



# **Small group poverty estimates: The case of disabled people in Mozambique**

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## **Discussion papers**

No. 25E  
April 2006

National Directorate of Studies  
and Policy Analysis

Ministry of Planning and  
Development

Republic of Mozambique

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The authors gratefully acknowledge the financial support provided by the World Bank to carry out this study. The authors would also like to thank Hans Hoogeveen and Daniel Mont for their constructive comments on an earlier version of this paper. The views expressed in this paper are the authors', and do not reflect the position of the World Bank or the Government of Mozambique.

This report contains preliminary material and research results. They have not been subject to formal external reviews managed by IFPRI's Publications Review Committee, but have been reviewed by at least one internal or external researcher. This report is circulated in order to stimulate discussion and critical comment.

## **Abstract**

Most empirical poverty analysis is based on household sample surveys, which collect detailed information on a few thousand households. The sampling design and sample size allow for estimates of poverty that are representative at the national level, and for large sub-national groups, such as provinces or rural areas. Recently, an analytical technique known as small-area estimation has been adapted to the study of poverty, facilitating the estimation of poverty at greater levels of disaggregation than is possible from a sample survey alone. This methodology combines the strengths of two different kinds of data sources: the population census's comprehensive coverage on a limited number of household and individual characteristics, along with a sample survey's detailed data on a small number of households. This approach, also known as poverty mapping, has been used to estimate poverty for small geographic units, such as the district or sub-district.

Although most applications of this methodology have focused on estimating poverty for small geographic areas, the technique can also be used to generate poverty estimates for any population sub-group that is not adequately represented by sample surveys. This paper examines poverty among those with physical or mental disabilities, who make up approximately two percent of the population in Mozambique. It presents descriptive statistics from the 1997 Census, comparing the characteristics of disabled individuals and households with disabled members with the characteristics of their non-disabled counterparts. This paper also estimates Foster-Greer-Thorbecke poverty indices for the disabled and non-disabled, using a variety of criteria to classify the population households as disabled or not. The descriptive data and the econometric results are consistent in indicating that disabled people in Mozambique are slightly more disadvantaged economically than the rest of the Mozambican population, but that the differences are not large. The differences tend to be statistically significant only at the national level. It should be noted, however, that the study describes the position at the time of the 1997 Census. Since then Mozambique has shown considerable progress in reducing poverty, but it is not yet known whether the disabled are enjoying the same benefits as the rest of the population.

## **1 Introduction**

Part of the first Millennium Development Goal (MDG) is to reduce by one-half the proportion of the world's population living in poverty by the year 2015. Effective poverty reduction requires both a detailed profile of the poor and their livelihood strategies, and a complement of policies that will raise their living standards. Although standard household surveys and qualitative poverty appraisals provide a wealth of information to assist in the design of policy, many gaps remain. Knowledge gaps are especially common for small sub-groups of the population, such as the residents of specific localities, or certain occupational classifications (e.g., fisherman). These sub-groups are too small in number to be represented by standard approaches to data collection, even though they may constitute tens of thousands, or even hundreds of thousands, of poor people.

One particularly pertinent example is people with physical or mental disabilities. The disabled merit attention both because of their special needs, and because of the challenges they face in leading economically productive lives. The problem is more severe in low income countries because poor living conditions tend to increase the prevalence of disabilities, and because the societies are not as well-equipped to accommodate the special needs of the disabled. Disabled persons are a vulnerable group because of the obstacles that limit their free participation in the labor market or pursuit of self-employment activities.

This paper examines the case of poverty among disabled people in Mozambique. In addition to the poor health and nutrition conditions that contribute to the prevalence of disabilities, Mozambique's recent history is marked by armed conflict that greatly added to the number of disabled persons. An armed struggle for the end of colonial rule dominated the years from 1964 to 1974. Shortly after independence in 1975, a devastating war broke out between the government and the forces of Renamo, who were largely supported first by the minority white government in Rhodesia, and then by apartheid South Africa. Although a peace accord was reached in 1992, that war continues to claim victims from the thousands of buried land mines that still dot the countryside.

This paper estimates poverty levels for the disabled population in Mozambique, using the small-area poverty estimation (poverty mapping) methodology developed by Elbers et al. (2003), and extended by Hoogeveen (2005) for analysis of non-geographically defined small groups. The paper is organized as follows. The next section presents information on disabilities in Mozambique, and briefly reviews efforts by Government and civil society to confront the problem of disabilities. Section 3 describes the data and the methodology applied to estimating poverty among the disabled sub-group of the population. The fourth section compares various characteristics of the disabled population with their non-disabled counterparts, and presents estimates of poverty indices for the disabled and non-disabled groups. The final section summarizes and provides some concluding observations.

## **2 Disability in Mozambique**

This section describes the principal causes of disabilities and examines the scope of disabilities in Mozambique, as well as public responses to the problem of disabilities.

## 2.1 *Causes of disability*

There are many causes of disability, and they are often inter-related. The proximate causes are usually one or more of birth defects, nutritional deficiencies, infectious and chronic disease, accidents, and physical conflict. Some of these may be underlying causes as well. For example, acute vitamin A deficiency can lead directly to xerophthalmia and blindness, whereas the risk of folate deficiency is more indirect, in that folate-deficient women are more likely to give birth to children with neural tube defects. Vitamin A deficiency can also indirectly contribute to disabilities, as it compromises the immune system, making children more susceptible to disabilities caused by disease.

Underlying causes of disability are an inadequate health care system, lack of awareness of preventive and curative options, high levels of poverty that prevent people from taking advantage of what health care is available, and living conditions that are often unhygienic. In addition, the risk of disability from accidents is high in poor countries such as Mozambique. Roads and vehicles are often in sub-standard condition. Closer to home, even the simple cooking fire that most households poses a risk for unsupervised children, who often fall into the fire and suffer not only burns, but contractures that restrict their mobility. As noted earlier, the warfare that prevailed in Mozambique from 1964 through 1992 led to many human-inflicted disabilities, with the number continuing to rise as long as the task of locating and clearing landmines remains incomplete.

## 2.2 *Disability in Mozambique*

In 1982 the World Programme of Action for Disabled People called for the routine collection of statistics on disabilities, recommending that the data be disaggregated by disability, to facilitate estimation of the proportion of each group in the world population. For Mozambique, this recommendation also came at a time when the country needed to understand the impact of the on-going armed conflict on the prevalence of disabilities.

