# Measuring poverty
## in South Africa

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# Executive summary

For informed decision-making on reducing poverty and inequality in the country, and for monitoring poverty when policies are implemented, reliable and valid methods of measuring and mapping poverty are essential. This report examines four different ways in which poverty can be measured in South Africa at present, and presents the findings from each method, mainly using existing Stats SA data sets.

In particular, this report shows the extent of poverty in specific geographical areas, by means of a series of poverty maps. These maps are merely an example of what can actually be mapped electronically. It is possible, using census data, to depict poverty through maps according to different measurements, for example household expenditure, or the need for infrastructure or better access to employment opportunities. These maps can be drawn at the level of small areas such as a village or suburb, enabling better targeting of programmes to address the complex issues that result in poverty.

## Chapter 1

The introductory chapter outlines the challenges faced by those engaged in the measurement of the complex phenomenon of poverty. It gives an overview of the methodological approaches used in the following chapters, with a critique of the strengths and limitations of each.

## Chapter 2

The second chapter examines ways in which census and survey data can be combined to construct a poverty map of South Africa. This map can be constructed at various levels, including provincial, district council, magisterial district, local authority, village or suburb level, or even smaller levels. Monthly household expenditure, as indicated in the 1995 income and expenditure survey (IES), formed the basis for measuring poverty in this approach. For explanatory aspects of poverty, for example educational attainment and access to services, the IES data were merged with data from the 1995 annual October household survey (OHS), since both surveys visited the same households, and then compared with equivalent data from Census '96. A series of regression analyses was carried out, using annual household expenditure as the dependent variable, and the poverty-related variables common to the OHS and the census as the explanatory variables, to impute expenditure values for each household in the census.

- The poorest province, in terms of average monthly household expenditure, was Eastern Cape, followed by Free State and then Northern Province. The wealthiest province was Gauteng, followed by Western Cape.
- The poorest district council, using this method, was the Wild Coast, followed by the Kei District Council (both in Eastern Cape), while the wealthiest was the four metropolitan councils in Gauteng (treated as one unit) followed by the Cape Metropolitan Council.
- The poorest magisterial district in the country was Elliotdale, followed by Willowvale, both in the Eastern Cape, while the wealthiest in terms of monthly household expenditure was Pietersburg in Northern Province followed by Germiston and Pretoria in Gauteng, Soutpansberg in Northern Province and then Bellville in the Western Cape.

## Chapter 3

The third chapter describes how two Stats SA indices – the household infrastructure index and the household circumstances index – were constructed to measure the extent of under-development in different parts of SouthAfrica, using both the data from Census '96, and the imputed expenditure values described above. These development indices can also be calculated andmapped at the various levels of geography mentioned above, adding new dimensions to thewaysinwhichpoverty can be examined.

The indicators taken into account for the two indices were:
(a) formal housing (brick dwellings, flats, townhouses, backyard rooms etc.);
(b) electricity for lighting from a public authority or supply company;
(c) tap water inside the dwelling;
(d) a flush or a chemical toilet;
(e) a telephone in the dwelling or a cellular 'phone;
(f) refuse removal at least once a week by a local or district authority;
(g) level of education of the head of household;
(h) average monthly household expenditure;
(i) unemployment rate (expanded definition);
(j) average household size; and
(k) the proportion of children in the household under the age of five years.

These indicators were entered into a principal components factor analysis, and the two indices were isolated by means of this analysis.

The number of households in each geographical component was then also taken into account (the square root of the number of households found within each area was built into the calculation).

The ranking order of provinces for these two indices is as follows:

*The household infrastructure index*
- The province most in need of infrastructural development such as clean water and sanitation is Eastern Cape, followed by Northern Province, KwaZulu-Natal, North West, Mpumalanga and Free State.
- The province with the least need for such development, with its sparse population of households, is Northern Cape, followed by Western Cape andGauteng.

*The household circumstances index*
- The provincemostinneedofimprovementof life circumstances such as employment creation and family planning was again Eastern Cape, followed this time by KwaZulu-Natal and then Northern Province.
- Gauteng, with its large number of households, and large proportion of people moving into the area in search of work, ranks fourth in need according to this index, followed by Mpumalanga, North West, Free State, Western and Northern Cape.

The use of these different indices, in addition to monthly household expenditure, gives a differentiated picture of poverty. The first index points to themeeting of basic needs, while the second is related to empowerment.

## Chapter 4

This chapter examines the issue of inequality of *earned monetary income*, based on responses given to four consecutive OHSs (1995-1998). It does not take into account other income sources. The Gini coefficient, which forms the basic measurement tool of this paper, is a widely used method of calculating income inequality. It ranges between 0 and 1. The closer the coefficient gets to 1, *the greater the inequality*.

In general, the findings show that:

- Earned monetary income continues to be unequally distributed by population group and gender. This inequality is confirmed by a second technique, namely a Dikhanov diagram, which was applied to the OHS 1998 findings.
- The pattern found over the four years reflects a possible increase in the extent of inequality between rich and poor during this time.
- This possible increase applies to both self-employed people and employees. It also applies within each population group and by gender. For example, the inequality between the richest and the poorest Africans seems to be increasing, as well as between the richest and poorest coloured and white people. Inequality of income between men and women is also showing signs of increasing.

Mapping of inequality by small area, as an aspect of poverty, is not yet complete at this stage, but should be possible in the near future, as and when more small area data on inequality of income become available.

## Chapter 5

This chapter discusses the way in which a social accounting matrix (SAM), based on household income, is calculated. The SAM integrates economic statistics across the country, since it is an extension of input-output tables calculated for national accounts, but the emphasis is on households rather than institutions. A SAM shows the relationship between income generation and consumption at a household level.

In South Africa, SAMs were previously calculated for 1978, 1988 and 1993.

- In 1993, the SAM showed that the per capita income for African households was approximately one-fifth of the per capita income for white households. This was an improvement from 1978, according to the SAM, when per capita income for African households was one-tenth of that for white households.
- A new SAM, based on the United Nations modifications in 1993 to the System of National Accounts (SNA), and using population counts from Census '96, is presently being undertaken, and should be released in 2003.

In the longer term, it should be possible to map data from SAMs, at least at provincial level.

## Conclusion

Each of these measurements can be used, either on their own or in combination with each other, to examine different aspects of poverty, including inequality and under-development, and changes in living conditions and life circumstances of SouthAfricans over time.

The user should determine whichmethod of calculating poverty best suits the particular requirements of a specific policy and its implementation. For example, the Department of Labour may need to use different poverty measures from those used by the Department of Housing, which may in turn differ from indices needed formonitoring the implementation of theRural Development Strategy.

The mapping of poverty according to different approaches should also add to our understanding of poverty as a multi-dimensional phenomenon.

Stats SA can produce maps at any level, from a national picture to small area level, on diverse aspects of poverty, according to the specific requirements of a particular user.

# Chapter 1

# Introduction

Charles Simkins

Reduction of poverty and inequality has been a central concern of South Africa's government since 1994. Yet quantitative description and analysis in this field has been slow to emerge. The main reason is that evidence has had to be built up (mainly by Statistics South Africa) from a very limited historical base.

Even now, there is little information on trends. We have had one post-apartheid population census (in 1996) and one income and expenditure survey (in 1995). The next census is due in 2001, and the next income and expenditure survey (IES) in 2000. Five sets of October household surveys (OHSs) have been published (for 1994, 1995, 1996, 1997 and 1998); one more has been conducted (in 1999) and its results were recently published. From the October household surveys, we know that unemployment increased between 1995 and 1998, but in 1999, there may have been a slight decrease.

Rising unemployment works to worsen poverty and inequality, but it may be offset by other changes in social and economic variables. We shall not know the overall trend in inequality between households or in money measures of poverty until at least the publication of the 2000 income and expenditure survey. If we measure poverty by the absence of services or the paucity of human capital, we can use successive October household surveys to establish trends in these variables at the national or provincial level, we shall have to wait for the publication of the 2001 census to establish trends in these variables. Small area analysis without sampling error will have to wait until publication of the 2001 population census.

Despite these limitations, much can be done with existing information. The 1998 *Poverty and Inequality Report*[1] was the first substantial post-apartheid publication using historical and contemporary data. The four studies in this collection are further examples of what is possible at present. They raise as many questions as they answer; in doing so, they reveal themselves as fruitful pieces of research in a developing field of enquiry.

The study by Alderman, Babita, J Lanjouw, P Lanjouw, Makhatha, Mohamed, Özler and Qaba in this collection, *Combining census and survey data to construct a poverty map of South Africa*, argues that the income variable in the 1996 population census is an insufficient basis for measuring poverty. The average monthly income per household, including remittances, from the census was R2 454, compared with income of R3 309 and expenditure of R2 954 (in October 1996 prices) from the 1995 income and expenditure survey. Grossed up, the IES estimate is a lot closer to the relevant national accounts variables. Alderman *et al.* therefore regressed expenditure (as a more accurate proxy than income for welfare in low-income households) on variables found both in the IES (or, more precisely, the linked IES/OHS data set) and in the census. The explanatory variables include the number of men and women of various ages and of two population groups (African and white), dwelling variables (type, number of rooms and ownership), service variables (electricity for lighting, refuse removal and telephone) and human capital variables (completed primary education, professionals, skilled labourers). The regression

[1] May, J. (1998). *Poverty and inequality in South Africa.* Report prepared for the office of the executive deputy president and the inter-ministerial committee for poverty and inequality. Praxis Publishing, Durban.

coefficients were estimated using the IES/OHS data set, and were then used to impute expenditures in the census, using the full census data set.

The comparison between poverty estimates based on imputed expenditures and reported census incomes is striking. Using a household poverty line of R800 per month, the percentage of poor in the population is put at 28,4% using imputed expenditure and 52,2% using census income. Using a per capita poverty line of R250 per month, the estimates are 48,4% and 60,8% respectively. The difference is not to be explained by the difference between expenditure and income but by the fact that a single income question is not suitable for households who receive income from a number of sources. Average imputed expenditure per household in Census '96 was R2 789 per month. The proportion of the population in households spending less than R800 per month is 28,5%, virtually identical with the IES estimate.

In order to construct a poverty map, Alderman *et al*. estimate the probability that each household lies below the poverty line given the explanatory variables used in estimating household expenditure. In each geographical area, the number of poor people is estimated by the weighted sum of individual household probabilities. Poverty estimates are produced for provinces, district councils and magisterial districts.

Angus Deaton has pointed out that the difficulty with this procedure arises when the geographical breakdown is to smaller areas than those adequately represented in the IES. Going down to the district council/metro level (of which there were 48*) presents few difficulties. Disaggregating to the more than 300 magisterial districts pushes the IES/OHS sample of 28 585 rather harder. At the level of villages, small towns, and limited rural areas, one has no hope of incorporating 'area effects' (not captured in the explanatory variables) in the estimates of poverty derived from imputed expenditures. This is not to claim that the Alderman *et al.* estimates are biased or inefficient in relation to the IES data. But the resolution to the IES data is limited. In the end, accurate small area estimates depend on accurate small area statistics. (For further discussion on how this will be dealt with in future see the article by Alderman *et al.*)

Hirschowitz, Orkin and Alberts' *Key baseline statistics for poverty measurement* considers poverty as indicated by

- the Alderman *et al*. imputed expenditure; and
- a range of indicators of dwelling conditions, services, educational/labour market status and household composition.

Households were divided into five expenditure categories, of which the lowest two were below R600 per month (the very poor) and between R600 and R1 000 per month (the poor). On this basis 16,5% of households were very poor and a further 24,8% were poor. In urban areas, the estimates were 10,7% and 15,4% and in rural areas 25,4% and 38,8% respectively. There is considerable variation by race and by province.

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* In the Alderman *et al.* paper in this volume, the four metropolitan councils in Gauteng (Johannesburg, Pretoria, Khayalami and Lekoa/Vaal) are treated as a single unit and referred to as 'Metropolitan Areas'. Hence the total number of district councils listed on page 28 is 45 rather than 48.

When it comes to housing, 35% of SouthAfrican households lived in traditional dwellings or shacks and 46% were living in three or fewer rooms. Forty-four per cent of households had a tap inside the dwelling and 50% had a flush or chemical toilet. While access to these facilities depends on expenditure, there are independent effects of population group and place of residence (urban or rural). The effects of education, occupation and gender on expenditure are also analysed.

The final section of the Hirschowitz *et al*. paper constructs development indices on the basis of factor analysis of 11 service level and demographic/education/employment status/ expenditure variables. These variables are estimated for each of the nine provinces. The factor analysis produced twomain factors, jointly accounting for 74% of the variance. The first is called a *household infrastructure index* (the service level variables load on to it as well as the education of the household head and monthly expenditure) and the second a *household circumstances index* (on which load the unemployment rate, average household size and young children variables). Instead of using the scores emerging from the factor analysis, each variable is trichotomised and a value of 1, 2 or 3 assigned.These scores are added for the groups of variables behind each index. On this basis, provinces are ranked by the two indices. The authors suggest that the indices, further weighted by the square root of the number of households, could be used to allocate funds for infrastructural development or for skills training by province. The ranking of provinces by the two indices is somewhat different.

One has to be cautious about using these indices for the allocation of funds if the objective is sustainable development. What can be sustained is what people can afford for themselves plus the support that the government is able to give them. A constant eye has to be kept on the expenditure variable and low levels of infrastructural or human capital identified *relative to the average for a given level of expenditure*. Low relative levels rather than low absolute levels offer the best opportunities for sustainable development.

Debbie Budlender's *Earnings inequality in South Africa* is an attempt to chart the recent course of inequality without two reliable observations of all household income. She does this by confining the analysis to 'pay' (wages and salaries alone) and 'earnings' (pay plus income from self-employment). Both these variables can be obtained from the OHS. Budlender considers changes between 1995 and 1998 (the data in this last year were taken from an alpha version of the OHS, which has now been circulated). She aggregates these two variables within each household and then divides them by household size to get a measure of per capita income from pay and earnings accruing to each member of the household. As Budlender notes, this method ignores intra-household inequality in access to pay/earnings. The derived variables are then analysed from a distributional point of view. Gini coefficients are calculated as well as quartile incomes. A lot of individuals belong to households with no wage or salary income: half ofAfricans, 24% of coloureds, 28% of Indians and 36% of whites were so placed in 1998. Budlender finds an increase in the Gini coefficients from 1995 to 1998, but gives no standard error for her estimates, making it hard to assess whether the differences are significant. The biggest change was between 1995 and 1996. She concludes that 'overall the analysis suggests that the country still has high levels of inequality – levels which appear to be somewhat higher than they were in 1994'.

The first part of the conclusion is uncontroversial and can be supported by the general proposition that inequality does not change rapidly in any country short of an economic revolution. It is the second part that, for two reasons, should be treated with some caution. First, the basis on which the income

measure is constructed is unusual, both in terms of what it omits (for instance, most of the 36% of white households without a salary or wage income must have been living off property income and many others must have been living off state transfers) and in terms of how it is constructed (Gini coefficients are commonly constructed from aggregate household incomes). Secondly, we have no idea of the standard error of the estimates, which are likely to be appreciable when it comes to the quartile levels of income per capita. Our confidence in the magnitude and even the sign of the trends must be rather fragile until fuller evidence is available.

Anemé Malan's *Income distribution in South Africa - a social accounting matrix approach* is an input-output table-based contribution to the debate. Final social accounting matrices (SAMs)for South Africa are available for 1978 and 1988 and a preliminary matrix is available for 1993. From SAM data, Malan concludes that the African share of personal income rose from 27,1% in 1978 to 45,2% in 1993. The former estimate is plausible, but the latter estimate is well above othersmade for the period between 1990 and 1995, casting some doubt on the accuracy of her sources or her interpretation of them. Malan uses SAM data to estimate household savings rates and taxation rates in various quintiles. On taxation, she comes to somewhat different conclusions about progressivity from the Department of Finance's study of redistribution through taxation and state expenditure, published in the *2000 Budget Review.*

The limitation of SAMs is that they are static models, based on linear homogeneous production functions. They can accommodate neither input substitution based on price changes nor technological change. Nonetheless, they can be used to explore certain 'what if' questions, provided that small changes only are considered. The questions dealtwith in the paper include:

* the impact of an exogenous increase in household income (by race and income quintile) on GDP;
* the impact of an exogenous increase in household income on imports.

Malan concludes that a costless redistribution of income from rich to poor will have a small positive impact on GDP. It will also increase imports. She concludes that analysis of substantial policy changes will require a fully articulated general equilibriummodel. Thismayrequirearatherdifferent approach tomodelling policy options; this together with a more complex model of the economy may produce rather different results.

The achievements and limitations of these studies underscore the complexity of quantitative poverty and inequality analysis. One has first to judge the quality of the available data and possibly undertake some quite complex statistical manoeuvres to construct reasonably reliable indices. Then one has to produce descriptivemeasures which have interpretative significance. Finally, one has towork out the relationship between positive analysis and quantitativemeasures for the guidance of policy. All these challenges are substantial in contemporary SouthAfrica, as the studies usefully show in their attempts to grapple with them.

Chapter 2

# Combining census and survey data to construct a poverty map of South Africa

Harold Alderman, Miriam Babita, Jean Lanjouw, Peter Lanjouw, Nthabiseng Makhatha, Amina Mohamed, Berk Özler and Olivia Qaba*

## Introduction

Geographical dimensions of poverty inform both public policies on, and research into the determinants of, economic development and poverty. Poverty maps, for example, are used in many developing countries to allocate resources to local agencies or administrations as a first step in reaching the poor. Similarly, ranking of community needs is a step towards prioritising programmes. However, in practice, these measures have only been useful at fairly aggregated levels. The effectiveness of using locale as a means of directing resources to the poor is a function of the level of the geographic unit chosen for allocation. This works best when the unit is relatively small (Baker and Grosh, 1994).

Globally, information on many aspects of living standards, especially poverty measured by household income or expenditure, is rarely available for a sufficient number of households to permit construction of a finely disaggregated map, or for ranking local units of government based on poverty levels. For example, the World Bank's living standard measurement surveys (LSMS), variants of which have been fielded in many developing countries, do not allow for disaggregation of average incomes or of poverty rates much beyond a simple rural/urban breakdown within broad regions of a given country.

Unlike most sample surveys, census data do not suffer from small sample problems. However, they typically contain little direct information on household resources. The lack of income or expenditure information in such data sets has often prompted policy makers to explore alternative welfare indicators to derive the required geographic dimension of poverty and inequality. Many countries have developed sometimes crude, sometimes more sophisticated, basic needs indicators for this purpose but these indicators do not always conform well with consumption or income welfare indicators (Grosh and Glinskaya, 1997, Hentschel *et al.*, 1999).

In other countries, including South Africa as well as Australia, income classifications are obtained in the census by using broad ranges. The classification of individual or household income into such ranges seldom conveys to the respondent a clear definition of income. Thus, even abstracting from the nearly universal tendency of households to conceal income from interviewers, a respondent may fail to consider key components of income for typically poor households, such as agricultural profits (either from sale or own consumption) or informal sector profits and casual wages. Again, this measure of income may not be a fair indicator of income and consumption.

This motivates the interest in seeking ways to combine the detailed information obtained in household surveys with the more extensive coverage of a census to derive detailed geographic poverty estimates based on a consumption welfare indicator. This has recently been explored by

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Hentschel *et al*. (2000) and Elbers *et al*. (2000), who both model consumption behaviour from a household survey in Ecuador, using a set of explanatory variables that are restricted to those also available in the Ecuadorian census. Applying the resulting parameter estimates to the census, both papers show how the probability that a given household in the census is in poverty can be derived. These authors also show how detailed geographic poverty rates can be calculated. Elbers *et al*. also provide a comprehensive description of the methodology they used in their study.

Information on aspects of living standards at a disaggregated level has a particular function in South Africa since the constitution requires parliament to pass legislation providing for the equitable division of nationally raised revenue among provincial and local spheres of governments. In terms of the Division of Revenue Act (Act 28 of 1998) passed in March 1998, provision is made for the distribution of a grant to municipalities – of which there were, at the time of writing, 843 – based on levels of poverty. This equitable shares grant is an unconditional grant to the municipality and is not a transfer to households intended to bring their incomes up to a target level. Nevertheless, the grant is based, in part, on the number of households within the jurisdiction which have an income of less that R800 per month.[1] However, there is no direct means of assessing the number of individuals in this category. This key allocation must be performed using incomplete or indirect information. As a general rule, central governments may not have the capacity to obtain this type of information directly and local governments may not have the incentive to transmit it (Alderman, 1999).

This study builds on the approach described above in order to utilise information from the 1995 South Africa October household survey (OHS) and the related income and expenditure survey (IES) in conjunction with the 1996 population census. We present evidence that incomes and poverty rates reported in the census differ systematically from those obtained in the household survey. We provide an alternative imputed expenditure estimate that is both consistent with the survey estimates and available for virtually all households which appear in the census. Thus, the methodology illustrates a means to obtain expected poverty estimates at any sub-national level of administration for which the information is desired.

The next section provides more details on the methodology and its links to the literature. In a further section relevant features of the data sets employed in this study are discussed. The section thereafter presents some direct comparisons between the mean levels of income and expenditure and poverty rates from the IES at various levels of aggregation and the corresponding means and poverty rates from Census '96. A subsequent section presents results of the regressions of consumption on housing and access to services, which form the basis for the imputation of consumption in the census data. The analogous comparisons to the third section are repeated using these imputations. In the next section the poverty mapping exercise is discussed. In a penultimate section the way forward in cooperative work between Stats SA and the World Bank are outlined. A final section draws the results together. The appendix provides the estimates of expected poverty rates, measured by the headcount index, and their standard errors, by province, by district council, and by magisterial district.

[1] Further information on this grant can be obtained from the South African local government website at: http:/www.local.gov.za/DCD/dcdindex.html

## Methodology

The basic methodology applied in linking surveys and census-type data sets is very similar to that of synthetic estimation used in small-area geography. Prediction models are derived for consumption or income as the endogenous variable, on the basis of the survey. The selection of exogenous variables is restricted to those variables that can also be found in the census (or some other large data set). The parameter estimates are then applied to the census data and expected poverty and inequality statistics derived. Simple performance tests can be conducted which compare basic poverty or inequality statistics across the two data sets. For Ecuador, Hentschel *et al*. (2000) show that regional poverty estimates, calculated on the basis of imputed household consumption in the census, are very similar to those derived from consumption measured directly in the household survey.

The calculation of expected poverty and inequality statistics using predicted income or consumption has to take into account that each individual household income or consumption value has been predicted and has standard errors associated with it. Elbers *et al*. (2000) show that the approach yields estimates of the incidence of poverty and of inequality that are unbiased, and that the standard errors are small. Furthermore, the Ecuador case study demonstrates that these estimates are quite precise to permit meaningful comparisons across regions, and that the confidence intervals do not widen further with higher levels of spatial disaggregation provided that the population of the unit of disaggregation remains sufficiently large.[2]

The combination of information from different data sets has sparked a recent interest in the literature, e.g. Arellano and Meghir (1992), Angrist and Krueger (1992) and Lusardi (1996). Typically, however, these studies combine several household surveys rather than surveys with census data, and so far they have not been used to study spatial dimensions of poverty. While within-sample imputation of missing observations is a quite common procedure, e.g. Paulin and Ferraro (1994), out-of-sample imputation, which combines different data sets, is less frequent. One recent study that does combine an expenditure survey with census information to estimate local income distributions is Bramley and Smart (1996). However, this study differs from the approach used here in that Bramley and Smart did not have access to unit level data from both data sources and hence derived local income distributions not from predicted household incomes but from estimates of mean incomes of different locale and distribution characteristics.

This study differs from other studies in the literature, including Hentschel *et al*. (2000) in that, while we are imputing values for consumption which are not present in the census, we are also substituting them for a variable, income, for which estimates are available. By what measure do we know we have substituted an improved indicator of the welfare of the community? We will take as a maintained hypothesis that consumption is generally more accurately collected in household surveys than is income and that it is a valid measure of the long run control of resources by the household (Deaton,

[2] Hentschel *et al*. (1999) state that: 'In fact, a poverty map would have to be constructed at quite a high degree of spatial disaggregation before the standard errors increase significantly due to small populations … Only when the [local] population falls well below 500 households does the corresponding standard error rise to levels which could compromise comparisons.'

1997).[3] Thus, we seek to compare the correspondence of both the average of the income measure obtained in the census and the poverty rates calculated using this measure with those estimates using the expenditure measure in the IES. If the imputation of expenditure is of value then the imputed measure using census data should be closer to the IES indicators of consumption and poverty. In addition to looking at the correlation of poverty measures and rankings on poverty we also look at a measure of the fit based on the absolute difference between the two poverty measures. This is defined as

$$\text{Fit} = 1/N[\Sigma \left| Y_i - \hat{Y}_i \right| / \text{mean}(Y_i)]$$

where $Y_i$ is a measure of poverty derived using IES data (poverty rate, average expenditures, or income) for a given unit, denoted by the subscript i. Similarly, $\hat{Y}$ indicates the corresponding estimate from the census.

While the goodness of fit measure provides a summary statistic, we also regress the individual components of the statistic against variables that may account for differences in the accuracy of the census income data. That is, we run regressions using $\left| Y_i - \hat{Y}_i \right| / \text{mean}(Y_i)$ as the left hand variable. This allows us to investigate whether the bias in average reported census income, measured by its divergence from mean expenditure in the household survey for the same region, varies between areas depending, among other factors, on the sectoral composition in each region.

The levels of administrative units in South Africa, in order of higher disaggregation, are as follows: province, district council, magisterial district, and urban or rural place name. At the time of writing, there were nine provinces, 45 district councils, 354 magisterial districts (MDs), and 12 753 towns or place names. The validation, however, must take into account that the IES was not designed to be representative at levels of disaggregation for which we want to use the data. Indeed, were it representative for lower levels of administration there would be little need to impute expected poverty estimates into the census. Thus, although we can link the OHS and the census at the magisterial district level, validation using this imprecise, albeit unbiased, reference point is of limited value. For this reason, we first perform our validation exercise at the province level even though we seek to create a poverty map for smaller geographical units. We repeat the exercise, however, at higher degrees of spatial disaggregation mainly to demonstrate what happens to the goodness of fit measure at lower levels of administration. Hence, we calculate mean census income and mean imputed expenditure in the census for each province and determine how they fare against the mean household expenditure in the IES for the corresponding province.

[3] We focus on the best means of measuring income or consumption poverty and abstract from the debate those measures of household welfare which add to a multi-dimensional understanding of poverty. See Ravallion (1992) for further discussion on the measurement of poverty.

**Data**

This section provides some information on each of the three data sources that are utilised.

The OHS is an annual survey, which focuses on a few key indicators of living patterns in South Africa. In particular the survey focuses on employment, internal migration, housing, access to services, individual education, and vital statistics. In the 1995 round of the survey, 29 700 households were interviewed.

As its name implies, the IES provides information on the income and expenditure of households for the 12-month period prior to the interview. The questionnaire was designed to capture the value of gifts and in-kind benefits and the imputed value of housing under income and consumption. The following information provides some ideas about the detail of consumption data collected. The cost of housing is based on 27 questions and monthly expenditures on food and beverage is aggregated up from information obtained in 131 questions. Twenty-two additional questions cover food consumed from own production. Similar details are sought regarding non-food purchases and services obtained, using a mix of monthly and annual recall. The expenditure variable used in this study is slightly redefined from standard Stats SA reporting from the 1995 IES. In order to correspond more closely to current consumption as a standard measure of household welfare, we netted out income taxes as well as various forms of saving (including lumpy purchases of durable goods and vehicles as well as *lobola* and dowry) from the total expenditures.

Income is based both on individual formal and non-formal earnings and returns to household assets as well as gifts and dowry received. In order to make these income and consumption aggregates comparable with the census data, all incomes and expenditures were put into 1996 Rand using the consumer price index.

The IES was designed to be merged with the OHS. While the interviews for the IES were conducted at a slightly later date than the OHS, the same households were visited. In all, 28 585 households remained in the data set after the two surveys were merged.

Census '96 covers over nine million households, recording data from individuals based on where they were the night between 9 and 10 October 1996. In addition to information on household composition, it collected some details on housing and services in a manner that paralleled the OHS. It also asked every *individual* to indicate his or her income, including pensions and disability grants. The individuals were asked to indicate which of 14 brackets this income fell within. In order to get to household income, each of these ranges was assigned a point value. For most categories this value was the logarithmic mean of the top and bottom income of the bracket. For the lowest group with income, however, the value was two-thirds of the interval. For the highest bracket (greater than R360 000 per year) this value was 720 000. These assignments follow standard practice within Statistics South Africa. The census also asks for the value of all remittances received by the household in the preceding year. The individual point estimates for each bracket were then summed. This figure was added to the estimate of household income.

All of these data sets include coding for the province, the enumeration area type (EA type), the district council, and the magisterial district in which the household resided. These geographic units are the ss

units of analysis in this study. As mentioned above, only the provinces are representative of the sample, but given how the sample was stratified, the breakdown to EA type within each province should also be quite close to being representative of the breakdown of the population into residents of urban portion of former homelands, other rural residents, urban formal, urban informal and other types of enumeration areas.[4] At each level of disaggregation, we excluded from our analysis units where three or less enumeration areas were revisited in the household survey.

For both the IES and Census '96 we averaged income per household and per capita over each of our units of analysis.[5] We also created headcount poverty indices for each geographical unit. This index is the well-known Foster, Greer and Thorbeck poverty measure (FGT) defined as

$$P_{i_\alpha} = \frac{1}{N}\sum_{h=1}^{N}\left(\frac{z - y_h}{z}\right)^{\alpha} \mid (y_h \leq z)$$

where $P_i$ is the index of poverty for the ith magisterial district, $y_h$ is a measure of household income from a sample of size N and z is the poverty line. With the headcount index $\alpha$ is zero, while it is set to one to measure poverty gap and higher for the severity of poverty. While this study focuses on the headcount measure of poverty, the methodology can be applied to these measures as well. The FGT measure is additive. Thus, one can go from poverty in each magisterial district to a consistent indicator of provincial or national poverty.

**Comparing Census '96 income and IES expenditure**

The average income from the IES is R3 309 per household per month, while the average monthly current expenditure is R2 954.[6] Both these estimates exceed the monthly income including remittances from the census income data. That average is R2 454. The IES *expenditure* figure aggregates up very close to the R330 billion of private consumption for 1996 estimated by the South African Reserve Bank, while the latter is nearly 20% below. In principal, household income includes private investment and, therefore, should exceed private consumption. Thus, the IES figures are fairly consistent with the share of gross national product (GNP) not accounted for by government consumption, corporate savings, or account deficits, while the aggregation from Census '96 is less so. Given the difference in income in the two data sets, it is not surprising that poverty rates using the IES also differ from those based on census data. We indicate this using two different poverty lines. One is the R800 per household per month line at which households are defined as poor for the purpose of the equitable shares grant. The second is a measure of per capita income set at R250. Using these two poverty lines and the expenditure data from the IES, the percentage of poor in the country is 28,4 and

[4] The sample was stratified by province, urban and non-urban areas, and population group.

[5] Recent studies have indicated that the poverty ranking of households is sensitive to assumptions regarding the degree that households have scale economies as well as whether adult equivalency scales are assumed for children (Lanjouw, Milanovic and Paternostro, 1999). However, we do not address this possibility in the current study.

[6] These averages were calculated using sampling weights that were available at the province level. For averages that were calculated for administrative units smaller than a province, such as district councils or magisterial districts, no sampling weights were used because they were not available.

48,4 respectively.[7] However, using the income from the census, the estimated number of poor based on the *household poverty line* is 52,2%. That is, the estimated poverty rate is over 80% higher in the census than the IES data. Similarly, using the *per capita poverty line*, the poverty rate from the census at 60,8% is also larger than that estimated from the IES.

The difference between the census and IES poverty estimates reported above can not be attributed to the fact that the former are based on incomes while the latter are based on expenditures. Poverty estimates using the *income* data from the IES show the percentage of poor in the country are 28,6 and 46,2 for the two poverty lines. Thus, the estimated rates of poverty are very similar to those estimated using expenditures. Given the close correspondence of the poverty estimates using either income of expenditure based on IES data, we will for the remainder of this paper concentrate on the expenditure data from the IES.

As indicated in Table 1, six out of the nine province-level income averages from the IES are significantly different to their counterparts from the census. However, this does not necessarily mean a poor correlation of average incomes by province as defined in the census with the average expenditures by province from the IES. While the correlation coefficient between the census income and IES expenditure is 0,93, the ordering in terms of income differ, hence the Spearman rank correlation coefficient is only 0,68 (see Table 2). The corresponding figures for the poverty measures in terms of the percentage of households with less than R800 per month calculated from the two alternative data sources are 0,76 and 0,55, respectively. While there is still a large difference in provincial poverty rates between the census and the IES when using the per capita poverty expenditure line of R250 per capita, the correlation coefficient rises to 0,93 although the rank correlation coefficient is only 0,72.

Table 1: Comparison of household income from Census '96 and household expenditure from the IES

| Province | Mean hh income (Rand/month) [census] | Mean hhs exp. (Rand/month) [IES] | % of hhs with monthly income below R800 [census] | % of hh with monthly exp. below R800 [IES] | % of individuals in hhs with per capita monthly income below R250 [census] | % of individuals in hhs with per capita monthly exp. below R250 [IES] |
|---|---|---|---|---|---|---|
| **Western Cape** | 3 976 | 3 919 (181,40) | 26,74* | 12,45 (1,12) | 30,09* | 25,32 (1,80) |
| **Eastern Cape** | 1 479* | 1 815 (80,92) | 68,30* | 44,51 (1,40) | 76,41* | 67,93 (1,34) |
| **Northern Cape** | 2 244 | 2 217 (164,90) | 50,33* | 38,02 (3,00) | 59,11* | 52,57 (2,96) |
| **Free State** | 1 823 | 1 794 (106,30) | 58,81* | 51,04 (2,22) | 66,25 | 62,16 (2,13) |
| **KwaZulu-Natal** | 2 193* | 2 680 (111,00) | 55,37* | 24,27 (1,36) | 66,12* | 52,17 (1,77) |
| **North West** | 1 737* | 2 218 (176,00) | 56,06* | 37,18 (2,40) | 65,40* | 58,88 (2,22) |
| **Gauteng** | 4 044* | 5 086 (221,50) | 33,90* | 10,57 (1,17) | 34,34* | 14,37 (1,43) |
| **Mpumalanga** | 1 762* | 2 356 (144,60) | 60,19* | 25,58 (2,17) | 68,42* | 53,96 (2,19) |
| **Northern Prov.** | 1 234* | 2 188 (130,90) | 71,76* | 36,42 (2,10) | 79,93* | 58,01 (2,17) |

**Standard errors in parentheses.**
***Signifies statistically significant differences from census averages at the 5% level.**

[7] Note that the first figure is household poverty, while the latter is individual poverty, i.e. 28,8% of the households in South Africa have a monthly household income of less than R800, whereas 48,4% of the individuals live in households with monthly per capita income of less than R250.

