***	0.09	-0.920***	0.06
Western Bahr Al Ghazal	-0.627***	0.07	-0.492***	0.07
Lakes	-0.374***	0.09	-0.256***	0.06
Western Equatoria	-0.643***	0.08	-0.518***	0.06
Central Equatoria	-0.268***	0.07	-0.660***	0.07
Eastern Equatoria	-0.445***	0.10	-0.487***	0.06
<u>Characteristics of household head</u>				
Log of household head's age	-0.176***	0.07	-0.191***	0.04
<u>Gender of the household head</u>				
Male				
Female	-0.114**	0.05	-0.113***	0.03
<u>Highest level of education of household</u>				
No Education				
Some Primary School	0.115**	0.06	0.165***	0.05
Primary School Completed	0.195**	0.08	0.462***	0.09
Some Secondary or Secondary School Completed	0.315***	0.06	0.557***	0.07
Post Secondary School	0.706***	0.09	0.707***	0.17
Khalwa	0.498	0.34	1.016	0.79
Intercept	6.772***	0.28	6.646***	0.20
Number of observations	1,448.00		3,283.00	
Adjusted R2	0.22		0.24	

Source: World Bank analysis of NBHS 2009.

Notes: These are results from regressions of log (household consumption per capita) on a set of variables at the household level. Separate regression results are shown for urban and rural areas. Omitted dummy categories in the regression are Northern state, no education for the household head, and male household head. *** p<0.01, ** p<0.05, * p<0.1

Table A4: Changes in the Probability of Being in Poverty from Changes in Household Head Characteristics, as Predicted by Regression Results

	Urban	Rural
Change from "Male" to "Female"	17.1	8.4
<u>Education event, change in household's head education:</u>		
Change from "No Education" to "Some Primary School"	-14	-11.6
Change from "No Education" to "Primary School Completed"	-23.3	-33
Change from "No Education" to "Some Secondary or Secondary School Completed"	-36.2	-39.7
Change from "No Education" to "Post Secondary School"	-68.8	-49.9

Source: World Bank analysis of NBHS 2009.

Note: These are predicted changes of an individual's probability of being in poverty given hypothetical changes in the characteristics of the household head. These predicted changes are based on the consumption regressions.

Table A5: Percentage of Population Living in Rural Areas by State

State	% Population	Standard error
Upper Nile	77.8	(5.5)
Jonglei	94.3	(2.4)
Unity	90.6	(3.7)
Warap	91.3	(2.9)
Northern Bahr Al Ghazal	92.8	(2.5)
Western Bahr Al Ghazal	53.0	(8.1)
Lakes	91.0	(3.0)
Western Equatoria	81.0	(5.7)
Central Equatoria	66.2	(7.0)
Eastern Equatoria	89.2	(3.9)
All	84.4	(1.4)

Source: World Bank analysis of NBHS

Note: Standard errors are shown in parentheses.