The 1997 census in Mozambique defined a disability as a loss of a body part or organ, or loss of the function of that body part or organ (INE 1999). Based on the census data, in 1997 Mozambique had 289,700 disabled people, or approximately 2 percent of the total population of 16 million. The census questionnaire asked whether each household member had no disability, a physical disability, a mental disability, or both physical and mental disabilities. Further details about disabilities were not collected in the census. The census data showed 229,000 with physical disabilities (77 percent of the total disabled population), 45,200 mentally disabled (16 percent of the disabled population), and 20,600 with both physical and mental disabilities (7 percent of the total disabled population) (INE, 1998).

Table 1 presents the statistics on disability in Mozambique disaggregated by zone and gender. The result shows that 80 percent of disabled people in Mozambique are found in rural areas, which is disproportionately high, given that the general population is 70 percent rural. Males are more likely to be disabled than females, with the disabled population split 54 percent male and 46 percent female, even though women make up 52 percent of the general population. These differences can be explained in part by the greater involvement of men in high-risk activities, including armed conflict. In the case of rural areas, apart of the war, which was deeply rooted in this area, the higher levels of poverty and deficient health infrastructure likely

contributes to the higher rate of disability in rural areas. It is also likely that those who are already disabled are less likely to migrate to urban areas for work.

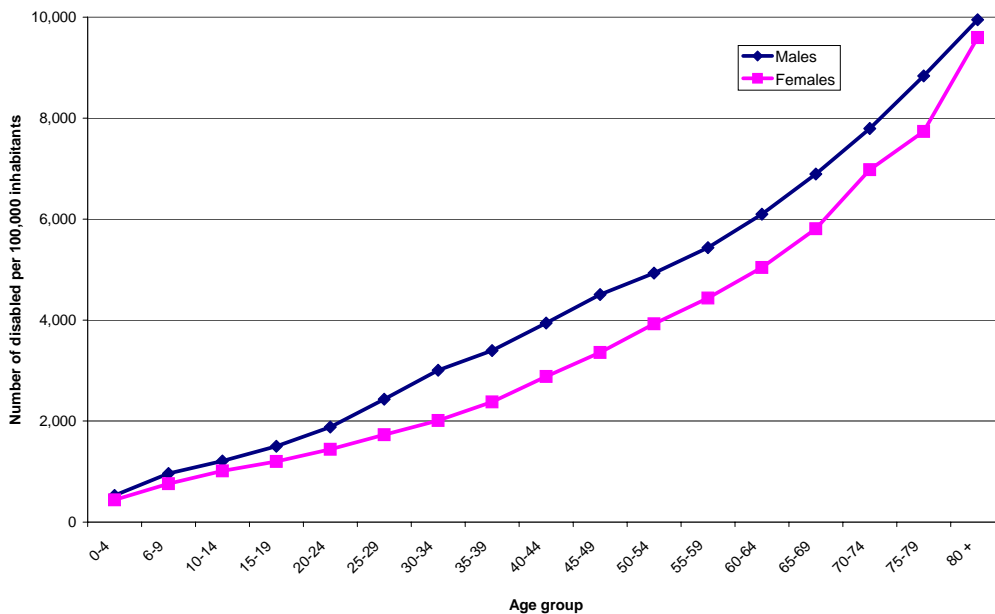
Table 1: Disability in Mozambique- Disaggregation of statistics by area, sex, and type of disability

Type of deficiency	National			Urban			Rural		
	Total	Males	Females	Total	Males	Females	Total	Males	Females
Physical	222,889	120,175	102,714	40,895	23,668	17,227	181,994	96,507	85,487
Mental	45,165	23,647	21,520	8,480	4,913	3,567	36,687	18,734	17,953
Physical and mental	20,607	10,859	9,748	3,158	1,705	1,453	17,449	9,154	8,295
Total disabled	288,663	154,681	133,982	52,533	30,283	22,247	236,130	124,395	11,735
Total population	16,098,456	7,713,927	8,384,529	4,693,990	2,319,455	2,374,536	11,404,466	5,394,473	6,009,993

Source: INE, 1998

Figure 1 presents the prevalence of disability by age group and sex. In all age groups, there is higher proportion of disabled men than women, and the prevalence of disabilities clearly increases with age. The positive relationship between age and disability is to be expected, as the disabilities captured by the census are usually irreversible, so that the probability of having a disability increases with age. Moreover, at the oldest ages disabilities become part of the physical aging of the body. The higher rate of disabilities among adult males compared to adult females can be explained by several factors, including dangerous occupation (e.g., mining), greater travel and exposure to accidents, and armed conflict, among others.

Figure 1: Prevalence of disability by sex and age group



Source: Adapted from INE, 1998.

### 2.3 Mozambique's response to the problems of disabilities

The Government of Mozambique recognizes the difficulties disabled persons confront in trying to earn a livelihood. To reduce the socio-economic problems of this group and other vulnerable groups<sup>1</sup>, in 1990 the Government created a program to help those having chronic disability in urban areas (Government of Mozambique 1990, 1997).

Mozambique has also responded to several international initiatives designed to improve the situation of disabled people, such as the United Nations' Decade of Disabled People (1982–1992) and the African Decade of Disabled People (1999–2009) that was declared by the African Heads of States. Within the government, the Ministry of Health works on most of the medical issues related to disabilities, with most of the responsibility for social protection and integration of disabled Mozambicans falling to the Ministry of Women and Social Action.

Outside of government, there are three major civil society organizations that promote the interests of disabled persons in Mozambique. These are the Association of Handicapped People in Mozambique (*Associação de Deficientes em Moçambique* or ADEMO), the Association of the Blind and Partially of Mozambique (*Associação de Cegos e Amblíopes de Moçambique* or ACAMO), and a group of disabled ex-combatants known as the Association of Mozambican Disabled Soldiers (*Associação de Deficientes Militares de Moçambique* or ADEMIMO). Disabled war veterans receive a pension from the government, with the amount varying depending on the gravity of disability and the person's position during military service.

## 3 Data and Methodology

This section outlines the data used in the quantitative analysis, and presents a brief summary of the methodology. The latter comprises both the criteria used to classify households and individuals as disabled or non-disabled, and the econometric approach used for estimating poverty indices for the disabled and non-disabled sub-groups of the Mozambican population.