Table 1A: Comparison of ***imputed*** expenditure from Census '96 and household expenditure from the IES

| Province | Mean imputed hh expenditure (Rand/ month) [census] | Mean hh expenditure (Rand/month) [IES] | % of hhs with imputed monthly expenditure below R800 [census] | % of hhs with monthly expenditure below R800 [IES] | % of individuals in hhs with per capita monthly imputed expenditure below R250 [census] | % of individuals in hhs with per capita monthly expenditure below R250 [IES] |
|---|---|---|---|---|---|---|
| **Western Cape** | 3 835 | 3 919 (181,4) | 12,05 | 12,45 (1,12) | 22,67 | 25,32 (1,80) |
| **Eastern Cape** | 1 718 | 1 815 (80,92) | 47,29 | 44,51 (1,40) | 66,56 | 67,93 (1,34) |
| **Northern Cape** | 2 400 | 2 217 (164,9) | 35,04 | 38,02 (3,00) | 49,78 | 52,57 (2,96) |
| **Free State** | 1 795 | 1 794 (106,3) | 48,14 | 51,04 (2,22) | 60,47 | 62,16 (2,13) |
| **KwaZulu-Natal** | 2 586 | 2 680 (111,0) | 25,67 | 24,27 (1,36) | 50,41 | 52,17 (1,77) |
| **North West** | 2 188 | 2 218 (176,0) | 37,32 | 37,18 (2,40) | 52,76* | 58,88 (2,22) |
| **Gauteng** | 4 341* | 5 086 (221,5) | 13,20* | 10,57 (1,17) | 18,92* | 14,37 (1,43) |
| **Mpumalanga** | 2 391 | 2 356 (144,6) | 24,46 | 25,58 (2,17) | 46,33* | 53,96 (2,19) |
| **Northern Prov.** | 1 837* | 2 188 (130,9) | 37,44 | 36,42 (2,10) | 59,93 | 58,01 (2,17) |

**Standard errors in parentheses.**
***Signifies statistically significant differences from census averages at the 5% level.**

Table 2: Simple and rank correlation coefficients between Census '96 income and IES expenditure

| | Number of observations | Simple correlation coefficient | Rank correlation coefficient | Correlation coefficient for poverty measures (hh poverty with z = R800) | Rank correlation coefficient for poverty measures (hh poverty with z = R800) |
|---|---|---|---|---|---|
| **Provinces (census and IES)** | 9 | 0,9275 (0,0003)* | 0,6833 (0,0424)* | 0,7612 (0,0172)* | 0,5500 (0,1250) |
| **Provinces (imputed census and IES)** | 9 | 0,9790 (0,0000)* | 0,9333 (0,0002)* | 0,9887 (0,0000)* | 0,9000 (0,0009)* |
| **Province/EA type (census and IES)** | 31 | 0,9339 (0,0000) | 0,7786 (0,0000) | 0,6971 (0,0000) | 0,6065 (0,0003) |
| **Province/EA type (imputed census and IES)** | 31 | 0,9475 (0,0000) | 0,8766 (0,0000) | 0,8546 (0,0000) | 0,8863 (0,0000) |
| **District council (census and IES)** | 45 | 0,8844 (0,0000) | 0,7835 (0,0000) | 0,7145 (0,0000) | 0,6872 (0,0000) |
| **District council (imputed census and IES)** | 45 | 0,8844 (0,0000) | 0,8407 (0,0000) | 0,8603 (0,0000) | 0,8672 (0,0000) |
| **Magisterial district (census and IES)** | 354 | 0,7084 (0,0000) | 0,6352 (0,0000) | 0,5753 (0,0000) | 0,5325 (0,0000) |
| **Magisterial district (imputed census and IES)** | 354 | 0,6949 (0,0000) | 0,6694 (0,0000) | 0,6957 (0,0000) | 0,7047 (0,0000) |

**Standard errors in parentheses.**
*** denotes significance at the 5% level**

Census '96 collects income information from one question on individual income including pensions and one on remittances without any probing about informal income or enterprise profits. In contrast, the household survey details both income and expenditure information as described in the beginning of this section. As a result, the census income is understated for most of the population, but likely more in rural areas. That is, it is plausible that people in urban areas, with a higher share of individuals earning salaries, are able to state their earnings better than people who live in rural portions of former homelands or other rural areas, who earn more from casual income and from own production, according to Census '96.

This is explored with the regressions reported in the first four columns of Table 3 which demonstrate the fact that the gap between the IES and the census differs depending, among other things, on the urban/rural composition of the province.[8] All of these regressions have considerable explanatory power, measured by the adjusted $R^2$. This indicates that the measure of goodness of fit is correlated with other observable characteristics and that the gap between census income and IES expenditure varies by some of these characteristics. However, there are only nine provinces in these regressions. Therefore there is a problem regarding the degrees of freedom. Below we repeat these regressions at different levels of aggregation.

The first two columns in Table 3 show regression results for the goodness of fit of the estimate of average income at the province level defined above as a function of the percentage of population living in rural areas classified as former homelands (or as urban formal) as well as the average provincial expenditure using the IES data. The overall goodness of fit measure for the left-hand variable in the regression is 0,187, but ranges from 0,009 to 0,353 over the provinces. The larger the percentage of population residing in rural areas of former homelands in a province the less correspondence between the census and the IES data (i.e. the *higher* the figure for the goodness of fit) as indicated by the positive and statistically significant coefficient on the variable. Similarly, the coefficient on the variable for the urban formal areas is negative and significant.

Furthermore, controlling for area of residence, provinces with higher average expenditures also have a larger gap between census income and IES expenditure. Since we are dealing with only nine observations at this time, we can match this result with the data in Table 1. For example there is a large gap in Gauteng, despite the fact that 81% of its population lives in urban formal areas, which likely accounts for the coefficient on the variable for provincial average expenditure. For the two other provinces with no areas classified as former homelands (Western Cape and Northern Cape), there are no significant differences between the two measures. The goodness of fit measures for these two provinces are quite small being 0,019 and 0,009, respectively.

[8] We discuss the last four columns of Table 3, as well as Tables 4-6, after the methodology for imputing expenditures is presented.

Table 3: Regression of goodness of fit on area of residence and mean expenditure (province level)

| **Dependent variable: goodness of fit** | **Fit between census income and IES expenditure** | | | | **Fit between imputed census exp. and IES expenditure** | | | |
|---|---|---|---|---|---|---|---|---|
| | **Mean expenditures** | | **Headcount indices** | | **Mean expenditures** | | **Headcount indices** | |
| | **Coeff. (1)** | **Coeff. (2)** | **Coeff. (3)** | **Coeff. (4)** | **Coeff. (5)** | **Coeff. (6)** | **Coeff. (7)** | **Coeff. (8)** |
| **IES expenditure (,000)** | 0,088 (0,028)* | 0,148 (0,028)** | 0,132 (0,072) | 0,309 (0,074)** | 0,063 (0,021)* | 0,074 (0,027)* | 0,01 (0,015) | -0,2 (0,019) |
| **% former homelands** | 0,414 (0,118)** | | 1,29 (0,306)** | | 0,098 (0,088) | | -0,071 (0,062) | |
| **% urban formal** | | -0,678 (0,134)** | | -2,05 (0,355)** | | -0,144 (0,131) | | 0,115 (0,091) |
| **NF(2,6)** | 7,73 | 15,56 | 8,89 | 16,63 | 4,59 | 4,52 | 0,67 | 0,82 |
| **Adjusted R^2** | 0,627 | 0,784 | 0,664 | 0,796 | 0,473 | 0,468 | -0,089 | -0,048 |
| **N** | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| **Mean goodness of fit** | | 0,183 | | 0,849 | | 0,081 | | 0,061 |

**Standard errors in parentheses.**
*** denotes significance at the 5% level and**
**** at the 1% level.**

The difference between the census and IES poverty estimates reported above can not be attributed to the fact that the former are based on incomes while the latter are based on expenditures. Poverty estimates using the *income* data from the IES show the percentage of poor in the country are 28,6 and 46,2 for the two poverty lines. Thus, the estimated rates of poverty are very similar to those estimated using expenditures. Given the close correspondence of the poverty estimates using either income of expenditure based on IES data, we will for the remainder of this paper concentrate on the expenditure data from the IES.

The third and fourth columns of Table 3 show results of regressions using the goodness of fit of the head count of poverty. Again, the percentage of rural portions of former homelands is associated with a large gap between the census and the IES poverty estimates and the percentage of households in formal urban areas is associated with a better fit.

We repeat the analysis at higher levels of disaggregation, hence increasing the number of observations. First, we take the averages for income or expenditure and the poverty rates in each province separately if the enumeration area was defined as urban formal, urban informal, rural or former homeland. Since there are not former homelands in every province or a sufficient number of enumeration areas defined as 'urban informal', this provides 31 cells instead of the nine provincial averages. The regression in the first four columns of Table 4 indicate that the basic story is unchanged; the fit is less precise when the average is over a rural portion of former homeland and lower for urban formal. The goodness of fit also declines with a higher average expenditure.

Table 5 repeats these regressions with the unit of observation being the goodness of fit with income averaged over 45 district councils as well as with the poverty rates for the councils. Finally, Table 6

takes this investigation to the level of the 354 magisterial districts.[9] As mentioned above, the IES was not designed to be representative at this degree of disaggregation; this is reflected in the increased average goodness of fit. However, the increased sample size of the magisterial district regressions also allows for greater precision of the estimates as well as more confidence that the income and urban effects are not driven by a single observation. As before, the regressions show that difference between IES and census data are not invariant to the place where the sample was collected.

Table 4: Regression of goodness of fit on area of residence and mean expenditure (province/EA-type level)

| **Dependent variable: goodness of fit** | **Fit between census income and IES expenditure** | | | | **Fit between imputed census exp. and IES expenditure** | | | |
|---|---|---|---|---|---|---|---|---|
| | **Mean expenditures** | | **Headcount indices** | | **Mean expenditures** | | **Headcount indices** | |
| | **Coeff. (1)** | **Coeff. (2)** | **Coeff. (3)** | **Coeff. (4)** | **Coeff. (5)** | **Coeff. (6)** | **Coeff. (7)** | **Coeff. (8)** |
| **IES expenditure (,000)** | 0,061 (0,017)** | 0,068 (0,024)** | 0,083 (0,070) | 0,009 (0,108) | 0,004 (0,019) | 0,033 (0,024) | -0,085 (0,039)* | -0,049 (0,050) |
| **% former homelands** | 0,186 ( 0,060)** | | 0,831 (0,246)** | | -0,015 (0,066) | | -0,101 (0,134) | |
| **% urban formal** | | -0,131 (0,068)* | | -0,208 (0,303) | | -0,096 (0,066) | | -0,075 (0,141) |
| **F(3,27)** | 6,50 | 3,94 | 7,02 | 2,45 | 0,35 | 1,05 | 6,97 | 6,80 |
| **Adjusted R^2** | 0,355 | 0,227 | 0,376 | 0,126 | -0,070 | 0,005 | 0,374 | 0,367 |
| **N** | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| **Mean goodness of fit** | | 0,187 | | 0,905 | | 0,103 | | 0,185 |

**Standard errors in parentheses.**
*** denotes significance at the 5% level and**
**** at the 1% level.**

[9] We also explored specifications which included either the number of households in the district or the square root of this number to see if smaller MDs or Dcs had measurably greater deviation between the census and the IES data. The coefficients of cluster size were generally significant at the 10% level or less and with a sign consistent with the expectation that precision increased with the size of the cluster. However, neither the regression r-square values nor the magnitude of the coefficient of other variables were affected by the inclusion of the cluster size. Thus the regression reported in the tables do not include the number of households.

Table 5: Regression of goodness of fit on area of residence and mean expenditure (district council level)

| **Dependent variable: goodness of fit** | **Fit between census income and IES expenditure** | | | | **Fit between imputed census exp. and IES expenditure** | | | |
|---|---|---|---|---|---|---|---|---|
| | **Mean expenditures** | | **Headcount indices** | | **Mean expenditures** | | **Headcount indices** | |
| | **Coeff. (1)** | **Coeff. (2)** | **Coeff. (3)** | **Coeff. (4)** | **Coeff. (5)** | **Coeff. (6)** | **Coeff. (7)** | **Coeff. (8)** |
| **IES expenditure (,000)** | 0,102 (0,020)** | 0,135 (0,024)** | 0,169 (0,057)** | 0,232 (0,079)** | 0,070 (0,016)** | 0,081 (0,019)** | 0,030 (0,032) | 0,092 (0,036)* |
| **% former homelands** | 0,304 (0,076)** | | 1,36 (0,215)** | | 0,046 (0,060) | | 0,103 (0,121) | |
| **% urban formal** | | -0,487 (0,106)** | | -1,65 (0,357)** | | -0,108 0,086) | | -0,471 (0,162)** |
| **F(3,41)** | 11,69 | 13,89 | 14,69 | 8,21 | 9,21 | 9,76 | 1,09 | 3,83 |
| **Adjusted R^2** | 0,422 | 0,468 | 0,483 | 0,330 | 0,359 | 0,374 | 0,006 | 0,162 |
| **N** | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 |
| **Mean goodness of fit** | | 0,243 | | 0,888 | | 0,176 | | 0,177 |

**Standard errors in parentheses.**
*** denotes significance at the 5% level and**
**** at the 1% level.**

Table 6: Regression of goodness of fit on area of residence and mean expenditure (magisterial district level)

| **Dependent variable: goodness of fit** | **Fit between census income and IES expenditure** | | | | **Fit between imputed census exp. and IES expenditure** | | | |
|---|---|---|---|---|---|---|---|---|
| | **Mean expenditures** | | **Headcount indices** | | **Mean expenditures** | | **Headcount indices** | |
| | **Coeff. (1)** | **Coeff. (2)** | **Coeff. (3)** | **Coeff. (4)** | **Coeff. (5)** | **Coeff. (6)** | **Coeff. (7)** | **Coeff. (8)** |
| **IES expenditure (,000)** | 0,159 (0,010)** | 0,171 (0,010)** | 0,154 (0,023)** | 0,146 (0,027)** | 0,116 (0,010)** | 0,128 (0,011)** | -0,016 (0,015) | 0,002 (0,016) |
| **% former homelands** | 0,282 (0,036)** | | 1,04 (0,084)** | | 0,167 (0,010)** | | 0,197 (0,056)** | |
| **% urban formal** | | -0,360 (0,046)** | | -0,910 (0,121)** | | -0,257 (0,049)** | | -0,337 (0,071)** |
| **F(3,346)** | 93,5 | 92,4 | 57,3 | 23,8 | 43,0 | 46,74 | 6,79 | 10,1 |
| **Adjusted R^2** | 0,443 | 0,440 | 0,326 | 0,164 | 0,265 | 0,282 | 0,047 | 0,073 |
| **N** | 354 | 354 | 354 | 354 | 354 | 354 | 354 | 354 |
| **Mean goodness of fit** | | 0,290 | | 0,948 | | 0,244 | | 0,376 |

**Standard errors in parentheses.**
*** denotes significance at the 5% level and**
**** at the 1% level.**

To summarise: the income data collected in the census significantly understates the income or expenditure levels of the households measured by a detailed module in a household survey in South Africa. Similarly, the census data imply much higher rates of poverty than the IES data. Furthermore, this gap depends on the area of residence of the households. For households which live in areas classified as rural portions of former homelands or other rural areas, this gap is larger than that of those who live in urban areas. These two findings suggest that one should be very cautious in using the census income for policy purposes, as one is likely to over-estimate poverty in some areas, and possibly under-estimate it in others, with the bias being systematic. In the section that follows we propose an alternative measure also derived from the census with the help of the household survey.

**Imputing expenditures in Census '96**

As described in above, the methodology of imputing expenditures for each household in the census is conceptually simple, yet computationally intensive. It involves creating an association model between per capita household expenditure (or income) and household characteristics that are common to both the census and the household survey. After carefully constructing the variables in the exact same manner in each data set, we run a simple OLS regression of logarithmic per capita household expenditure on the other constructed variables that consist of household composition, education, primary occupation, quality of housing, and access to services. To avoid forcing the parameter estimates to be the same for all areas in South Africa, we run the regression separately for each of the nine provinces. The explanatory power of the nine regressions ranged from an $R^2$ of 0,6 (Northern Province) to 0,79 (Free State). As these are regressions based on household level observations, these values can be considered quite good. In Table 7, we show the results of our regression on the entire sample, i.e. covering all nine provinces in South Africa.

These regressions can be considered as components of an association model rather than a causal model. That is, the parameter estimates should not be interpreted as the effect of the explanatory variables on household expenditure. The parameters form a set of weights by which the household variables in census data are to be summed in order to get a measure of imputed expenditure. In effect, we use the set of parameter estimates to predict logarithmic per capita household expenditure for each household in the census in a manner quite similar to the construction of a basic needs indicator (BNI). However, while almost all BNIs that one can find in the literature use an *ad hoc* set of weights, our weights are informed by an association model from the household survey. Hentschel *et al.* (2000) shows that such *ad hoc* BNIs can lead to significant errors in spatial rankings compared to estimates of welfare, measured by household consumption.

Given the vector for the parameter estimates ß, and the vector of explanatory variables in the census $X_c$, the predicted log per capita expenditure for each household in the census is $X_c$ß. This provides measures of per capita and total monthly expenditure for each household in the census. These can then be used to compare mean predicted expenditures from the census with point estimates for mean expenditures from the IES at the province (and geographical units of higher disaggregation) level.

Estimating standard errors is a bit more complicated. While the standard errors from the IES are the familiar estimates of the standard deviation based on sample theory, the issues of sample error does not exist in a census. However, there is a distribution around each imputation of expenditure for the census households. We will defer discussion of this until after the comparison between the point estimates of expenditures in the census and the IES estimates.

Table 7: Regression results by province

| Variable | Western Cape | Eastern Cape | Northern Cape | Free State | KwaZulu-Natal |
|---|---|---|---|---|---|
| **# of males aged 0-10** | -0,153** | -0,125** | -0,121** | -0,221** | -0,079** |
| | (0,015) | (0,011) | (0,024) | (0,017) | (0,012) |
| **# of males aged 11-20** | -0,189** | -0,184** | -0,180** | -0,240** | -0,109** |
| | (0,017) | (0,012) | (0,028) | (0,018) | (0,013) |
| **# of males aged 21-40** | -0,111** | -0,158** | -0.148** | -0,175** | -0,070** |
| | (0,018) | (0,013) | (0,029) | (0,021) | (0,014) |
| **# of males aged 41-65** | -0,009 | -0,073** | -0,095** | -0,097** | -0,058** |
| | (0,023) | (0,017) | (0,035) | (0,025) | (0,019) |
| **# of females aged 0-10** | -0,141** | -0,134** | -0,166** | -0,200** | -0,067** |
| | (0,016) | (0,011) | (0,025) | (0,018) | (0,012) |
| **# of females aged 11-20** | -0,179** | -0,163** | -0,214** | -0,251** | -0,105** |
| | (0,017) | (0,012) | (0,028) | (0,018) | (0,013) |
| **# of females aged 21-40** | -0,138** | -0,139** | -0,202** | -0,213** | -0,112** |
| | (0,019) | (0,014) | (0,032) | (0,020) | (0,014) |
| **# of females aged 41-65** | -0,185** | -0,161** | -0,183** | -0,252** | -0,154** |
| | (0,022) | (0,017) | (0,038) | (0,024) | (0,018) |
| **# of individuals** | -0,025** | -0,003 | -0,030** | 0,007 | -0,039** |
| **categorized as African** | (0,007) | (0,005) | (0,008) | (0,008) | (0,006) |
| **# of individuals** | 0,175** | 0,128** | 0,200** | 0,214** | 0,139** |
| **categorized as white** | (0,008) | (0,011) | (0,015) | (0,013) | (0,009) |
| **Hh lives in a formal** | -0,263** | 0,158** | -0,124** | 0,009 | 0,154** |
| **dwelling** | (0,040) | (0,021) | (0,053) | (0,027) | (0,025) |
| **# of rooms per person** | 0,266** | 0,245** | 0,225** | 0,197** | 0,237** |
| | (0,010) | (0,008) | (0,016) | (0,010) | (0,010) |
| **Hh owns the dwelling** | 0,183** | 0,131** | 0,128** | 0,178** | 0,181** |
| | (0,023) | (0,018) | (0,037) | (0,026) | (0,018) |
| **Sanitary services available** | 0,207** | 0,198** | 0,285** | 0,414** | 0,289** |
| | (0,037) | (0,026) | (0,043) | (0,028) | (0,031) |
| **Electricity for lighting** | 0,315** | 0,261** | 0,164** | 0,266** | 0,289** |
| **available** | (0,041) | (0,025) | (0,047) | (0,027) | (0,026) |
| **Refuse removal 1 x week** | 0,024 | -0,055** | 0,148** | 0,121** | -0,077** |
| | (0,031) | (0,023) | (0,046) | (0,031) | (0,028) |
| **Telephone available** | 0,422** | 0,334** | 0,405** | 0,244** | 0,301** |
| | (0,027) | (0,029) | (0,045) | (0,032) | (0,026) |
| **# of ind. who completed** | 0,054** | 0,087** | 0,081** | 0,045** | 0,048** |
| **primary education** | (0,011) | (0,007) | (0,017) | (0,012) | (0,008) |
| **# of professionals** | 0,273** | 0,511** | 0,307** | 0,433** | 0,299** |
| | (0,016) | (0,016) | (0,034) | (0,019) | (0,014) |
| **# of skilled labourers** | 0,141** | 0,246** | 0,198** | 0,338** | 0,169** |
| | (0,018) | (0,023) | (0,039) | (0,028) | (0,017) |
| **Adjusted R^2** | 0,743 | 0,737 | 0,743 | 0,793 | 0,730 |
| **N** | 3213 | 5200 | 1419 | 3105 | 4933 |

**Standard errors in parentheses.**
*** denotes significance at the 5% level and**
**** at the 1% level.**
**# means number**

Table 7: Regression results by province (continued)

| Variable | North West | Gauteng | Mpumalanga | Northern Province |
|---|---|---|---|---|
| **# of males aged 0-10** | -0,124** | -0,099** | -0,055** | 0,017 |
| | (0,021) | (0,018) | (0,019) | (0,026) |
| **# of males aged 11-20** | -0,152** | -0,166** | -0,073** | -0,052* |
| | (0,021) | (0,019) | (0,020) | (0,027) |
| **# of males aged 21-40** | -0,099** | -0,053** | -0,035 | -0,045 |
| | (0,025) | (0,020) | (0,021) | (0,029) |
| **# of males aged 41-65** | -0,056* | -0,021 | 0,011 | 0,135** |
| | (0,031) | (0,025) | (0,028) | (0,035) |
| **# of females aged 0-10** | -0,123** | -0,110** | -0,032* | 0,009 |
| | (0,021) | (0,018) | (0,019) | (0,025) |
| **# of females aged 11-20** | -0,147** | -0,184** | -0,077** | -0,051* |
| | (0,022) | (0,020) | (0,020) | (0,026) |
| **# of females aged 21-40** | -0,162** | -0,160** | -0,095** | -0,083** |
| | (0,025) | (0,022) | (0,022) | (0,029) |
| **# of females aged 41-65** | -0,234** | -0,219** | -0,137** | -0,129** |
| | (0,030) | (0,025) | (0,028) | (0,034) |
| **# of individuals categorized as African** | -0,008 | -0,080** | -0,077** | -0,130** |
| | (0,011) | (0,007) | (0,012) | (0,020) |
| **# of individuals categorized as white** | 0,143** | 0,104** | 0,121** | 0,033 |
| | (0,016) | (0,008) | (0,016) | (0,026) |
| **Hh lives in a formal dwelling** | -0,199** | 0,009 | 0,183** | 0,230** |
| | (0,038) | (0,037) | (0,033) | (0,033) |
| **# of rooms per person** | 0,264** | 0,222** | 0,234** | 0,262** |
| | (0,014) | (0,011) | (0,014) | (0,017) |
| **Hh owns the dwelling** | 0,233** | 0,250** | 0,274** | 0,138** |
| | (0,029) | (0,024) | (0,027) | (0,039) |
| **Sanitary services available** | 0,524** | 0,282** | 0,030 | 0,223** |
| | (0,040) | (0,054) | (0,040) | (0,047) |
| **Electricity for lighting available** | 0,309** | 0,308** | 0,388** | 0,255** |
| | (0,038) | (0,047) | (0,032) | (0,036) |
| **Refuse removal 1 x week** | -0,089** | 0,126** | 0,046 | -0,189** |
| | (0,040) | (0,031) | (0,039) | (0,047) |
| **Telephone available** | 0,319** | 0,338** | 0,152** | 0,385** |
| | (0,042) | (0,026) | (0,040) | (0,050) |
| **# of ind. who completed primary education** | 0,090** | 0,070** | 0,034** | 0,117** |
| | (0,013) | (0,013) | (0,012) | (0,014) |
| **# of professionals** | 0,425** | 0,245** | 0,356** | 0,437** |
| | (0,024) | (0,015) | (0,024) | (0,025) |
| **# of skilled labouers** | 0,214** | 0,119** | 0,209** | 0,306** |
| | (0,031) | (0,021) | (0,026) | (0,037) |
| **Adjusted R^2** | 0,716 | 0,699 | 0,709 | 0,600 |
| **N** | 2441 | 3247 | 2370 | 2634 |

**Standard errors in parentheses.**
*** denotes significance at the 5% level and**
**** at the 1% level.**
**# means number**

*How well do the imputed expenditure measures improve the fit between data sets?* As already mentioned, the regression parameters reported in Table 7, allow us to derive a measure of expected household expenditure conditional on the quality of housing, services received and the composition of each household in the census. The average household expenditure from this imputation is R2 789 per month. This is only 6,4% below that in the IES. Thus, the difference between the imputed expenditures using census data and the IES expenditures is only a third as large as the difference between the average census income and the IES expenditures. While the average predicted value from an OLS regression will be the same as the average of the sample *from which it was derived*, this is not necessarily the case when fitting parameters to another data set. The fact that the predicted value corresponds to the average from the IES reflects the fact that the distribution of explanatory variables is similar in the two data sets. Furthermore, using the poverty line of R800 per household per month, we find an overall expected poverty incidence of 28,5% for South Africa, a figure which is virtually identical to the corresponding headcount index value (28,4%) from the IES.

The correlation coefficient between the provincial averages of census imputed expenditures and that from the IES expenditure is 0,97, and the Spearman rank correlation coefficient is 0,93 (Table 2). Similarly, the corresponding figures for the poverty measures (% of households with less than R800 per month) calculated from the two alternative data sources are 0,90 and 0,97, respectively. These are significant improvements over the previous figures that used census income. There is less improvement in the simple correlation coefficients for average income at lower levels of aggregation and, indeed, the correlation declines slightly at the MD level. However, the rank correlation for the averages do improve at all levels of aggregation. Even more germane to the objectives of this study, at all levels of aggregation, the expected poverty rates and poverty ranking correlate more closely with the corresponding observations in the IES than do the poverty rates using census income.[10]

Moreover, unlike the average income and poverty estimates based on the census data there is no systematic pattern in the difference between the imputed expenditures and the IES data. This is demonstrated by the last four columns of Tables 3-6. For example, in the last four columns in Table 3 there is no longer a significant effect of the areas of residence on the goodness of fit between the two measures. However, the coefficient for mean expenditure levels in each province remain significant and positive in the regressions for mean expenditures but not for poverty rates. Furthermore, the F statistics in both regressions are significant only at the 10% level and the explanatory power of each has dropped significantly. This is exactly what one would expect if there is only a weak relationship between area of residence and how closely the mean imputed census expenditure corresponds with expenditure from the household survey.

Table 4 indicates that when the unit of observation is averaged over the type of enumeration area in each province, the sign of the average expenditure is no longer consistently positive, and, as with Table 3, the type of residence no longer influences the goodness of fit. Note that the coefficient on dummy variable for the per cent of households residing in urban formal areas remains negative in the regression at the district and MD levels (Tables 5 and 6). However, the magnitude of this coefficient is greatly reduced compared to the regression results in columns 2 and 4, as are themeanvalues for the goodness of fit. As indicated above, a reduction in the goodness of fit measure indicates an improvement in the overall fit. Also as discussed, it should be borne in mind that the IES is not representative at this level and some of the observed imprecision may reflect sample error in that survey.

[10] If we look at the correlation of average income from the IES and average expenditures from that survey, we find that at the province and DC level the correlations are both 0,99. At the MD level the correlation is 0,96. For all three levels the rank correlations areabove 0,93.

**Povertymapping using imputed expenditures from Census '96**

Having established a closer correspondence of imputed expenditure in the census data to household expenditure in the IES than that of income from the census, we proceed to the primary objective for this paper, the construction of a poverty map for South Africa, using the imputed expenditures, at all levels of disaggregation. What we have done so far is this.[11] We have estimated 1st stage regressions for each province in the household survey:

$$lny_i = X_{i'}\beta + \varepsilon_i \qquad \varepsilon_i \_ N(0,\sigma^2) \tag{1}$$

where $lny_i$ is the logarithm of per-capita consumption expenditure for household *i*, with independent variables $X_i$ common to the IES and the census, and $\varepsilon_i$ a random disturbance term. Using the predicted values of ß and $\sigma$, we can calculate our estimator of expected poverty for household *i* in the census by:

$$P_i^* = \hat{E}[P_i \mid X_i, \hat{\beta}, \hat{\sigma}] = \Phi\left(\frac{lnz - X_{i'}\hat{\beta}}{\hat{\sigma}}\right) \tag{2}$$

where $P_i$ is the poverty for household *i*, z is the poverty line, and $\Phi$ indicates the cumulative standard normal distribution. Given that we aim to calculate the expected headcount poverty indicator, the value in (2) is simply the estimate of the probability that a household with observable characteristics $X_i$ is poor. The intuition here is quite clear. Since the 1st stage regressions have an idiosyncratic component, there is always a non-zero probability that a household is poor however high its predicted expenditure may be. A weighted (by household size and sampling weights whenever available) average of these probabilities over any geographical unit would give us the expected percentage of poor individuals in that area. Thus, the predicted incidence of poverty P*, given the estimated model of consumption is

$$P^* = \hat{E}[P \mid X, \hat{\beta}, \hat{\sigma}] = \frac{1}{N}\sum_{i=1}^{N} n_i * \Phi\left(\frac{lnz - X_{i'}\hat{\beta}}{\hat{\sigma}}\right). \tag{3}$$

where N is the number of households in the area and $n_i$ is the number of individuals in household *i*. These expected poverty rates are illustrated in Figure 1 and reported in the appendix. In Appendix Table 1, provinces are ranked by the expected headcount poverty rate in descending order, i.e. from poorest to the richest province. Appendix Tables 2 and 3 are sorted by province and then within the province, districts are ranked by the headcount index to illustrate the wide variation of expected poverty within each province.

For many uses of the imputed poverty rates or average imputed expenditures, such as making pair-wise comparisons, we need to calculate the error in our prediction in the census. To summarise the difference between our estimates of the expected poverty rates and the actual value of the poverty rates in population, we introduce the following notation. The interested reader should refer to Elbers *et al.* (2000), for a detailed discussion of the standard error calculations.

[11] The methodology employed here of calculating headcount indices from the imputed expenditures in the census is based on Hentschel *et al.* (1999). More details can be found in that paper.

Suppose that we denote the poverty in the population by $P(y) = P(X, ß, \varepsilon)$[12]. Since we do not know the actual vector of disturbances, $\varepsilon^0$, we estimate the expected value of this indicator, $E[P \mid X,\omega]$, where $\omega$ represents the vector of parameters $\{ß, \sigma^2\}$. Furthermore, when we construct an estimator for this expected value, we replace the unknown vector $\omega$ with consistent estimators, $\varpi$, from the 1st stage regressions described in equation (1) above. This yields $E[P \mid X,\varpi]$. Finally, since, for most of the FGT-class poverty measures and for all of the inequality measures, this expectation is analytically intractable, we use a method of computation that employs the actual distribution of the predicted log expenditures and a simulated distribution of the vector of disturbances, $\varepsilon$. We will denote this estimator by $E_s[P \mid X,\omega]$.

Hence, the difference between the value of the indicator, $P^0(y)$ and our estimator $E_s[P \mid X,\varpi]$ can be written as the following:

$$\begin{aligned} P^0(y) - E_s[P \mid X,\varpi] \;=\; & P^0(y) - E[P \mid X,\omega] + \\ & E[P \mid X,\omega] - E[P \mid X,\varpi] + \\ & E[P \mid X,\varpi] - E_s[P \mid X,\varpi] \end{aligned} \qquad \textbf{(4)}$$

This means that the error in our prediction can be broken down into three separate components. Elbers *et al*. call these three components the *idiosyncratic error*, the *model error*, and the *computation error*, respectively. The properties of each of these error components are discussed in their paper in detail. The standard errors of our expected poverty rates are small. In fact, for the levels of aggregation considered in our paper, the standard errors are such that most comparisons of expected poverty rates between provinces, district councils or magisterial districts yield differences that are statistically significant. These errors are reported in the appendix along with the expected headcount index figures for each of these administrative units. In the next section, we discuss possible extensions to our paper, and the likely implications of these extensions for our results.

**The way forward: Stats SA and the World Bank**

There are a number of important assumptions embedded in the methodology of Stats SA and the World Bank. The sensitivity of our results to these assumptions is an important issue that should not be overlooked. We discuss three main assumptions below. We also describe future work on sensitivity analysis.

First, we assume that the residuals from the 1st stage regressions are normally distributed. This is an assumption that is easy to test and easy to relax. Our preliminary analysis shows that our residuals do look normal when overlaid on a normal kernel density function, and in the cases where we do not pass the standard tests of normality, we find that this is due to the existence of a few outliers. [The tests for normality that we utilised are all readily implemented in STATA, such as sktest (skewness and kurtosis test), sfrancia (Shapiro-Francia test), and jb (Jarque-Bera test)]. After dropping a few of these observations (usually less than 1% of the total number of observations in a province) we cannot reject the null hypothesis that the residuals are normally distributed in each region. Furthermore, our results

[12] Poverty in the population depends on household size, but, without loss of generality, we have left it out of the discussion for simplicity of notation.

are not sensitive to the elimination of these few outliers from the sample in each region. Finally, one can easily relax the normality assumption by drawing from the pool of the residuals from the 1st stage regressions with replacement, rather than from a normal distribution. That is, one does not need to impose a certain distributional form on the residuals.

We also assumed initially that our residuals are homoskedastic. Further tests of this assumption showed us that in most of our nine regressions, the residuals are in fact heteroskedastic. To deal with heteroskedasticity, if it is there, we need to estimate its form and then draw residuals in the imputation stage accordingly. This is a fairly straightforward extension, especially if the assumption of normality holds, in which case the residuals can still be drawn from a uniform distribution for our simulations and then transformed to have an appropriate variance.

Finally, we assume that the disturbance term in our equation (1) is not correlated across households within a cluster, town, or a magisterial district. Ignoring the fact that a component of the disturbance term is shared within groups, our methodology would still yield unbiased estimates of expected poverty for small areas conditional on their observable characteristics, although the standard errors around these estimates would be underestimated (see Elbers *et al*, 2000). That is, for each town (or place name ormagisterial district, etc.), we do not know the true value of poverty but our expectation of poverty, given whatwecanobserve, isunbiased.

Incorporating interaction terms, other data sources (e.g. geographic information systems databases), and means of our current explanatory variables at the cluster (or town, or magisterial district) level into our regression models are all various ways to ameliorate possible 'small area effects'. We find in several instances that our explanatory variables are sufficiently informative that the assumption of independence of the disturbance term across households cannot be rejected. Elbers *et al*. (2000) find no random effects at the cluster level in rural areas of Ecuador, although they get significant and sizeable effects in urban areas. In similar work in Nicaragua, we found no sign of fixed or random effects at the 'municipio' *(municipality)* level in any of the seven regions, urban or rural.

Hence, what we plan to do next is to perform proper diagnostics to see whether our assumption of 'no small area effects' is violated. If so, and preliminary evidence shows that it very well might be, we will explore expanding our set of explanatory variables as described above. If the problem still persists, we will incorporate the component of the disturbance term that is due to a common cluster effect into our simulations in the imputation stage. In that case, the standard errors around our expected poverty rates will be larger than those that are reported in this paper, butwithout doing the diagnostics it is not possible to know howmuchlarger.

