



# Discussion Paper BRIEFS

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*Discussion Paper 192*

## Poverty, Inequality, and Geographic Targeting: Evidence from Small-Area Estimates in Mozambique

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Most analyses of poverty or inequality in low-income countries are based on household surveys that collect detailed income or expenditure information. Because these surveys are costly to implement, the samples are generally limited to a few thousand households. As a result, poverty and inequality estimates and analyses must occur at a high level of aggregation, such as the national level or the first subnational level (e.g., province, state, or region). The survey designs do not permit reliable analysis of smaller subgroups, such as districts or specific occupational classifications. This can be a severe constraint for policymakers, who wish to know not only which provinces are the poorest, but also which areas *within* a province are the poorest.

Recent methodological developments have provided one solution to this problem: adaptation of small-area estimation. The small-area estimation approach combines census data, which has limited socioeconomic information on a vast number of households, with survey data that has detailed socioeconomic information on a relatively small number of households. By exploiting the strengths of each data source, it is possible to estimate poverty and inequality measures for population subgroups as small as a few thousand households.

This paper applies small area estimation techniques to Mozambican data to develop high resolution (subdistrict-level) poverty and inequality maps.

### Country Setting

Although it has made a strong recovery since the end of civil war in 1992, Mozambique remains one of the world's poorest countries. At the time of the 1996–97 national poverty assessment, almost 70 percent of the Mozambican population was living below the poverty line.

Although poverty rates were somewhat higher in rural than urban areas, differences between provinces were more pronounced. For instance, the poverty headcount ranged from 48 percent in the capital city of Maputo to 88 percent in Sofala Province. Addressing regional disparities is an explicit objective of the government's poverty reduction strategy, which also recognizes the need for finely disaggregated information on living standards.

### Data and Methodology

The poverty mapping analysis uses household survey data from the Mozambique *Inquérito Nacional aos Agregados Familiares sobre as Condições de Vida* 1996–97 (National

Household Survey of Living Conditions). It is the first survey of living conditions in Mozambique with national coverage and a welfare measure based on comprehensive income or expenditure data. The survey covers 8,250 households and is designed to be nationally representative. It is also representative of each of the ten provinces plus the city of Maputo, and along the rural/urban dimension.

The second data source is the *II Recenseamento Geral de População e Habitação* (Second General Population and Housing Census), conducted in August 1997. The first census since 1980, it also collected information on socioeconomic variables, including education, employment, dwelling characteristics, and selected household assets. The 1997 census covers approximately 16 million people living in 3.6 million households. It is convenient that the census and the household survey are nearly contemporaneous, as a pivotal assumption of the small area estimation method is that the parameters estimated from the survey data are also applicable to the period covered by the census.

In small-area estimation methodology, household survey 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 the cost of living) and a set of independent variables that is expected to be correlated with welfare. The set of variables considered as regressors 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 and inequality, such as the Foster-Greer-Thorbecke (FGT) class of poverty measures, the Gini inequality index, or generalized entropy (GE) inequality measures.

The regression equations explain only a portion of the variation in per capita consumption, with the remainder captured by the residual. The unexplained variation remains an essential component of

poverty and inequality estimates, so it is re-introduced via simulation methods when predicting consumption from the variables in the census data. The simulated residuals allow for a cluster-specific error component and heteroscedasticity in the household-specific error component. Bootstrapping methods are used to estimate standard errors for poverty and inequality indices.

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## Results

The finely disaggregated poverty and inequality estimates are presented as a series of maps showing the indices for 128 districts and 420 subdistricts (*postos administrativos* or PAs). Although district and subdistrict poverty rates tend to be higher in provinces with elevated poverty levels, there is considerable intra-provincial and intra-district variation, whether using the poverty headcount index or the average poverty gap index.

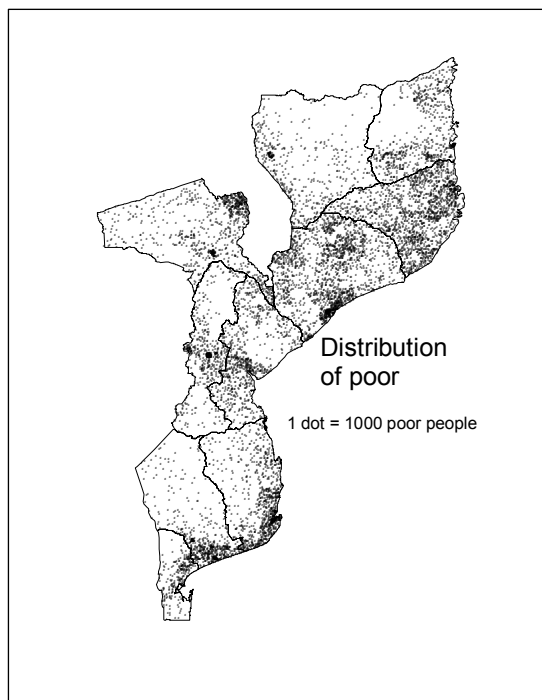
Some of the most useful information for policymakers is the finding that the distribution of the poor tends to run counter to poverty rates. That is, areas with lower poverty rates are more densely populated, so that most poor people live in areas where poverty indices are lower than the national average (see map). High concentrations of poor people are visible along the southern coast and along the east-west Beira corridor in the middle of the country. The pattern is different in Nampula and Zambézia Provinces in north-central Mozambique, which have poverty rates below the national average but account for 40 percent of the national population. The poor are distributed almost uniformly within these two provinces.

Analysis of inequality at the district and subdistrict levels shows heterogeneity similar to that found in the poverty analysis. Decomposition of the inequality indices reveals that 75–80 percent of total inequality in Mozambique occurs *within* PAs, meaning that only a small portion of inequality could be characterized as interregional.

## Conclusions

The picture that emerges is one of considerable local-level economic heterogeneity, with the poor living alongside the nonpoor. Rather than finding stark pockets of intense poverty traps in one part of the country and a relative absence of poverty in other parts, the situation is much more nuanced. This suggests that targeting antipoverty efforts on purely geographic criteria is almost certain to be inefficient, with leakages to the nonpoor and under-coverage of the significant numbers of poor households in areas that are “less poor.”

That said, geographic criteria could serve a useful role in initial targeting, provided it is complemented with information on characteristics of the poor. For example, central government funds could be allocated to decentralized governmental units using the poverty mapping results as a guide, with the decentralized units then employing other information (such as information about the characteristics of the poor) to reduce errors of inclusion and exclusion. The feasibility and cost-effectiveness of multi-stage targeting is a useful avenue for future research.



**Keywords: poverty, inequality, poverty mapping, Mozambique**

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