### 3.1 Data

Detailed information about living conditions is drawn from the 1996–97 National Household Survey of Living Conditions, also known by its Portuguese abbreviation IAF (for *Inquérito aos Agregados Familiares Sobre as Condições de Vida*). The survey was carried out by the National Institute of Statistics (INE), and collected data at individual, household and community levels. The sample included 8250 households, with 2,439 in urban areas and 5,811 in rural areas. The sample is representative at the national level, and for large sub-national units such as rural and urban areas, and each of Mozambique's 10 provinces plus the capital city of Maputo. Information was collected on many topics, including household composition, housing conditions, fertility, migration, employment, individual and household expenditures, agricultural production, education, and other characteristics (for more details see, INE 1998). This survey formed the basis for Mozambique's first national poverty assessment (MPF et al. 1998), and numerous other poverty related studies, including a poverty mapping study (Simler and Nhate 2005).

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<sup>1</sup> In addition to the disabled, the program covers two other vulnerable groups, namely the elderly and single mothers with more than five children.

Shortly after completing data collection for the IAF, INE undertook a Population and Housing Census, which was only Mozambique’s second census since gaining independence in 1975, and the first census since 1980. Although some countries implement a basic census questionnaire for all households and a more extensive questionnaire for a subset of households, the 1997 Mozambique census used only one questionnaire. The census questionnaire collected information on demographics, education, employment, housing conditions, and a small number of household assets. It is convenient that the census and the 1996–97 IAF are almost contemporaneous, as a pivotal assumption of the method is that the parameters estimated from the survey data are equally applicable to the period covered by the census.

### 3.2 Methodology

The methodology for using small-area estimation techniques in poverty analysis has been described in detail elsewhere, most notably by Hentschel et al. (2000), Minot (2000), and Elbers et al. (2003). Hooegeven (2005) provides a description of the extension of this method to the analysis of poverty among the disabled, using data from Uganda. Therefore this section will not attempt a thorough description of the method, but only present the broad outlines of the approach.

The household survey data—in this instance, the 1996–97 IAF data—are used to estimate the statistical relationship between the empirical variable used to measure welfare (consumption per capita, adjusted for spatial and temporal variation in prices) and a set of independent variables that are expected to be correlated with welfare. The set of variables considered for the right-hand side of the regression equation is limited to those variables that appear in both the household survey and the population census. The estimated regression coefficients are then applied to the census data to produce estimates of consumption per capita for each of the households in the census. The estimates of consumption per capita are used in turn to calculate summary measures of poverty, in this case, the Foster-Greer-Thorbecke (FGT) class of  $P_\alpha$  poverty measures. Because consumption estimates are available for the entire population, it is possible to calculate welfare measures for small sub-groups of the population, such as the disabled.

More formally, the natural logarithm of per capita consumption is modeled as a function of a set of observable household characteristics. We estimate this relationship by a linear approximation of the form

$$\ln y_{ch} = X'_{ch}\beta + \eta_c + \varepsilon_{ch}, \quad (1)$$

where  $y_{ch}$  is per capita consumption of household  $h$  residing in cluster  $c$ ,  $X_{ch}$  are the observable characteristics of that household that are available in both the survey and census data sets, and  $\beta$  is a coefficient vector. The disturbance term has two components. The first component,  $\eta_c$ , applies to all households within a given cluster, while the second,  $\varepsilon_{ch}$ , is specific to the household. These two components are uncorrelated with one another and independent of the regressors. This specification of the disturbance term accommodates the possibility of spatial autocorrelation, i.e., a location-specific effect common to all households within a cluster. It also allows for heteroscedasticity of the household-specific error component.

Equation (1) is estimated using generalized least squares (GLS), taking into account the heteroscedasticity of the household component of the disturbance term,  $\epsilon_{ch}$ . The survey is not self-weighting, so regressions are estimated using the survey probability weights, which are the inverse of the probability of selection into the sample. Rather than impose an assumption of homogeneous coefficients throughout Mozambique, separate regressions are estimated for each of the strata of the survey data set. The same set of candidate variables is considered for each of the models, with final variable selection determined by a stepwise procedure supplemented with extensive ex post diagnostics. The number of variables in the regressions is constrained not by the number of common variables in the survey and the census, but rather by the number of clusters in the first stage of sampling within each stratum, as the appropriate Wald test for the regression is based on an F distribution with  $(k, d - k + 1)$  degrees of freedom, where  $k$  is the number of terms in the model (excluding the constant) and  $d$  is the number of primary sampling units minus the number of strata (Korn and Graubard 1990).

The resulting parameter estimates are then applied to the census data. Estimates of consumption for the census households are generated by simulations, which re-introduce the household-specific and cluster-specific disturbances that are not captured by the regression equation. The simulations also account for the inherent model error (i.e., the regression coefficients are only estimates of the true coefficients, and are estimated with a standard error) by perturbing the  $\beta$  coefficients using the coefficients' variance-covariance matrix. Consumption estimates for each household are obtained as the average of 100 simulations.

## 4 Results

This section presents results of the quantitative analysis of disability and welfare in Mozambique. The first sub-section provides descriptive statistics, comparing characteristics of disabled and non-disabled households (defined below) at the national level, and disaggregated by rural and urban area of residence. The descriptive statistics focus on non-income dimensions of well-being. The second sub-section uses small-area estimation techniques to estimate FGT indices for consumption (i.e., income-based) poverty for the disabled and non-disabled populations, again at the national, rural, and urban levels.

### 4.1 Descriptive statistics

We begin the presentation of the quantitative analysis by comparing descriptive statistics for the disabled and the non-disabled population, using data from the 1997 Population and Housing Census. As described in the preceding section, there are various ways in which one can define the disabled population, particularly as disability is an individual characteristic, but much of the available relevant data measures household characteristics.

Other studies (e.g., Hoogeveen 2005, Lindeboom 2005) have classified entire households as disabled or non-disabled depending on whether the head of household is disabled. In this section we take a slightly different approach, and classify households as disabled or non-disabled depending on whether *any* member of the household has a disability.

There are several reasons for this difference in approach. First, although the household head is often the main economic earner in the household, other household members also

invariably contribute to the welfare of the household. This is especially the case for farming households, in which virtually all adults—and many children—are economically active. As the disability of any member could reduce that member's economic activity and household welfare, we believe that limiting the disability definition to the head's status is unnecessarily narrow. Second, it is often the case that the head of household is not the main economic actor in the household. The most common case is when the elderly, who are more likely to be disabled, live with one or more of their adult children and it is the adult children who are the main earners. Such extended households are extremely common in Mozambique, and elsewhere in Africa, and it is typically the oldest member (especially the oldest male) who is designated as the head of household in censuses and surveys. Yet in these cases any disability of the titular head of household will likely have very little direct impact on the household economy. Third, there are important indirect effects of disabilities that also affect household welfare. Most notably, disabled household members often require more care and attention than non-disabled members, and time diverted from productive activities to caregiving activities can also constrain households' productive capacity and welfare.