In addition to these issues of estimation, our future work will explore estimating other dimensions of poverty. It is possible that our results are sensitive to the choice of our poverty line and/or to the choice of the poverty indicator. In this paper, we have only concentrated on the expected poverty rates. There is no reason why this should be the preferred choice of any policy-maker when using poverty maps as targeting tools. The poverty gap measure, for example, is widely used because of its interpretation as the amount of money necessary to bring all the poor up to the poverty line. Poverty severity, another indicator in the general class of Foster-Greer-Thorbecke Index of poverty measures [FGT ($\alpha$=2)], is another possibility. It is not clear that all of the rankings of magisterial districts in South Africa are robust to the choice of poverty indicator. Furthermore, we have chosen our household poverty line to be R800 permonth, because it has immediate policy relevance as described in the introduction of our

paper. Whether our rankings are sensitive to the choice of the poverty line is also an empirical question. We will explore both of these issues of robustness in a separate forthcoming paper.

**Concluding discussion**

We have shown that the income from the census data provides only a weak proxy for the average income or poverty rates at either the provincial level or at lower levels of aggregation. We have also shown a simple method of imputing expenditures using information in the IES. The values for household consumption obtained using the regression coefficients from the IES and the characteristics available in the census are plausible and provide a fair fit with the IES data. The expected poverty rates for each magisterial district based on this methodology are provided in the appendix.

Since we have attempted to validate the estimates with data in the IES, it might seem logical to simply use this data, and bypass the imputation. However, as discussed, the IES was not designed to be representative at lower levels of aggregation while the census is, by design, exhaustive (and, hence, representative) for any jurisdiction. That is, there is no sample error, although there may be non-sample errors in the manner in which complex information was captured. The imputations reported here are based on readily-observable characteristics of a household such as its composition as well as the characteristics of its housing.

Our purpose is not merely to explore measures of poverty at the province level. In many cases these districts are themselves heterogeneous and there is often the need to know the rates of poverty for lower tiers of administration or for sub-regions within a province. While we cannot *formally* test whether the imputations which we provide are more accurate than the original information on income in the census data for lower tiers of administration, the evidence that has been presented is supportive of the claim that the imputed consumption provides an unbiased measure of poverty. Thus, we believe that the measure of consumption constructed for each household can be aggregated at any level of administration that requires information on poverty at the local level. Indeed, because the technique provides a measure of consumption for each household in rather geographically defined enumeration areas, expected poverty estimates can be provided for aggregations that differ from that which existed at the time the census was undertaken. This assists in updating information as the process of decentralisation of government services progresses. Moreover, with improvements provided with geographic information systems, such mapping can be a valuable tool in prioritising government resource allocation.

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**Tables of poverty rates by province, district council, and magisterial district**

**Map 1**

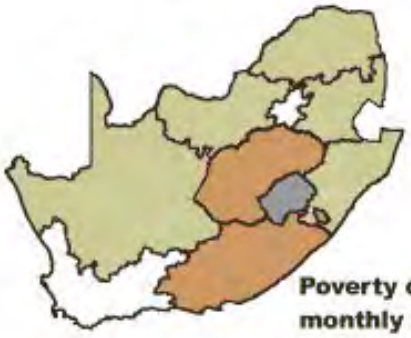
# Poverty in South Africa

(household poverty line based on consumption expenditure at R800 or less per month - 1996 prices)

**Provinces with less than 20% poverty**
Gauteng (12%) • Western Cape (12%)

**Provinces with poverty levels between 20%- 40%**
Mpumalanga (25%) • KwaZulu-Natal (26%)
Northern Cape (35%) • North West (37%)
Northern Province (38%)

**Provinces with poverty levels greater than 40%**
Free State (48%) • Eastern Cape (48%)

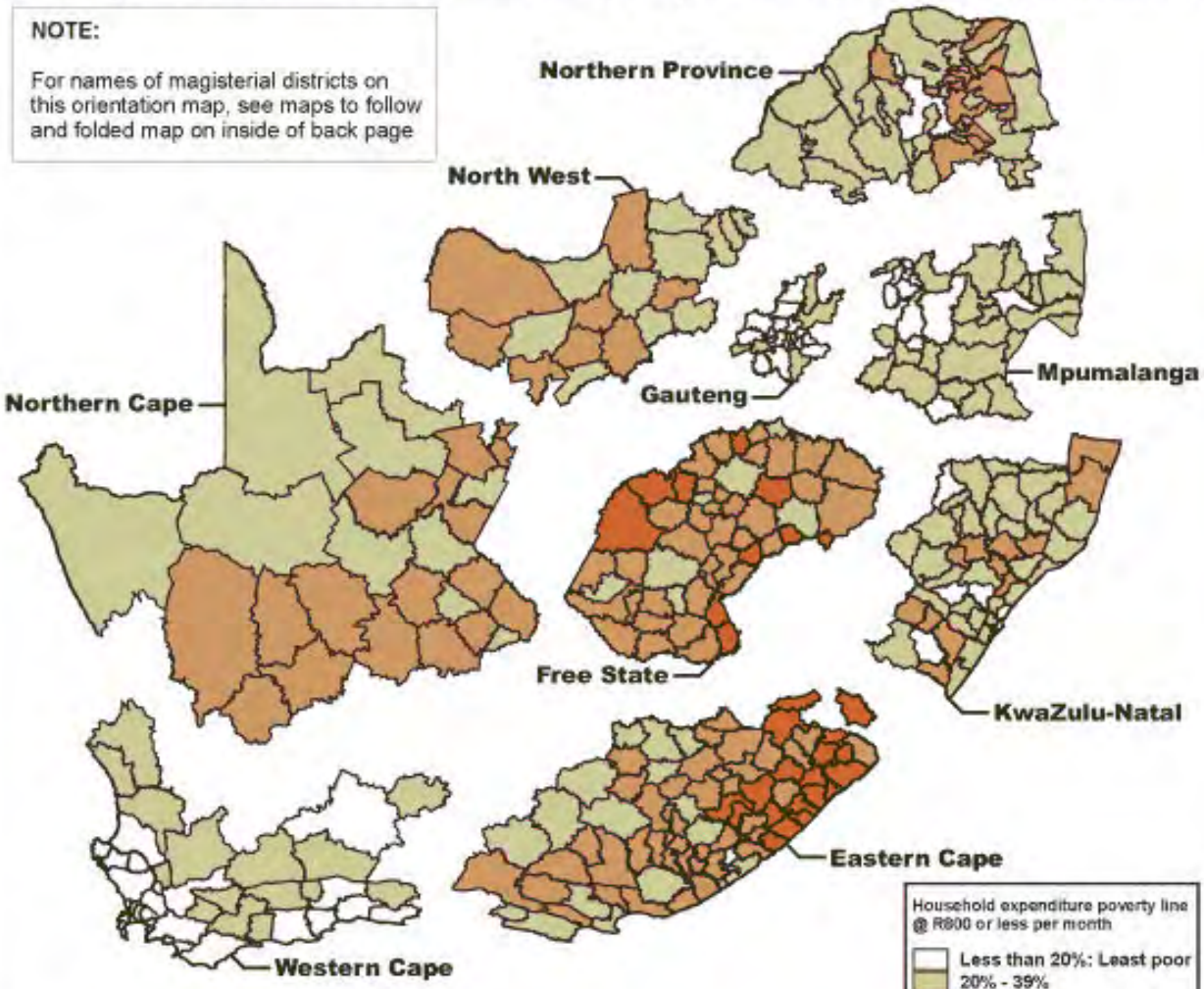


**Poverty distribution based on monthly expenditure by province**

**Poverty distribution based on monthly expenditure, by magisterial district**

NOTE:

For names of magisterial districts on this orientation map, see maps to follow and folded map on inside of back page




Statistics South Africa

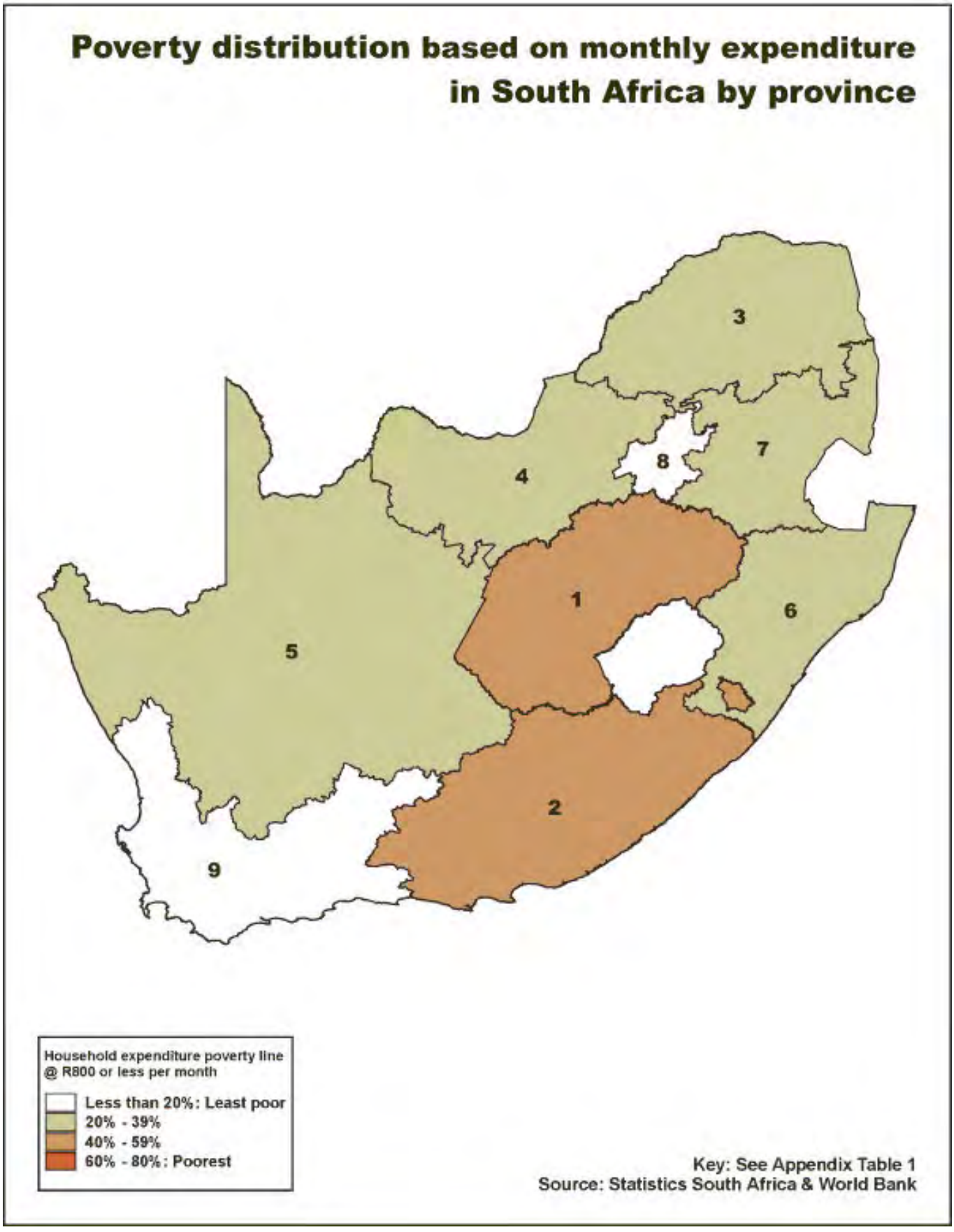
Source: Statistics South Africa & World Bank

Appendix Table 1: Headcount index by province

| * | Province | Headcount ratio | Imputed mean monthly household expenditure (R) |
|---|---|---|---|
| 1 | **Free State** | 0,48 (0,0008) | 1 819 |
| 2 | **Eastern Cape** | 0,48 (0,0006) | 1 702 |
| 3 | **Northern Province** | 0,38 (0,0010) | 1 855 |
| 4 | **NorthWest** | 0,37 (0,0008) | 2 137 |
| 5 | **Northern Cape** | 0,35 (0,0012) | 2 396 |
| 6 | **KwaZulu-Natal** | 0,26 (0,0009) | 2 579 |
| 7 | **Mpumalanga** | 0,25 (0,0017) | 2 394 |
| 8 | **Gauteng** | 0,12 (0,0012) | 4 270 |
| 9 | **Western Cape** | 0,12 (0,0011) | 3 816 |

**The poverty line is R800 or less per household. Standard errors in parentheses.**
*** The numbers in this column refer to the provinces on Map 2.**

**Map 2**

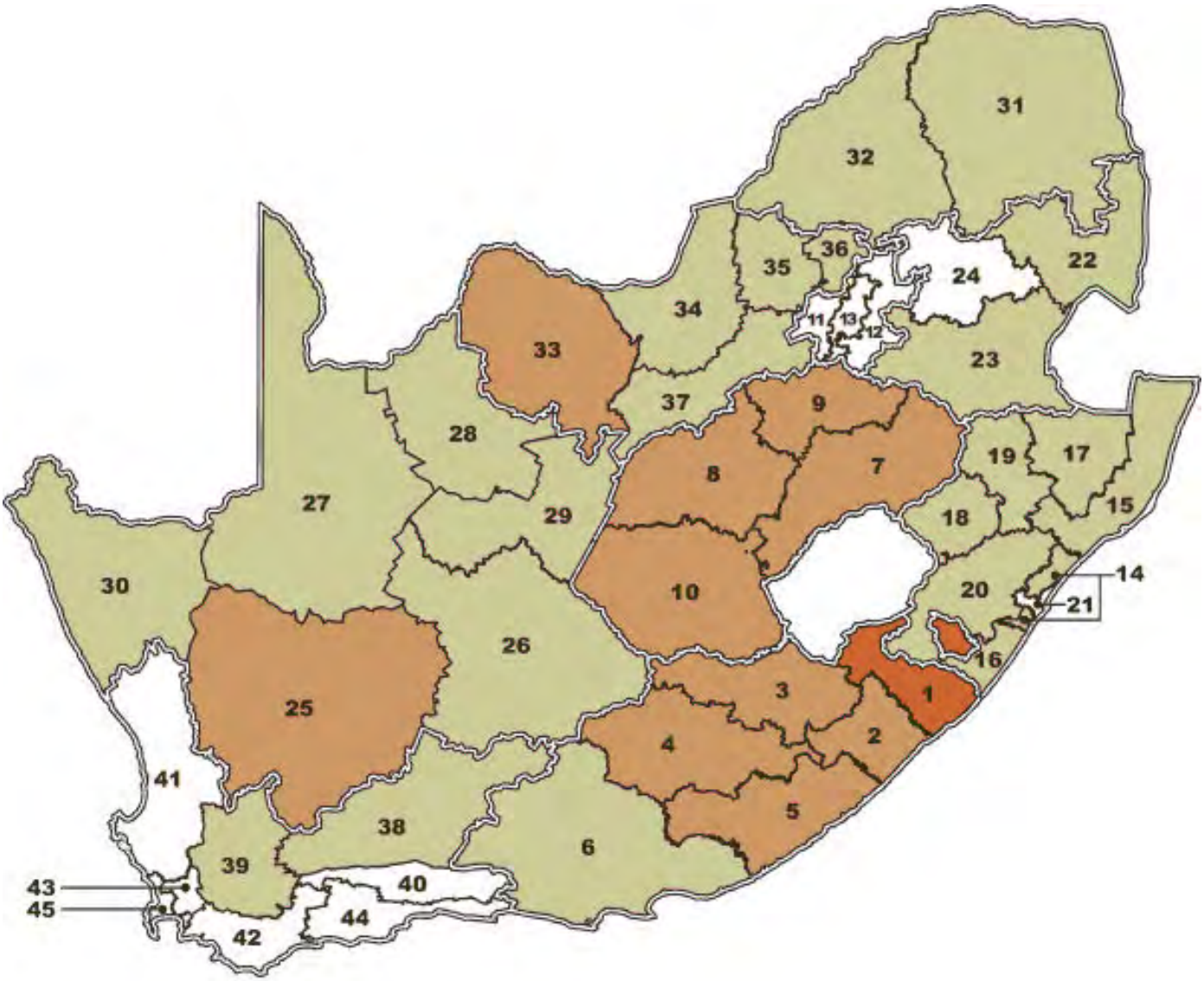

Poverty distribution based on monthly expenditure in South Africa by province
3
4
8
7
1
6
5
2
9
Household expenditure poverty line @ R800 or less per month
Less than 20%: Least poor
20% - 39%
40% - 59%
60% - 80%: Poorest
Key: See Appendix Table 1
Source: Statistics South Africa & World Bank

Appendix Table 2: Headcount index by district council

| Province | * | District council | Headcount ratio | Imputed mean monthly household expenditure (R) |
|---|---|---|---|---|
| **Eastern Cape** | 1 | Wild Coast District Council | 0,62 (0,0015) | 862 |
| | 2 | Kei District Council | 0,60 (0,0014) | 998 |
| | 3 | Drakensberg District Council | 0,50 (0,0018) | 1 377 |
| | 4 | Stormberg District Council | 0,48 (0,0014) | 1 482 |
| | 5 | Amatola District Council | 0,46 (0,0008) | 1 729 |
| | 6 | Western Region District Council | 0,27 (0,0008) | 3 051 |
| **Free State** | 7 | Eastern Free State District Council | 0,59 (0,0016) | 1 294 |
| | 8 | Goldfields District Council | 0,45 (0,0011) | 1 861 |
| | 9 | Northern Free State District Council | 0,44 (0,0013) | 2 070 |
| | 10 | Bloem-Area District Council | 0,43 (0,0010) | 2 127 |
| **Gauteng** | 11 | Western Gauteng Services Council | 0,18 (0,0014) | 3 626 |
| | 12 | Eastern Gauteng Services Council | 0,15 (0,0013) | 4 030 |
| | 13 | Metropolitan Areas** | 0,11 (0,0012) | 4 430 |
| **KwaZulu-Natal** | 14 | Ilembe Regional Council | 0,33 (0,0016) | 1 644 |
| | 15 | Uthungulu Regional Council | 0,33 (0,0013) | 2 042 |
| | 16 | Ugu Regional Council | 0,32 (0,0014) | 1 960 |
| | 17 | Zululand Regional Council | 0,32 (0,0017) | 1 775 |
| | 18 | Uthukela Regional Council | 0,29 (0,0018) | 1 920 |
| | 19 | Umzinyathi Regional Council | 0,28 (0,0014) | 2 142 |
| | 20 | Indlovu Regional Council | 0,28 (0,0011) | 2 428 |
| | 21 | Durban Metropolitan Council | 0,17 (0,0009) | 3 512 |
| **Mpumalanga** | 22 | Lowveld Escarpment District Council | 0,28 (0,0018) | 2 088 |
| | 23 | Eastvaal District Council | 0,28 (0,0016) | 2 461 |
| | 24 | Highveld District Council | 0,19 (0,0022) | 2 580 |
| **Northern Cape** | 25 | Hantam District Council | 0,42 (0,0038) | 2 053 |
| | 26 | Upper Karoo District Council | 0,39 (0,0025) | 2 068 |
| | 27 | Lower Orange District Council | 0,36 (0,0023) | 2 310 |
| | 28 | Kalahari District Council | 0,34 (0,0027) | 2 716 |
| | 29 | Diamantveld District Council | 0,33 (0,0017) | 2 520 |
| | 30 | Namaqualand District Council | 0,31 (0,0032) | 2 366 |
| **Northern Province** | 31 | Northern District Council | 0,39 (0,0010) | 1 783 |
| | 32 | Bushveld District Council | 0,35 (0,0016) | 2 448 |
| **North West** | 33 | Bophirima District Council (Huhudi) | 0,48 (0,0015) | 1 429 |
| | 34 | Central District Council | 0,40 (0,0013) | 1 890 |
| | 35 | Rustenburg District Council | 0,36 (0,0013) | 2 112 |
| | 36 | Eastern District Council | 0,33 (0,0014) | 2 004 |
| | 37 | Southern District Council (Klerksdorp) | 0,31 (0,0011) | 3 009 |
| **Western Cape** | 38 | Sentrale Karoo District Council | 0,21 (0,0033) | 2 743 |
| | 39 | Bree River District Council | 0,21 (0,0017) | 2 957 |
| | 40 | Klein Karoo District Council | 0,20 (0,0024) | 3 132 |
| | 41 | West Coast District Council | 0,18 (0,0017) | 3 276 |
| | 42 | Overberg District Council | 0,18 (0,0019) | 3 258 |
| | 43 | Winelands District Council | 0,15 (0,0016) | 3 546 |
| | 44 | South Cape District Council | 0,14 (0,0016) | 3 650 |
| | 45 | Cape Metropolitan Council | 0,09 (0,0011) | 4 075 |

**The poverty line is R800 or less per household. Standard errors in parentheses.**
*** The numbers in this column refer to the district councils on Map 3.**
**** Johannesburg, Pretoria, Khayalami and Lekoa/Vaal**

Map 3




Household expenditure poverty line @ R800 or less per month

- Less than 20%: Least poor
- 20% - 39%
- 40% - 59%
- 60% - 80%: Poorest

Key: See Appendix Table 2
Source: Statistics South Africa & World Bank

Appendix Table 3: Headcount index by magisterial district: Eastern Cape

| Province | * | Magisterial district | Headcount ratio | Imputed mean monthly household expenditure (R) |
|---|---|---|---|---|
| **Eastern Cape** | 1 | Elliotdale | 0,69 (0,0042) | 746 |
| | 2 | Willowvale | 0,66 (0,0033) | 792 |
| | 3 | Tabankulu | 0,66 (0,0033) | 797 |
| | 4 | Kentani | 0,66 (0,0037) | 795 |
| | 5 | Port St Johns | 0,65 (0,0041) | 853 |
| | 6 | Mqanduli | 0,65 (0,0033) | 817 |
| | 7 | Engcobo | 0,65 (0,0028) | 832 |
| | 8 | Flagstaff | 0,64 (0,0034) | 827 |
| | 9 | Mt Fletcher | 0,64 (0,0032) | 809 |
| | 10 | Ngqueleni | 0,64 (0,0030) | 833 |
| | 11 | Cofimvaba | 0,64 (0,0033) | 840 |
| | 12 | Libode | 0,63 (0,0031) | 885 |
| | 13 | Maluti | 0,63 (0,0028) | 841 |
| | 14 | Lusikisiki | 0,63 (0,0025) | 874 |
| | 15 | Mt Ayliff | 0,62 (0,0038) | 861 |
| | 16 | Tsomo | 0,62 (0,0042) | 847 |
| | 17 | Umzimkulu | 0,62 (0,0028) | 877 |
| | 18 | Idutywa | 0,61 (0,0035) | 904 |
| | 19 | Tsolo | 0,61 (0,0033) | 901 |
| | 20 | Mt Frere | 0,60 (0,0030) | 910 |
| | 21 | Mpofu | 0,60 (0,0085) | 908 |
| | 22 | Bizana | 0,59 (0,0026) | 923 |
| | 23 | Qumbu | 0,58 (0,0033) | 922 |
| | 24 | Cala | 0,58 (0,0046) | 982 |
| | 25 | Nqamakwe | 0,58 (0,0037) | 918 |
| | 26 | Keiskammahoek | 0,57 (0,0054) | 977 |
| | 27 | Sterkspruit | 0,56 (0,0031) | 964 |
| | 28 | Middledrift | 0,53 (0,0048) | 995 |
| | 29 | Lady Frere | 0,53 (0,0025) | 1 116 |
| | 30 | Pearston | 0,52 (0,0127) | 1 355 |
| | 31 | Ntabethemba | 0,51 (0,0069) | 1 028 |
| | 32 | Peddie | 0,51 (0,0040) | 1 062 |
| | 33 | Komga | 0.51 (0,0075) | 1 589 |
| | 34 | Barkly East | 0,50 (0,0082) | 1 554 |
| | 35 | Umtata | 0,49 (0,0018) | 1 447 |
| | 36 | Hofmeyr | 0,49 (0,0122) | 1 617 |
| | 37 | Maclear | 0,49 (0,0067) | 1 568 |
| | 38 | Lady Grey | 0,48 (0,0104) | 1 573 |
| | 39 | Stutterheim | 0,47 (0,0050) | 1 556 |
| | 40 | Bedford | 0,47 (0,0086) | 1 476 |
| | 41 | Zwelitsha | 0,46 (0,0020) | 1 400 |
| | 42 | Butterworth | 0,46 (0,0029) | 1 438 |
| | 43 | Wodehouse | 0,46 (0,0079) | 1 791 |
| | 44 | Tarka | 0,45 (0,0097) | 1 862 |
| | 45 | Victoria East | 0,44 (0,0043) | 1 388 |
| | 46 | Steytlerville | 0,44 (0,0117) | 1 850 |
| | 47 | Elliot | 0,43 (0,0073) | 1 800 |

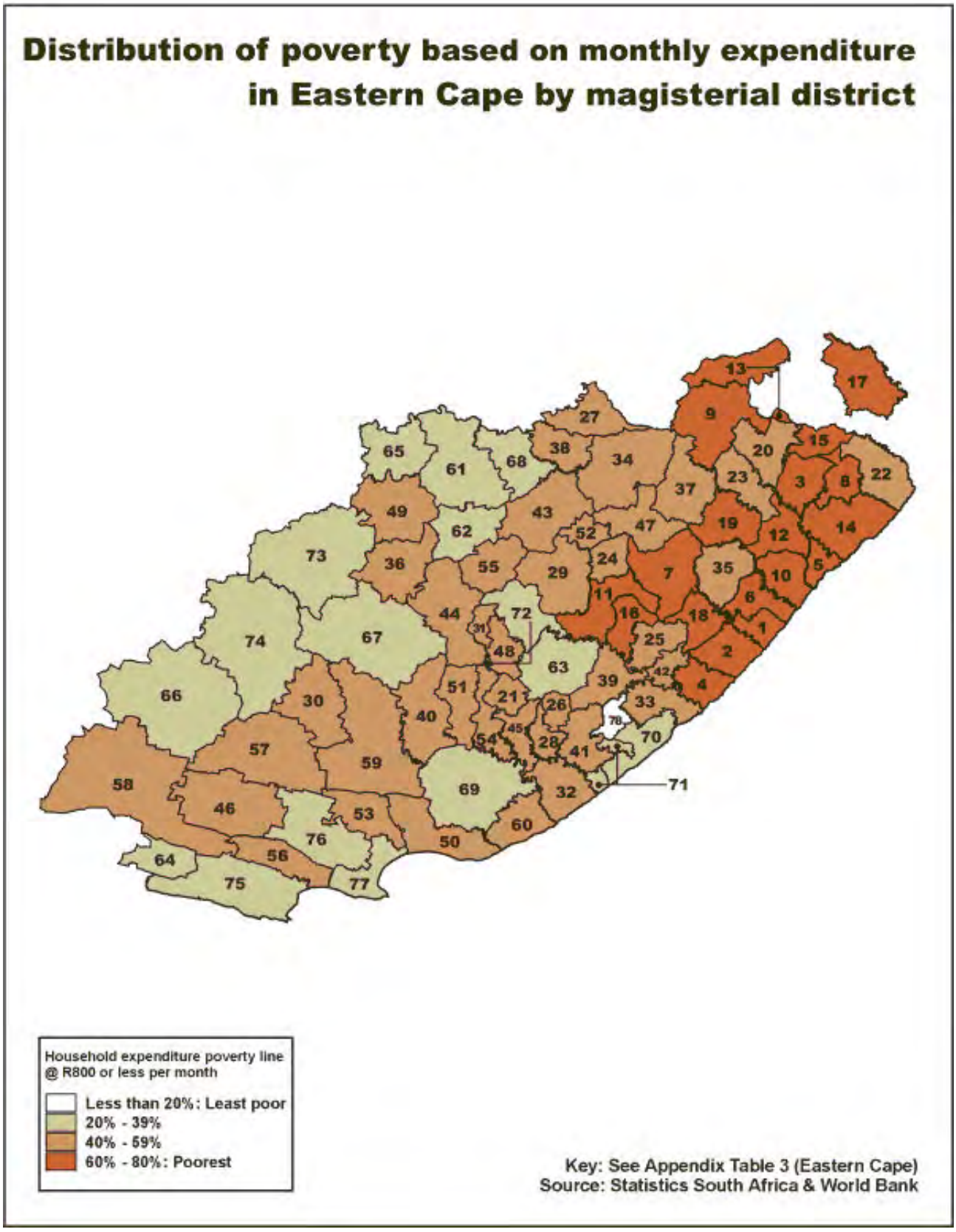
**The poverty line is R800 or less per household. Standard errors in parentheses.**
*** The numbers in this column refer to the magisterial districts on Map 4.**

Appendix Table 3: Headcount index by magisterial district: Eastern Cape (continued)

| Province | * | Magisterial district | Headcount ratio | Imputed mean monthly household expenditure (R) |
|---|---|---|---|---|
| **Eastern Cape** | 48 | Hewu | 0,43 (0,0041) | 1 261 |
| | 49 | Steynsburg | 0,43 (0,0101) | 1 707 |
| | 50 | Alexandria | 0,43 (0,0054) | 1 773 |
| | 51 | Adelaide | 0,43 (0,0074) | 1 766 |
| | 52 | Indwe | 0,42 (0,0100) | 1 564 |
| | 53 | Kirkwood | 0,42 (0,0050) | 1 778 |
| | 54 | Fort Beaufort | 0,41 (0,0059) | 1 944 |
| | 55 | Sterkstroom | 0,41 (0,0102) | 1 671 |
| | 56 | Hankey | 0,41 (0,0057) | 1 794 |
| | 57 | Jansenville | 0,41 (0,0085) | 1 847 |
| | 58 | Willowmore | 0,40 (0,0084) | 1 872 |
| | 59 | Somerset East | 0,40 (0,0050) | 2 037 |
| | 60 | Bathurst | 0,40 (0,0043) | 2 000 |
| | 61 | Albert | 0,40 (0,0067) | 2 115 |
| | 62 | Molteno | 0,39 (0,0086) | 1 803 |
| | 63 | Cathcart | 0,38 (0,0074) | 1 856 |
| | 64 | Joubertina | 0,38 (0,0069) | 2 071 |
| | 65 | Venterstad | 0,38 (0,0112) | 1 759 |
| | 66 | Aberdeen | 0,37 (0,0088) | 1 934 |
| | 67 | Cradock | 0,36 (0,0043) | 2 171 |
| | 68 | Aliwal North | 0,36 (0,0050) | 2 281 |
| | 69 | Albany | 0,35 (0,0030) | 2 993 |
| | 70 | East London | 0,34 (0,0014) | 3 223 |
| | 71 | Mdantsane | 0,34 (0,0019) | 1 796 |
| | 72 | Queenstown | 0,31 (0,0030) | 2 821 |
| | 73 | Middelburg | 0,30 (0,0056) | 2 406 |
| | 74 | Graaff-Reinet | 0,29 (0,0043) | 2 660 |
| | 75 | Humansdorp | 0,27 (0,0032) | 2 906 |
| | 76 | Uitenhage | 0,26 (0,0018) | 3 031 |
| | 77 | Port Elizabeth | 0,24 (0,0010) | 3 375 |
| | 78 | King William's Town | 0,18 (0,0037) | 3 996 |

**The poverty line is R800 or less per household. Standard errors in parentheses.**
*** The numbers in this column refer to the magisterial districts on Map 4.**

**Map 4**


Distribution of poverty based on monthly expenditure in Eastern Cape by magisterial district
13
17
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61
68
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20
15
23
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22
37
49
43
62
52
47
19
12
14
73
36
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29
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10
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11
6
44
72
16
18
1
74
67
31
48
25
2
63
42
66
39
4
30
51
21
26
33
40
78
45
70
57
54
28
41
59
58
69
32
71
46
53
60
76
50
64
56
75
77
Household expenditure poverty line @ R800 or less per month
Less than 20%: Least poor
20% - 39%
40% - 59%
60% - 80%: Poorest
Key: See Appendix Table 3 (Eastern Cape)
Source: Statistics South Africa & World Bank

Appendix Table 3: Headcount index by magisterial district: Free State

| Province | * | Magisterial district | Headcount ratio | Imputedmean monthly household expenditure (R) |
|---|---|---|---|---|
| **Free State** | 1 | Witsieshoek | 0,69 (0,0024) | 807 |
| | 2 | Fouriesburg | 0,66 (0,0066) | 1 081 |
| | 3 | Hoopstad | 0,62 (0,0056) | 1 374 |
| | 4 | Vredefort | 0,62 (0,0065) | 1 279 |
| | 5 | Boshof | 0,62 (0,0046) | 1 370 |
| | 6 | Wesselsbron | 0,62 (0,0051) | 1 167 |
| | 7 | Lindley | 0,61 (0,0045) | 1 214 |
| | 8 | Zastron | 0,61 (0,0062) | 1 372 |
| | 9 | Wepener | 0,60 (0,0072) | 1 363 |
| | 10 | Clocolan | 0,60 (0,0059) | 1 373 |
| | 11 | Botshabelo | 0,60 (0,0025) | 901 |
| | 12 | Excelsior | 0,60 (0,0067) | 1 212 |
| | 13 | Marquard | 0,60 (0,0066) | 1 271 |
| | 14 | Bultfontein | 0,60 (0,0051) | 1 279 |
| | 15 | Smithfield | 0,58 (0,0088) | 1 344 |
| | 16 | Koppies | 0,58 (0,0063) | 1 239 |
| | 17 | Reitz | 0,57 (0,0049) | 1 516 |
| | 18 | Theunissen | 0,57 (0,0049) | 1 270 |
| | 19 | Viljoenskroon | 0,57 (0,0043) | 1 384 |
| | 20 | Brandfort | 0,57 (0,0051) | 1 491 |
| | 21 | Senekal | 0,56 (0,0041) | 1 437 |
| | 22 | Heilbron | 0,56 (0,0041) | 1 603 |
| | 23 | Ficksburg | 0,56 (0,0037) | 1 495 |
| | 24 | Ventersburg | 0,55 (0,0074) | 1 302 |
| | 25 | Winburg | 0,55 (0,0068) | 1 402 |
| | 26 | Thaba'Nchu | 0,55 (0,0032) | 1 062 |
| | 27 | Vrede | 0,54 (0,0046) | 1 379 |
| | 28 | Jacobsdal | 0,54 (0,0078) | 1 526 |
| | 29 | Rouxville | 0,53 (0,0091) | 1 525 |
| | 30 | Bothaville | 0,52 (0,0038) | 1 597 |
| | 31 | Frankfort | 0,49 (0,0038) | 1 574 |
| | 32 | Dewetsdorp | 0,49 (0,0070) | 1 467 |
| | 33 | Petrusburg | 0,49 (0,0078) | 1 548 |
| | 34 | Harrismith | 0,49 (0,0035) | 1 736 |
| | 35 | Ladybrand | 0,48 (0,0044) | 1 719 |
| | 36 | Hennenman | 0,48 (0,0052) | 1 849 |
| | 37 | Fauresmith | 0,47 (0,0080) | 1 674 |
| | 38 | Parys | 0,45 (0,0032) | 1 870 |
| | 39 | Philippolis | 0,45 (0,0086) | 1 634 |
| | 40 | Trompsburg | 0,44 (0,0109) | 1 487 |
| | 41 | Odendaalsrus | 0,43 (0,0027) | 1 641 |
| | 42 | Jagersfontein | 0,42 (0,0093) | 1 714 |
| | 43 | Bethulie | 0,42 (0,0074) | 1 707 |
| | 44 | Edenburg | 0,41 (0,0094) | 1 761 |
| | 45 | Virginia | 0,41 (0,0029) | 2 047 |
| | 46 | Reddersburg | 0,39 (0,0098) | 1 993 |
| | 47 | Kroonstad | 0,38 (0,0023) | 2 155 |