Table A6: Main Livelihoods of the Households of Individuals by State

State	Crop farming	Animal husbandry	Wages and salaries	Owned business enterprises	Property income	Remittances	Pension	Aid	Other	Total
Upper Nile	42.4 (4.7)	16.3 (4.1)	22.4 (4.3)	7.5 (2.1)	1.9 (0.9)	0.1 (0.1)	0.3 (0.2)	0.1 (0.1)	8.9 (1.7)	100
Jonglei	72.7 (4.7)	11.3 (3.2)	9.2 (2.4)	0.9 (0.5)	0.4 (0.3)	0.0 (0.0)	0.0 (0.0)	0.1 (0.1)	5.5 (2.1)	100
Unity	56.3 (4.8)	9.7 (1.9)	18.3 (3.8)	4.3 (1.0)	0.3 (0.2)	0.0 (0.0)	0.0 (0.0)	0.3 (0.2)	10.8 (1.9)	100
Warap	80.9 (3.6)	5.3 (1.7)	4.5 (1.6)	2.1 (0.7)	0.0 (0.0)	0.1 (0.1)	0.5 (0.5)	1.3 (0.9)	5.4 (1.5)	100
Northern Bahr Al Ghazal	78.9 (3.4)	0.7 (0.4)	7.1 (1.7)	5.7 (1.4)	0.0 (0.0)	0.4 (0.3)	0.0 (0.0)	0.4 (0.3)	6.8 (1.4)	100
Western Bahr Al Ghazal	61.5 (6.8)	1.5 (0.6)	22.9 (4.4)	8.2 (1.7)	1.0 (0.7)	0.1 (0.1)	0.6 (0.4)	0.6 (0.2)	3.7 (1.1)	100
Lakes	84.0 (3.2)	2.5 (0.9)	8.9 (2.2)	1.9 (0.7)	0.7 (0.4)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	2.0 (0.8)	100
Western Equatoria	88.1 (2.3)	1.4 (0.8)	6.2 (1.4)	2.1 (0.7)	0.5 (0.4)	0.5 (0.4)	0.0 (0.0)	0.1 (0.1)	1.2 (0.4)	100
Central Equatoria	54.8 (6.1)	1.1 (0.6)	22.6 (4.4)	4.2 (1.2)	1.5 (0.7)	0.5 (0.4)	1.2 (0.6)	0.4 (0.3)	13.5 (2.0)	100
Eastern Equatoria	75.0 (4.8)	11.2 (3.8)	7.0 (2.2)	2.5 (0.9)	2.2 (0.8)	0.3 (0.2)	0.0 (0.0)	0.0 (0.0)	1.9 (0.8)	100
All	69.1 (1.5)	6.7 (0.9)	12.4 (1.0)	3.6 (0.4)	0.9 (0.2)	0.2 (0.1)	0.3 (0.1)	0.3 (0.1)	6.4 (0.5)	100

Source: World Bank analysis of NBHS 2009.

Note: Standard errors are shown in parentheses. Figures shown are the percentages of individuals by state living in households which report having each of the listed activities as their main livelihood.

Table A7: Main Livelihoods of the Households of Individuals by Quintile of Consumption

Main livelihood of household	Quintile					All
	Poorest	Second	Third	Fourth	Wealthiest	
Crop farming	77.9 (2.2)	76.3 (1.9)	74.7 (2.1)	66.8 (2.5)	49.8 (2.8)	69.2 (1.5)
Animal husbandry	5.8 (1.1)	6.8 (1.2)	6.8 (1.3)	6.8 (1.2)	7.6 (1.4)	6.7 (0.9)
Wages and salaries	3.1 (0.7)	7.4 (1.0)	9.4 (1.2)	15.0 (1.5)	27.0 (2.3)	12.4 (1.0)
Owned business enterprise	1.7 (0.5)	2.7 (0.6)	2.8 (0.5)	3.5 (0.7)	7.4 (1.1)	3.6 (0.4)
Property income	0.3 (0.2)	0.8 (0.4)	0.6 (0.3)	1.0 (0.4)	1.6 (0.4)	0.9 (0.2)
Remittances	0.2 (0.2)	0.0 (0.0)	0.1 (0.1)	0.3 (0.1)	0.4 (0.3)	0.2 (0.1)
Pension	0.0 (0.0)	0.0 (0.0)	0.8 (0.4)	0.2 (0.1)	0.5 (0.2)	0.3 (0.1)
Aid	0.2 (0.1)	0.4 (0.3)	0.1 (0.1)	0.8 (0.6)	0.2 (0.2)	0.3 (0.1)
Other	10.8 (1.9)	5.5 (0.9)	4.6 (0.8)	5.6 (0.9)	5.4 (0.8)	6.4 (0.5)
Total	100	100	100	100	100	100

Source: World Bank analysis of NBHS 2009.