In sum, we find a classification based on the disability status of any household member to be a more compelling and relevant approach to analyzing these issues. Although our discussion of the descriptive analysis will focus on this classification, for the sake of comparability with other studies we also present results based on the head's disability status in the appendix. A third classification, based on the disability status of any member *other than* the household head, is also presented in the appendix.

Table 2 shows descriptive data from the 1997 census. As the data come from a complete enumeration of the population in Mozambique, there is no sampling error and standard errors are not presented. We summarize the results by topic area.

**Education:** The literacy rates of heads of household are low, especially in rural areas, where less than one-third of household heads can read and write. Households without any disabled member are more likely to have a head of household who is literate, with the difference being approximately 6 percentage points in urban areas and 5 percentage points nationally. In rural areas heads of disabled households are only slightly less likely to be literate than heads of non-disabled households (28 vs. 29 percent). A similar pattern appears with respect to the highest level of education completed by the head of household. Again there are strong differences between rural and urban households. The percentage of households in which the head did not complete any education is higher among disabled households (62 percent, compared to 57 percent for non-disabled households), with most of the difference driven by urban households (38 percent to 31 percent) and only small differences between disabled and non-disabled households in rural areas. Likewise, heads of disabled households are much less likely to be able to speak Portuguese than their counterparts in non-disabled households, with the difference most pronounced in urban areas, where rates of Portuguese ability are much higher overall. Average years of education completed by the head of household are higher for heads of non-disabled households in both rural and urban areas. For younger household members there is essentially no

difference between disabled and non-disabled households in the education deficit (defined as in Hoogeveen 2005)<sup>2</sup>.

**Employment:** The census questionnaire asked about the work status over the preceding 7 days for each person in the household aged 7 years or older. The responses of heads of household are summarized in Table 2. In both urban and rural areas, the heads of non-disabled households were more likely than the heads of disabled households to report that they had worked in the preceding week, with a difference of 4 to 6 percentage points. A considerably higher number of heads of disabled households reported “other” for employment status; this category included not working because of disability or infirmity. As to type of employer, there is little difference between heads with and without disabled members in their households.

**Dwelling characteristics:** There is little difference between disabled and non-disabled households in the overall type of housing in which they live. Almost all rural households (97 percent), and two-thirds of urban households, live in huts (*palhotas*). Almost all housing is owner-occupied, again with no substantial differences between disabled and non-disabled households, except perhaps in urban areas where disabled households are slightly more likely to own their homes and non-disabled are somewhat more likely to rent. On average, non-disabled households tend to have houses of slightly higher quality building materials, although the differences are extremely small. For example, non-disabled households are more likely to live in houses with concrete block walls (8 percent versus 6 percent), or adobe block walls (19 percent versus 15 percent), and less likely to have walls made out of sticks, bamboo, or palm (20 percent versus 24 percent). Similarly, non-disabled households are slightly more likely to have a cement or tile roof (5 percent versus 4 percent) or zinc roof (13 percent versus 12 percent). Floor materials are also largely similar between disabled and non-disabled households, with non-disabled households slightly more likely to have cement floors and correspondingly less likely to have earthen floors. Very few Mozambicans have electricity in their homes, but non-disabled households are more likely to have electricity than disabled households (20 percent versus 18 percent in urban areas, and 6 percent versus 4 percent overall). Disabled households tend to have slightly more rooms in their houses than non-disabled households. This applies to both bedrooms and the total number of rooms, and is observed in both rural and urban areas.

**Water and sanitation:** There are some noticeable differences between disabled and non-disabled households’ source of drinking water and type of sanitation facilities, with disabled households tending to have slightly inferior conditions, albeit by a small margin. Most of the difference between disabled and non-disabled households is observed in urban areas. Non-disabled households are more likely to have piped water, either in their house or in their yard, by a margin of 3 percentage points. Non-disabled households are also more likely to get their drinking water from a public tap, by a margin of 2 percentage points in both urban areas and overall. As of the 1997 census, more than half of the Mozambican population had neither a toilet nor a latrine. Differences in household sanitation facilities are small, with non-disabled households being slightly more likely than disabled households to have a latrine.

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<sup>2</sup> Education deficit is defined as (age – 6) – number of years of education received.

**Household assets:** Non-disabled are more likely than disabled households to have a working radio, by a margin of 3 percentage points, with all of the difference occurring in urban areas. Most farmland in Mozambique is either held under customary tenure or owned by the state, meaning that it cannot be purchased or sold. Almost all (96 percent) rural households operate at least some farmland. Farming is also practiced in urban areas, largely in green zones on the periphery and in smaller urban areas. Disabled households in urban areas are slightly more likely to operate farmland than their non-disabled urban counterparts. For livestock, it should be noted that only about 2 percent of Mozambican households report owning any cattle, and that only about 12 percent own any goats or pigs. In contrast, approximately one-half of Mozambican households keep some type of fowl or poultry. On average, disabled households tend to have slightly more livestock than non-disabled households, with the difference appearing in both rural and urban areas.

As noted earlier, analogous descriptive statistics are reported in the appendix using alternative, more restrictive, definitions of disabled and non-disabled households. Table A1 presents information when households are classified as disabled or non-disabled based exclusively on the head of household's disability status. Table A2 takes a complementary approach, classifying households as disabled or non-disabled according to the disability status of any household member other than the head. That is, if the spouse, or child, or mother of the head is disabled, then the household is classified as disabled. Thus, if only the head is disabled, the household would be classified as disabled in Tables 2 and A1, but non-disabled in Table A2.

The results for the non-disabled category are almost identical across Tables 2, A1, and A2, but the results for the disabled category vary, albeit slightly. This is to be expected. The stability of the non-disabled results occurs because, relative to the classification in Table 2, the re-classification in Tables A1 and A2 effectively involves moving some households from the disabled category to the non-disabled category. The number of re-classified households is extremely small relative to the bulk of the population (i.e., non-disabled households), so there is negligible impact on the non-disabled results. The effect of the re-classification on the results for disabled households is also limited, as the disabled households in Tables A1 and A2 are subsets of the disabled households appearing in Table 1. These two subsets overlap somewhat, to the extent that there are households in which both the head and at least one other household member are disabled.

When households are classified according exclusively to the disability status of the head of household (Table A1), the differences between disabled and non-disabled households tend to increase slightly compared to the classification used for Table 2. This is especially notable with respect to the characteristics of the household head, namely literacy, highest educational attainment, and employment status. The differences also become slightly greater for some housing characteristics and radio ownership. In contrast, differences in livestock ownership (in which disabled households showed higher levels in Table 1) are diminished, i.e., the two groups become more equal.