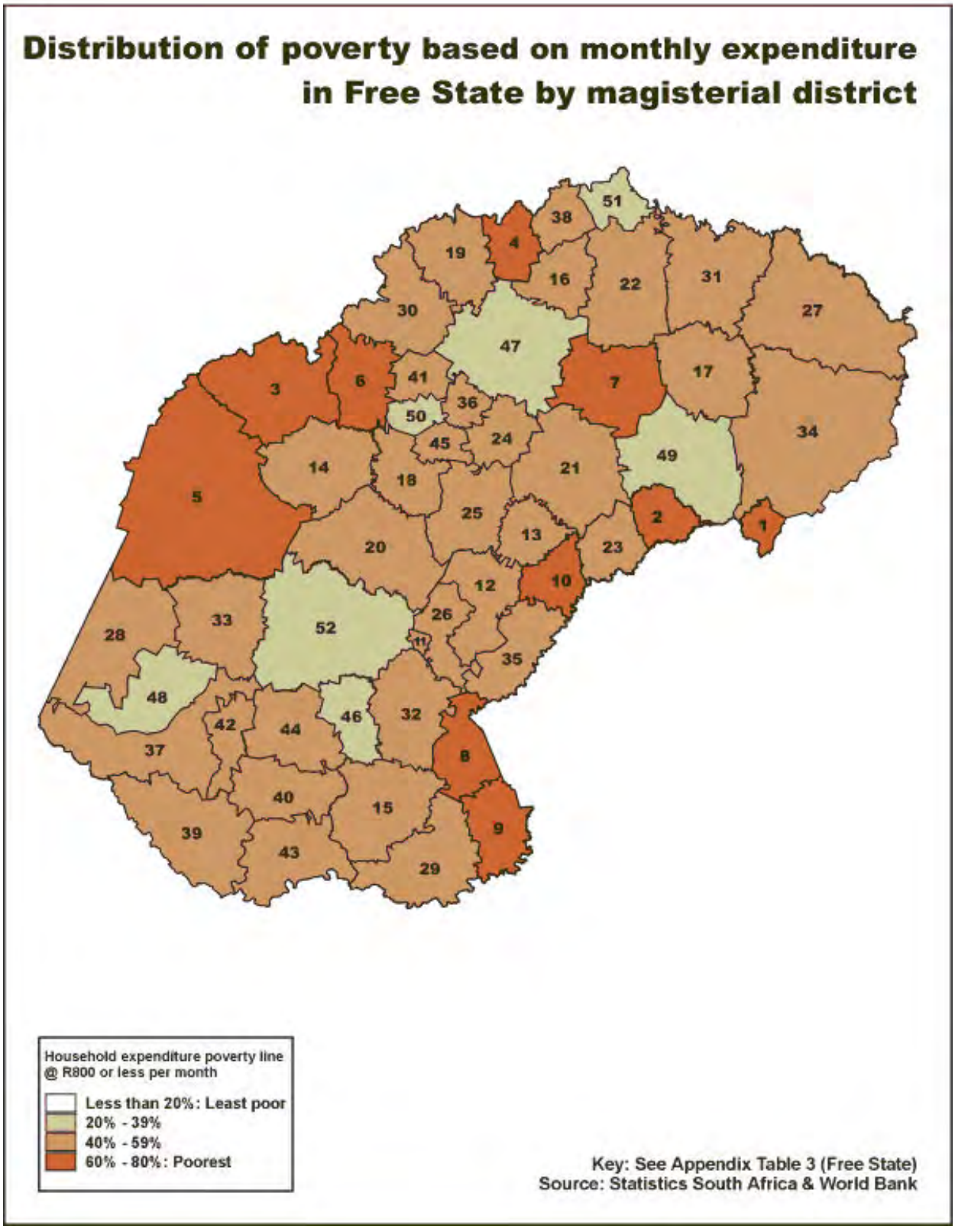
**The poverty line is R800 or less per household. Standard errors in parentheses.**
*** The numbers in this column refer to the magisterial districts on Map 5.**

Appendix Table 3: Headcount index by magisterial district: Free State (continued)

| Province | * | Magisterial district | Headcount ratio | Imputed mean monthly household expenditure (R) |
|---|---|---|---|---|
| **Free State** | 48 | Koffiefontein | 0,37 (0,0073) | 1 703 |
| | 49 | Bethlehem | 0,37 (0,0025) | 2 328 |
| | 50 | Welkom | 0,34 (0,0016) | 2 364 |
| | 51 | Sasolburg | 0,33 (0,0022) | 3 028 |
| | 52 | Bloemfontein | 0,31 (0,0011) | 3 077 |

**The poverty line is R800 or less per household. Standard errors in parentheses.**
*** The numbers in this column refer to the magisterial districts on Map 5.**

**Map 5**

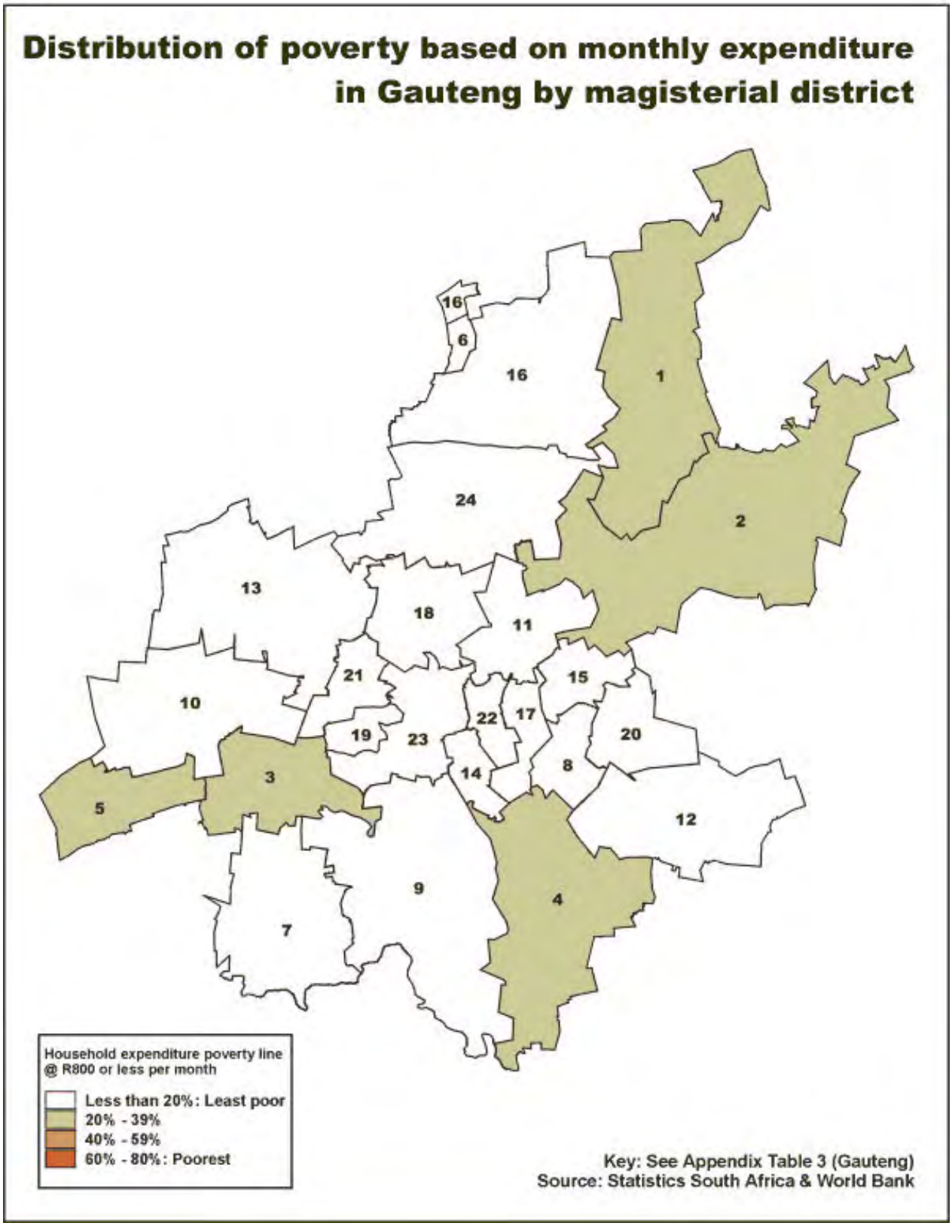

Distribution of poverty based on monthly expenditure in Free State by magisterial district
51
38
4
19
16
22
31
27
30
47
3
6
41
7
17
36
50
34
45
24
49
14
18
21
5
25
2
1
13
20
23
12
10
28
33
52
26
35
48
42
44
46
32
37
8
40
15
9
39
43
29
Household expenditure poverty line @ R800 or less per month
Less than 20%: Least poor
20% - 39%
40% - 59%
60% - 80%: Poorest
Key: See Appendix Table 3 (Free State)
Source: Statistics South Africa & World Bank

Appendix Table 3: Headcount index by magisterial district: Gauteng

| Province | * | Magisterial district | Headcount ratio | Imputed mean monthly household expenditure (R) |
|---|---|---|---|---|
| **Gauteng** | 1 | Cullinan | 0,32 (0,0031) | 2 083 |
| | 2 | Bronkhorstspruit | 0,25 (0,0041) | 3 229 |
| | 3 | Westonaria | 0,22 (0,0023) | 2 948 |
| | 4 | Heidelberg | 0,21 (0,0030) | 2 927 |
| | 5 | Oberholzer | 0,20 (0,0024) | 3 109 |
| | 6 | Soshanguve | 0,19 (0,0022) | 2 388 |
| | 7 | Vanderbijlpark | 0,19 (0,0016) | 2 948 |
| | 8 | Brakpan | 0,17 (0,0019) | 3 748 |
| | 9 | Vereeniging | 0,16 (0,0017) | 3 530 |
| | 10 | Randfontein | 0,16 (0,0021) | 3 637 |
| | 11 | Kempton Park | 0,15 (0,0018) | 3 404 |
| | 12 | Nigel | 0,15 (0,0024) | 3 676 |
| | 13 | Krugersdorp | 0,15 (0,0015) | 4 390 |
| | 14 | Alberton | 0,15 (0,0017) | 3 434 |
| | 15 | Benoni | 0,14 (0,0018) | 3 583 |
| | 16 | Wonderboom | 0,11 (0,0013) | 4 983 |
| | 17 | Boksburg | 0,11 (0,0014) | 4 729 |
| | 18 | Randburg | 0,10 (0,0014) | 4 958 |
| | 19 | Soweto | 0,10 (0,0017) | 2 871 |
| | 20 | Springs | 0,10 (0,0015) | 4 910 |
| | 21 | Roodepoort | 0,08 (0,0013) | 5 573 |
| | 22 | Germiston | 0,08 (0,0011) | 6 841 |
| | 23 | Johannesburg | 0,08 (0,0011) | 5 144 |
| | 24 | Pretoria | 0,06 (0,0008) | 6 487 |

**The poverty line is R800 or less per household. Standard errors in parentheses.**
*** The numbers in this column refer to the magisterial districts on Map 6.**

**Map 6**

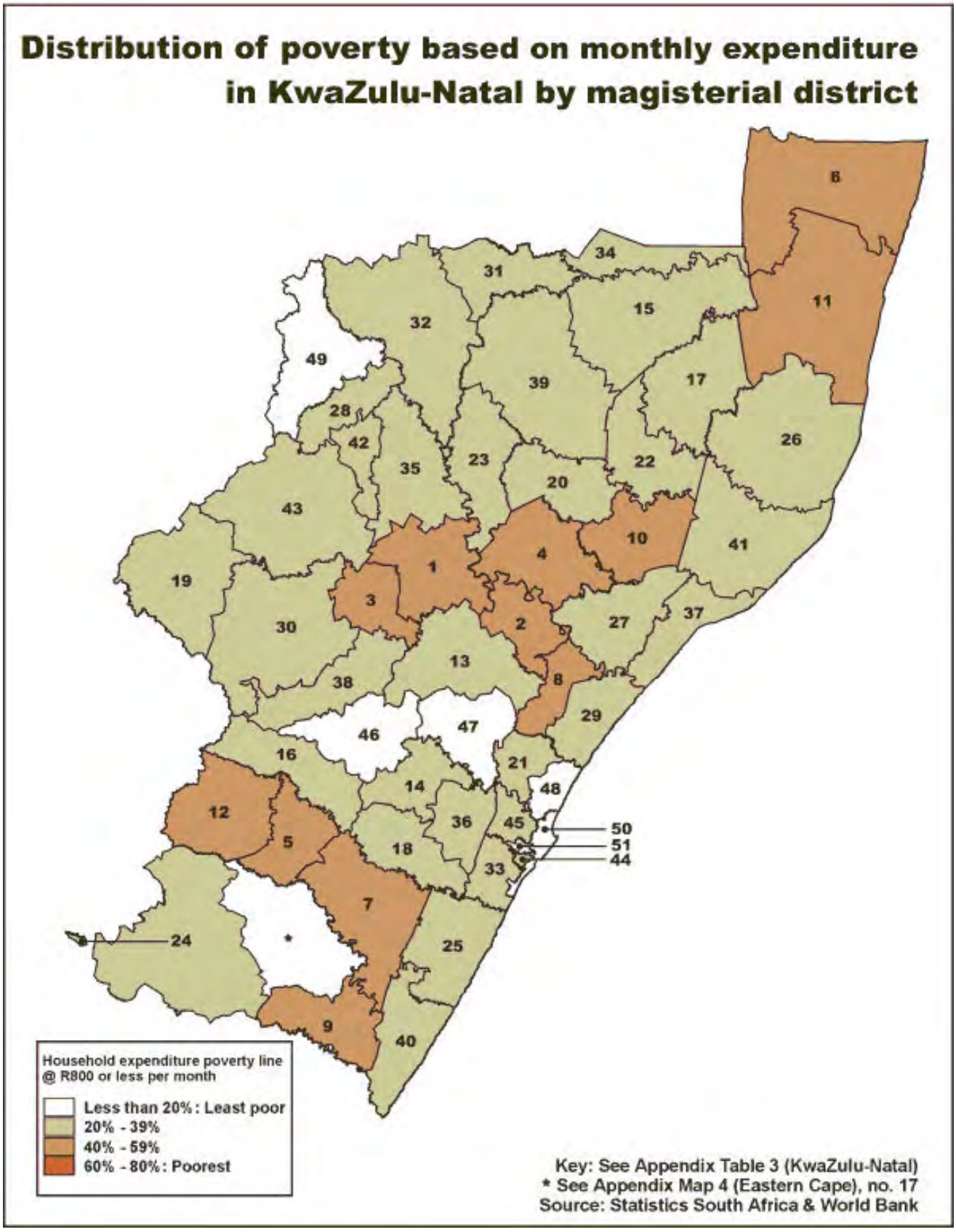

Distribution of poverty based on monthly expenditure in Gauteng by magisterial district
16
6
16
1
24
2
13
18
11
21
15
10
22
17
19
23
20
8
3
14
5
12
9
4
7
Household expenditure poverty line @ R800 or less per month
Less than 20%: Least poor
20% - 39%
40% - 59%
60% - 80%: Poorest
Key: See Appendix Table 3 (Gauteng)
Source: Statistics South Africa & World Bank

Appendix Table 3: Headcount index by magisterial district: KwaZulu-Natal

| Province | * | Magisterial district | Headcount ratio | Imputed mean monthly household expenditure (R) |
|---|---|---|---|---|
| **KwaZulu-Natal** | 1 | Msinga | 0,49 (0,0030) | 1 014 |
| | 2 | Kranskop | 0,45 (0,0049) | 1 170 |
| | 3 | Weenen | 0,45 (0,0081) | 1 303 |
| | 4 | Nkandla | 0,44 (0,0035) | 3 535 |
| | 5 | Polela | 0,44 (0,0041) | 1 131 |
| | 6 | Ingwavuma | 0,43 (0,0030) | 1 150 |
| | 7 | Ixopo | 0,42 (0,0031) | 1 262 |
| | 8 | Mapumulo | 0,42 (0,0031) | 1 165 |
| | 9 | Alfred | 0,41 (0,0033) | 1 252 |
| | 10 | Mthonjaneni | 0,41 (0,0048) | 1 433 |
| | 11 | Ubombo | 0,41 (0,0035) | 1 267 |
| | 12 | Underberg | 0,41 (0,0076) | 1 808 |
| | 13 | Umvoti | 0,40 (0,0034) | 1 580 |
| | 14 | New Hanover | 0,38 (0,0035) | 1 596 |
| | 15 | Ngotshe | 0,38 (0,0061) | 1 520 |
| | 16 | Impendle | 0,37 (0,0059) | 1 328 |
| | 17 | Nongoma | 0,37 (0,0030) | 1 283 |
| | 18 | Richmond | 0,37 (0,0041) | 1 670 |
| | 19 | Bergville | 0,36 (0,0035) | 1 389 |
| | 20 | Babanango | 0,36 (0,0064) | 1 315 |
| | 21 | Ndwedwe | 0,36 (0,0034) | 1 361 |
| | 22 | Mhlabathini | 0,35 (0,0031) | 1 558 |
| | 23 | Nqutu | 0,35 (0,0028) | 1 410 |
| | 24 | Mount Currie | 0,33 (0,0040) | 2 294 |
| | 25 | Umzinto | 0,33 (0,0021) | 1 898 |
| | 26 | Hlabisa | 0,32 (0,0029) | 1 625 |
| | 27 | Eshowe | 0,32 (0,0025) | 1 691 |
| | 28 | Dannhauser | 0,30 (0,0042) | 1 754 |
| | 29 | Lower Tugela | 0,30 (0,0020) | 2 072 |
| | 30 | Estcourt | 0,29 (0,0028) | 1 876 |
| | 31 | Paulpietersburg | 0,29 (0,0046) | 1 736 |
| | 32 | Utrecht | 0,29 (0,0072) | 2 306 |
| | 33 | Umbumbulu | 0,27 (0,0026) | 1 703 |
| | 34 | Simdlangentsha | 0,27 (0,0049) | 1 962 |
| | 35 | Dundee | 0,26 (0,0035) | 2 207 |
| | 36 | Camperdown | 0,25 (0,0024) | 2 117 |
| | 37 | Mtunzini | 0,25 (0,0025) | 2 151 |
| | 38 | Mooi River | 0,25 (0,0062) | 2 643 |
| | 39 | Vryheid | 0,24 (0,0033) | 2 937 |
| | 40 | Port Shepstone | 0,23 (0,0020) | 2 648 |
| | 41 | Lower Umfolozi | 0,23 (0,0021) | 2 920 |
| | 42 | Glencoe | 0,23 (0,0051) | 2 615 |
| | 43 | Kliprivier | 0,22 (0,0023) | 2 434 |
| | 44 | Umlazi | 0,22 (0,0017) | 2 358 |
| | 45 | Pinetown | 0,21 (0,0012) | 3 809 |
| | 46 | Lions River | 0,19 (0,0034) | 3 157 |
| | 47 | Pietermaritzburg | 0,19 (0,0014) | 3 117 |
| | 48 | Inanda | 0,19 (0,0012) | 2 964 |
| | 49 | Newcastle | 0,14 (0,0019) | 2 962 |
| | 50 | Durban | 0,11 (0,0009) | 4 573 |
| | 51 | Chatswoth | 0,08 (0,0013) | 3 992 |

**The poverty line is R800 or less per household. Standard errors in parentheses.**
*** The numbers in this column refer to the magisterial districts on Map 7.**

**Map 7**


Distribution of poverty based on monthly expenditure in KwaZulu-Natal by magisterial district
6
34
31
11
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32
49
39
17
28
42
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35
23
22
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43
10
41
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1
19
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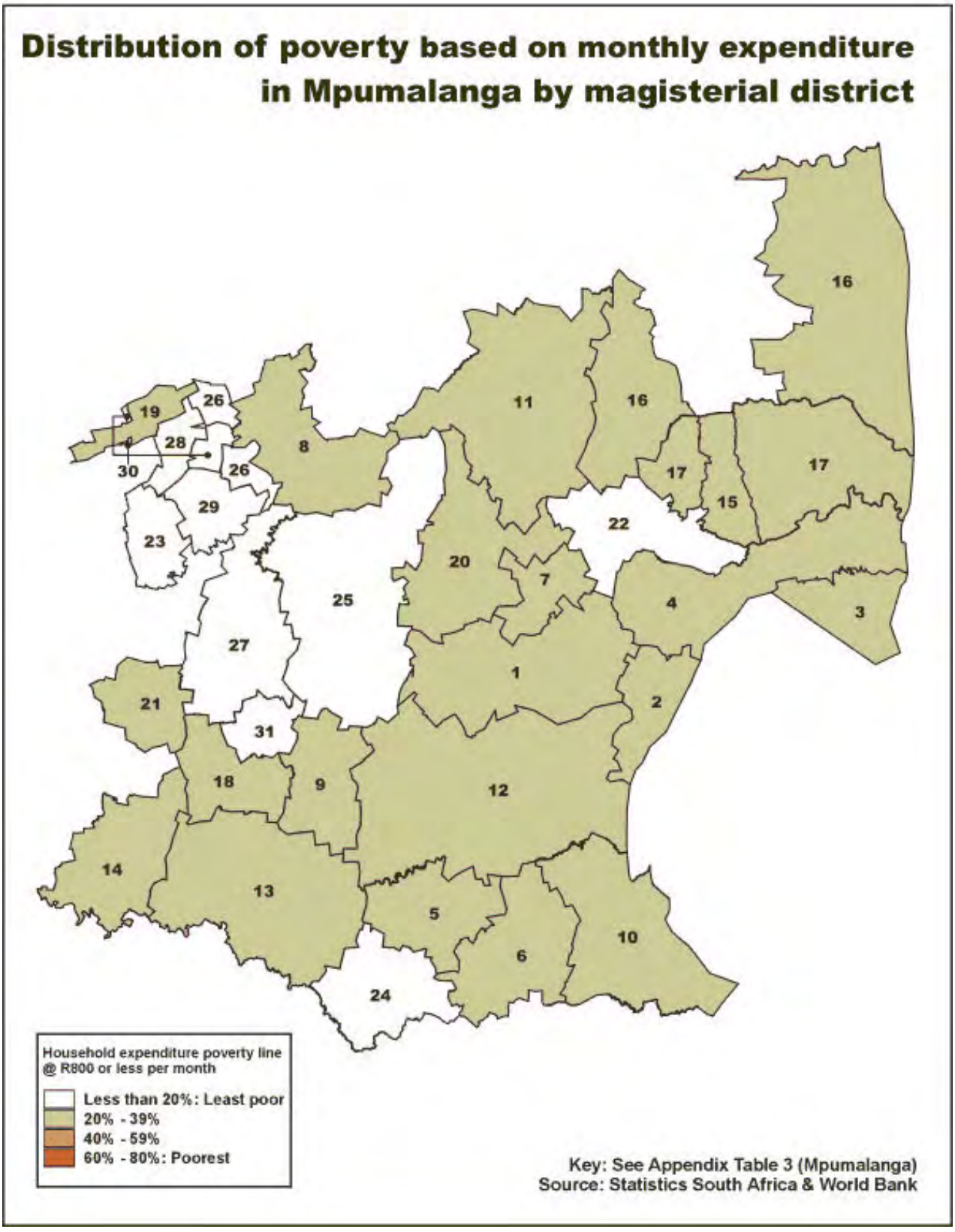
25
9
40
Household expenditure poverty line @ R800 or less per month
Less than 20%: Least poor
20% - 39%
40% - 59%
60% - 80%: Poorest
Key: See Appendix Table 3 (KwaZulu-Natal)
* See Appendix Map 4 (Eastern Cape), no. 17
Source: Statistics South Africa & World Bank

Appendix Table 3: Headcount index by magisterial district: Mpumalanga

| Province | * | Magisterial district | Headcount ratio | Imputed mean monthly household expenditure (R) |
|---|---|---|---|---|
| **Mpumalanga** | 1 | Carolina | 0,36 (0,0053) | 1 981 |
| | 2 | Eerstehoek | 0,34 (0,0031) | 1 417 |
| | 3 | Nkomazi | 0,33 (0,0026) | 1 489 |
| | 4 | Barberton | 0,33 (0,0031) | 2 084 |
| | 5 | Amersfoort | 0,32 (0,0057) | 1 776 |
| | 6 | Wakkerstroom | 0,32 (0,0059) | 1 579 |
| | 7 | Waterval-Boven | 0,31 (0,0071) | 2 378 |
| | 8 | Groblersdal | 0,30 (0,0044) | 3 134 |
| | 9 | Bethal | 0,29 (0,0040) | 2 450 |
| | 10 | Piet Retief | 0,29 (0,0039) | 2 379 |
| | 11 | Lydenburg | 0,28 (0,0041) | 2 502 |
| | 12 | Ermelo | 0,28 (0,0027) | 2 628 |
| | 13 | Standerton | 0,28 (0,0030) | 2 570 |
| | 14 | Balfour | 0,26 (0,0045) | 2 208 |
| | 15 | Nsikazi | 0,26 (0,0024) | 1 784 |
| | 16 | Pelgrimsrus | 0,26 (0,0042) | 2 014 |
| | 17 | Witrivier | 0,25 (0,0049) | 3 597 |
| | 18 | Highveld Ridge | 0,24 (0,0024) | 3 078 |
| | 19 | Moretele | 0,24 (0,0041) | 1 707 |
| | 20 | Belfast | 0,24 (0,0055) | 2 269 |
| | 21 | Delmas | 0,23 (0,0038) | 2 994 |
| | 22 | Nelspruit | 0,20 (0,0028) | 4 523 |
| | 23 | KwaMhlanga | 0,19 (0,0031) | 1 997 |
| | 24 | Volksrust | 0,19 (0,0046) | 2 986 |
| | 25 | Middelburg | 0,19 (0,0022) | 3 655 |
| | 26 | Moutse | 0,18 (0,0037) | 1 839 |
| | 27 | Witbank | 0,18 (0,0020) | 3 525 |
| | 28 | Mbibana | 0,18 (0,0046) | 1 922 |
| | 29 | Mkobola | 0,16 (0,0037) | 1 975 |
| | 30 | Mdutjana | 0,15 (0,0035) | 2 090 |
| | 31 | Kriel | 0,15 (0,0043) | 3 839 |

**The poverty line is R800 or less per household. Standard errors in parentheses.**
*** The numbers in this column refer to the magisterial districts on Map 8.**

**Map 8**


Distribution of poverty based on monthly expenditure in Mpumalanga by magisterial district
16
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23
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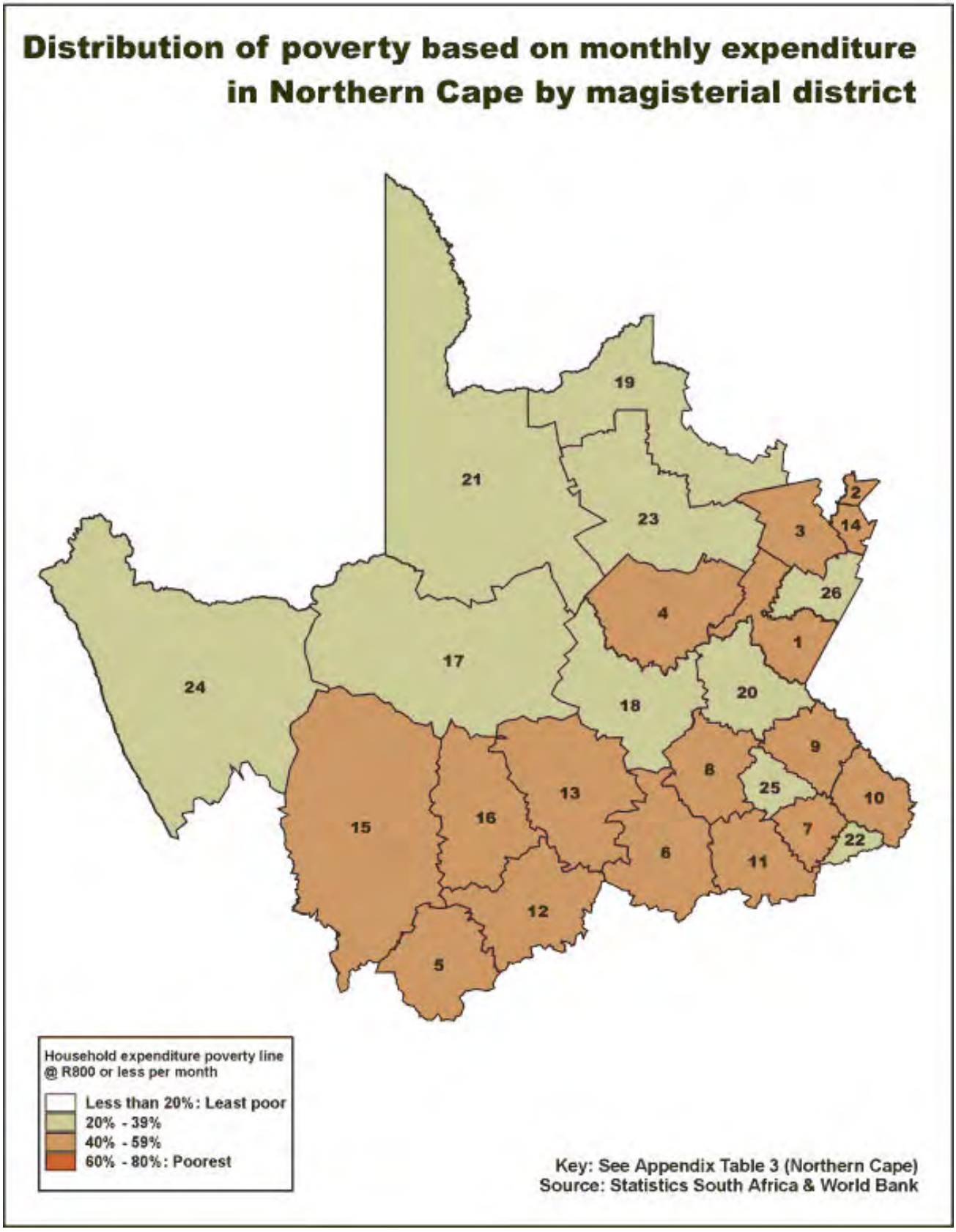
10
6
24
Household expenditure poverty line @ R800 or less per month
Less than 20%: Least poor
20% - 39%
40% - 59%
60% - 80%: Poorest
Key: See Appendix Table 3 (Mpumalanga)
Source: Statistics South Africa & World Bank

Appendix Table 3: Headcount index by magisterial district: Northern Cape

| Province | * | Magisterial district | Headcount ratio | Imputed mean monthly household expenditure (R) |
|---|---|---|---|---|
| **Northern Cape** | 1 | Herbert | 0,53 (0,0056) | 1 613 |
| | 2 | Hartswater | 0,51 (0,0042) | 2 165 |
| | 3 | Barkly West | 0,50 (0,0051) | 1 605 |
| | 4 | Hay | 0,48 (0,0080) | 1 688 |
| | 5 | Sutherland | 0,47 (0,0118) | 2 228 |
| | 6 | Victoria-West | 0,46 (0,0081) | 1 941 |
| | 7 | Hanover | 0,46 (0,0135) | 1 618 |
| | 8 | Britstown | 0,45 (0,0110) | 1 807 |
| | 9 | Philipstown | 0,45 (0,0083) | 1 786 |
| | 10 | Colesberg | 0,45 (0,0072) | 1 732 |
| | 11 | Richmond | 0,44 (0,0105) | 1 835 |
| | 12 | Fraserburg | 0,44 (0,0108) | 2 172 |
| | 13 | Carnarvon | 0,43 (0,0086) | 1 833 |
| | 14 | Warrenton | 0,42 (0,0056) | 1 840 |
| | 15 | Calvinia | 0,41 (0,0054) | 2 079 |
| | 16 | Williston | 0,40 (0,0108) | 2 123 |
| | 17 | Kenhardt | 0,40 (0,0068) | 1 964 |
| | 18 | Prieska | 0,40 (0,0059) | 2 005 |
| | 19 | Kuruman | 0,40 (0,0045) | 2 880 |
| | 20 | Hopetown | 0,38 (0,0076) | 2 202 |
| | 21 | Gordonia | 0,35 (0,0024) | 2 352 |
| | 22 | Noupoort | 0,32 (0,0104) | 1 900 |
| | 23 | Postmasburg | 0,31 (0,0033) | 2 647 |
| | 24 | Namakwaland | 0,31 (0,0033) | 2 309 |
| | 25 | De Aar | 0,30 (0,0050) | 2 633 |
| | 26 | Kimberley | 0,23 (0,0025) | 3 013 |

**The poverty line is R800 or less per household. Standard errors in parentheses.**
*** The numbers in this column refer to the magisterial districts on Map 9.**

**Map 9**


Distribution of poverty based on monthly expenditure in Northern Cape by magisterial district
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Household expenditure poverty line @ R800 or less per month
Less than 20%: Least poor
20% - 39%
40% - 59%
60% - 80%: Poorest
Key: See Appendix Table 3 (Northern Cape)
Source: Statistics South Africa & World Bank