Note: Standard errors are shown in parentheses. Figures shown are the percentages of individuals by quintile of consumption in households which report having each of the listed activities as their main livelihood

Table A8: Net Primary School Attendance Rate by Urban/Rural Location

	Urban	Rural	All
Net primary school attendance	63.8 (2.7)	35.8 (1.7)	39.8 (1.5)

Source: World Bank analysis of NBHS 2009
 Note: Standard errors are shown in parentheses.

Table A9: Net Primary School Attendance Rate by State

State	Net primary school attendance	Standard error
Upper Nile	55.4	(4.0)
Jonglei	33.4	(4.6)
Unity	38.7	(4.4)
Warap	20.6	(3.7)
Northern Bahr Al Ghazal	32.7	(2.7)
Western Bahr Al Ghazal	41.4	(5.4)
Lakes	29.1	(4.3)
Western Equatoria	65.5	(3.1)
Central Equatoria	58.2	(6.1)
Eastern Equatoria	29.1	(5.1)
All	39.8	(1.5)

Source: World Bank analysis of NBHS 2009

Table A10: Education Attainment and Literacy Rates of Households Heads by Quintile of Consumption, Gender and Urban/Rural Location

	No education	Some primary school	Primary school completed	Some secondary or secondary school completed	Post secondary school	Khalwa	Total	Can read and write	Cannot read and write	Total
Quintile										
Poorest	88.7 (1.3)	8.0 (1.1)	0.8 (0.3)	2.4 (0.6)	0.0 (0.0)	0.0 (0.0)	100	11.8 (1.3)	88.2 (1.3)	100
Second	81.4 (1.7)	13.3 (1.6)	1.7 (0.5)	3.2 (0.6)	0.4 (0.2)	0.0 (0.0)	100	16.2 (1.5)	83.8 (1.5)	100
Third	74.4 (1.8)	14.5 (1.4)	2.7 (0.5)	7.5 (0.9)	0.9 (0.3)	0.0 (0.0)	100	23.4 (1.5)	76.6 (1.5)	100
Fourth	69.8 (1.7)	15.0 (1.2)	5.0 (0.8)	8.2 (1.0)	1.8 (0.4)	0.2 (0.1)	100	29.8 (1.8)	70.2 (1.8)	100
Wealthiest	60.7 (2.2)	14.7 (1.4)	5.5 (0.7)	14.9 (1.5)	4.1 (0.8)	0.1 (0.1)	100	39.1 (2.1)	60.9 (2.1)	100
Gender										
Male	68.4 (1.3)	15.7 (0.9)	4.2 (0.4)	9.6 (0.7)	2.0 (0.3)	0.1 (0.0)	100	31.1 (1.2)	68.9 (1.2)	100
Female	89.2 (0.9)	7.6 (0.7)	0.9 (0.3)	2.1 (0.4)	0.2 (0.1)	0.0 (0.0)	100	8.6 (0.8)	91.4 (0.8)	100
Location										
Urban	43.5 (2.3)	20.0 (1.6)	6.7 (0.7)	21.9 (1.5)	7.6 (1.2)	0.3 (0.2)	100.0	51.3 (2.1)	48.7 (2.1)	100
Rural	80.2 (1.1)	12.0 (0.8)	2.6 (0.3)	4.8 (0.5)	0.4 (0.1)	0.0 (0.0)	100.0	19.5 (1.0)	80.5 (1.0)	100
All	75.0 (1.0)	13.1 (0.7)	3.1 (0.3)	7.3 (0.5)	1.4 (0.2)	0.1 (0.0)	100.0	24.0 (0.9)	76.0 (0.9)	100

Source: World Bank analysis of NBHS 2009

Note: Standard errors are shown in parentheses. Figures shown are percentages of household heads with each level of education or literacy, by quintile of consumption, gender, and urban/rural location. Standard errors are shown in parentheses.