The comparison of Table A2 with Table 2 is essentially the mirror image of the comparison between Table A1 and Table 2. Once again, and for the same reasons, the non-disabled results are essentially unchanged. Compared to Table 2 there are slight differences in the

results for disabled households, and these differences go in the opposite direction from those shown in Table A1.

#### 4.2 *Poverty estimates*

In this sub-section we present results of estimations for poverty levels among the disabled and non-disabled sub-populations, also disaggregating results by rural and urban area of residence. Three poverty measures from the Foster-Greer-Thorbecke  $P_\alpha$  class of poverty measures are presented: the poverty headcount index ( $P_0$ ), the poverty gap index ( $P_1$ ), and the squared poverty gap index ( $P_2$ ).

As was done for the descriptive statistics, we use three different methods for classifying households as disabled or non-disabled. As in that sub-section, our discussion focuses primarily on the results using the classification that considers a household disabled if any member of the household has a disability. For the consumption poverty analysis we also introduce a fourth method of classification, which is based on the disability status of individuals. Those individuals who reported a disability are classified as disabled, and those who did not report a disability are classified as non-disabled. Note that because consumption and poverty are estimated at the household level, the disabled and non-disabled members of a given household will have the same estimated levels of poverty, but that the aggregate levels of poverty for each group (disabled and non-disabled) will differ.

Table 3 presents results based on the broadest classification of disability, which categorizes a household as disabled if any member of the household is disabled. For all three poverty indices, disabled households have higher rates of poverty than non-disabled households. The differences are statistically significant at the national level ( $p < 0.01$ ), but are not statistically significant for either the urban or rural areas of residence.

Poverty levels are almost the same when households are classified according to the disability status of the head of household (Table 4). All of the point estimates are higher for disabled households, and the differences are statistically significant for all three indices at the national level ( $p < 0.01$ ). In addition, in urban areas the headcount index is statistically significant ( $p < 0.05$ ) and the poverty gap index is also marginally significant ( $p < 0.10$ ).

Results are also largely similar using the third classification, based on the disability status of members of the household other than the head (Table 5). Again, the point estimates for disabled households are consistently higher than those for non-disabled households, and the differences at the national level are highly significant ( $p < 0.01$ ). However, under this classification the differences in rural areas are also significant ( $p < 0.05$ ), but the urban differences are not.

The picture changes when we turn to the estimates based on individual-level classification of disability, as seen in Table 6. Under this classification, the point estimates for the disabled population are lower than those for the non-disabled in rural areas and at the national level. But in urban areas the disabled population has higher point estimates. Note, however, that the differences are quite small and largely insignificant statistically. The sole exception is the headcount index in rural areas, which is only barely significant at the 10 percent level.

To some degree the difference in poverty comparisons between Table 6 and the earlier preceding tables is to be expected. Consider the comparison between Table 6 and Table 3. In Table 3, all persons with disabilities and all of their household members are captured in the “disabled” column. In Table 6, all those household members without disabilities are shifted to the non-disabled column, with only the disabled individuals remaining in the disabled column. As Table 3 shows that households with a disabled member tend to be poorer than households in which no member is disabled, it stands to reason that the poverty indices will increase among the non-disabled category in Table 6. This increase is small, because the number of “shifted” persons is small relative to the number of persons in households where no member is disabled.

What is less clear is why the poverty indices among the disabled population should drop so much in Table 6. One possible explanation is related to the positive correlation between poverty and household size. Larger households tend to be poorer, and other things being equal, among poor households larger households contribute greater weight to poverty indices, simply because they have more people. An example may help illustrate this point. Assume for the moment (without loss of generality) that each disabled household in Table 3 has one disabled member, and a varying number of non-disabled members. Assume also that poverty and household size are positively correlated. In the re-categorization of the population that takes place in Table 6 the poverty level of each disabled individual will not change, but aggregate poverty will decrease among the disabled category because each disabled person is weighted equally, rather than according to the size of their household.

## **5 Summary and conclusions**

This paper has examined the welfare of disabled persons in Mozambique. The most recent census, conducted in 1997, shows that disabled people make up approximately 2 percent of the Mozambican population. The profile of disabled persons shows that the disabled are more likely to be male, and more likely to reside in rural areas. It also shows that the prevalence of disabilities increases steadily with age.

The analysis of non-income welfare indicators reveals that the disabled tend to be slightly poorer than the non-disabled, but not drastically so. Non-income indicators such as educational levels, quality of housing, source of drinking water, household sanitation, and ownership of a working radio all show that households in which one or more person is disabled tend to be slightly worse off than households in which there are no disabled people. Disabled households tend to have slightly more livestock than non-disabled households, although that result is colored by the observation that only a small minority of households own cattle, goats, or pigs. The results of the non-income indicators are consistent across the three definitions of disabled households that were investigated (i.e., any household member disabled, head disabled, or member other than the head disabled).

The small-group poverty estimates paint a similar picture: poverty levels among the disabled are slightly higher than the levels among the non-disabled. For the most part, the differences are statistically significant only at the national level, and not within urban and rural areas, although there are some exceptions to this depending on which of the three definitions of disabled household is used. When a fourth definition is employed, which classifies individuals

rather than entire households as disabled, there is no significant difference in the poverty levels of disabled and non-disabled persons. When considering the different approaches to classifying individuals and households by disability, we give greater credence to the definition based on the disability of any household member, because an individual's disability does indeed affect the entire household, regardless of that person's place in the household.

Thus, the overall picture is that disabled people in Mozambique are somewhat more disadvantaged economically than the rest of the Mozambican population, but the differences are not large. That is not to say, however, that there is no need for special attention to be paid to the situation of the disabled in Mozambique. Recall that the data used for this analysis is from 1997, only a few years after the signing of the peace accord and at a time when Mozambique was still shattered from the war. Analysis of more recent data has shown considerable progress in reducing both income poverty and non-income poverty (MPF et al. 2004). It remains to be seen whether the disabled are enjoying the same benefits from Mozambique's recent growth and poverty reduction as the rest of the population.