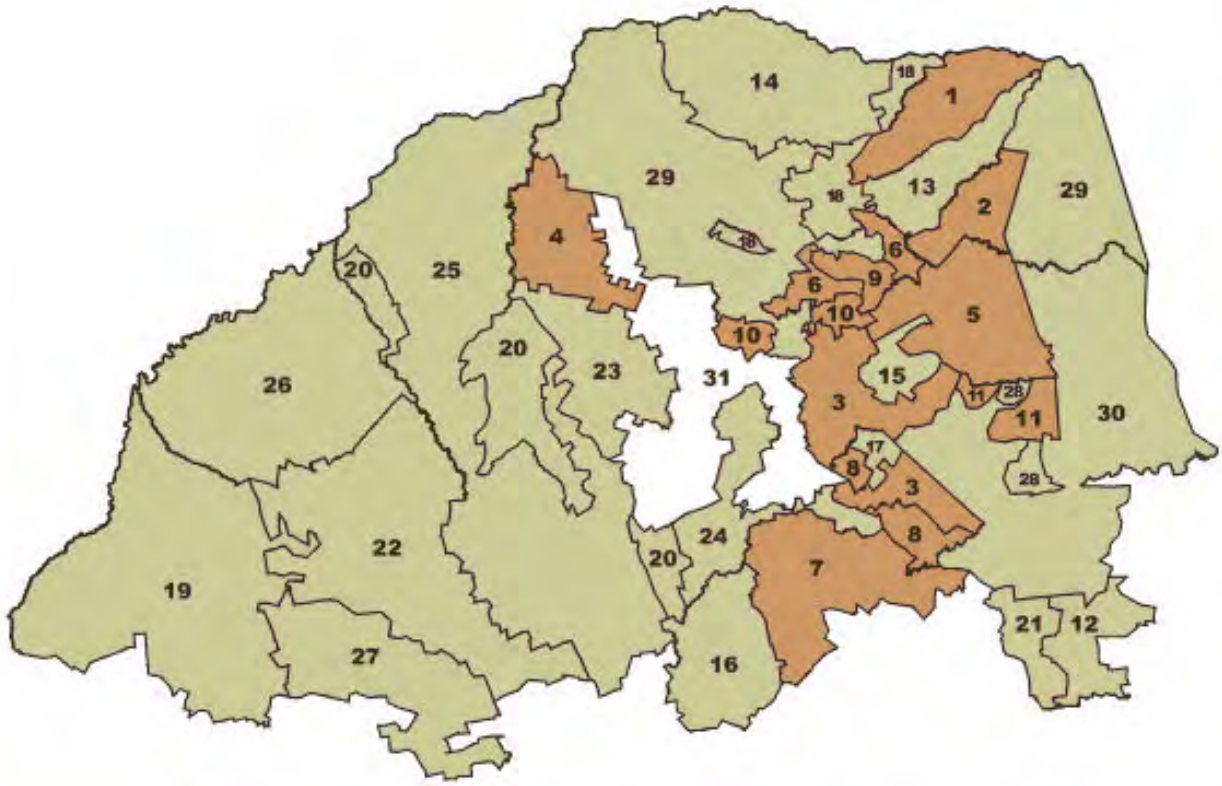
Appendix Table 3: Headcount index by magisterial district: Northern Province

| Province | * | Magisterial district | Headcount ratio | Imputed mean monthly household expenditure (R) |
|---|---|---|---|---|
| **Northern Province** | 1 | Mutali | 0,48 (0,0042) | 1 300 |
| | 2 | Malamulela | 0,45 (0,0028) | 1 405 |
| | 3 | Letaba | 0,44 (0,0036) | 2 805 |
| | 4 | Bochum | 0,44 (0,0028) | 1 306 |
| | 5 | Giyani | 0,43 (0,0024) | 1 571 |
| | 6 | Vuwani | 0,43 (0,0026) | 1 520 |
| | 7 | Sekhukhuneland | 0,42 (0,0019) | 1 399 |
| | 8 | Naphuno | 0,42 (0,0028) | 1 493 |
| | 9 | Hlanganani | 0,41 (0,0032) | 1 516 |
| | 10 | Sekgosese | 0,41 (0,0033) | 1 423 |
| | 11 | Lulekani | 0,40 (0,0054) | 1 579 |
| | 12 | Mhala | 0,40 (0,0021) | 1 535 |
| | 13 | Thohoyandou | 0,39 (0,0019) | 1 822 |
| | 14 | Messina | 0,39 (0,0051) | 2 744 |
| | 15 | Bolobedu | 0,39 (0,0026) | 1 505 |
| | 16 | Nebo | 0,39 (0,0023) | 1 502 |
| | 17 | Ritavi | 0,38 (0,0027) | 1 729 |
| | 18 | Dzanani | 0,38 (0,0028) | 1 604 |
| | 19 | Thabazimbi | 0,38 (0,0038) | 3 473 |
| | 20 | Mokerong | 0,36 (0,0021) | 1 648 |
| | 21 | Mapulaneng | 0,36 (0,0024) | 1 639 |
| | 22 | Waterberg | 0,36 (0,0039) | 3 244 |
| | 23 | Seshego | 0,34 (0,0022) | 1 883 |
| | 24 | Thabamoopo | 0,33 (0,0022) | 1 859 |
| | 25 | Potgietersrus | 0,32 (0,0037) | 3 358 |
| | 26 | Ellisras | 0,31 (0,0051) | 3 935 |
| | 27 | Warmbad | 0,30 (0,0041) | 3 045 |
| | 28 | Namakgale | 0,27 (0,0041) | 2 368 |
| | 29 | Soutpansberg | 0,27 (0,0043) | 6 174 |
| | 30 | Phalaborwa | 0,23 (0,0042) | 5 557 |
| | 31 | Pietersburg | 0,14 (0,0026) | 7 577 |

**The poverty line is R800 or less per household. Standard errors in parentheses.**
*** The numbers in this column refer to the magisterial districts on Map 10.**

**Map 10**

## Distribution of poverty based on monthly expenditure in Northern Province by magisterial district




Household expenditure poverty line @ R800 or less per month

- Less than 20%: Least poor
- 20% - 39%
- 40% - 59%
- 60% - 80%: Poorest

Key: See Appendix Table 3 (Northern Province)
Source: Statistics South Africa & World Bank

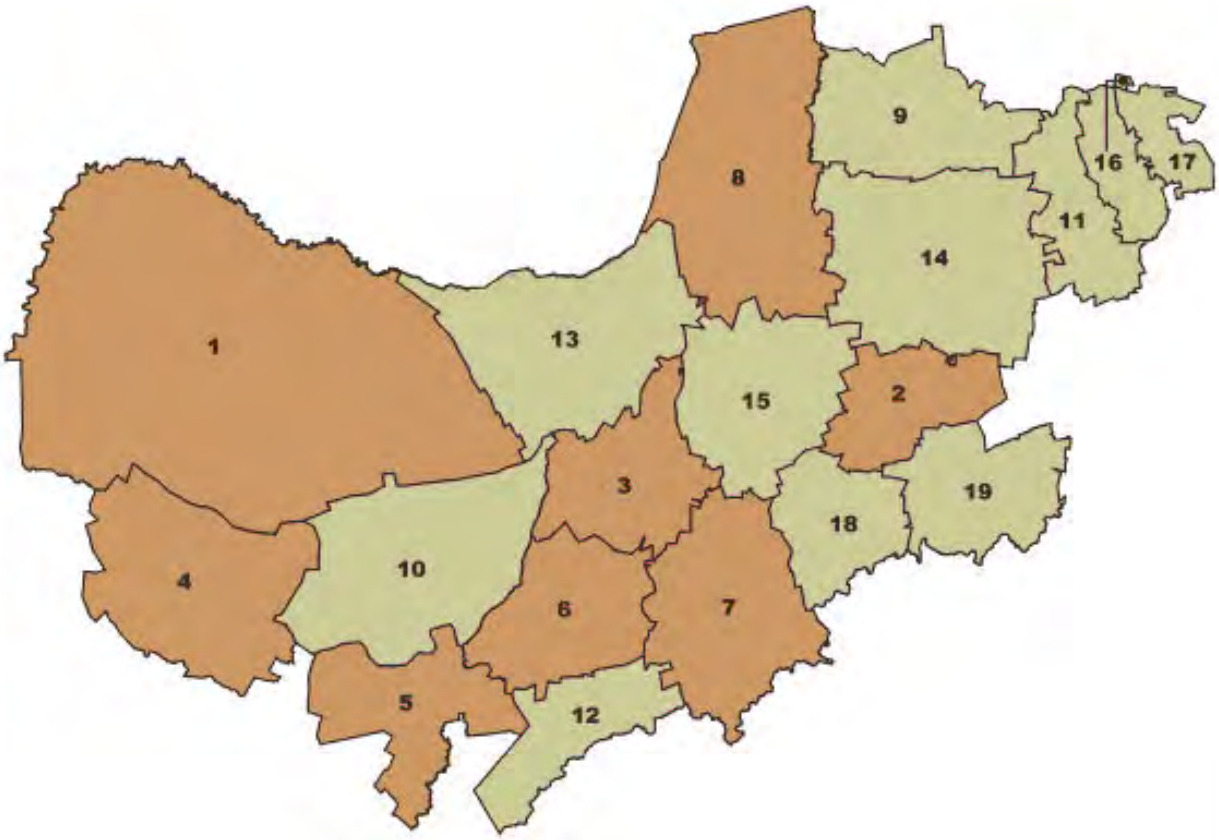
Appendix Table 3: Headcount index by magisterial district: North West

| Province | * | Magisterial district | Headcount ratio | Imputed mean monthly household expenditure (R) |
|---|---|---|---|---|
| **North West** | 1 | Huhudi | 0,54 (0,0033) | 1 146 |
| | 2 | Ventersdorp | 0,51 (0,0051) | 1 851 |
| | 3 | Delareyville | 0,49 (0,0028) | 1 339 |
| | 4 | Kudumane | 0,48 (0,0029) | 1 169 |
| | 5 | Phokwani | 0,47 (0,0024) | 1 301 |
| | 6 | Schweizer-Reneke | 0,46 (0,0044) | 1 741 |
| | 7 | Wolmaransstad | 0,45 (0,0033) | 1 875 |
| | 8 | Madikwe | 0,43 (0,0028) | 1 764 |
| | 9 | Mankwe | 0,40 (0,0023) | 1 473 |
| | 10 | Vryburg | 0,39 (0,0030) | 2 729 |
| | 11 | Brits | 0,39 (0,0018) | 2 466 |
| | 12 | Christiana | 0,38 (0,0046) | 2 382 |
| | 13 | Mmabatho | 0,37 (0,0019) | 1 965 |
| | 14 | Rustenburg | 0,35 (0.0015) | 2 424 |
| | 15 | Lichtenburg | 0,34 (0,0025) | 2 434 |
| | 16 | Ga-Rankuwa | 0,32 (0,0016) | 2 009 |
| | 17 | Temba | 0,31 (0,0023) | 1 707 |
| | 18 | Klerksdorp | 0,29 (0,0015) | 3 157 |
| | 19 | Potchefstroom | 0,24 (0,0019) | 3 715 |

**The poverty line is R800 or less per household. Standard errors in parentheses.**
*** The numbers in this column refer to the magisterial districts on Map 11.**

**Map 11**

## Distribution of poverty based on monthly expenditure in North West by magisterial district




Household expenditure poverty line @ R800 or less per month

- Less than 20%: Least poor
- 20% - 39%
- 40% - 59%
- 60% - 80%: Poorest

Key: See Appendix Table 3 (North West)
Source: Statistics South Africa & World Bank

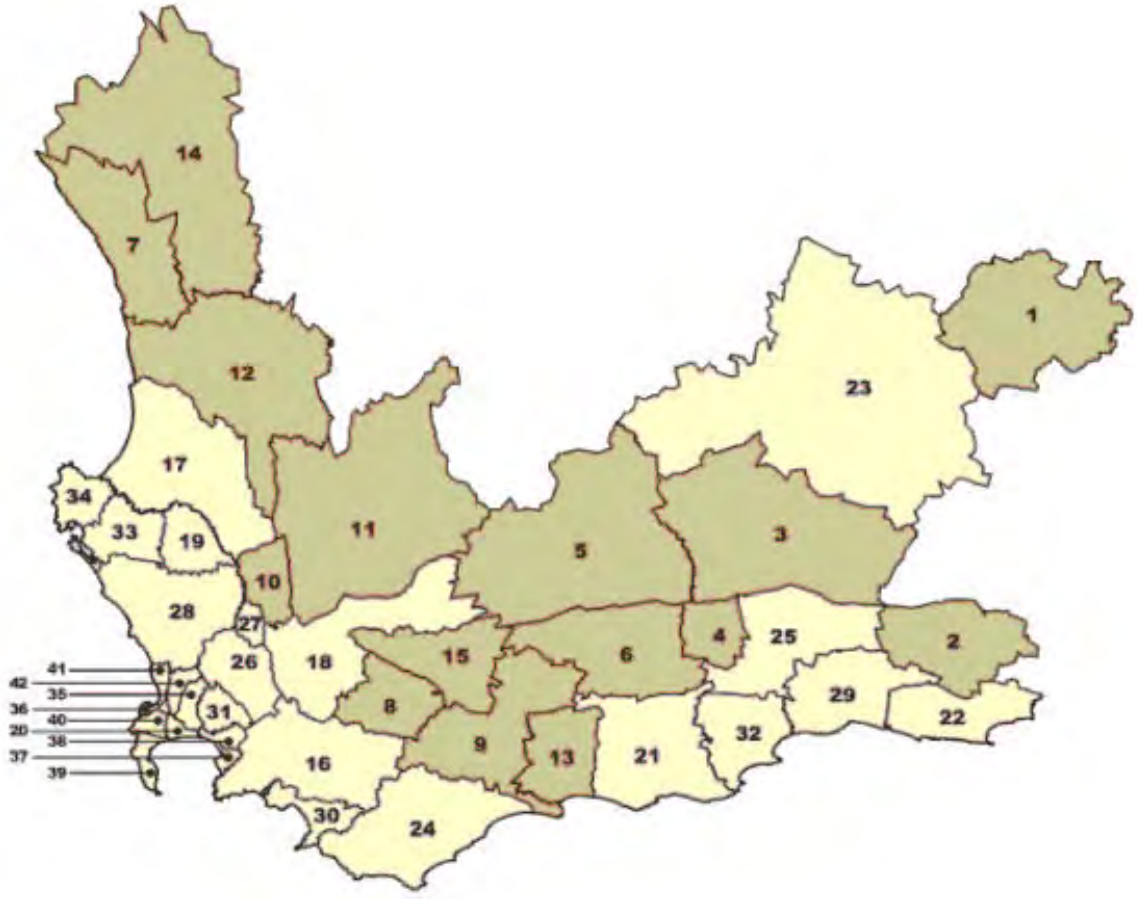
Appendix Table 3: Headcount index by magisterial district: Western Cape

| Province | * | Magisterial district | Headcount ratio | Imputed mean monthly household expenditure (R) |
|---|---|---|---|---|
| **Western Cape** | 1 | Murraysburg | 0,32 (0,0112) | 2 065 |
| | 2 | Uniondale | 0,31 (0,0085) | 2 361 |
| | 3 | Prince Albert | 0,28 (0,0084) | 2 417 |
| | 4 | Calitzdorp | 0,28 (0,0090) | 2 640 |
| | 5 | Laingsburg | 0,26 (0,0098) | 2 470 |
| | 6 | Ladismith | 0,26 (0,0064) | 2 589 |
| | 7 | Vredendal | 0,25 (0,0041) | 2 955 |
| | 8 | Robertson | 0,24 (0,0040) | 2 735 |
| | 9 | Swellendam | 0,23 (0,0040) | 3 024 |
| | 10 | Tulbagh | 0,23 (0,0045) | 2 470 |
| | 11 | Ceres | 0,23 (0,0037) | 2 793 |
| | 12 | Clanwilliam | 0,22 (0,0045) | 2 796 |
| | 13 | Heidelberg | 0,22 (0,0067) | 2 877 |
| | 14 | Van Rhynsdorp | 0,22 (0,0060) | 3 000 |
| | 15 | Montagu | 0,20 (0,0048) | 2 939 |
| | 16 | Caledon | 0,20 (0,0028) | 2 841 |
| | 17 | Piketberg | 0,20 (0,0036) | 3 156 |
| | 18 | Worcester | 0,19 (0,0022) | 3 213 |
| | 19 | Moorreesburg | 0,18 (0,0055) | 3 425 |
| | 20 | Mitchells Plain | 0,18 (0,0018) | 2 254 |
| | 21 | Riversdal | 0,18 (0,0039) | 3 405 |
| | 22 | Knysna | 0,17 (0,0028) | 3 317 |
| | 23 | Beaufort West | 0,16 (0,0039) | 3 008 |
| | 24 | Bredasdorp | 0,16 (0,0039) | 3 567 |
| | 25 | Oudtshoorn | 0,15 (0,0026) | 3 472 |
| | 26 | Paarl | 0,15 (0,0021) | 3 391 |
| | 27 | Wellington | 0,14 (0,0031) | 3 583 |
| | 28 | Malmesbury | 0,14 (0,0021) | 3 297 |
| | 29 | George | 0,13 (0,0021) | 3 903 |
| | 30 | Hermanus | 0,12 (0,0030) | 4 052 |
| | 31 | Stellenbosch | 0,11 (0,0022) | 3 930 |
| | 32 | Mossel Bay | 0,11 (0,0026) | 3 714 |
| | 33 | Hopefield | 0,10 (0,0053) | 3 898 |
| | 34 | Vredenburg | 0,10 (0,0029) | 3 764 |
| | 35 | Kuils River | 0,10 (0,0014) | 4 305 |
| | 36 | Goodwood | 0,09 (0,0014) | 4 253 |
| | 37 | Strand | 0,08 (0,0021) | 4 395 |
| | 38 | Somerset West | 0,07 (0,0018) | 5 104 |
| | 39 | Simon's Town | 0,06 (0,0016) | 5 159 |
| | 40 | Wynberg | 0,05 (0,0011) | 4 476 |
| | 41 | Cape | 0,04 (0,0010) | 5 071 |
| | 42 | Bellville | 0,04 (0,0010) | 5 878 |

**The poverty line is R800 or less per household. Standard errors in parentheses.**
*** The numbers in this column refer to the magisterial districts on Map 12.**

**Map 12**

## Distribution of poverty based on monthly expenditure in Western Cape by magisterial district




Household expenditure poverty line @ R800 or less per month

- Less than 20%: Least poor
- 20% - 39%
- 40% - 59%
- 60% - 80%: Poorest

Key: See Appendix Table 3 (Western Cape)
Source: Statistics South Africa & World Bank

# Chapter 3

# Key baseline statistics for poverty measurement

Ros Hirschowitz, Mark Orkin and Piet Alberts*

## Introduction

Statistical measurement of poverty, and ways ofmonitoring its alleviation, are relatively new fields of endeavour in South Africa. Prior to the first democratic elections in April 1994, nation-wide integrated statistics of this nature were not officially collected.[1]

In 1994, however, under the new government representing all the people of the country, Statistics South Africa (Stats SA),[2] the national statistics agency, conducted its first nation-wide October household survey (OHS), including the former 'TBVC (Transkei-Bophuthatswana-Venda-Ciskei) states'. It covered a wide range of socio-economic issues related to poverty, including levels of education and employment status among individuals and access to services such as clean water and electricity among households. This initial survey was followed by similar surveys in 1995, 1996, 1997, 1998 and 1999.

One dimension of poverty, i.e. money-related poverty, was more thoroughly measured in 1995 compared with other years, when the annual OHS was linked to the five-yearly income and expenditure survey (IES). The same households were separately visited for the 1995 OHS and IES, with the IES visits taking place shortly after the OHS. The linkage of data from the two surveys allowed for the development of a large data base by means of which to compare household income and expenditurewith living conditions and life circumstances.

The questionnaire for the 1996 population census included several socio-economic items similar to the OHSs. This allow SouthAfrica's new democracy to obtain its first set of baseline statistics on the life circumstances of all SouthAfricans down to the level of small areas.During Census '96, under the motto 'count us in', 100 000 fieldworkers employed by Stats SA traversed the cities, towns, townships, informal settlements, villages, farms and remote rural communities of the country. Their task was to record the number of people in SouthAfrica at the time, and to obtain a picture of what life was like in each part of the country, from small groupings of land of approximately 150 households called enumeration areas, upwards to provincial and national levels. In November 1996, shortly after enumeration, a post-enumeration survey (PES) was conducted in order to estimate and adjust for the extent of persons and/or households which are unavoidably missed in any census.[3]

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* The authors wish to thankProfessor D Stoker forhis statistical advice.

[1] The World Bank and the South African Labour and Development Research Unit (SALDRU) of the University of Cape Town undertook a national household-based poverty study in 1993, using the internationally applied World Bank methodology. In 1993, the first annual October household survey, conducted by the Central Statistical Service, took place, butitexcluded the former 'TBVC' states.

[2] Prior to September 1999,Statistics SouthAfrica was known as Central Statistical Service.

[3] For a more detailed discussion of the censusmethodology, see: Statistics SouthAfrica. (1998). *The people of SouthAfrica: population census 1996. The count and how itwasdone*. Report No. 03-01-17 (1996) Pretoria: Statistics SouthAfrica.

The annual October household surveys, and the IES, are cross-sectional in nature, giving a snapshot picture of the life circumstances and living conditions in South Africa at a given point in time. However, once they are all weighted to Census '96, comparisons of life circumstances across these surveys become possible, within sampling errors.

This report focuses on the findings from three of these sources, namely the 1995 OHS and its linked 1995 IES, as well as Census '96 adjusted by the PES, in relation to poverty. Moreover, the two surveys have been linked to the census in respect of expenditure, by means of imputations, allowing the expenditure detail of the former to be extended to the geographical detail of the latter.

This use of household surveys in conjunction with the population census allows us to obtain imputed poverty-related data. It also gives us a standard for subsequent poverty reports, against which to measure and monitor future change, as and when new policies are introduced to address this issue, and then implemented at community, local, district, provincial and national levels.

**Definition of poverty**

Poverty has been defined in a variety of ways both nationally and internationally. In this report, poverty is reviewed, in common with the United Nations development reports,[4] in a broader perspective than merely the extent of low income or low expenditure in the country. It is seen here as 'the denial of opportunities and choices most basic to human development to lead a long, healthy, creative life and to enjoy a decent standard of living, freedom, dignity, self-esteem and respect from others.'[5]

While household expenditure, as described below, is taken as an important component of poverty in this report, a variety of other variables are related to this expenditure level, with regard to both individuals and households: for example, type of housing, access to clean water and sanitation, education and employment.[6]

**Poverty estimates**

The monthly household expenditure categories used here were not derived from Census '96. Instead, they were imputed onto geographical areas of Census '96 from the income and expenditure survey and its linked October household survey of 1995.

In the census questionnaire, individuals were asked to indicate their income (before tax) in terms of 14 income categories. These could be indicated on equivalent scales for a weekly, monthly or annual basis. Respondents were requested to include, in their reported total, income from remittances, pensions or from the sale of home-grown produce. This general type of questioning, unavoidable in a census, probably led to under-reporting of income.

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[4] United Nations Development Programme. (1998). *UNDP poverty report, 1998: overcoming human poverty*. New York: United Nations Development Programme.

[5] *Ibid*. p.14.

[6] *Paccoud*, T. (1998). *Poverty: its statistical dimension*. Luxembourg: Eurostat.

In the IES, however, far more detailed questions were asked on the amounts from different sources of income, as well as on expenditure covering an extremely wide range of products. More precise answers could thus be obtained.

A recent study undertaken by Alderman *et al.*[7] pointed out that there was indeed a clear linear relationship between household income derived from both the 1995 OHS and Census '96, and expenditure, as measured in more detail by the IES.

- This correlation applied strongly at a national and provincial level of aggregation. But, at the lower geographical levels of disaggregation, for example at magisterial district level, it was less obvious.
- In general, the relationship between income and expenditure was less strong at the lower, poverty-related levels than it was at the higher levels.
- The relatively low correlation between income and expenditure applied particularly to the rural areas in the former homelands. These areas house some of the poorest households in the country.
- There were large differences, when using specified cut-off points, in the proportion of those who could be regarded as poor when income, rather than expenditure, categories were used.

Our main concern in this report is with these lower categories where the correlation is lowest. The Alderman *et al.* study[8] found that expenditure proved to be a more reliable measure than income in estimating economic well-being. It also aggregated up closely to the R330 billion of private consumption at the time of Census '96, as estimated by the South African Reserve Bank when calculating the gross domestic product (GDP) from the point of view of expenditure.

It was thus decided to use monthly household expenditure quintiles, inflated from October 1995 to October 1996 estimates, rather than monthly household incomes (before tax), as poverty measures in this report. The following monthly expenditure categories were used:
R0–R600; R601–R1 000; R1 001–R1 800; R1 801–R3 500; and R3 501 or more.

The use of these expenditure categories may have some unexpected outcomes.

- For example, the province with the highest proportion of households in the lowest *expenditure* category is Free State (39% of households spent R600 or less per month on goods and services at the time of Census '96). By contrast, Eastern Cape had the highest proportion of households in the lowest *income* category (32% of households had an income of R200 or less per month).
- Payment in kind, for example giving food instead of money for some work done in Free State with its large commercial agricultural sector, may partly explain this lower-than-expected expenditure pattern in this province. So may the under-estimation of the value of cash remittances in Eastern Cape, where migrant labour is relatively common.

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[7] Alderman, H. *et al.* (2000). *Combining census and survey data to construct a poverty map of South Africa*, which appears as Chapter 2 in this volume.
[8] *Ibid.* p.7.

**Imputations ofmonthly household expenditure**

*Note*. Calculation of imputed expenditure has not been adjusted to take into account rootmean square errors (RMSE).

The basic methodology used in imputing monthly expenditure values for households in the census involved linking survey and census data sets by means of prediction models, based on regression analyses,[9] as follows:

- Common questions regarding living conditions such as clean water and electricity, and life circumstances such as level of education and employment, were identified in both the 1995 OHS (linked to the IES) and Census '96.
- Regression analysis was used on the OHS/IES to establish which of the common variables best predicted the expenditure reported in the IES.
- These regression equations were then applied to those common variables found in the small geographical areas of Census '96, to yield imputed expenditures for these small areas.
- Then the expenditure-based categories of households, e.g. the lowest versus the highest quintile, could be compared regarding other life-style variables in Census '96.
- Although both the IES and OHS of 1995 were still weighted to the 1991 census, this did not substantially affect the outcome of the prediction model, since the variables were used to derive classes or categories for the imputations. The actual numbers or proportions subsequently reported derive from Census '96.
- For example, if a household was situated in a traditional rural area in Northern Province during the time of the 1996 census, and it did not have any running water or toilet facilities, an expenditure value for each household in this type of category was imputed. This imputation was taken across to the corresponding areas in Census '96, based on the 1995 IES, irrespective of the number of households in the category.

**Comparisons with other countries**

In certain other countries, for example those in Latin America,[10] income- rather than expenditure-based estimates of poverty are used. When possible, these countries make use of 'poverty lines' representing the level of income required by a household to meet the basic needs of all its members. These lines are determined on the basis of the estimated costs of a basket of staple foods, in relation to the cost of non-food basic needs. There are certain advantages, as well as disadvantages, in using this type of measure of poverty.[11] On the one hand, it allows for international comparison, on the other, the

[9] For a more detailed description of themethodology, see pp.7-8 above.
[10] Economic Commission for LatinAmerica and the Caribbean (ECLAC)(1996). *Social panorama of LatinAmerica*, p. 26.
[11] Townsend, P. (1993). *The international analysis of poverty*. London: Harvester Wheatsheaf.

concepts of basic food and non-food requirements tend to be subjective. At present this measure is not used as part of official South African statistics.[12]

## Overall results of Census '96

### The people of South Africa

On the night of 9-10 October 1996 there were 40,58 million people in South Africa. This total has been adjusted for undercount, using the PES. Table 1 indicates the size of the population in the country as a whole, and in each province, by gender. The percentages add up to 100 across the rows. For example in the Eastern Cape row, 46,1% (third column from the left) were males, and 53,9% (fifth column) were females, adding up to 100,0% (final column on the right).

- Among the people in South Africa counted on census night, 77% classified themselves as African, while 11% classified themselves as white, and 9% as coloured. The Indian/Asian population was smallest at 3%, and 1% did not specify their group, or else classified themselves in some other way, for example as Griquas.[13]
- More than half the population (54%) lived in urban areas at the time of the census, but this milieu varied by population group.
- Among the 31,1 million Africans who were in South Africa in October 1996, 13,5 million (43%) were living in urban areas.
- Among the 3,6 million coloureds, 3,0 million (83%) were living in urban areas.
- As many as 1,02 million of the Indian population of 1,05 million (97%) were living in urban areas.
- Among the white population group, 4,0 million (91%) of the total of 4,4 million people were urbanised.[14]

[12] At present Stats SA does not have data on the cost of a basket of food and other products in non-urban areas on which to base the calculation of poverty lines. But it has made significant advances towards achieving this in recent years. For example, in 1995, by means of the *income and expenditure survey,* it collected data on expenditure patterns by households on food items and other goods and services on a country-wide basis for the first time, including rural areas and small towns. This information was collected in preparing a consumer price index (CPI) for all parts of the country. But Stats SA has not as yet, due to financial restrictions, been able to collect prices from shops and other outlets in non-urban areas to calculate a rural CPI. Once Stats SA has collected information on prices from rural outlets, it will be possible to calculate poverty lines for households living under different circumstances in all parts of the country.

[13] *Population group* describes the racial classification of a particular group of South African citizens. The previous government used this type of classification to divide the South African population into distinct groupings on which to base apartheid policies. It is important for Stats SA to continue to use this classification wherever possible, since it clearly indicates the effects of discrimination of the past, and permits monitoring of policies to alleviate discrimination. In the past, population group was based on a legal definition, but it is now based on self-perceptions and self-classification.

[14] An *urban* area is classified as such if it has been legally proclaimed as being urban. These include small and larger towns, cities and metropolitan areas. All other areas are classified as *non-urban* or *rural,* including commercial farms, small settlements, rural villages, and other areas, which are further away from towns and cities. A *semi-urban* area is not part of a legally proclaimed urban area, but adjoins it. *Semi-urban* areas have been *included* with *non-urban* areas.

Table 1: The population of South Africa by province and gender

| Province | Male | | Female | | Total | |
|---|---|---|---|---|---|---|
| | N* | %** | N* | %** | N* | % |
| **Eastern Cape** | 2 908 056 | 46,1 | 3 394 469 | 53,9 | 6 302 525 | 100,0 |
| **Free State** | 1 298 348 | 49,3 | 1 335 156 | 50,7 | 2 633 504 | 100,0 |
| **Gauteng** | 3 750 845 | 51,0 | 3 597 578 | 49,0 | 7 348 423 | 100,0 |
| **KwaZulu-Natal** | 3 950 527 | 46,9 | 4 466 493 | 53,1 | 8 417 021 | 100,0 |
| **Mpumalanga** | 1 362 028 | 48,6 | 1 438 683 | 51,4 | 2 800 711 | 100,0 |
| **Northern Cape** | 412 681 | 49,1 | 427 639 | 50,9 | 840 321 | 100,0 |
| **Northern Province** | 2 253 072 | 45,7 | 2 676 296 | 54,3 | 4 929 368 | 100,0 |
| **North West** | 1 649 835 | 49,2 | 1 704 990 | 50,8 | 3 354 825 | 100,0 |
| **Western Cape** | 1 935 494 | 48,9 | 2 021 381 | 51,1 | 3 956 875 | 100,0 |
| **South Africa** | **19 520 887** | **48,1** | **21 062 685** | **51,9** | **40 583 573** | **100,0** |

*** All numbers given in this report are adjusted by the PES and rounded to whole numbers. The totals may therefore differ slightly.**

**** The percentages are rounded to the first decimal place, therefore they may not always add up to exactly 100.**

## The households of SouthAfrica

On the night of 9-10 October 1996 there were 9,1 million households in South Africa, excluding institutions such as tourist hotels, prisons, boarding schools and homes for the aged. This total has been adjusted for undercount, using the PES, as indicated in Table 2. The percentages in this table add up to 100 down the columns. For example, column 3 shows that Eastern Cape had 9,9% of all urban households, while Free State had 8,4%.

- The province with most households overall (last column on the right) was Gauteng with 2,0 million, and thenKwaZulu-Natal with 1,7million.
- Although there were more people in KwaZulu-Natal compared to Gauteng, the average number of people per household in KwaZulu-Natal was larger than in Gauteng, thus giving fewer households in the former province compared to the latter.
- The province with fewest households, i.e. about 187 000, wasNorthern Cape.
- Table 2 also shows that 35% of all urban households in the country were found in Gauteng, with KwaZulu-Natal and Western Cape each containing 16% of all households in urban areas.
- Northern Province has the largest percentage of households living in non-urban areas (24%), followed by Eastern Cape and KwaZulu-Natal (each with 22%) of the total of non-urban households.

Table 2: South African households in urban and non-urban areas by province

| Province | Urban | | Non-urban | | Total *** | |
|---|---|---|---|---|---|---|
| | N* | %** | N* | %** | N* | %** |
| **Eastern Cape** | 538 220 | 9,9 | 794 114 | 21,9 | 1 332 334 | 14,7 |
| **Free State** | 453 044 | 8,4 | 171 968 | 4,7 | 625 013 | 6,9 |
| **Gauteng** | 1 898 158 | 35,0 | 66 013 | 1,8 | 1 964 161 | 21,7 |
| **KwaZulu-Natal** | 874 108 | 16,1 | 786 828 | 21,7 | 1 660 936 | 18,3 |
| **Mpumalanga** | 260 290 | 4,8 | 343 718 | 9,5 | 604 012 | 6,7 |
| **Northern Cape** | 127 508 | 2,3 | 59 460 | 1,6 | 186 968 | 2,1 |
| **Northern Province** | 124 734 | 2,3 | 857 710 | 23,6 | 982 444 | 10,8 |
| **North West** | 277 702 | 5,1 | 442 934 | 12,2 | 720 640 | 8,0 |
| **Western Cape** | 873 067 | 16,1 | 109 945 | 3,0 | 983 015 | 10,9 |
| **Total** | **5 426 874** | **100,0** | **3 632 697** | **100,0** | **9 059 570** | **100,0** |

*** All numbers given in this report are adjusted by the PES and rounded to whole numbers. The totals may therefore differ slightly.**
**** The percentages are rounded to the first decimal place, therefore they may not always add up to exactly 100.**
***** Excluding institutions.**

## Poor households in SouthAfrica

In this section, the distribution of the derivedmonthly household expenditure is discussed by gender, urban or non-urban place of residence and population group. This is followed by a description of the life circumstances and living conditions of individuals and households in each expenditure category. The focus is on those in the lowest expenditure categories.

### Monthly household expenditure by gender of household head and province

Table 3 indicates household expenditure, as imputed for Census '96, from the 1995 IES, in each province and for the country as a whole, by gender of the household head. The table excludes institutions.

The percentages in the table add up to 100 across the rows. For example, in the first row of the first set of rows labelled Eastern Cape, the third column shows that there were 665 000 households headed by a male. The fourth column shows that 29,0% of these male-headed households had a monthly expenditure of R600 or less per month. The second row of the three columns referring to Eastern Cape shows that, among the 667 000 households headed by a female in this province, 37,8% had a monthly expenditure of R600 or less. The third Eastern Cape row shows that of the 1,3 million households in the province, 33,4% spent R600 or less per month, while 35,1% spent between R600 and R1 000 per month, etc.

For the purposes of this report, households with a total expenditure of R600 or less per month (the lowest quintile) are regarded as very poor, whereas householdswith expenditures of between R601 to R1 000 (the second lowest quintile) per month were regarded as poor.