Table A11: Percentage of Population Owning Assets by Quintile of Consumption

Type of asset	Quintile					All
	Poorest	Second	Third	Fourth	Wealthiest	
Motor vehicles	1.0 (0.4)	1.1 (0.4)	2.0 (0.6)	2.8 (0.6)	4.8 (0.8)	2.3 (0.3)
Motorcycle/motor rickshaw	1.3 (0.5)	2.5 (0.8)	3.9 (0.8)	5.7 (0.9)	7.5 (0.9)	4.2 (0.4)
Bicycle	15.8 (1.8)	24.7 (2.0)	31.9 (2.0)	29.6 (1.9)	32.1 (2.1)	26.8 (1.0)
Canoe/boat	2.4 (1.1)	1.6 (0.5)	0.8 (0.4)	2.2 (0.7)	2.2 (0.7)	1.8 (0.3)
Animal used for transport	0.6 (0.4)	1.2 (0.6)	1.9 (0.6)	4.2 (1.1)	5.2 (1.2)	2.6 (0.5)
Television/satellite dish	0.5 (0.2)	1.2 (0.4)	2.8 (0.6)	5.0 (0.8)	13.2 (1.8)	4.5 (0.5)
Radio/transistor	13.9 (1.7)	19.1 (1.8)	26.3 (1.9)	34.0 (2.0)	45.8 (2.4)	27.8 (1.1)
Phone	7.6 (1.3)	10.0 (1.2)	14.2 (1.5)	22.7 (2.0)	38.4 (2.7)	18.6 (1.2)
Computer	0.1 (0.1)	0.1 (0.1)	0.6 (0.3)	0.6 (0.2)	3.3 (0.8)	1.0 (0.2)
Refrigerator	0.0 (0.0)	0.1 (0.1)	1.3 (0.4)	0.8 (0.3)	4.3 (0.9)	1.3 (0.2)
Fan	0.4 (0.3)	0.5 (0.2)	1.0 (0.4)	1.1 (0.3)	4.9 (1.1)	1.6 (0.3)
Air cooler/air conditioner	0.1 (0.1)	0.2 (0.1)	0.7 (0.4)	1.1 (0.5)	1.7 (0.5)	0.8 (0.2)
Pair of shoes	36.4 (2.6)	50.2 (2.5)	58.8 (2.2)	63.3 (2.1)	71.7 (2.3)	56.0 (1.5)
Blanket	33.5 (2.5)	49.7 (2.3)	55.2 (2.0)	55.2 (2.1)	57.9 (2.1)	50.3 (1.2)
Mosquito net	52.2 (2.6)	60.3 (2.4)	63.4 (2.0)	64.3 (2.0)	69.6 (1.9)	61.9 (1.2)

Source: World Bank analysis of NBHS 2009.

Note: Standard errors are shown in parentheses. Figures shown are the percentages of individuals in each quintile who live in households that own each asset.

Table A12: Percentage of Population Affected by Shocks in the Past Five Years, by Quintile of Consumption

Type of shock	Quintile					All
	Poorest	Second	Third	Fourth	Wealthiest	
Drought or floods	67.1 (2.7)	62.5 (2.3)	56.6 (2.3)	57.2 (2.2)	45.7 (2.4)	57.8 (1.4)
Crop diseases or pest	42.4 (2.7)	45.0 (2.5)	42.1 (2.5)	42.5 (2.2)	34.5 (2.1)	41.3 (1.4)
Livestock died or stolen	51.7 (2.4)	53.3 (2.3)	48.6 (2.2)	48.2 (2.3)	44.7 (2.3)	49.3 (1.3)
Illness or accident of member	30.7 (2.4)	35.7 (2.4)	36.6 (2.2)	36.9 (2.2)	40.2 (2.0)	36.0 (1.3)
Death of member	30.4 (2.3)	31.4 (2.0)	33.7 (1.9)	37.6 (1.9)	35.4 (1.8)	33.7 (1.0)
Fire	5.3 (1.0)	9.3 (1.2)	9.5 (1.1)	12.3 (1.3)	12.0 (1.1)	9.6 (0.6)
Robbery/burglary or assault	9.8 (1.6)	9.3 (1.2)	9.5 (1.1)	12.3 (1.5)	15.7 (1.4)	11.3 (0.7)
Dwelling damaged/destroyed	12.3 (1.6)	15.7 (1.6)	13.9 (1.5)	16.0 (1.6)	14.0 (1.3)	14.4 (0.8)
Severe shortage of water	31.1 (2.7)	25.8 (2.2)	22.5 (1.7)	23.7 (2.0)	20.1 (1.7)	24.6 (1.2)
Other events	4.4 (1.2)	4.4 (0.8)	4.2 (0.9)	3.0 (0.7)	5.3 (0.8)	4.2 (0.4)