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Table 2—Descriptive statistics (based on any member of household with disability)

	Non-disabled			Disabled		
	Rural	Urban	Total	Rural	Urban	Total
<b>Age of head of household (years)</b>	40.4	39.4	40.1	46.7	45.3	46.4
<b>Literacy of household head (%)</b>						
Can read and write	28.9	67.0	38.9	28.1	60.5	34.2
Can only read	1.4	1.0	1.3	1.6	1.3	1.5
Cannot read or write	68.9	31.7	59.2	69.6	37.8	63.6
<b>Head's highest level of education (%)</b>						
None	66.3	31.3	57.1	67.3	37.7	61.7
Lower primary (EP1)	28.3	37.1	30.6	28.9	39.0	30.8
Complete primary or more	5.4	31.5	12.3	3.9	23.3	7.5
Head can speak Portuguese (%)	32.1	75.7	43.6	31.1	70.5	38.5
Head's average years of education	0.72	3.25	1.38	0.59	2.58	0.96
Education deficit (at 12 years)	5.82	5.45	5.70	5.81	5.47	5.74
Education deficit (at 18 years)	11.25	8.82	10.45	11.10	8.83	10.51
<b>Head's employment status (preceding 7 days) (%)</b>						
Worked	82.4	73.1	80.0	77.6	67.4	75.7
Family worker	6.6	10.7	7.7	6.8	10.1	7.4
Other Situation	11.0	16.2	12.4	15.6	22.5	16.9
<b>Employer (%)</b>						
Civil servant	1.4	13.0	4.4	1.3	12.0	3.5
Private sector	2.6	18.0	6.6	2.5	15.7	5.1
Self-employment	70.7	34.1	61.1	68.4	34.7	61.7
Other employers	25.3	35.0	27.8	27.8	37.6	29.8
<b>Type of housing (%)</b>						
House	2.6	28.1	9.3	3.2	29.2	8.1
Flat or apartment	0.1	4.4	1.2	0.1	3.7	0.8
Hut and other	97.3	67.5	89.5	96.7	67.1	91.1
<b>Method of house acquisition (%)</b>						
Rented	0.4	10.9	3.1	0.3	8.5	2.0
Owned	95.3	82.2	91.9	95.8	85.2	93.7
Ceded	2.3	5.1	3.0	2.3	4.6	2.8
Other means	2.0	1.9	1.9	1.6	1.7	1.6
<b>Type of walls (%)</b>						
Concrete block	1.6	24.1	7.5	2.3	23.3	6.2
Brick	1.3	5.7	2.4	1.2	6.4	2.2
Wood or zinc	1.0	3.2	1.6	1.2	3.6	1.7
Adobe block	17.5	23.3	19.0	13.6	20.9	15.0
Stick, bamboo or palm	20.0	20.2	20.1	24.1	22.1	23.8
Stick and bark	56.9	21.7	47.6	55.4	21.5	49.0
Other	1.7	1.9	1.8	2.1	2.3	2.1
<b>Type of roof (%)</b>						
Cement or tile	1.1	15.6	4.9	1.3	15.9	4.0
Zinc	5.0	34.1	12.6	6.5	33.4	11.5
Grass/thatch/palm/other	93.9	50.3	82.5	92.2	50.7	84.4

Source: Authors' calculations from 1997 Population and Housing Census

Table 2 (continued)—Descriptive statistics (based on any member of household with disability)

	Non-disabled			Disabled		
	Rural	Urban	Total	Rural	Urban	Total
<b>Type of floor (%)</b>						
Cement	4.0	44.7	14.6	5.6	45.5	13.6
Adobe	19.3	13.6	17.8	19.6	13.3	18.3
Earth	76.2	41.3	67.1	74.2	40.7	67.5
<b>Household has electricity (%)</b>	0.5	20.2	5.7	0.4	18.4	3.8
<b>Number of rooms in the house</b>	2.04	2.88	2.26	2.14	2.97	2.29
<b>Number of bedrooms in the house</b>	1.46	1.91	1.58	1.61	2.07	1.70
<b>Source of drinking water (%)</b>						
Piped	0.9	31.8	9.0	0.7	29.2	6.1
Public tap	2.8	19.0	7.1	2.9	16.6	5.4
Well	73.9	43.6	66.0	72.3	47.3	67.6
River or lake	21.1	4.8	16.8	22.5	6.1	19.4
<b>Housing sanitation conditions (%)</b>						
Toilet	0.8	10.9	3.4	0.7	10.6	2.5
Latrine	22.5	55.1	31.1	22.8	54.8	28.8
No toilet or latrine	76.7	34.0	65.5	76.6	34.6	68.7
Household has radio (%)	21.4	51.4	29.3	20.6	48.5	25.8
Household has farmland (%)	96.1	60.4	86.8	96.0	67.7	90.7
Average number of cattle	0.19	0.16	0.19	0.29	0.19	0.27
Average number of goats	0.66	0.39	0.59	0.99	0.55	0.91
Average number of pigs	0.40	0.22	0.34	0.47	0.26	0.43
Average number of fowl	4.97	2.78	4.40	6.00	3.55	5.54

Source: Authors' calculations from 1997 Population and Housing Census

Table 3: Poverty estimates (based on any member of household with disability)

	Disabled	Non-disabled	Total
National			
P <sub>0</sub>	0.696 (0.010)	0.658 (0.010)	0.661 (0.010)
P <sub>1</sub>	0.315 (0.007)	0.290 (0.007)	0.292 (0.007)
P <sub>2</sub>	0.179 (0.005)	0.163 (0.005)	0.164 (0.005)
Rural			
P <sub>0</sub>	0.725 (0.011)	0.701 (0.012)	0.703 (0.012)
P <sub>1</sub>	0.332 (0.008)	0.314 (0.008)	0.316 (0.008)
P <sub>2</sub>	0.190 (0.006)	0.178 (0.006)	0.179 (0.006)
Urban			
P <sub>0</sub>	0.589 (0.015)	0.554 (0.014)	0.556 (0.014)
P <sub>1</sub>	0.254 (0.009)	0.234 (0.009)	0.235 (0.009)
P <sub>2</sub>	0.140 (0.006)	0.128 (0.006)	0.129 (0.006)

Source: Authors' calculations from 1997 Population and Housing Census and 1996–97 IAF

Table 4: Poverty estimates (based on head of household with disability)

	Disabled	Non-disabled	Total
National			
P <sub>0</sub>	0.694 (0.010)	0.659 (0.010)	0.661 (0.010)
P <sub>1</sub>	0.315 (0.007)	0.291 (0.007)	0.292 (0.007)
P <sub>2</sub>	0.180 (0.005)	0.164 (0.005)	0.164 (0.005)
Rural			
P <sub>0</sub>	0.715 (0.011)	0.703 (0.012)	0.703 (0.012)
P <sub>1</sub>	0.327 (0.008)	0.315 (0.008)	0.316 (0.008)
P <sub>2</sub>	0.188 (0.006)	0.178 (0.006)	0.179 (0.006)
Urban			
P <sub>0</sub>	0.597 (0.015)	0.555 (0.014)	0.556 (0.014)
P <sub>1</sub>	0.259 (0.009)	0.234 (0.009)	0.235 (0.009)
P <sub>2</sub>	0.144 (0.006)	0.128 (0.006)	0.129 (0.006)