Table 3: Monthly household expenditure by province and gender of household head

| Province and gender of household head | | Total* | R0 – R600 | R601 – R1 000 | R1 001 – R1 800 | R1 801 – R3 500 | R3 501 or more | Total** |
|---|---|---|---|---|---|---|---|---|
| | | N | % | % | % | % | % | |
| **Eastern Cape** | **Male** | 665 007 | 29,0 | 30,8 | 15,6 | 11,9 | 12,7 | 100,0 |
| | **Female** | 667 341 | 37,8 | 39,5 | 13,3 | 6,8 | 2,6 | 100,0 |
| | **Total** | 1 332 348 | 33,4 | 35,1 | 14,4 | 9,4 | 7,6 | 100,0 |
| **Free State** | **Male** | 411 122 | 34,5 | 22,8 | 15,8 | 12,2 | 14,7 | 100,0 |
| | **Female** | 213 890 | 47,8 | 25,1 | 16,6 | 7,7 | 2,9 | 100,0 |
| | **Total** | 625 011 | 39,0 | 23,6 | 16,1 | 10,7 | 10,7 | 100,0 |
| **Gauteng** | **Male** | 1 394 032 | 5,2 | 13,8 | 20,2 | 22,1 | 38,7 | 100,0 |
| | **Female** | 570 136 | 8,4 | 17,7 | 24,4 | 30,2 | 19,3 | 100,0 |
| | **Total** | 1 964 168 | 6,1 | 14,9 | 21,4 | 24,4 | 33,1 | 100,0 |
| **KwaZulu-Natal** | **Male** | 1 007 409 | 12,5 | 21,6 | 24,6 | 18,9 | 22,4 | 100,0 |
| | **Female** | 653 525 | 13,9 | 35,8 | 29,4 | 14,6 | 6,3 | 100,0 |
| | **Total** | 1 660 934 | 13,1 | 27,2 | 26,5 | 17,2 | 16,0 | 100,0 |
| **Mpumalanga** | **Male** | 388 397 | 13,4 | 21,4 | 28,6 | 20,8 | 15,7 | 100,0 |
| | **Female** | 215 613 | 12,9 | 28,3 | 40,2 | 15,4 | 3,2 | 100,0 |
| | **Total** | 604 010 | 13,2 | 23,9 | 32,7 | 18,9 | 11,3 | 100,0 |
| **Northern Cape** | **Male** | 132 288 | 23,3 | 22,0 | 21,1 | 14,3 | 19,3 | 100,0 |
| | **Female** | 54 696 | 18,0 | 30,1 | 30,4 | 15,9 | 5,5 | 100,0 |
| | **Total** | 186 984 | 21,7 | 24,4 | 23,8 | 14,8 | 15,3 | 100,0 |
| **Northern Province** | **Male** | 470 055 | 15,4 | 28,6 | 32,7 | 13,4 | 10,0 | 100,0 |
| | **Female** | 512 402 | 15,8 | 43,8 | 32,5 | 6,3 | 1,6 | 100,0 |
| | **Total** | 982 457 | 15,6 | 36,5 | 32,6 | 9,7 | 5,6 | 100,0 |
| **North West** | **Male** | 452 040 | 19,7 | 27,4 | 22,9 | 14,5 | 15,5 | 100,0 |
| | **Female** | 268 604 | 20,3 | 38,4 | 24,8 | 11,7 | 4,8 | 100,0 |
| | **Total** | 720 643 | 19,9 | 31,5 | 23,6 | 13,5 | 11,5 | 100,0 |
| **Western Cape** | **Male** | 710 424 | 4,8 | 10,8 | 20,2 | 27,4 | 36,8 | 100,0 |
| | **Female** | 272 591 | 5,2 | 13,1 | 28,4 | 34,6 | 18,6 | 100,0 |
| | **Total** | 983 015 | 4,9 | 11,4 | 22,5 | 29,4 | 31,7 | 100,0 |
| **Total** | **Male** | **5 630 774** | **14,4** | **20,5** | **22,0** | **18,7** | **24,4** | **100,0** |
| | **Female** | **3 428 797** | **19,9** | **31,9** | **25,4** | **15,4** | **7,5** | **100,0** |
| | **Total** | **9 059 571** | **16,5** | **24,8** | **23,3** | **17,4** | **18,0** | **100,0** |

*** All totals exclude unspecified categories. Institutions are also excluded.**
**** Due to rounding, percentages do not always add up to exactly 100.**

The table shows that:

- Overall, 17% of households spent R600 or less per month at the time of Census '96, while 25% spent between R601 and R1 000. A further 23% of households spent between R1 001 and R1 800 per month, while 17% spent between R1 801 and R3 500, and 18% spent R3501 or more per month.[15]

[15] These cut-off points can be compared with those shown in the report: Ministry of the Office of the President: Reconstruction and Development Programme (1995). *Key indicators of poverty in South Africa.* Pretoria: Office of the President.

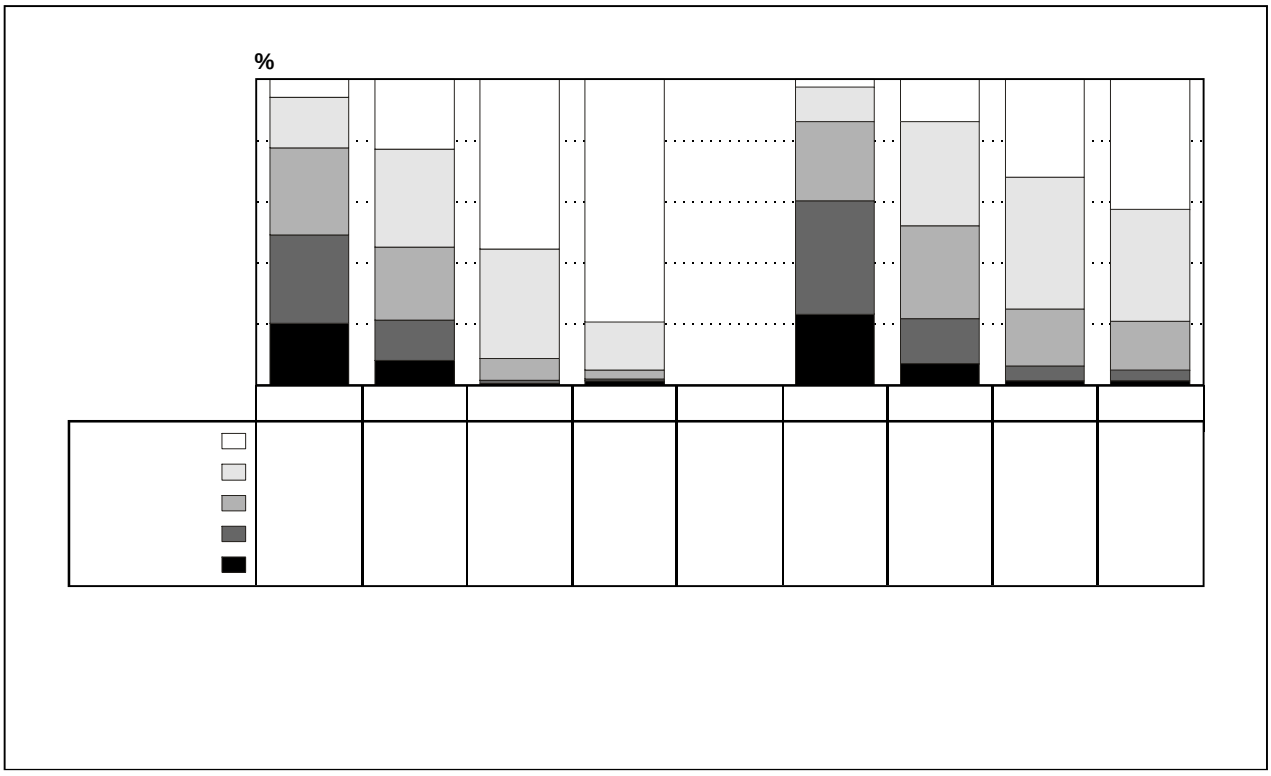



**Figure 1: Monthly household expenditure by population group and gender of household head**

- In general, female-headed households tended to spend less per month than male-headed ones. For example, throughout the country, 20% of female-headed households spent R600 or less per month at the time of Census '96, as against 14% of male-headed households.
- Household expenditure varied by province. Free State had the largest proportion of households in the lowest expenditure category of R600 or less per month (39%), followed by Eastern Cape (33%), Northern Cape (22%), North West (20%) and Northern Province (16%).
- Mpumalanga and KwaZulu-Natal had 13% in the lowest expenditure category, while Gauteng had 6% and Western Cape 5%.
- Male-headed households in Gauteng formed the highest proportion in the top expenditure category of R3 501 or more per month (39%) at the time of Census '96. This was followed by male-headed households in Western Cape (37%), then KwaZulu-Natal (22%), Northern Cape (19%), Mpumalanga and North West (16% each), Free State (15%), Eastern Cape (13%) and Northern Province (10%).

**Monthly household expenditure by population group and gender of household head**

Figure 1 indicates the monthly household expenditure distribution at the time of Census '96, by population group and gender of the household head. It clearly shows that African-headed households generally, and female-headed ones in particular, tended to spend less than the other households.

- For example, 23% of African female-headed households were found in the lowest expenditure category, as against 7% of coloured, 1% of Indian and 2% of white female-headed households.
- Among male-headed households, 20% of African, 8% of coloured, 1% of Indian and 1% of white male-headed households fell into this lowest expenditure category.
- On the other hand, the highest expenditure category contained 79% of white male-headed households, and 55% of Indian, 23% of coloured, and only 6% of African male-headed households.
- Among female-headed households, 43% of white households were in the highest expenditure category, as against 32% of Indian, 14% of coloured and 3% of African female-headed households.

**Monthly household expenditure by urban/non-urban place of residence and by province**

Table 4 indicates household expenditure, as imputed for Census '96, from the 1995 OHS and IES, in each province and for the country as a whole, by urban or non-urban place of residence.

In common with Table 3, the percentages in the table add up to 100 across the rows. For example, in the first row of the second set of rows labelled Free State, the third column shows that there were 454 000 households in urban areas. The fourth column shows that 29,5% of these urban households had a monthly expenditure of R600 or less per month, while the fifth column shows that 24,4% were spending between R601 and R1 000 per month, etc.

The table shows that:

- In general, households in non-urban areas tended to spend less money per month compared with those households in urban areas. For example, throughout the country, 25% of non-urban households spent R600 or less per month at the time of Census '96, as against 11% of urban households.
- In urban areas, 28% of households were in the top expenditure category, as against only 4% in non-urban areas.
- Household expenditure in urban and non-urban areas varied by province. For example, 64% of non-urban and 30% of urban households in Free State were in the lowest expenditure category, but in Western Cape, 15% of non-urban and 4% of urban households were in this category.
- As many as 34% of urban households in the Western Cape, and 33% of urban households in Gauteng were in the top expenditure category of R3 501 or more per month at the time of Census '96. Urban parts of KwaZulu-Natal had 29% of households in this top expenditure category, as against 25% in urban Northern Province, 24% in urban North West, 21% in urban Mpumalanga, 17% in urban Eastern and Northern Cape and 13% in urban parts of Free State.

Table 4: Monthly household expenditure in urban and non-urban areas in each province

| Province and urban non-urban place of residence | | Total* | R0 – R600 | R601 – R1 000 | R1 001 – R1 800 | R1 801 – R3 500 | R3 501 or more | Total** |
|---|---|---|---|---|---|---|---|---|
| | | N | % | % | % | % | % | % |
| **Eastern Cape** | **Urban** | 539 349 | 20,6 | 20,3 | 22,4 | 19,9 | 16,8 | 100,0 |
| | **Non-urban** | 794 513 | 42,2 | 45,2 | 9,0 | 2,2 | 1,4 | 100,0 |
| | **Total** | 1 333 862 | 33,5 | 35,1 | 14,4 | 9,4 | 7,6 | 100,0 |
| **Free State** | **Urban** | 453 719 | 29,5 | 24,4 | 19,9 | 13,3 | 12,8 | 100,0 |
| | **Non-urban** | 172 615 | 64,4 | 21,1 | 5,9 | 3,6 | 4,9 | 100,0 |
| | **Total** | 626 333 | 39,1 | 23,5 | 16,1 | 10,6 | 10,6 | 100,0 |
| **Gauteng** | **Urban** | 1 900 887 | 5,7 | 14,5 | 21,6 | 24,9 | 33,4 | 100,0 |
| | **Non-urban** | 66 711 | 22,8 | 25,9 | 15,7 | 11,0 | 24,6 | 100,0 |
| | **Total** | 1 967 598 | 6,3 | 14,9 | 21,4 | 24,4 | 33,1 | 100,0 |
| **KwaZulu-Natal** | **Urban** | 876 237 | 12,0 | 13,2 | 18,5 | 27,6 | 28,7 | 100,0 |
| | **Non-urban** | 789 068 | 14,7 | 42,5 | 35,3 | 5,7 | 1,9 | 100,0 |
| | **Total** | 1 665 304 | 13,3 | 27,1 | 26,4 | 17,2 | 16,0 | 100,0 |
| **Mpumalanga** | **Urban** | 260 623 | 11,4 | 17,8 | 24,9 | 24,9 | 21,0 | 100,0 |
| | **Non-urban** | 344 485 | 14,9 | 28,4 | 38,6 | 14,2 | 3,9 | 100,0 |
| | **Total** | 605 107 | 13,4 | 23,8 | 32,7 | 18,8 | 11,2 | 100,0 |
| **Northern Cape** | **Urban** | 127 913 | 11,9 | 24,3 | 29,4 | 17,9 | 16,6 | 100,0 |
| | **Non-urban** | 59 686 | 43,6 | 24,4 | 11,7 | 7,9 | 12,3 | 100,0 |
| | **Total** | 187 599 | 22,0 | 24,3 | 23,8 | 14,7 | 15,2 | 100,0 |
| **Northern Province** | **Urban** | 125 173 | 14,0 | 15,6 | 21,8 | 23,7 | 24,9 | 100,0 |
| | **Non-urban** | 859 285 | 16,0 | 39,5 | 34,1 | 7,6 | 2,8 | 100,0 |
| | **Total** | 984 458 | 15,8 | 36,4 | 32,5 | 9,7 | 5,6 | 100,0 |
| **North West** | **Urban** | 278 035 | 10,2 | 17,6 | 23,9 | 24,6 | 23,7 | 100,0 |
| | **Non-urban** | 443 617 | 26,1 | 40,1 | 23,3 | 6,5 | 3,9 | 100,0 |
| | **Total** | 721 652 | 20,0 | 31,4 | 23,6 | 13,5 | 11,5 | 100,0 |
| **Western Cape** | **Urban** | 875 076 | 3,9 | 9,1 | 21,5 | 31,8 | 33,8 | 100,0 |
| | **Non-urban** | 110 413 | 15,3 | 30,0 | 29,9 | 9,9 | 14,9 | 100,0 |
| | **Total** | 985 489 | 5,2 | 11,4 | 22,4 | 29,3 | 31,7 | 100,0 |
| **Total** | **Urban** | **5 437 011** | **10,7** | **15,4** | **21,5** | **24,7** | **27,6** | **100,0** |
| | **Non-urban** | **3 640 392** | **25,4** | **38,8** | **25,8** | **6,4** | **3,6** | **100,0** |
| | **Total** | **9 077 403** | **16,6** | **24,8** | **23,2** | **17,4** | **18,0** | **100,0** |

*** All totals exclude unspecified categories. Institutions are also excluded.**
**** Due to rounding, percentages do not add up to exactly 100.**

**Monthly household expenditure by population group and urban/non-urban place of residence**

Table 5 indicates household expenditure for the country as a whole by population group and urban or non-urban place of residence. It excludes institutions.

Table 5: Monthly household expenditure by population group and urban/non-urban place of residence

| Population group and place of residence | | Total* | R0 – R600 | R601 – R1 000 | R1 001 – R1 800 | R1 801 – R3 500 | R3 501 ormore | Total** |
|---|---|---|---|---|---|---|---|---|
| | | N | % | % | % | % | % | % |
| **African** | **Urban** | 3 190 514 | 16,6 | 23,8 | 28,5 | 23,1 | 8,1 | 100,0 |
| | **Non-urban** | 3 343 484 | 26,2 | 40,6 | 26,6 | 5,7 | 0,9 | 100,0 |
| | **Total** | 6 533 998 | 21,5 | 32,4 | 27,5 | 14,2 | 4,4 | 100,0 |
| **Coloured** | **Urban** | 604 948 | 3,6 | 8,8 | 25,1 | 38,2 | 24,3 | 100,0 |
| | **Non-urban** | 136 258 | 26,1 | 34,9 | 28,9 | 8,1 | 2,0 | 100,0 |
| | **Total** | 741 206 | 7,8 | 13,6 | 25,8 | 32,7 | 20,2 | 100,0 |
| **Indian** | **Urban** | 237 506 | 0,7 | 1,6 | 9,1 | 37,0 | 51,7 | 100,0 |
| | **Non-urban** | 6 133 | 5,3 | 7,6 | 19,1 | 39,1 | 28,9 | 100,0 |
| | **Total** | 243 639 | 0,8 | 1,7 | 9,3 | 37,0 | 51,1 | 100.0 |
| **White** | **Urban** | 1 348 836 | 1,4 | 1,3 | 5,9 | 20,4 | 71,1 | 100,0 |
| | **Non-urban** | 133 655 | 1,9 | 1,5 | 4,8 | 20,4 | 71,3 | 100,0 |
| | **Total** | 1 482 492 | 1,4 | 1,3 | 5,8 | 20,4 | 71,1 | 100,0 |
| **Total** | **Urban** | **5 381 805** | **10,6** | **15,5** | **21,6** | **24,7** | **27,6** | **100,0** |
| | **Non-urban** | **3 619 530** | **25,3** | **38,9** | **25,9** | **6,4** | **3,6** | **100,0** |
| | **Total** | **9 001 335** | **16,5** | **24,9** | **23,3** | **17,4** | **18,0** | **100,0** |

*** All totals exclude unspecified categories. Institutions are also excluded.**
**** Due to rounding, percentages do not add up to exactly 100.**

In common with Tables 3 and 4, the percentages in the table add up to 100 across the rows. It shows the following:

- Non-urban areas contain predominantly African households. There were as many as 3,3 million African households in non-urban areas at the time of Census '96, as against 136 000 coloured, 134 000 white and 6 000 Indian households in non-urban areas.
- In general, the African and coloured households in non-urban areas tended to spend far less than the Indian or white ones in the same type of area. For example, 26% of both African and coloured households in non-urban areas spent R600 or less per month at the time of Census '96, compared with 5% of Indian and 2% of white households in these areas.
- On the other hand, only 1% of African and 2% of coloured households in non-urban areas spent R3 501 or more per month, as against 29% of Indian and 71% of white households in these non-urban areas.
- Those living in urban areas tended to spend more money per month than those living in non-urban areas. For example, 28% of all households in urban areas spent R3 501 or more, as against only 4% in non-urban areas.

**Monthly household expenditure by gender and urban/non-urban place of residence**

Regarding monthly expenditure and their relation to living in an urban or non-urban milieu, Figure 2 shows that non-urban households tend to be noticeably poorer than urban ones. The relationship between gender and poverty, although clear, is less stark than the urban/non-urban divide.

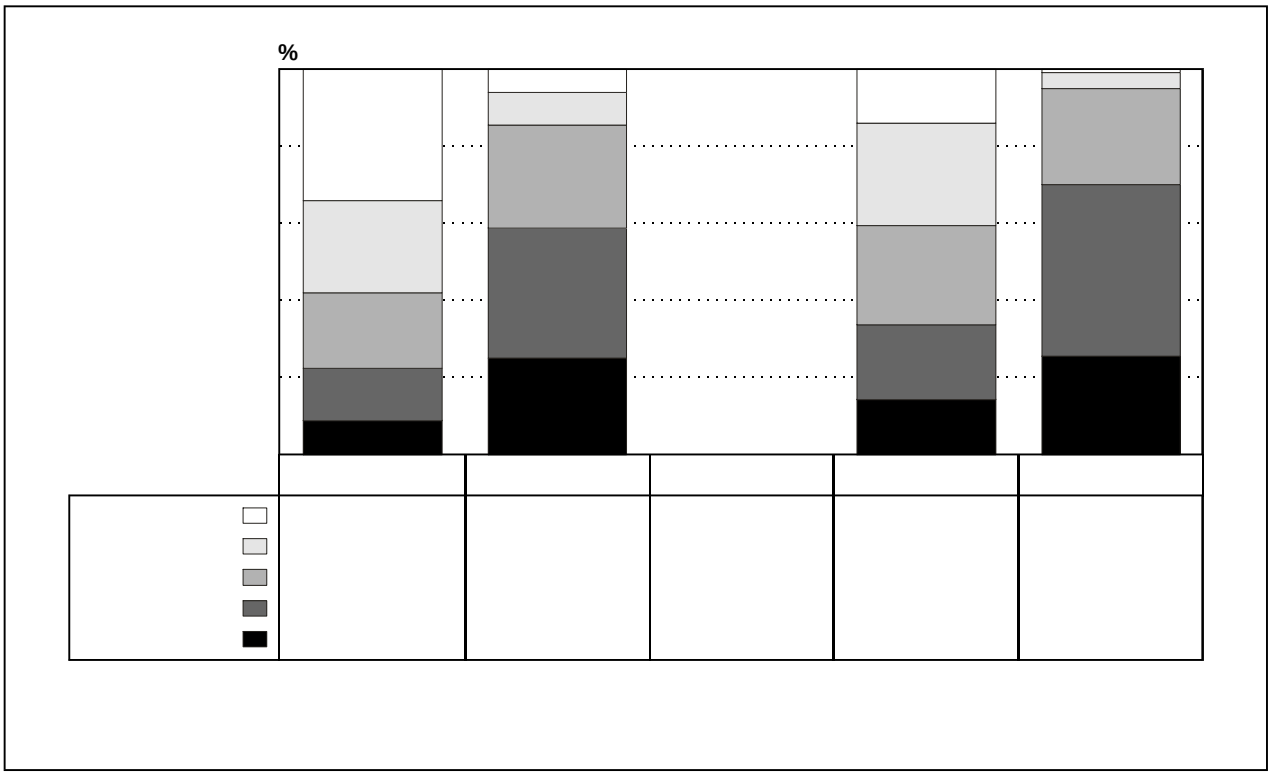



**Figure 2: Monthly household expenditure by urban or non-urban place of residence and gender of household head**

The figure shows that:

- Approximately a quarter of bothmale-(25%)andfemale-headed (26%) households in non-urban areas were found in the lowest expenditure category.
- In urban areas, however, only 9% of male-headed households were in the lowest expenditure category, as against 14% of female-headed households.
- In non-urban areas, only 6% of male-headed and 1% of female-headed households were in the highest expenditure category.
- In urban areas, however, 34% of male-headed, as against 14% of female-headed households were in the highest expenditure category.

# Living conditions of the poor in South Africa

Poor living conditions were characteristic of a large number of the approximately nine million South African households found in the country on census night.

- Regarding type of dwelling, about one in every six (18%) households were living in traditional dwellings, and another one in every six (17%) were living in shacks.
- As many as 17% of households were living in one room or else were sharing a room with another household, while 15% were living in two rooms, and 14% in three. Altogether 46% of households were living in three or fewer rooms at the time of Census '96. These rooms include kitchens, but exclude bathrooms.
- As far as access to services is concerned, electricity for lighting was available to 58% of households, while 29% were still using candles, and 13% paraffin.
- For cooking, 23% of households were using wood, another 22% were using paraffin, and 3% were using coal.
- Fewer than half of South African households (45%) had a tap inside the dwelling.
- As many as 32% of households were using a pit latrine as a toilet, while 12% did not have any toilet facilities.

### *Poverty and living conditions*

As we shall see below, households with low expenditures were less likely to have access to adequate housing or to infrastructure or services, compared to those with higher expenditures. But this pattern varied by urban or non-urban place of residence and also by population group. The vast majority of households with white or Indian heads had access to formal housing, as well as to services such as electricity and clean water. This applied even to those in the lowest expenditure categories. Among African-headed and coloured-headed households, however, access to formal housing, or to infrastructure, was directly related to expenditure category.

### *Poverty and type of dwelling*

A larger proportion of African-headed households generally, and African households in the low expenditure categories in particular, tended to live in traditional or informal dwellings, compared with households headed by other population groups, as indicated in Table 6.

The percentages in Table 6 again add up to 100 across the rows. For example, in the first row of the first set of six rows labelled African, the third column shows that there were 1,375 million households in the monthly expenditure category of R600 or less. The fourth column shows that 29,9% of African households in this lowest expenditure category lived in formal housing, such as a brick house or a flat in a block of flats. The fifth column indicates that 36,9% of African households in this lowest expenditure category lived in traditional dwellings, while 29,3% lived in informal dwellings or shacks, and so on.

Table 6: Access to housing by monthly household expenditure and population group of household head

| Population group and monthly expenditure | | Total* | Formal | Traditional | Informal | Room/ flatlet | Other | Total** |
|---|---|---|---|---|---|---|---|---|
| | | N | % | % | % | % | % | % |
| **African** | **R0 – R600** | 1 375 813 | 29,9 | 36,9 | 29,3 | 2,9 | 0,9 | 100,0 |
| | **R601 – R1 000** | 2 099 595 | 37,0 | 37,1 | 24,0 | 1,6 | 0,3 | 100,0 |
| | **R1 001 – R1 800** | 1 782 329 | 60,1 | 16,7 | 21,7 | 1,3 | 0,2 | 100,0 |
| | **R1 801 – R3 500** | 920 556 | 86,4 | 2,9 | 9,6 | 0,9 | 0,2 | 100,0 |
| | **R3 501 or more** | 285 756 | 96,8 | 0,7 | 1,5 | 0,7 | 0,2 | 100,0 |
| | **Total** | 6 464 049 | 51,5 | 24,9 | 21,5 | 1,7 | 0,4 | 100,0 |
| **Coloured** | **R0 – R600** | 56 060 | 69,5 | 5,8 | 18,5 | 3,4 | 2,8 | 100,0 |
| | **R601 – R1 000** | 100 017 | 74,2 | 4,2 | 17,7 | 2,8 | 1,1 | 100,0 |
| | **R1 001 – R1 800** | 189 457 | 85,3 | 1,9 | 10,5 | 1,8 | 0,5 | 100,0 |
| | **R1 801 – R3 500** | 241 148 | 94,1 | 0,8 | 3,6 | 1,3 | 0,2 | 100,0 |
| | **R3 501 or more** | 148 646 | 97,9 | 0,6 | 0,6 | 0,7 | 0,2 | 100,0 |
| | **Total** | 735 327 | 88,0 | 1,9 | 7,8 | 1,6 | 0,6 | 100,0 |
| **Indian** | **R0 – R600** | 1 480 | 66,2 | 9,9 | 10,6 | 10,7 | 2,5 | 100,0 |
| | **R601 – R1 000** | 4 198 | 77,2 | 6,1 | 7,6 | 7,9 | 1,3 | 100,0 |
| | **R1 001 – R1 800** | 22 549 | 89,7 | 1,4 | 3,4 | 5,0 | 0,4 | 100,0 |
| | **R1 801 – R3 500** | 89 827 | 97,5 | 0,4 | 0,6 | 1,4 | 0,1 | 100,0 |
| | **R3 501 or more** | 124 112 | 99,4 | 0,2 | 0,1 | 0,3 | 0,1 | 100,0 |
| | **Total** | 242 167 | 97,2 | 0,5 | 0,8 | 1,3 | 0,1 | 100,0 |
| **White** | **R0 – R600** | 15 967 | 85,7 | 2,0 | 1,0 | 8,5 | 2,8 | 100,0 |
| | **R601 – R1 000** | 19 337 | 83,2 | 1,1 | 1,1 | 11,7 | 2,9 | 100,0 |
| | **R1 001 – R1 800** | 84 585 | 93,8 | 0,6 | 0,4 | 3,9 | 1,1 | 100,0 |
| | **R1 801 – R3 500** | 300 003 | 97,5 | 0,6 | 0,2 | 1,3 | 0,5 | 100,0 |
| | **R3 501 or more** | 1 050 189 | 98,6 | 0,7 | 0,1 | 0,4 | 0,1 | 100,0 |
| | **Total** | 1 470 080 | 97,8 | 0,7 | 0,1 | 1,0 | 0,3 | 100,0 |
| **Total** | **R0 – R600** | **1 449 320** | **32,1** | **35,3** | **28,6** | **3,0** | **1,0** | **100,0** |
| | **R601 – R1 000** | **2 223 147** | **39,1** | **35,2** | **23,5** | **1,7** | **0,4** | **100,0** |
| | **R1 001 – R1 800** | **2 078 920** | **64,1** | **14,5** | **19,6** | **1,5** | **0,3** | **100,0** |
| | **R1 801 – R3 500** | **1 551 534** | **90,4** | **2,0** | **6,3** | **1,1** | **0,2** | **100,0** |
| | **R3 501 or more** | **1 608 703** | **98,3** | **0,7** | **0,4** | **0,5** | **0,1** | **100,0** |
| | **Total** | **8 911 623** | **63,4** | **18,4** | **16,2** | **1,5** | **0,4** | **100,0** |

*** All totals exclude unspecified categories. Institutions are also excluded.**
**** Due to rounding, percentages do not add up to exactly 100.**

The table shows that:

- Across all population groups, as shown at the bottom of the table, amongst those households spending R600 or less per month, 32% were living in formal housing. This proportion rose to 98% amongst those households spending R3501 or more per month.
- Within each expenditure category, African households were less likely to have access to formal housing, compared with the other population groups. For example, in the expenditure category R601–R1 000, 37% of African households lived in formal dwellings, as against 74% of coloured, 77% of Indian and 83% of white households in this expenditure category.
- Among African households, those in the two lowest expenditure groups tended to live in traditional dwellings (37% in both the lowest and the second lowest categories) or informal (29% in the lowest and 24% in the second lowest categories). As expenditure increased, the higher the expenditure, the higher the proportion of households living in formal dwellings.

**Poverty and access to infrastructure and services**

Table 7 indicates the extent of access which households had to various types of infrastructure and services, for example, electricity for lighting, a tap inside the dwelling or a telephone inside the dwelling or a cellular telephone.

This table is read differently from the previous tables. Each percentage stands on its own as a percentage for that particular variable. For example, regarding energy source for lighting, 14,8% of those with monthly expenditures of R600 or less had electricity for lighting. The remainder, i.e. 85%, not shown in the table, used candles, paraffin, gas or other energy sources.

The table shows the following:

- Fewer than half of the households in the country (44%) had a tap inside the dwelling, and only half of the households (50%) had a flush or chemical toilet.
- Telephones in the dwelling, or cellular telephones, were generally rather uncommon. Overall, only 29% of households had access to this service.
- Access to infrastructure or services varied by monthly household income. For example, 16% of those in the lowest expenditure category had access to electricity for lighting, compared with 99% in the highest category.
- Access also varied by population group. For example, 17% of African households in the second lowest expenditure category had a flush or chemical toilet, as against 39% of coloured, 79% of Indian and 95% of white households in the same expenditure category.

**Differences in access to services in urban and non-urban areas**

Urban or non-urban place of residence was also related to whether or not a household had access to services. For example, Figure 3 gives the situation among African and coloured households with regard to access to electricity for lighting. It excludes Indian and white households, since almost all (99%) had access to this facility.

Table 7: Access to facilities by monthly household expenditure and population group of household head

| Population group and expenditure category | | Total* | Electricity (lighting) | Tap inside dwelling | Flush/chem. toilet | Telephone in dwelling | Refuse removal 1 x week |
|---|---|---|---|---|---|---|---|
| | | N | %** | %** | %** | %** | %** |
| **African** | **R0 – R 600** | 1 405 346 | 14,8 | 10,8 | 13,1 | 1,2 | 21,5 |
| | **R601 – R1 000** | 2 116 381 | 22,6 | 13,1 | 17,3 | 2,2 | 23,4 |
| | **R1 001 – R1 800** | 1 796 910 | 57,0 | 27,6 | 37,8 | 6,2 | 40,3 |
| | **R1 801 – R3 500** | 927 509 | 90,6 | 62,8 | 77,4 | 36,2 | 71,6 |
| | **R3 501 or more** | 287 852 | 96,9 | 82,8 | 92,1 | 80,3 | 84,9 |
| | **Total** | 6 533 998 | 43,3 | 26,7 | 33,9 | 11,3 | 37,2 |
| **Coloured** | **R0 – R 600** | 57 611 | 25,2 | 18,5 | 20,9 | 2,7 | 30,5 |
| | **R601 – R1 000** | 100 904 | 50,1 | 31,0 | 39,0 | 3,8 | 49,9 |
| | **R1 001 – R1 800** | 190 971 | 86,5 | 66,8 | 81,9 | 13,2 | 79,4 |
| | **R1 801 – R3 500** | 242 308 | 97,8 | 90,1 | 96,7 | 64,4 | 94,9 |
| | **R3 501 or more** | 149 411 | 99,5 | 97,2 | 99,3 | 90,5 | 97,6 |
| | **Total** | 741 206 | 83,1 | 71,9 | 79,7 | 43,4 | 80,3 |
| **Indian** | **R0 – R 600** | 1 878 | 60,4 | 56,3 | 59,4 | 26,5 | 60,5 |
| | **R601 – R1 000** | 4 260 | 83,2 | 78,7 | 79,1 | 20,0 | 80,5 |
| | **R1 001 – R1 800** | 22 776 | 94,7 | 92,0 | 91,2 | 31,2 | 90,1 |
| | **R1 801 – R3 500** | 90 242 | 99,1 | 97,9 | 98,1 | 67,6 | 96,1 |
| | **R3 501 or more** | 124 483 | 99,8 | 98,9 | 99,7 | 94,8 | 97,7 |
| | **Total** | 243 639 | 98,5 | 97,2 | 97,6 | 76,9 | 95,8 |
| **White** | **R0 – R 600** | 20 841 | 80,8 | 77,3 | 81,9 | 62,8 | 73,7 |
| | **R601 – R1 000** | 19 674 | 93,6 | 90,3 | 94,8 | 34,1 | 86,4 |
| | **R1 001 – R1 800** | 85 494 | 96,2 | 94,8 | 97,6 | 67,9 | 90,5 |
| | **R1 801 – R3 500** | 301 919 | 97,9 | 96,0 | 99,0 | 81,1 | 90,4 |
| | **R3 501 or more** | 1 054 563 | 99,3 | 96,5 | 99,8 | 93,8 | 90,9 |
| | **Total** | 1 482 492 | 98,5 | 96,0 | 99,2 | 88,5 | 90,4 |
| **Total*** | **R0 – R600** | **1 485 677** | **16,2** | **12,1** | **14,4** | **2,1** | **22,6** |
| | **R601 – R1 000** | **2 241 218** | **24,6** | **14,7** | **19,1** | **2,5** | **25,3** |
| | **R1 001 – R1 800** | **2 096 151** | **61,7** | **34,6** | **44,8** | **9,7** | **46,5** |
| | **R1 801 – R3 500** | **1 561 978** | **93,6** | **75,5** | **85,8** | **51,1** | **80,3** |
| | **R3 501 or more** | **1 616 310** | **98,9** | **94,3** | **98,4** | **91,2** | **90,9** |
| | **Total** | **9 001 335** | **57,2** | **43,8** | **50,1** | **28,5** | **51,1** |

*** All totals exclude unspecified categories. Institutions are also excluded. Since the number of unspecified responses varied for the different type of facilities, the totals reported here may vary slightly for each facility.**

**** Each percentage stands on its own. For example 57,2% of households (column three last line) had electricity for lighting, the remainder of 42,8% (not shown in the table) used other sources, for example candles or paraffin.**

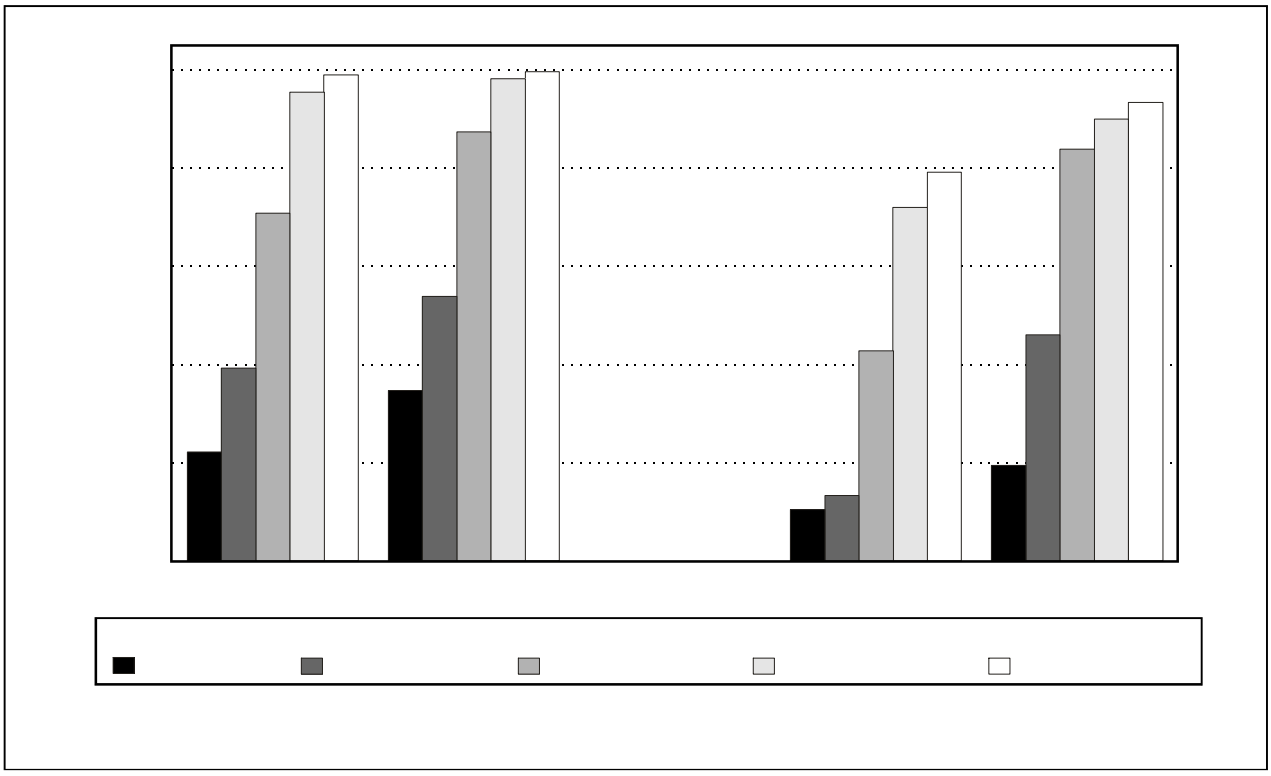


**Figure 3: Percentage of African and coloured households with electricity for lighting in urban and non-urban areas, by expenditure quintile**

The figure shows the following:

- In both urban and non-urban areas, as expenditure increased, so did access to electricity used for lighting purposes. But there were clear urban/non-urban and population group differences.
- In urban areas, 22% of African and 35% of coloured households in the lowest expenditure category had access to electricity for lighting, as against 10% of African and 19% of coloured households in non-urban areas.
- Almost all African (99%) and coloured (>99%) households in the highest expenditure category in urban areas had access to electricity for lighting, as against proportionately fewer households in this expenditure category in non-urban areas (79% of African and 93% of coloured households).