Source: World Bank analysis of NBHS 2009.

Note: Standard errors are shown in parentheses. Figures shown are the percentages of individuals in each quintile who live in households that have experienced each shock

Table A13: Type of Dwelling by Quintile of Consumption

Type of dwelling	Quintile					All
	Poorest	Second	Third	Fourth	Wealthiest	
Dwelling from straw	5.1 (1.0)	4.9 (0.9)	6.0 (1.2)	5.0 (0.9)	5.1 (0.9)	5.2 (0.5)
Tukul	83.4 (2.1)	83.8 (1.7)	82.9 (1.7)	85.6 (1.5)	79.0 (2.0)	82.9 (1.1)
Flat/Villa/Multi-storey house	1.0 (0.4)	0.4 (0.3)	0.5 (0.4)	0.3 (0.2)	2.3 (0.6)	0.9 (0.2)
House of one floor-mud	6.1 (1.2)	6.4 (1.0)	6.2 (1.1)	4.1 (0.8)	6.0 (1.0)	5.8 (0.5)
House of one floor - brick/concrete	0.9 (0.4)	0.9 (0.4)	1.7 (0.4)	2.7 (0.5)	5.5 (1.0)	2.3 (0.3)
House constructed of wood	3.5 (1.1)	3.6 (0.9)	2.6 (0.6)	2.4 (0.7)	2.0 (0.5)	2.8 (0.5)
Total	100	100	100	100	100	100

Source: World Bank analysis of NBHS 2009.

Note: Standard errors are shown in parentheses. Figures shown are the percentages of individuals in each quintile living in households with each type of dwelling.

Table A14: Type of Sanitation Facility by Quintile of Consumption

Main type of toilet facility	Quintile					All
	Poorest	Second	Third	Fourth	Wealthiest	
Pit latrine private	3.7 (0.7)	10.2 (1.5)	12.1 (1.6)	17.8 (1.6)	22.2 (1.8)	13.2 (0.9)
Shared pit latrine	2.1 (0.6)	4.2 (0.9)	5.5 (0.9)	5.1 (0.8)	10.4 (1.4)	5.4 (0.6)
Private flush toilet	0.0 (0.0)	0.3 (0.3)	0.5 (0.3)	0.8 (0.3)	1.6 (0.5)	0.7 (0.2)
Shared flush toilet	0.0 (0.0)	0.2 (0.1)	0.1 (0.1)	0.3 (0.2)	0.7 (0.3)	0.3 (0.1)
Bucket toilet	0.1 (0.1)	0.1 (0.1)	0.5 (0.3)	0.2 (0.2)	0.3 (0.2)	0.2 (0.1)
No toilet facility	94.1 (1.1)	85.1 (1.9)	81.3 (1.8)	75.7 (1.7)	64.8 (2.3)	80.2 (1.2)
Total	100	100	100	100	100	100

Source: World Bank analysis of NBHS 2009.

Note: Standard errors are shown in parentheses. Figures shown are the percentages of individuals in each quintile living in households with each type of toilet facility.