Source: Authors' calculations from 1997 Population and Housing Census and 1996–97 IAF

Table 5: Poverty estimates (based on member other than household head with disability)

	Disabled	Non-disabled	Total
<b>National</b>			
P <sub>0</sub>	0.701 (0.010)	0.658 (0.010)	0.661 (0.010)
P <sub>1</sub>	0.319 (0.007)	0.291 (0.007)	0.292 (0.007)
P <sub>2</sub>	0.182 (0.005)	0.163 (0.005)	0.164 (0.005)
<b>Rural</b>			
P <sub>0</sub>	0.735 (0.011)	0.701 (0.012)	0.703 (0.012)
P <sub>1</sub>	0.338 (0.008)	0.314 (0.008)	0.316 (0.008)
P <sub>2</sub>	0.194 (0.006)	0.178 (0.006)	0.179 (0.006)
<b>Urban</b>			
P <sub>0</sub>	0.588 (0.015)	0.555 (0.014)	0.556 (0.014)
P <sub>1</sub>	0.253 (0.009)	0.234 (0.009)	0.235 (0.009)
P <sub>2</sub>	0.140 (0.007)	0.128 (0.006)	0.129 (0.006)

Source: Authors' calculations from 1997 Population and Housing Census and 1996–97 IAF

Table 6: Poverty estimates (based on individual-level classification)

	Disabled	Non-disabled	Total
National			
P <sub>0</sub>	0.656 (0.010)	0.660 (0.010)	0.661 (0.010)
P <sub>1</sub>	0.289 (0.007)	0.292 (0.007)	0.292 (0.007)
P <sub>2</sub>	0.162 (0.005)	0.164 (0.005)	0.164 (0.005)
Rural			
P <sub>0</sub>	0.675 (0.011)	0.703 (0.011)	0.703 (0.012)
P <sub>1</sub>	0.299 (0.008)	0.315 (0.008)	0.316 (0.008)
P <sub>2</sub>	0.169 (0.005)	0.178 (0.005)	0.179 (0.006)
Urban			
P <sub>0</sub>	0.567 (0.014)	0.557 (0.015)	0.556 (0.014)
P <sub>1</sub>	0.242 (0.009)	0.236 (0.010)	0.235 (0.009)
P <sub>2</sub>	0.133 (0.006)	0.129 (0.007)	0.129 (0.006)

Source: Authors' calculations from 1997 Population and Housing Census and 1996–97 IAF

Table A1—Descriptive statistics (based on head of household with disability)

	Non-disabled			Disabled		
	Rural	Urban	Total	Rural	Urban	Total
<b>Age of head of household (years)</b>	40.5	39.5	40.3	48.1	46.9	47.9
<b>Literacy of household head (%)</b>						
Can read and write	29.0	66.9	38.9	25.8	55.4	30.6
Can only read	1.4	1.0	1.3	1.5	1.6	1.5
Cannot read or write	68.8	31.8	59.2	71.9	42.5	67.1
<b>Head's highest level of education (%)</b>						
None	66.2	31.4	57.2	69.9	42.6	65.4
Lower primary (EP1)	28.4	37.2	30.7	26.6	37.3	28.4
Complete primary or more	5.4	31.4	12.2	3.5	20.1	6.2
Head can speak Portuguese (%)	0.0	0.0	0.0	0.0	0.0	0.0
Head's average years of education	0.72	3.24	1.37	0.54	2.26	0.82
Education deficit (at 12 years)	5.82	5.45	5.70	5.81	5.46	5.74
Education deficit (at 18 years)	11.24	8.82	10.45	11.13	8.98	10.67
<b>Head's employment status (preceding 7 days) (%)</b>						
Worked	82.4	73.1	80.0	73.4	60.9	71.3
Family worker	6.6	10.7	7.6	7.2	9.6	7.6
Other Situation	11.0	16.2	12.4	19.4	29.4	21.0
<b>Employer (%)</b>						
Civil servant	1.4	12.5	4.3	0.9	7.9	2.1
Private sector	2.6	17.8	6.5	1.9	12.3	3.6
Self-employment	70.5	34.3	61.1	61.5	32.4	56.7
Other employers	25.6	35.4	28.1	35.7	47.5	37.6
<b>Type of housing (%)</b>						
House	2.7	28.2	9.3	2.9	25.9	6.7
Flat or apartment	0.1	4.4	1.2	0.1	3.0	0.6
Hut and other	97.3	67.4	89.5	97.0	71.1	92.8
<b>Method of house acquisition (%)</b>						
Rented	0.4	11.1	3.2	0.4	7.9	1.6
Owned	94.8	81.1	91.2	93.9	83.9	92.3
Ceded	2.7	5.7	3.5	3.8	6.1	4.1
Other means	2.1	2.1	2.1	1.9	2.1	2.0
<b>Type of walls (%)</b>						
Concrete block	1.6	24.2	7.5	2.1	19.9	5.0
Brick	1.3	5.7	2.4	1.0	5.7	1.8
Wood or zinc	1.0	3.2	1.6	1.2	3.3	1.5
Adobe block	17.0	23.0	21.0	12.0	21.0	13.0
Stick, bamboo or palm	20.1	20.1	20.1	25.6	25.3	25.5
Stick and bark	56.8	21.6	47.7	55.6	22.3	50.2
Other	1.7	1.9	1.8	2.3	2.7	2.7
<b>Type of roof (%)</b>						
Cement or tile	1.1	15.7	4.9	1.2	13.9	3.3
Zinc	5.1	34.1	12.7	5.8	31.1	10.0
Grass/thatch/palm/other	93.8	50.2	82.5	92.9	55.0	86.7

Source: Authors' calculations from 1997 Population and Housing Census

Table A1 (continued)—Descriptive statistics (based on head of household with disability)