**Integration**

In general, the lower the expenditure, the less the access to adequate housing, infrastructure and services. However, other variables such as population group and urban or non-urban place of residence, had a clear influence on access to housing or other facilities. Overall, while gender of household head did have some impact on access to housing or services, this was less noticeable than the impact of population group or place of residence.

# Life circumstances of the poor in South Africa

From households, we now turn to individuals and their life circumstances, and how they are affected by poverty. Here we refer specifically to access to opportunities assisting in escaping the ravages of poverty, such as education, employment, health care, HIV/Aids prevention and contraception. While the census does not provide measures for all these variables, level of education, average household size, the proportion of children in the household under the age of five years, and the unemployment rate (expanded definition) are indeed available.

### Level of education and expenditure among the employed, by population group

Table 8 shows that, in general, there is a direct relationship between expenditure category and level of education. The higher the monthly expenditure is among employed individuals, the higher the level of education. But this pattern varies by population group.

The percentages in Table 8 also add up to 100 across the rows. The table shows that:

- Amongst the employed with no education, 27% were spending R600 or less per month, and a further 32% were spending between R601 and R1 000 per month, but amongst those with a tertiary education, only 2% were in the lowest, and 3% in the second lowest category.
- African employed people had less to spend per month than coloured, Indian or white employed people, For example, 7% of employed Africans were in the highest expenditure category, as against 23% of coloured, 57% of Indian and 80% of white employed people.
- African (27%) and coloured (28%) employed people with no education had less per month to spend than employed Indian (3%) or white (4%) people with no education.

Table 8: Monthly expenditure among the employed aged 20 years or more by population group and level of education

| Population group and level of education | | Total* | R0 – R600 | R601 – R1 000 | R1 001 – R1 800 | R1 801 – R3 500 | R3 501 or more | Total** |
|---|---|---|---|---|---|---|---|---|
| | | N | % | % | % | % | % | % |
| **African** | **None** | 557 680 | 27,3 | 32,7 | 28,9 | 9,8 | 1,4 | 100,0 |
| | **Some primary** | 566 301 | 27,8 | 31,5 | 28,3 | 10,7 | 1,6 | 100,0 |
| | **Complete primary** | 263 597 | 19,1 | 28,0 | 32,7 | 17,1 | 3,1 | 100,0 |
| | **Some secondary** | 947 350 | 13,8 | 22,5 | 31,7 | 24,5 | 7,5 | 100,0 |
| | **Matric** | 310 588 | 8,3 | 15,2 | 26,6 | 32,7 | 17,3 | 100,0 |
| | **Higher** | 187 754 | 5,6 | 8,6 | 18,1 | 36,8 | 30,9 | 100,0 |
| | **Total** | 2 833 270 | 18,6 | 25,1 | 29,1 | 19,9 | 7,3 | 100,0 |
| **Coloured** | **None** | 46 298 | 27,6 | 30,6 | 26,7 | 11,7 | 3,3 | 100,0 |
| | **Some primary** | 84 230 | 15,9 | 25,9 | 32,6 | 19,9 | 5,7 | 100,0 |
| | **Complete primary** | 45 371 | 7,6 | 15,7 | 31,5 | 32,2 | 13,0 | 100,0 |
| | **Some secondary** | 200 281 | 3,3 | 7,3 | 22,4 | 39,4 | 27,6 | 100,0 |
| | **Matric** | 52 206 | 1,5 | 3,9 | 14,6 | 39,7 | 40,3 | 100,0 |
| | **Higher** | 31 665 | 0,9 | 2,1 | 7,9 | 33,9 | 55,3 | 100,0 |
| | **Total** | 460 051 | 8,1 | 13,1 | 23,7 | 32,0 | 23,1 | 100,0 |
| **Indian** | **None** | 3 188 | 2,8 | 4,3 | 13,3 | 40,4 | 39,2 | 100,0 |
| | **Some primary** | 6 657 | 1,5 | 2,9 | 11,1 | 41,6 | 42,9 | 100,0 |
| | **Complete primary** | 5 671 | 0,8 | 1,7 | 8,9 | 39,6 | 49,0 | 100,0 |
| | **Some secondary** | 71 828 | 0,4 | 0,9 | 6,9 | 36,9 | 54,9 | 100,0 |
| | **Matric** | 47 783 | 0,4 | 0,8 | 6,7 | 33,4 | 58,8 | 100,0 |
| | **Higher** | 24 202 | 0,3 | 1,1 | 4,9 | 24,5 | 69,2 | 100,0 |
| | **Total** | 159 330 | 0,5 | 1,1 | 6,9 | 34,4 | 57,2 | 100,0 |
| **White** | **None** | 6 321 | 4,3 | 3,0 | 5,5 | 20,2 | 67,1 | 100,0 |
| | **Some primary** | 2 573 | 6,8 | 6,1 | 8,5 | 18,9 | 59,7 | 100,0 |
| | **Complete primary** | 1 936 | 3,8 | 5,2 | 7,3 | 19,3 | 64,5 | 100,0 |
| | **Some secondary** | 240 029 | 0,9 | 0,9 | 3,4 | 16,2 | 78,6 | 100,0 |
| | **Matric** | 347 128 | 1,0 | 0,9 | 3,6 | 15,2 | 79,4 | 100,0 |
| | **Higher** | 308 962 | 0,8 | 0,5 | 2,9 | 12,5 | 83,3 | 100,0 |
| | **Total** | 906 949 | 0,9 | 0,8 | 3,4 | 14,6 | 80,3 | 100,0 |
| **Total*** | **None** | **613 487** | **26,9** | **32,1** | **28,4** | **10,2** | **2,4** | **100,0** |
| | **Some primary** | **659 761** | **25,9** | **30,4** | **28,6** | **12,3** | **2,8** | **100,0** |
| | **Complete primary** | **316 576** | **17,1** | **25,6** | **32,0** | **19,6** | **5,7** | **100,0** |
| | **Some secondary** | **1 459 488** | **9,6** | **15,8** | **24,5** | **25,8** | **24,3** | **100,0** |
| | **Matric** | **757 705** | **4,0** | **6,9** | **14,0** | **25,2** | **49,9** | **100,0** |
| | **Higher** | **552 582** | **2,4** | **3,4** | **8,5** | **22,5** | **63,3** | **100,0** |
| | **Total** | **4 359 599** | **13,2** | **17,9** | **22,4** | **20,6** | **26,0** | **100,0** |

*** All totals exclude unspecified categories. Institutions are also excluded.**
**** Due to rounding, percentages do not add up to exactly 100.**

## Monthly expenditure by occupation and gender among the employed

Figure 4 gives the differences in monthly expenditure by broad occupational category (management, professional and technical; clerical and sales; artisan and skilled blue collar; operators and semi-skilled; and elementary or unskilledworkers) among the employed.

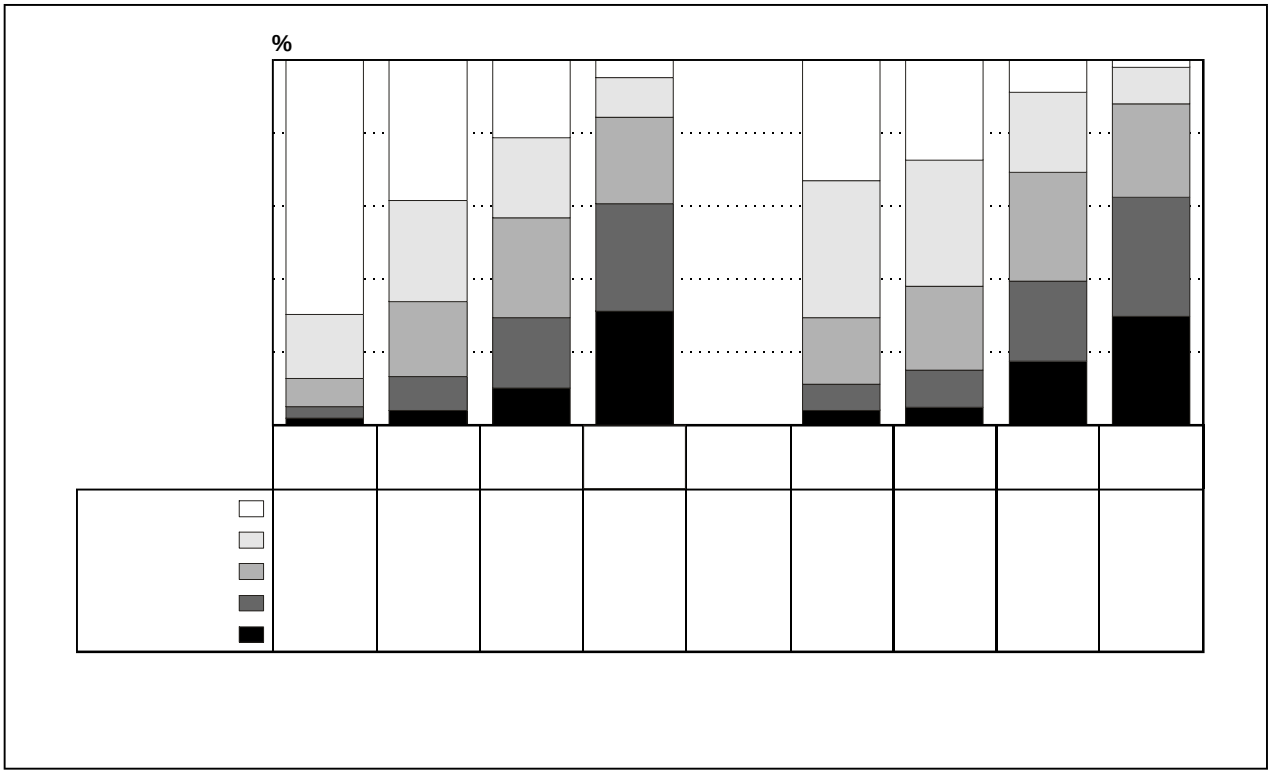



**Figure 4: Monthly household expenditure by occupation and gender of household head**

- It clearly shows that those in managerial and professional positions, particularly males, had the highest monthly expenditure. For example, 70% of male managers, professionals and technicians were in the top expenditure category, compared with only 33% of female managers, professionals and technicians.
- There is an increase in the proportion of people in the lowest expenditure category as we move from management and professional occupations towards more elementary ones. For example, 4% of males and 5% of females employed in clerical and sales occupations spend R600 or less per month. This proportion increases to 10% of male and 18% of female workers in skilled or semi-skilled occupations, and it increases even further to 31% of male and 30% of female elementary workers.
- Among those employed in elementary occupations, for example tea-making and street-sweeping, the difference in proportions of men and women in each category of monthly expenditure is relatively small. For example, 31% of men and 30% of women are in the lowest monthly expenditure category, while 29% of males and 33% of females are in the second lowest category. In the highest monthly expenditure category, however, there are proportionately more men (5%) than women (2%).

## Stats SA development indices

Stats SA has evolved two development indices based on Census '96, namely the *Household infrastructure index* and the *Household circumstances index*, to describe the extent of development of different areas in South Africa. The indices given here compare provinces to each other, based on national data. They can, in fact, be applied at any appropriate level. For example, they can be used to compare development across district councils or local authorities or magisterial districts in the country. Within a particular magisterial district, these indices can be used to compare the extent of development of its different components, such as a suburb or a township. The confidentialised data set to do these calculations, based on less aggregated geographical levels, is available from Stats SA.

The two Stats SA development indices are based on the statistical technique of factor analysis which determined that there were two principal components, when this technique was applied to items (a) to (k) listed below. The items comprise a theoretically plausible list of relevant indicators available from the census, namely:

(a) living in formal housing (brick dwellings, flats, townhouses, backyard rooms etc.);
(b) access to electricity for lighting from a public authority or supply company;
(c) tap water inside the dwelling;
(d) a flush or a chemical toilet;
(e) a telephone in the dwelling or a cellular telephone;
(f) refuse removal at least once a week by a local or district authority;
(g) level of education of the head of household;
(h) average monthly household expenditure;
(i) unemployment rate (expanded definition);
(j) average household size; and
(k) the proportion of children in the household under the age of five years.

The indices ultimately also take the number of households in each area into account.

### Provincial differences

The report now compares the provinces and the extent of their development, using the 11 variables that constitute the two indices. Table 9 indicates the percentages or other scores obtained in each province on each of these variables. In the shaded columns of the table, the scoring was reversed for calculating the indices.

Each percentage in the table stands on its own.

- For example, column (a) shows that in Eastern Cape, 46,9% of households lived in formal dwellings.
- Column (c) shows that, in North West, 29,5% of households had a tap inside the dwelling.

The table shows large differences between provinces.

- In particular, Gauteng, Western Cape and Northern Cape have relatively high scores on most variables.
- Eastern Cape, Northern Province and North West have relatively low scores.

Table 9: Scores obtained in each province for each variable constituting the two Stats SA development indices

| Province | Formal dwell-ing | Elec. light | Tap in dwell-ing | Flush/ chem. toilet | Tel. in dwell. or cell. | Refuse 1 x week | Edu-cation hhld head | Mean monthly expend. | Un-employ-ment rate | Aver-age hhld size | Child < 5 years |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | (a) | (b) | (c) | (d) | (e) | (f) | (g) | (h) | (i) | (j) | (k) |
| | % | % | % | % | % | % | Years | Rand | % | N | % |
| **Eastern Cape** | 46,9 | 31,2 | 24,4 | 30,6 | 15,6 | 33,8 | 5,1 | 1 403 | 48,5 | 4,3 | 12,0 |
| **Free State** | 62,5 | 56,8 | 40,2 | 45,1 | 22,9 | 60,4 | 5,5 | 1 543 | 30,0 | 3,8 | 9,5 |
| **Gauteng** | 73,8 | 79,4 | 66,9 | 82,9 | 45,3 | 81,4 | 7,1 | 3 594 | 28,2 | 3,3 | 8,9 |
| **KwaZulu-Natal** | 55,3 | 53,2 | 39,2 | 41,7 | 26,9 | 41,9 | 5,4 | 2 138 | 39,1 | 4,5 | 11,5 |
| **Mpumalanga** | 64,9 | 56,3 | 36,5 | 37,8 | 18,2 | 37,7 | 5,0 | 1 899 | 32,9 | 4,2 | 11,6 |
| **Northern Cape** | 80,1 | 68,8 | 49,7 | 59,5 | 30,8 | 67,4 | 5,1 | 2 023 | 28,5 | 4,0 | 10,6 |
| **Northern Prov.** | 62,0 | 36,2 | 17,3 | 13,1 | 7,4 | 11,2 | 4,6 | 1 418 | 46,0 | 4,6 | 13,1 |
| **North West** | 69,5 | 43,7 | 29,5 | 32,0 | 16,8 | 34,3 | 5,1 | 1 820 | 37,9 | 4,2 | 11,2 |
| **Western Cape** | 81,3 | 84,9 | 75,3 | 85,8 | 55,2 | 82,2 | 7,0 | 3 324 | 17,9 | 3,7 | 9,6 |

## Calculating the Stats SAdevelopment indices

Once the percentages and other scores for each of the 11 variables had been calculated for each province, these were subjected to a factor analysis, with rotation, to determine the principal components. This statistical technique reduces a large set of variables to a smaller set of components by grouping together those variables which co-vary orwhich are correlated.[16]

This analysis indicated that the variables grouped into two principal components, which explained 74% of the variance, as shown in Table 10. The first component, i.e. the Stats SA *household infrastructure index*, explained 57% and the second, i.e. the Stats SA *household circumstances index*, explained a further 17% of the variance.

[16] Pietersen, J. and G. Damianov, (1988). *Guideto practical statistics*. Pretoria: Human Sciences Research Council.

Table 10: Loadings obtained by each variable on each component constituting the two Stats SA development indices (after rotation)

| Variables | Household infrastructure index | Household circumstances index |
|---|---|---|
| (a) living in formal housing | 0,65 | -0,01 |
| (b) access to electricity for lighting | 0,78 | 0,07 |
| (c) tap water inside the dwelling | 0,83 | 0,12 |
| (d) a flush or a chemical toilet | 0,84 | 0,19 |
| (e) a telephone in dwelling or cellular 'phone | 0,77 | 0,05 |
| (f) refuse removal at least once a week | 0,74 | 0,19 |
| (g) level of education of household head | 0,60 | 0,25 |
| (h) monthly household expenditure | 0,84 | -0,08 |
| (i) unemployment rate (expanded definition) | 0,39 | 0,45 |
| (j) average household size | -0,02 | 0,90 |
| (k) children under the age of five years | 0,05 | 0,80 |

Index 1, the *Household infrastructure index* was constituted by the following variables:

(a) living in formal housing;
(b) access to electricity for lighting;
(c) tap water inside the dwelling;
(d) a flush or a chemical toilet;
(e) a telephone in dwelling or cellular telephone;
(f) refuse removal at least once a week;
(g) level of education of household head; and
(h) monthly household expenditure.

Since all the variables used for the first index obtained a relatively high loading on the first factor, each was given a weight of one.

Index 2, the *Household circumstances index* was constituted by the following variables:

(i) unemployment rate (expanded definition);
(j) average household size; and
(k) children under the age of five years.

Since the three variables used for the second index obtained relatively high loadings on this second factor, each was given a weight of one.

**The Stats SAhousehold infrastructure index**

On each index, the variables constituting it were arranged from highest to lowest scores or percentages, to establish cut-off points, and to divide each variable into three new categories (for the

shaded variables in the tables that follow, the procedure was reversed). This is a convenient and robust procedure to create an additive index from variables with different ranges (e.g. average household size versus number of children under five years).

Table 11, which indicates these cut-off points for the *Household infrastructure index,* is read as follows: in column (a) indicating the percentage of households in each province living in formal dwellings, the lowest score was 46,9%, while the highest was 81,3%. The cut-off points for grouping provinces in the lowest third on this variable was 58,3% and for the middle third, 69,8%.

- A province that contained between 46,9% and 58,3% of its households living in formal dwellings was placed in the lowest category.
- A province with between 58,4% and 69,8% of its households living in formal dwellings was placed in the middle category.
- A province with between 69,9% and 81,3% of its households living in formal dwellings was placed in the highest category.

Table 11: Cut-off points for calculating the Stats SA household infrastructure index

| Scoring | Formal dwell. | Elec. light | Tap in dwell. | Flush/ chem. toilet | Tel. in dwell. or cell. | Refuse 1 x week | Monthly expend. | Education hh head |
|---|---|---|---|---|---|---|---|---|
| | (a) | (b) | (c) | (d) | (e) | (f) | (g) | (h) |
| | % | % | % | % | % | % | Rand | Years |
| Lowest score | 46,9 | 31,2 | 17,3 | 13,1 | 7,4 | 11,2 | 1 403 | 3,63 |
| Upper limit: bottom third | 58,3 | 49,1 | 36,6 | 37,4 | 23,4 | 34,8 | 2 133 | 4,75 |
| Upper limit: middle third | 69,8 | 67,0 | 56,0 | 61,6 | 39,3 | 58,5 | 2 863 | 5,78 |
| Highest score | 81,3 | 84,9 | 75,3 | 85,8 | 55,2 | 82,2 | 3 593 | 6,99 |

Table 12 indicates the scores divided into three categories for each of the variables constituting the Stats SA *household infrastructure index*.

Table 12: Scores obtained by each province on the Stats SA household infrastructure index

| Province | Formal dwell. | Elec. light | Tap in dwell. | Flush/ chem. toilet | Refuse 1 x week | Tel./ cell | Ed. hh head | Monthly expend. | Interim score | Rank |
|---|---|---|---|---|---|---|---|---|---|---|
| | (a) | (b) | (c) | (d) | (e) | (f) | (g) | (h) | | |
| | % | % | % | % | % | % | Years | Rands | | |
| **Eastern Cape** | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 | 9,0 |
| **Free State** | 2 | 2 | 2 | 2 | 1 | 3 | 2 | 3 | 17 | 4,5 |
| **Gauteng** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 | 1,5 |
| **KwaZulu-Natal** | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 17 | 4,5 |
| **Mpumalanga** | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 20 | 6,0 |
| **Northern Cape** | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 3 | 14 | 3,0 |
| **Northern Prov.** | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 23 | 7,5 |
| **North West** | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 23 | 7,5 |
| **Western Cape** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 | 1,5 |

For each variable, a score of 1 indicates a high level of development, while a score of 2 indicates an average and a score of 3 a low level of development. For example, reading across the columns, Eastern Cape obtained a score of 3 for all variables, indicating a low level of development across the board, and a total score of 24. It is ranked in position nine, and so it is the province that needs most overall attention for development. On the other hand, Western Cape had scores of 1 on all variables, and a total score of 8. It is ranked in position one together with Gauteng, so these two provinces require the least overall attention for infra-structural development.

The state of infra-structural development of each province, as indicated above, is a useful measure of relative development, but excludes the number of households in each province. For policy decisions such as the amount of money to be allocated for a specific public works programme in a province, the population of households should be taken into account.

The total number of households in each province is shown in the fourth column of Table 13. There were indeed wide variations regarding number of households, which were taken into account in the following stage of the Stats SAdevelopment indices.

Firstly, the total score across the eight trichotomised items was divided by eight, to eliminate the effect of the number of items (there are presently fewer in the other index). Then the square root of the number of households in each province was calculated to yield a multiplier with a suitable range, also shown in Table 13. The product of these two amounts was calculated.

The province with the lowest such score after taking number of households into accountwasNorthern Cape, followed by Western Cape, Gauteng, Free State, Mpumalanga, North West, KwaZulu-Natal, Northern Province and Eastern Cape.

For comparisons, one may take the minimum possible score in the least populous province as the baseline, and give it a value of 100. The provinces could then be compared to this base, as indicated in the second last column of Table 13.

Table 13: Scores obtained by each province on the Stats SA household infrastructure index after taking number of households into account

| Province | Interim score | Interim score divided by the number of items | Number of households | Square root of number of households | Index | Rank |
|---|---|---|---|---|---|---|
| | | | 1 000 | | | |
| **Eastern Cape** | 24 | 3,0 | 1 332 | 1 154,3 | 458 | 9 |
| **Free State** | 17 | 2,1 | 626 | 790,8 | 222 | 4 |
| **Gauteng** | 8 | 1,0 | 1 964 | 1 401,5 | 185 | 3 |
| **KwaZulu-Natal** | 17 | 2,1 | 1 661 | 1 288,8 | 362 | 7 |
| **Mpumalanga** | 20 | 2,5 | 604 | 777,2 | 257 | 5 |
| **Northern Cape** | 14 | 1,8 | 187 | 432,4 | 100 | 1 |
| **Northern Prov.** | 23 | 2,9 | 982 | 991,2 | 433 | 8 |
| **North West** | 23 | 2,9 | 721 | 848,9 | 323 | 6 |
| **Western Cape** | 8 | 1,0 | 983 | 991,5 | 131 | 2 |

After taking the number of households into account as part of the index:

- The province with the highest index, and therefore needing the most infra-structural development in relation to its population size, is Eastern Cape.
- This is followed by Northern Province, KwaZulu-Natal, North West, Mpumalanga, Free State, Gauteng, Western Cape and Northern Cape.

Here is an illustration of how the index could be used to allocate money to the provinces for a public works programme such as labour-intensive road building, or a general infrastructure development programme. The index shows that, for every R100 that Northern Cape gets, Eastern Cape should get R458, Northern Province should get R433, KwaZulu-Natal should get R362, etc.

The reader will have noticed that, if number of households is not taken into account, a somewhat different ranking order results. The index and ranking should be chosen appropriately according to need. In apportioning a total amount of money (the original stimulus to this calculation), it is obviously desirable to take the number of households into account.

### The Stats SA household circumstances index

The above procedure was repeated to calculate the Stats SA household circumstances index. Table 14 indicates the outcome.

Table 14: Scores obtained by each province on the Stats SA household circumstances index after taking number of households into account

| Province | Unemploy-ment rate | Average hh size | Child < 5 years | Interim score | Interim score divided by the number of items | Square root of number of hholds | Index | Rank |
|---|---|---|---|---|---|---|---|---|
| | (i) | (j) | (k) | | | | | |
| | % | % | % | | | | | |
| **Eastern Cape** | 3 | 3 | 3 | 9 | 6,0 | 1 154,3 | 400 | 9 |
| **Free State** | 2 | 2 | 1 | 5 | 1,7 | 790,8 | 152 | 3 |
| **Gauteng** | 2 | 1 | 1 | 4 | 1,3 | 1 401,5 | 216 | 6 |
| **KwaZulu-Natal** | 3 | 3 | 2 | 8 | 2,7 | 1 288,8 | 397 | 8 |
| **Mpumalanga** | 2 | 3 | 2 | 7 | 2,3 | 777,2 | 210 | 5 |
| **Northern Cape** | 2 | 2 | 2 | 6 | 2,0 | 432,4 | 100 | 1 |
| **Northern Prov.** | 3 | 3 | 3 | 9 | 3,0 | 991,2 | 344 | 7 |
| **North West** | 2 | 2 | 2 | 6 | 2,0 | 848,9 | 196 | 4 |
| **Western Cape** | 1 | 1 | 1 | 3 | 1,0 | 991,5 | 115 | 2 |

The table shows that:

- Eastern Cape requires the most attention in terms of development to improve the life circumstances of the households.
- KwaZulu-Natal, with its large population and thus its large number of households, as well as its large average household size and high unemployment rate, requires the second most attention.
- This ranking is followed by Northern Province, which requires the third highest amount of development assistance to improve life circumstances.

- Gauteng, with its large number of households, and large numbers of people moving to the area in search of work, comes next regarding development involving change in life circumstances, while Mpumalanga, North West, Free State and Western Cape require less assistance in this regard.
- As an example, let us assume that the Department of Labour wishes to allocate money to the provinces for skills training. The index shows that for every R100 that is allocated to Northern Cape, Western Cape should get R115, while Free State should get R152, Gauteng R216, etc.

## Comparing the indices

The final indices and the rank order of the provinces in comparison with Northern Cape differ slightly on the two indices, as indicated in Table 15. Eastern Cape ranks highest on both the Household infrastructure and the Circumstances index, (in most need of development assistance). On the Infrastructure index it is followed by Northern Province and KwaZulu-Natal, while on the Household circumstances index KwaZulu-Natal is ranked second highest, followed by Northern Province.

The indices may therefore serve as baselines for different monitoring roles. The first index is directly related to improving the quality of life of people by ensuring that their basic needs, for example access to clean water, sanitation and basic education, are met. On the other hand, the second is related to giving people more empowerment, for example, through job creation and population development programmes.

Table 15: Comparing the scores and rankings on Stats SA household infrastructure and household circumstances indices

| Province | Stats SA household infrastructure index | | Stats SA household circumstances index | |
|---|---|---|---|---|
| | Index | Rank | Index | Rank |
| **Eastern Cape** | 458 | 9 | 400 | 9 |
| **Free State** | 222 | 4 | 152 | 3 |
| **Gauteng** | 185 | 3 | 216 | 6 |
| **KwaZulu-Natal** | 362 | 7 | 397 | 8 |
| **Mpumalanga** | 257 | 5 | 210 | 5 |
| **Northern Cape** | 100 | 1 | 100 | 1 |
| **Northern Prov.** | 433 | 8 | 344 | 7 |
| **North West** | 323 | 6 | 196 | 4 |
| **Western Cape** | 131 | 2 | 115 | 2 |

These indicesmayhavedifferentaudiences.

- For example, in the government sector, the first index with its focus on service provision may be more useful to planners in theDepartments of Housing,WaterAffairs and Public Works.
- The second index, with its focus on empowerment, may be more useful to the Departments of Labour,Health and Welfare.

**Comparisonwithother indices**

Within government, various departments have developed indices for the allocation of funds for capital and operational expenditure at provincial and local government level.[17,18,19] These indices tend to be more limited in scope, focusing specifically on funding allocations. In addition, fewer demographic and socio-economic variables are taken into account.

For example, the Financial and Fiscal Commission's calculations on which to base financial allocations to provinces include the following variables: total population, the percentage of the population that is rural, the estimated population growth rate and the percentage of children aged 5 to 17 years.

The Department of Constitutional Development makes 'equitable shares allocations' to local authorities. These include, among other funds to be phased in over time, a basic services (S), and an institutional capacity-building (I) grant. The S grant supports the ability of municipalities to supply services to the poor. The approach is to estimate the number of poor households, defined as those earning less than R800 (1998 Rand values) a month, and to allocate an operating subsidy to each municipality for each poor household (in 1998 the amount per poor household was R86 per month).

The two Stats SA development indices could indeed be used in conjunction with the fund-allocating formulas of the Financial and Fiscal Commission, or the Department of Constitutional Development as instruments tomonitor change in the life circumstances of poor households over time, as funding becomes utilised, and development programmes implemented.

The Stats SA indices may have many wider uses. They can be used to plan services within funding allocations, and to act as baseline information against which to monitor change, as and when new policies are introduced and put into operation. These can be measured at various geographical levels during annual inter-censal surveys. The task in hand in relation to poverty alleviation should determine the type of index to be used.

[17] Financial and Fiscal Commission. (1977) *Local government in a system of intergovernmental fiscal relations. A discussion document.* Midrand: Financial and Fiscal Commission.
[18] De Bruyn, J., D. McIntyre, N. Mthethwa, K. Naidoo, L. Ntenga, P. Pillay, and C. Pantusewitz, (1988). *Public expenditure on basic social services in South Africa*. Midrand: Financial and Fiscal Commission.
[19] Personal communication with Ms W Fanoe of the Department of Constitutional Development.

Chapter 4

# Earnings inequality in South Africa, 1995-1998

Debbie Budlender

## Introduction

The 1998 *Poverty and Inequality Report*[1] notes that, while South Africa is an upper middle-income country in terms of per capita income, a large number of the country's citizens live in poverty. While this is true of many other middle-income countries, South Africa's income distribution is among the most unequal in the world. The 1996 World Development Report found that only Brazil had a higher level of inequality than South Africa as measured by the Gini coefficient (quoted in May, 1998:23). Our own income and expenditure survey of 1995 gave an overall household Gini coefficient of 0,59 (Hirschowitz, 1997:28).

Stats SA now has data from household surveys conducted in October/November in five consecutive years, 1994 to 1998. The data from four of these datasets provide the basis for analysis as to what has happened in terms of income distribution in the first years after the first democratic elections of 1994. Unfortunately the first survey of 1994 does not provide suitable data for comparison due to both differences in the way income questions were asked and limitations in the sampling method. The pages which follow first examine the trend in the overall pattern of inequality over the four years 1995 through 1998. We then go on to look at trends and patterns of inequality in respect of population group and gender.

The Gini coefficient is a measure of monetary inequality. Recent poverty analysis, inspired by the work of Nobel laureate Amartya Sen (Sen,1981) and others, has increasingly focused on broader conceptions of poverty which measure the ability of individuals and households to command the resources necessary for a decent standard of living. The human development index, for example, adds measures of health and education to a monetary measure in order to arrive at a broader measure. Stats SA's index, described elsewhere in this publication, is a further elaboration of a multi-factor approach to measuring people's well-being.

The analysis here is confined to monetary income. It is further confined to earned income i.e. the money that individuals within households earn in salaries and wages and the money that they earn in self-employment, whether as employers or working alone. Earned income is by no means the only form of income for South African households. Previous research suggests that poor South African households obtain 40% of their income from wages and a further 5% from self-employment. Non-poor households, on the other hand, obtain 72% of their income from wages and 6% from self-employment. These figures implicitly point to the role of the state in supporting poor people. The same research shows that poor households receive 26% of their income in state transfers such as old age pensions, while non-poor households receive only 3% of their income from this source (May, 1998:36). Focusing on earned income thus provides an approximate measure as to what the inequality situation would be without such state assistance.

[1] May, J. (1998). *Poverty and inequality in South Africa*. Report prepared for the office of the executive deputy president and the inter-ministerial committee for poverty and inequality. Praxis Publishing, Durban.

The analysis here builds on that of other researchers as well as that of Stats SA itself. In 1998 Stats SA produced *Unemployment and employment in South Africa.* That publication examined unemployment trends in the October households surveys (OHS) of 1994 to 1997. The official unemployment rate was shown to have dropped from a 1994 level of 20,0% to 16,9% in 1995, but then risen again sharply to 22,9% in 1997. Since then the rate has risen still further. In terms of population group, the African unemployment rate was highest across the period, followed by that of coloured, Indian and white people. The differences between population groups were marked. In 1997, for example, the respective rates were 29,3%, 16,0%, 10,2% and 4,4%.

Within each population group and across all years the unemployment rate was markedly higher for women than men. In 1997 the overall unemployment rate for women was 28% while that for men was 19%. The publication *Women and men in South Africa* goes one step further to reveal the expected differences in earnings between those women and men of the different population groups who were lucky enough to be employed in 1995 (Budlender, 1998:24-5).

All these findings have relevance for the current analysis given its focus on earned income. The difference between this earlier work and the current publication is that the latter moves beyond the earners themselves to examine the outcomes both for them and those within their households who depend on their earnings. This aspect has also been covered before by Stats SA. *Earning and spending in South Africa* (Hirschowitz, 1997) analyses data from the 1995 income and expenditure survey. Among other issues, it looks at the differences between households headed by women and men, and between households from the different population groups. It finds, for example, that the average household income of a male-headed household was R48 000 in 1995, compared to R25 000 for a female-headed household. African households were found to have the lowest average annual income across all provinces while white households had the highest (Hirschowitz, 1997:12-3). The pages below elaborate on this analysis by looking beyond the household head to what happens to individual male and female members of households.

# Methodology

### Calculating income

The questions in the October household surveys have changed somewhat over the years as Stats SA has endeavoured to improve its measurement of what is happening in the society. The datasets are thus not completely comparable in respect of all variables. In this analysis we focus on income from wages and salaries. The employment questions have been modified in important ways, particularly between 1995 and the later years. While we believe that the data is similar enough to engage in comparative analysis, we nevertheless point out below where and how changes in questions and method may have influenced the findings.

One of the differences across years relates to the way in which the income questions are asked and answered. Firstly, in most years the respondent is given a choice as to whether to provide an exact earnings figure or instead indicate a bracket, or income interval. Secondly, the income intervals offered for the second option change over the years.