Table A15: Type of Energy for Cooking by Quintile of Consumption

Main energy source for cooking	Quintile					
	Poorest	Second	Third	Fourth	Wealthiest	All
Firewood	95.4 (0.9)	92.3 (1.1)	89.4 (1.5)	81.6 (2.0)	70.3 (2.5)	85.8 (1.1)
Charcoal	1.4 (0.4)	3.4 (0.6)	6.0 (0.9)	13.6 (1.8)	26.2 (2.4)	10.1 (1.0)
Gas	0.0 (0.0)	0.0 (0.0)	0.4 (0.3)	0.3 (0.3)	0.8 (0.3)	0.3 (0.1)
Electricity	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Paraffin	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.1 (0.0)	0.0 (0.0)
Cow dung	0.0 (0.0)	0.3 (0.2)	0.3 (0.2)	0.0 (0.0)	0.0 (0.0)	0.1 (0.1)
Grass	3.2 (0.9)	3.8 (1.0)	3.3 (1.1)	4.1 (1.0)	2.3 (0.7)	3.3 (0.6)
Biogas	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.1 (0.1)	0.0 (0.0)	0.0 (0.0)
No cooking	0.0 (0.0)	0.2 (0.1)	0.5 (0.3)	0.3 (0.2)	0.3 (0.2)	0.3 (0.1)
Total	100	100	100	100	100	100

Source: World Bank analysis of NBHS 2009.

Note: Standard errors are shown in parentheses. Figures shown are the percentages of individuals in each quintile living in households using each type of energy for cooking.

Table A16: Type of Access to Water by Quintile of Consumption

Access to water	Quintile					
	Poorest	Second	Third	Fourth	Wealthiest	All
Water filtering stations	0.7 (0.3)	1.1 (0.3)	2.7 (0.8)	3.6 (0.8)	4.5 (1.0)	2.5 (0.4)
Deep boreholes	52.4 (3.5)	52.9 (3.0)	54.6 (2.8)	53.4 (2.9)	49.6 (3.0)	52.6 (2.0)
Dam/wells	25.8 (3.1)	20.8 (2.3)	17.0 (2.0)	16.3 (1.8)	10.5 (1.4)	18.1 (1.4)
Running open water source	18.9 (2.9)	22.1 (2.5)	22.0 (2.3)	21.0 (2.3)	27.4 (3.0)	22.3 (1.7)
Water vendor	1.8 (0.6)	2.7 (0.8)	3.0 (0.7)	5.5 (1.2)	7.5 (1.2)	4.1 (0.5)
Sand filters with common network stand	0.4 (0.2)	0.4 (0.2)	0.8 (0.6)	0.2 (0.1)	0.5 (0.3)	0.5 (0.1)
Total	100	100	100	100	100	100

Source: World Bank analysis of NBHS 2009.

Note: Standard errors are shown in parentheses. Figures shown are the percentages of individuals in each quintile living in households reporting each source as their main source of water.

Table A17: Reclassification of Access to Water and Type of Dwelling

Access to water	Labels in the poverty profile	Type of dwelling	Labels in the poverty profile
Water filtering stations with common network/stand pipe	Water filtering stations	Tent	Dwelling from straw mats/Tent
Mechanical boreholes with common network/standpipe		dwelling of straw mats	
Deep boreholes (donkey) without network	Deep boreholes	Tukul/gottiya-mud	Tukul
Deep boreholes (donkey) with network		Tukul/gottiya-sticks	
Hand pumps	Sand filters with common network stand pipe (koshk)	Flat or apartment	Flat/Villa/Multi-storey house
Sand filters with common network stand pipe (koshk)		Villa	
Shallow wells (dug wells)		Multi-storey house	
Hafeer/Dam without filter (still open water)	Dam/wells	House of one floor-brick/concrete	House of one floor - brick/concrete
Hafeer/Dam with filter (still open water)		House constructed of wood	House constructed of wood
Turdal/fula/river (still open water)	Running open water	House of one floor-mud	House of one floor-mud
Running open water source(river, pond, tura'a)		Incomplete	Not included in the survey
Water vendor (tanker-cart-bearer) from deep boreholes	Water vendor		
Water vendor - from shallow wells pond/river/spring			