	Non-disabled			Disabled		
	Rural	Urban	Total	Rural	Urban	Total
<b>Type of floor (%)</b>						
Cement	4.1	43.9	14.4	4.4	37.1	9.7
Adobe	19.1	13.6	17.6	19.4	14.4	18.6
Earth	76.4	42.1	67.4	75.5	47.8	71.0
<b>Household has electricity (%)</b>	0.5	19.6	5.5	0.4	14.2	2.6
<b>Number of rooms in the house</b>	2.05	2.89	2.27	1.99	2.70	2.11
<b>Number of bedrooms in the house</b>	1.47	1.92	1.59	1.50	1.85	1.55
<b>Source of drinking water (%)</b>						
Piped	0.9	31.8	9.0	0.7	25.9	4.8
Public tap	2.8	19.0	7.0	2.9	16.1	5.0
Well	73.9	43.7	66.0	71.9	50.5	68.4
River or lake	21.1	4.9	16.9	22.9	6.8	20.3
<b>Housing sanitation conditions (%)</b>						
Toilet	0.8	10.9	3.4	0.6	8.7	2.0
Latrine	22.6	55.2	31.1	20.8	52.3	25.9
No toilet or latrine	76.6	33.9	65.5	78.6	39.0	72.1
Household has radio (%)	21.5	51.4	29.3	17.9	41.9	21.8
Household has farmland (%)	96.2	60.6	86.9	94.7	66.5	90.1
Average number of cattle	0.20	0.17	0.19	0.25	0.13	0.23
Average number of goats	0.68	0.39	0.60	0.88	0.48	0.82
Average number of pigs	0.38	0.23	0.34	0.42	0.22	0.39
Average number of fowl	5.03	2.81	4.45	5.46	3.14	5.08

Source: Authors' calculations from 1997 Population and Housing Census

Table A2—Descriptive statistics (based on non-head of household with disability)

	Non-disabled			Disabled		
	Rural	Urban	Total	Rural	Urban	Total
<b>Age of head of household</b>	39.8	39.2	39.7	45.7	44.5	45.5
<b>Literacy of household head (%)</b>						
Can read and write	30.4	68.7	40.4	30.4	63.9	37.1
Can only read	1.4	1.0	1.3	1.7	1.2	1.6
Cannot read or write	67.4	30.1	57.7	67.3	34.6	60.7
<b>Head's highest level of education (%)</b>						
None	64.7	29.8	55.6	64.6	34.2	58.5
Lower primary (EP1)	29.7	38.1	31.9	31.4	40.5	33.2
Complete primary or more	5.6	32.2	12.5	4.1	25.3	8.3
Head can speak Portuguese (%)	33.5	77.2	45.0	33.3	73.3	41.3
Head's average years of education	0.75	3.33	1.42	0.63	2.79	1.06
Education deficit (at 12 years)	5.82	5.45	5.70	5.82	5.47	5.73
Education deficit (at 18 years)	11.24	8.81	10.44	11.08	8.79	10.46
<b>Head's employment status (preceding 7 days) (%)</b>						
Worked	82.5	73.5	80.2	81.4	71.7	79.5
Family worker	6.5	10.6	7.6	6.3	10.3	7.1
Other Situation	11.0	16.0	12.3	12.3	17.9	13.4
<b>Employer (%)</b>						
Civil servant	1.4	12.5	4.3	1.2	10.3	2.9
Private sector	2.6	17.9	6.6	2.3	14.4	4.5
Self-employment	70.5	34.3	61.0	65.1	33.7	59.2
Other employers	25.5	35.4	28.1	31.5	41.6	33.4
<b>Type of housing (%)</b>						
House	2.6	28.9	9.5	3.6	31.7	9.2
Flat or apartment	0.1	4.4	1.2	0.1	4.1	0.9
Hut and other	97.3	66.8	89.3	96.3	64.2	89.9
<b>Method of house acquisition (%)</b>						
Rented	0.4	11.2	3.3	0.4	8.3	1.9
Owned	94.8	81.0	91.2	94.8	84.5	92.9
Ceded	2.7	5.7	3.5	3.1	5.3	3.5
Other means	2.1	2.1	2.1	1.8	1.9	1.8
<b>Type of walls (%)</b>						
Concrete block	1.6	24.1	7.5	2.3	23.3	6.2
Brick	1.3	5.7	2.4	1.2	6.4	2.2
Wood or zinc	1.0	3.2	1.6	1.2	3.6	1.7
Adobe block	17.5	23.3	19.0	13.6	20.9	15.0
Stick, bamboo or palm	20.0	20.2	20.1	24.1	22.1	23.8
Stick and bark	56.9	21.7	47.6	55.4	21.5	49.0
Other	1.7	1.9	1.8	2.1	2.3	2.1
<b>Type of roof (%)</b>						
Cement or tile	1.1	15.7	4.9	1.3	17.2	4.5
Zinc	5.1	34.6	12.8	7.1	35.1	12.7
Grass/thatch/palm/other	93.9	49.7	82.3	91.6	47.7	82.8

Source: Authors' calculations from 1997 Population and Housing Census

Table A2 (continued)—Descriptive statistics (based on non-head of household with disability)

	Non-disabled			Disabled		
	Rural	Urban	Total	Rural	Urban	Total
<b>Type of floor (%)</b>						
Cement	4.0	43.8	14.4	5.0	42.1	12.0
Adobe	19.1	13.6	17.6	19.4	13.6	18.3
Earth	76.4	42.2	67.5	75.0	43.7	69.1
<b>Household has electricity (%)</b>	0.5	20.2	5.7	0.5	21.2	4.6
<b>Number of rooms in the house</b>	2.09	2.95	2.31	2.29	3.17	2.47
<b>Number of bedrooms in the house</b>	1.50	1.98	1.63	1.74	2.23	1.84
<b>Source of drinking water (%)</b>						
Piped	0.9	31.8	9.0	0.7	29.2	6.1
Public tap	2.8	19.0	7.1	2.9	16.6	5.4
Well	73.7	43.6	66.0	72.3	47.3	67.6
River or lake	21.1	4.8	16.8	22.5	6.1	19.4
<b>Housing sanitation conditions (%)</b>						
Toilet	0.8	10.9	3.4	0.7	10.6	2.5
Latrine	23.0	56.1	31.6	24.7	56.7	31.1
No toilet or latrine	76.2	33.0	65.0	74.6	31.3	66.0
Household has radio (%)	22.8	53.6	30.8	23.3	53.2	29.3
Household has farmland (%)	96.9	61.7	87.7	97.5	69.1	91.9
Average number of cattle	0.21	0.17	0.20	0.34	0.22	0.32
Average number of goats	0.72	0.41	0.64	1.15	0.60	1.04
Average number of pigs	0.40	0.23	0.36	0.54	0.30	0.49
Average number of fowl	5.33	2.95	4.71	6.70	3.91	6.15

Source: Authors' calculations from 1997 Population and Housing Census