In the later years the overwhelming majority of respondents have their income recorded within an

income interval rather than as an exact figure. In 1995, on the other hand, approximately three-quarters of people with non-zero wages or salary recorded exact amounts. The inequality calculations below require data in the form of amounts rather than intervals. Where income was given as an interval, this was converted into a rand amount by taking the logarithmic mean of the two endpoints of the interval for all intervals except the bottom non-zero one. For the bottom interval, the rand amount was taken to be two thirds of the top endpoint for all years except 1995.

The reason for the different approach to 1995 relates to the difference in intervals over the years. In 1995 the first non-zero monthly interval was R1–R999. In 1996 the first non-zero monthly interval was reduced, to R1–R199, as far too large a proportion of earners were found within the single interval of the previous year. The intervals remained constant for the following two years of the survey. Taking two-thirds as the estimate for the extremely large first non-zero interval for 1995 would have clearly yielded an over-estimate of actual income. In that year the logarithmic mean was therefore used for all intervals.

**Pay and earnings**

As noted above, the analysis below looks at both the wages and salaries earned by employees and the income accruing to the self-employed.[2] Wages and salary alone are referred to as 'pay'. Wages and salary together with self-employed income is referred to as 'earnings'. The analysis shows similar trends for the two measures, but more stability in the wage/salary measures. This is understandable. At the level of the individual, wages and salaries are less likely to fluctuate between months than earned income does. At a methodological level, measuring self-employed income involves a calculation based on turnover less expenses, and the data for both of these variables is far less accurate than that for wages and salaries.

With both the pay and earnings measures one has to decide how to deal with missing data. Stats SA has achieved a remarkably high rate of response to questions in the OHS, even where these relate to income. In 1995, for example, only about 1% of wage and salary employees would provide neither an exact amount nor an interval. Nevertheless, the question remains as to how one deals with this missing data in analysis.

For the purposes of the analysis which follows, all missing data were set to zero. This could introduce some bias as generally it is wealthier people who are less inclined to reveal their earnings. The effect of the bias should be minimal because of the low number of non-responses.

The income figure for self-employed individuals is calculated by taking their reported turnover per month and subtracting the monthly costs given for wages and other costs. Here there is the possibility of non-response on up to four items. Where the turnover was not given, the self-employed net figure was set to zero. Where other amounts were not given, they were taken as zero i.e. nothing was subtracted from the gross turnover. Where the net amount became less than zero after the subtraction, the net amount was set as zero. All these complications add to the lesser reliability of the earnings calculations below when compared to those based on employee pay alone.

[2] Domestic workers were classified as self-employed in 1995 and as employees thereafter. For purposes of comparability, the data were converted so that they would be included among wage and salary earners throughout the period under examination.

**Computing individual income**

In the analysis which follows, we look at individual income rather than household income. The method consists in adding together the earned income accruing to all individuals within a particular household and then dividing the sum by the total number of household members. This differs from income distribution analysis in *Earning and spending in South Africa* which takes the household as the unit.

Our first reason for adopting the individual approach relates to the weight one attaches to poorer as opposed to wealthier people. Overall, poorer households tend to be larger in terms of number of members than richer households. There will therefore be proportionately fewer poor households than there are poor individuals. An individual approach gives more weight to poor people.

Our second reason for adopting the individual rather than the household as unit of analysis is so as to be able to do meaningful analysis by population group and gender. In respect of population group previous analysis assumed, as was fairly reasonable during apartheid, that all members of the household belonged to the same group. This assumption will become increasingly untenable as the years pass.

In respect of gender the situation was never as simple, as most households contain both male and female members. In the past the approach was to compare households with male and female heads. The analysis invariably revealed significant differences between the two groups of households. It said nothing, however, about the male and female individuals who would be found in both female- and male-headed households. The distinction reflected structures and life cycles of households rather than individual well-being. It was further complicated by differing conceptions across population and other social groups as to what constituted a household head.

Our method is still not accurate on gender distribution. In the analysis which follows we calculate the sum of all wage and salary income accruing to members of a particular household and then divide that figure equally between all members. This approach ignores inequalities within the household. Both evidence from elsewhere and commonsense suggest that household members do not have equal power over and access to the available income. In particular, those who bring income into the household are more likely to have decision-making power over what happens to it. Because women are less likely to be employed, and tend to earn less than men when they are employed, women could well be getting less than their equal share of household income. The analysis which follows thus probably underplays gender differences.

A final methodological point is that we have used simple mean per capita figures rather than adult equivalences. Some income analysts argue that children, in particular, require less money than adults and that in deriving per capita income figures one should therefore consider a child as some proportion of an adult unit. Some analysts go further and suggest that women require less money than men. In choosing a simple mean we recognise Angus Deaton's argument that 'economies of scale are likely to be more pronounced in higher income families than in families which spend a larger proportion of their income on food and essential commodities' (quote in May, 1998: Appendix B: 9). We are thus again, as with our choice of individual rather than household, focusing on the poor.

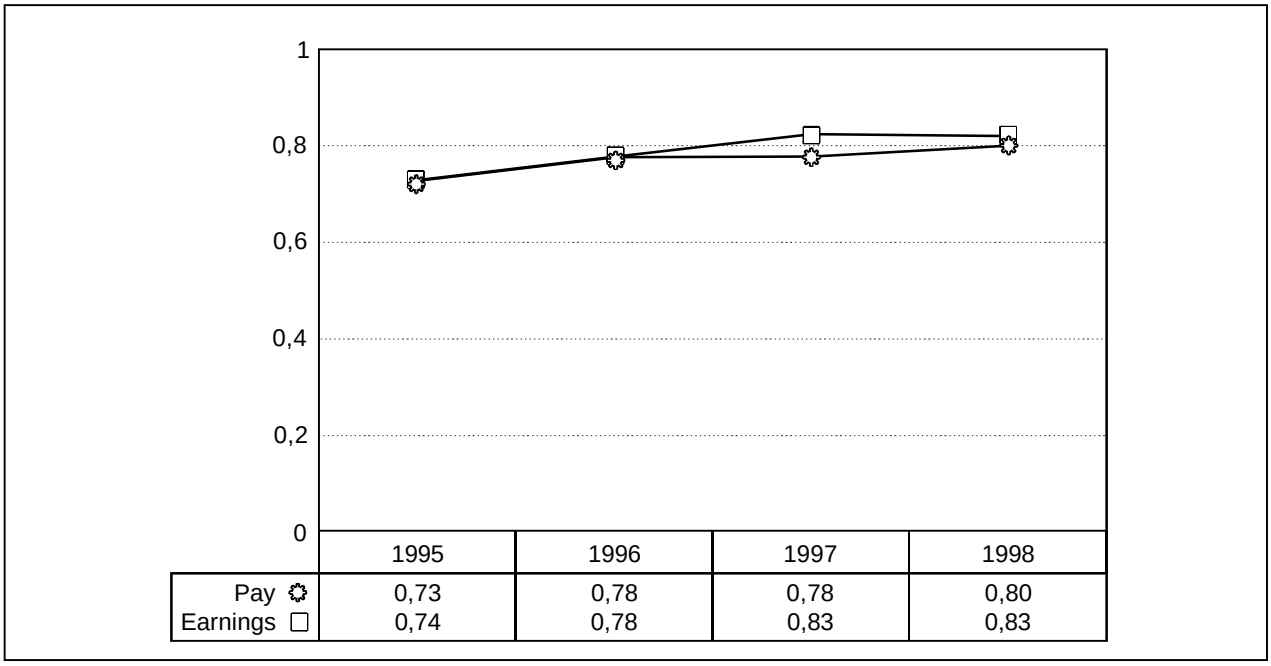
# Results

## Inequality

The Gini coefficient and the related Lorenz curve are among the most commonmethods of measuring inequality. The procedure involves ranking all income units (individuals in this analysis, households elsewhere) in ascending order of magnitude of income and then graphing the cumulative income of the units against the cumulative percentage of units. In a perfectly equal society where each unit receives the same income, the resultant Lorenz curve will coincide exactly with the diagonal. In reality the graph will be a shallower or deeper curve to the right of the diagonal.

The Gini coefficient expresses the area between the Lorenz curve and the diagonal as a fraction of the total triangle under the diagonal. In a perfectly equal society there is no area between the curve and the diagonal and the Gini coefficient is zero. In a perfectly unequal society, where one individual or household has all the income and all the others have nothing, the area between the curve and the diagonal equals the triangle and the Gini coefficient is equal to one. The nearer a Gini coefficient is to 1, the more unequal the society.[3]

Figure 1 graphs the Gini coefficients for pay and total earnings for each of the four years between




| | 1995 | 1996 | 1997 | 1998 |
|---|---|---|---|---|
| Pay | 0,73 | 0,78 | 0,78 | 0,80 |
| Earnings | 0,74 | 0,78 | 0,83 | 0,83 |

**Figure 1: Gini coefficients on pay and earnings, 1995-1998**

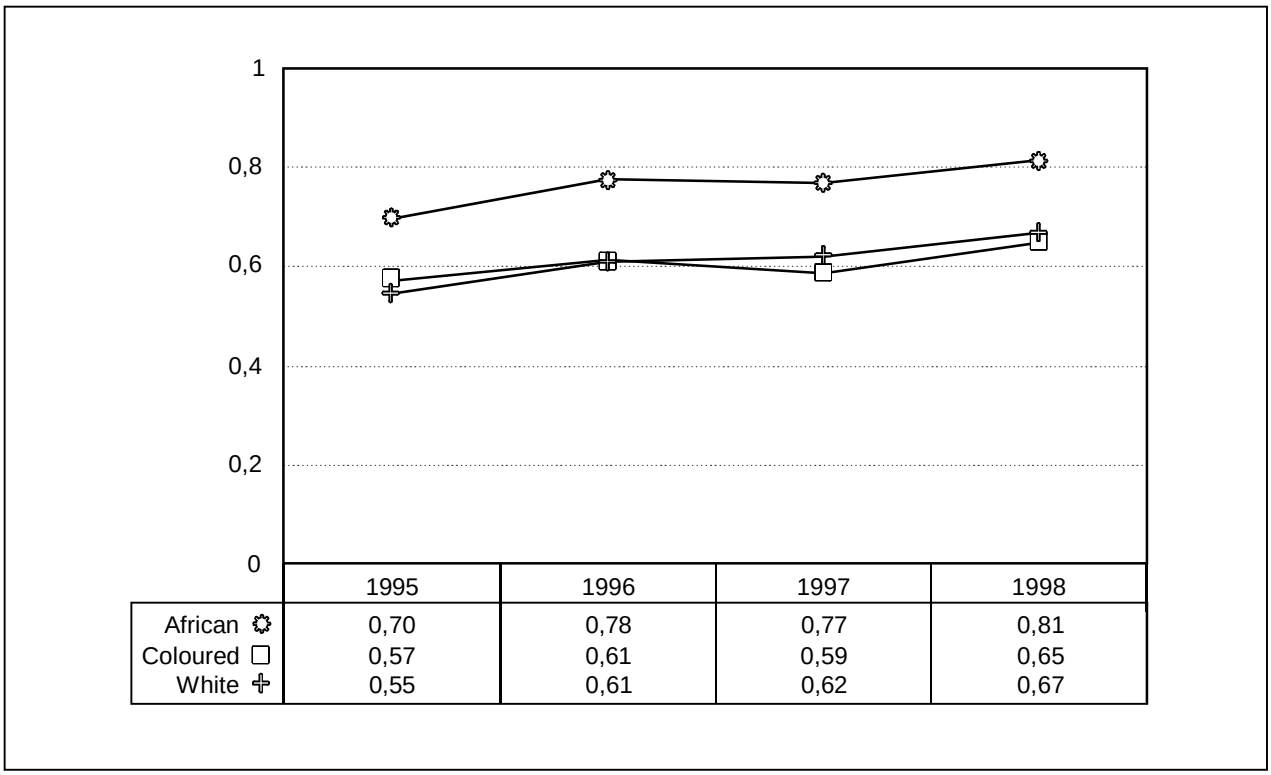
[3] The formula used to calculate the Gini coefficient[2] was as follows:
Gini= (2*covariance (Y,F(Y)))/mean(Y) where Y is income and F(Y) is the cumulative distribution of total household income in the sample (i.e. F(Y)=f(y1),…,f(yn)) where f(yi) is equal to the rank of yi divided by the number of observations (n)).
The formula used to calculate covariance was as follows:
Covariance(percap,F(Y)) = 1/n SUM((percap1-meanpercap)*(F(Y)1-meanF(Y)).
Thanks to Ingrid Woolaard for providing the formula.

1995 and 1998. The measures in respect of both pay and earnings go in the same direction, but increase faster for total earnings than for pay. The graph suggests that inequality increased in respect of both pay and total earnings over the period, but increased faster in respect of self-employed earnings than for wages and salaries.

As noted above, the income and expenditure survey of 1995 yielded an overall Gini of 0,59 based on total income or expenditure. The income and expenditure questionnaire distinguished between salary and other types of income. When the Gini calculations are done on household salary income alone, the measure rises to 0,69. Our figure here for 1995 is 0,73. The four-percentage point difference can be explained by our use of the individual as the unit. Because poorer households tend to have more members, we can expect the individual measure to be higher than that for households.

Under apartheid, population group was one of the most important determinants of an individual's income. The analysis below will show that this factor remains an important determinant of income today. Nevertheless, with a lessening of legal and other formal restrictions, one can expect more black people to have been able to access income than previously. This has not, however, been possible for everyone.

Figure 2 compares the trend in Gini coefficients for pay for African, coloured and white people over the four years. (The number of observations for Indian income-earners was felt to be too small for reliable analysis.) For all three groups the graph shows a rising trend in inequality. The level of inequality among African people is higher than that for the other groups throughout the period. The levels of inequality for the white and coloured groups are very similar throughout the period.




| | 1995 | 1996 | 1997 | 1998 |
|---|---|---|---|---|
| African | 0,70 | 0,78 | 0,77 | 0,81 |
| Coloured | 0,57 | 0,61 | 0,59 | 0,65 |
| White | 0,55 | 0,61 | 0,62 | 0,67 |

**Figure 2: Gini coefficients on pay for African, coloured and white people, 1995-1998**

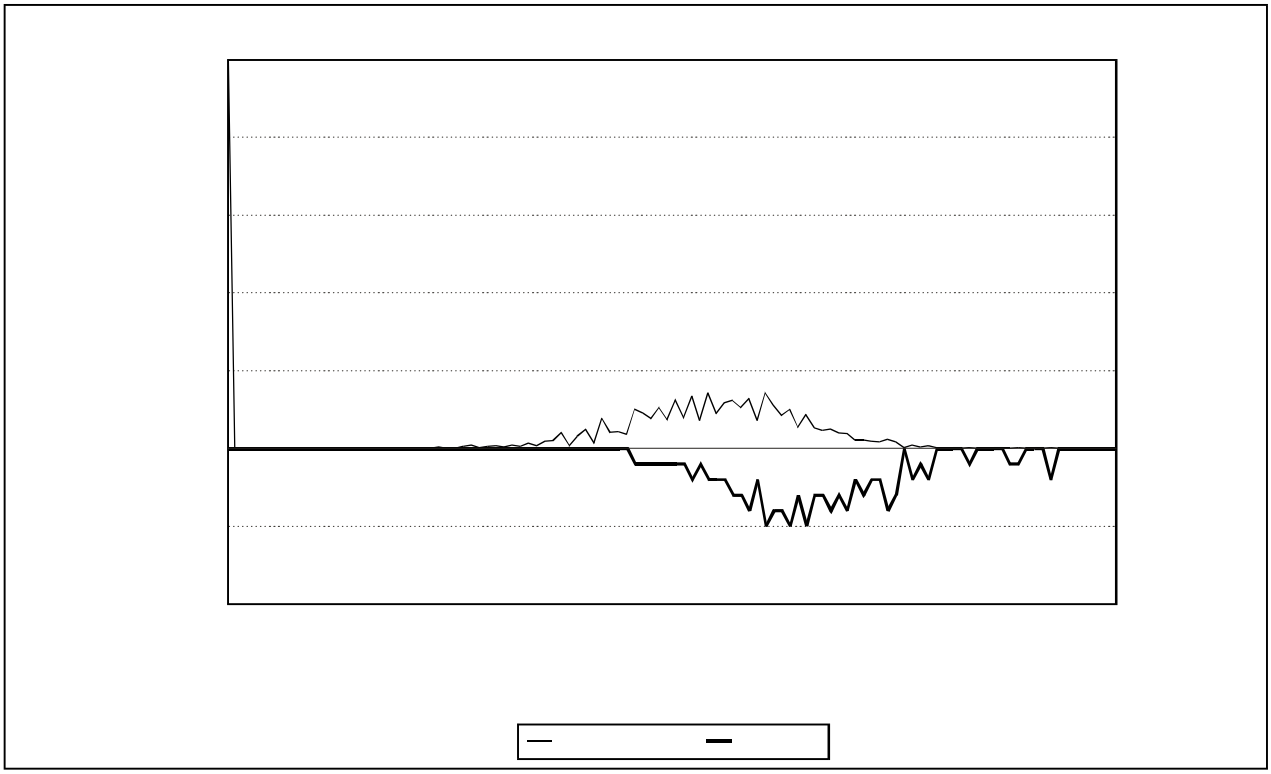


**Figure 3: Dikhanov diagram of pay, 1998**

A Dikhanov diagram represents an alternative method of illustrating inequality.[4] The diagram does not provide a single figure as the Gini does. It does, however, illustrate graphically the effects of unequal distribution. In the Dikhanov diagram, the proportion of total population (above the X axis) and the proportion of total income (below the X axis) are plotted against log income. The diagram is usually constructed in terms of total income or expenditure, where the units are households or even countries. Figure 3, following the approach adopted in the rest of this paper, is constructed on the basis of per capita pay in 1998 and the units are individuals.

The sharp initial peak above the line in Figure 3 illustrates the large proportion of individuals living in households with no income from wages or salaries. The income line at this stage is flat, and on, rather than below the line, indicating that these people account for no part of total pay income. The later humps above and below the line echo the pattern found in all Dikhanov diagrams, with population concentrated at lower levels of (log) income, but the smaller proportion of people at higher income levels accounting for a disproportionate proportion of the total income.

## Population group and gender

The Gini coefficient provides a single measure of inequality within a population or sub-group. To look at differences within the group, one needs a different form of analysis. In this section we look at

[4] Thanks to Anne Harrison for assistance with the Dikhanov diagram.

the proportion of male and female individuals within the different population groups who are at different income levels. For each year we have arrived at four income brackets which correspond roughly with the quartiles of per capita income for that year.

The cut-off points are not exact quartiles. Firstly, over 25% of the population in each year was living in households with zero earned income. This at first seems implausible as every household must have some income if it is to survive. The anomaly is explained by the fact that the analysis here looks only at earned income and excludes grants, remittances and other sources of non-earned income. The result is that the 25% cut-off points work out as zero, which does not allow for a distinction between the first and second quartile. Instead, the first category in the analysis which follows comprises those with zero per capita income, while the second category is those with non-zero income but where the income is not greater than the median.

The second complication arises because of the clustered nature of the income data given its derivation from income intervals. The result is that the 'medians' below provide a cut-off point near the mid-point of the population, but not exactly on it, while the '75%' cut-off point is near that percentage but not exactly on it. All these approximations should not, however, affect the comparability of gender and population group patterns within a particular year.

Table 1 gives the cut-off points used in the analysis as 50% (median) and 75%. The figures are counter-intuitive for 1995 when compared with the figures for 1996 through 1998 in that the earlier figures are much higher than those for the later years. The higher figures for 1995 are partly explained by the large first interval bracket in the questionnaire for that year (R1 000 as opposed to the R200 in the later three years). A further factor explaining the higher figure is the greater number of employed people given lower unemployment rates. In 1995, 34% of individuals aged 15 and above had non-zero pay recorded, compared to 28% or fewer for the later years. In 1995, 68% of all individuals were living in households with non-zero pay income, compared to only 55% of individuals in the later three years. The greater disparity between 1995 and later years in terms of percentages of earning-age individuals and percentages of households reflects clustering of employed people within the fortunate households as well as higher dependency rates within poorer households.

**Table 1: Cut-off points for categorical analysis (Rands per month)**

| Cut-off points | Category | 1995 | 1996 | 1997 | 1998 |
|---|---|---|---|---|---|
| 75% | Pay | 455 | 353 | 325 | 370 |
| | Earnings | 525 | 377 | 400 | 450 |
| 50% | Pay | 143 | 53 | 50 | 57 |
| | Earnings | 170 | 63 | 86 | 94 |

Figure 4 shows the distribution of monthly per capita income of individuals for the different population groups across the four quartiles for 1998. The differences are stark. Half of all African individuals are shown to be living in households with no wage or salary income, compared to 24% of coloured, 28% of Indian and 36% of white. At the other end of the scale, only 19% of African individuals were living in households with per capita pay of more than R370 per month, while approximately six in ten Indian and white individuals were in this position. Among the households with non-zero pay earnings, there are very few white households where pay was R370 or less per capita.

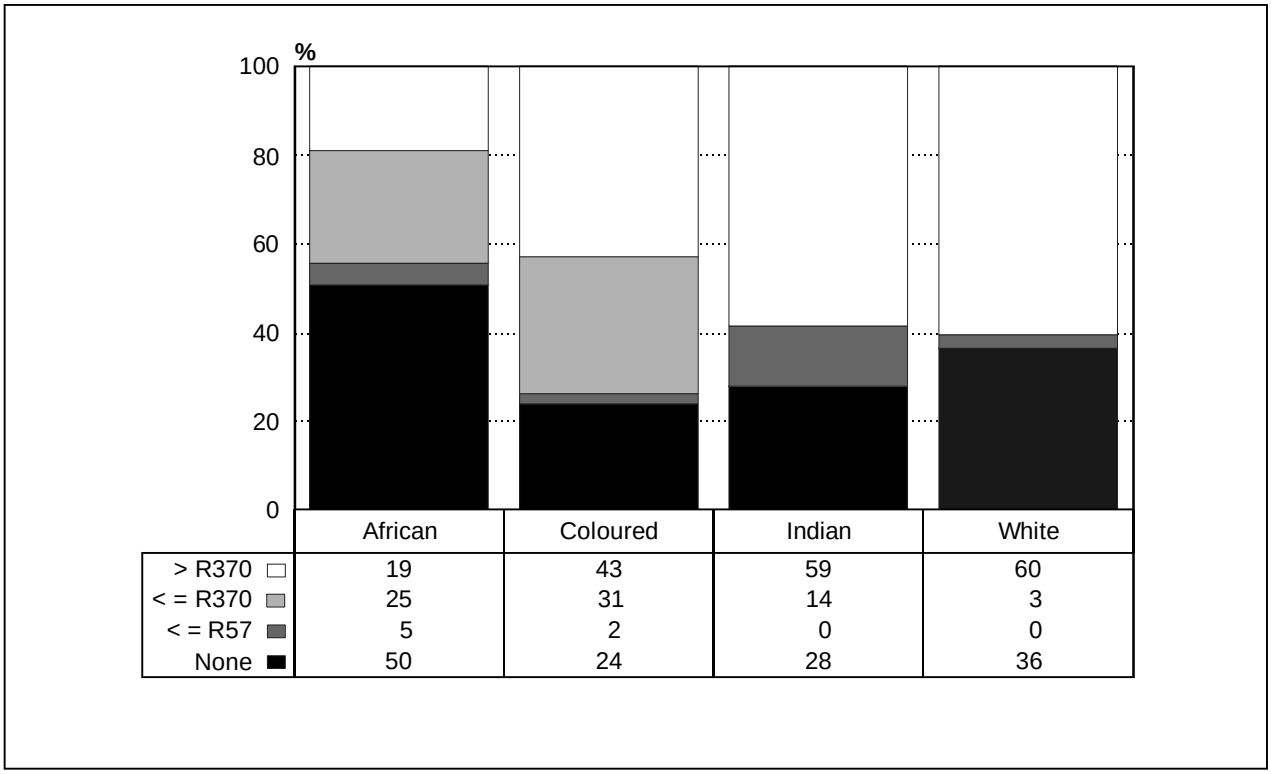



**Figure 4: Distribution of monthly per capita pay income by population group, 1998**

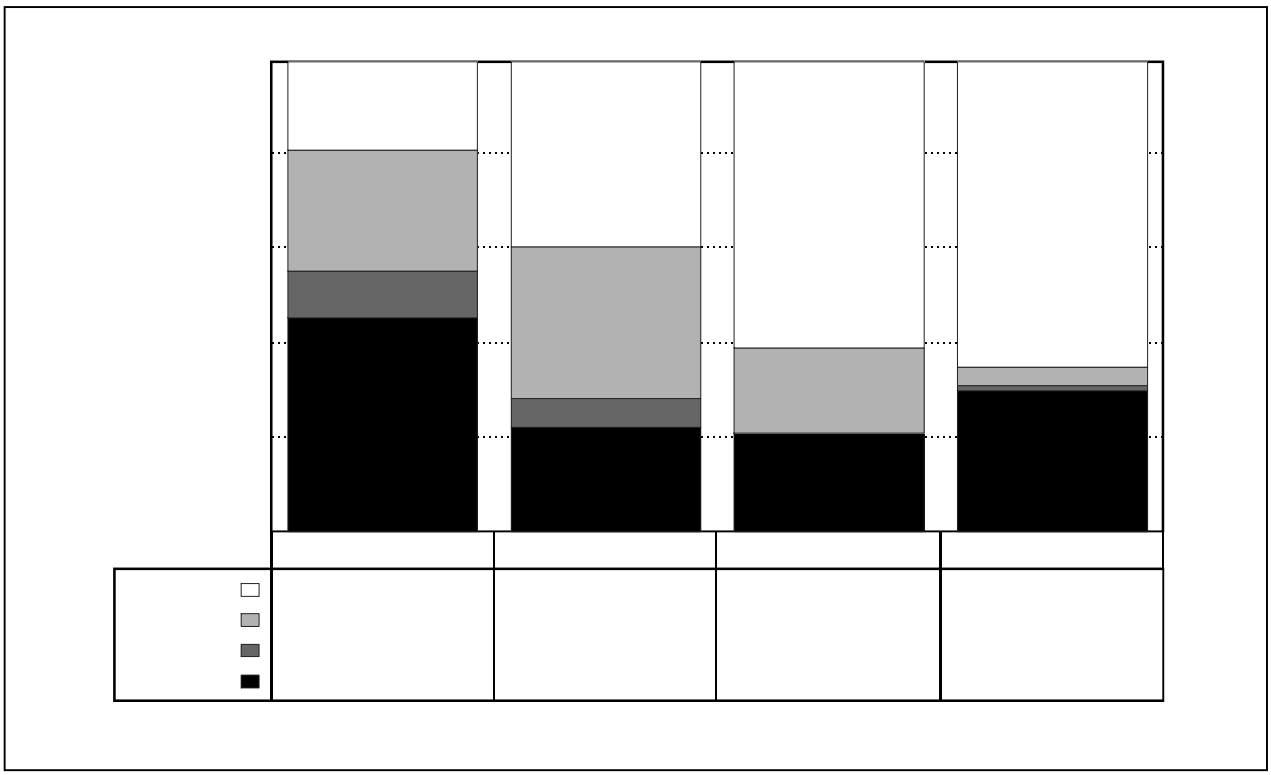


**Figure 5: Distribution of monthly per capita earnings by population group, 1998**

Figure 5 is similar to Figure 4 except that it refers to total earnings rather than only wage and salary pay. The percentage of individuals in the zero category drops for all population groups, but most markedly for the Indian group. The percentage of African people in the top category remains constant, while that for white people increases from 60% to 65%. The higher percentage of white than Indian individuals in households with zero pay income in this and the previous graph probably reflects a higher percentage of white pensioners living alone.

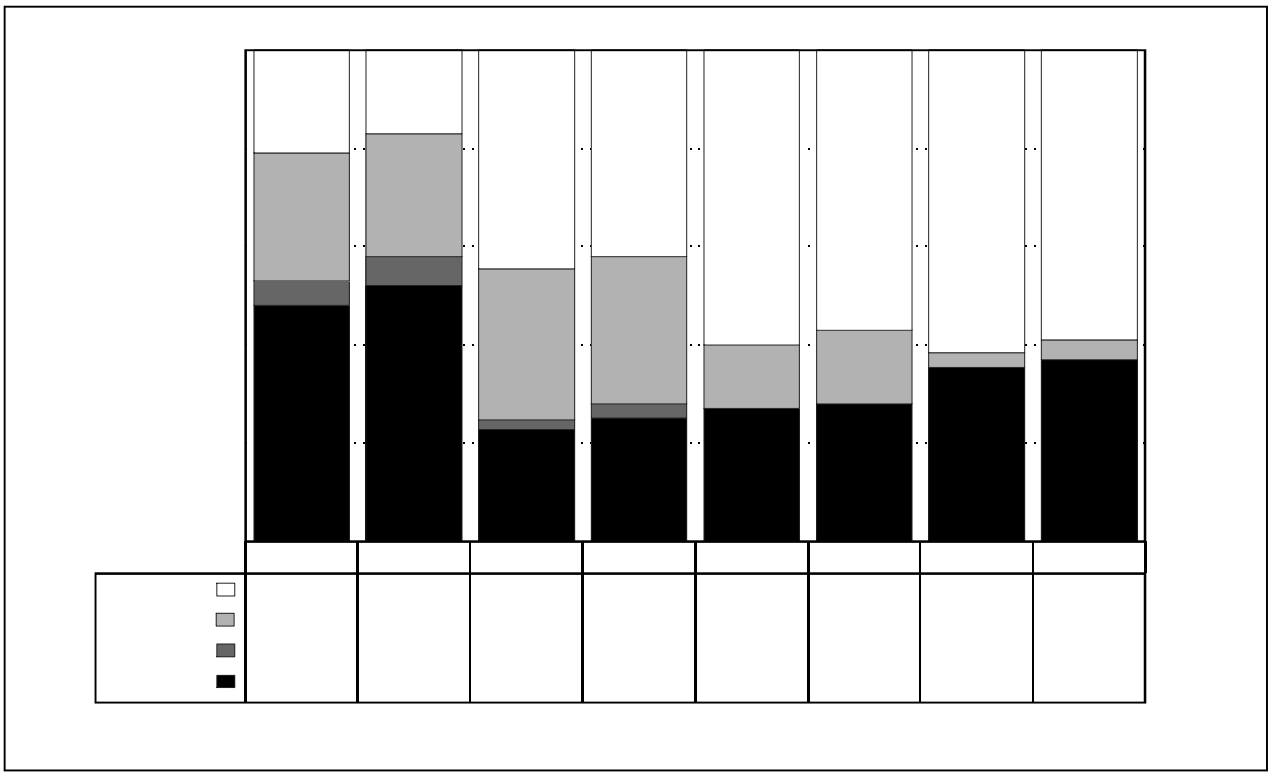


**Figure 6: Distribution of monthly per capita pay income by population group and gender, 1998**

Figure 6 elaborates Figure 5 by adding gender. It shows the percentage of individuals in each gender-population group category in the first, second, third and fourth 'quartiles' in 1998 in respect of pay. The graph shows that within each population group a larger percentage of female than male individuals live in households with zero pay income and a smaller percentage of female than male individuals live in households in the top quartile of per capita pay.

The difference between male and female individuals is consistent across all years. In each case a larger percentage of females than males are in the zero pay category and a smaller percentage are in the top pay category. Overall, then, women and girls are more likely than men and boys to be living in households in which there are no wage earners. Where there are wage earners in their households, they tend to be fewer and/or have lower pay.

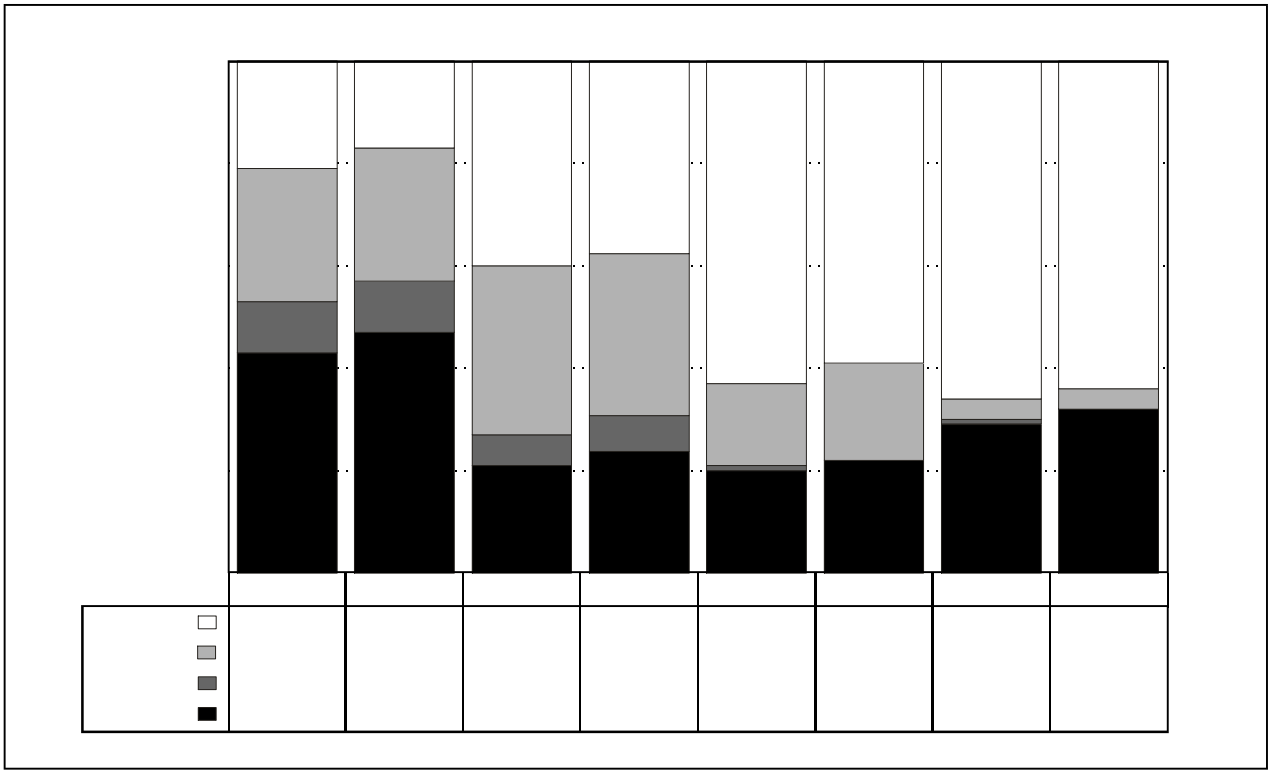


**Figure 7: Distribution of monthly per capita earnings by population group and gender, 1998**

Figure 7 completes the picture by showing the population and gender distribution across quartiles in respect of total earnings. The pattern is very similar to that in the previous graph, with larger percentages of female individuals with zero income and smaller percentages in the top quartile.

# Conclusion

The first years of post-apartheid South Africa have seen concerted attempts by the government to address the race and gender inequalities in the society. In respect of employment these initiatives include the Employment Equity Act which came into operation in late 1999. The preceding pages have examined what has happened in terms of the distribution of earned income among male and female SouthAfricans from different population groups, before this date.

Overall the analysis suggests that the country still has high levels of inequality – levels which appear to be somewhat higher than they were in 1994. This is to be expected given the rising level of unemployment over the period.

In terms of population group, the inequalities within the African group have increased. The explanation for this phenomenon is more positive as it reflects the fact that more African people have been able to access higher-paying positions over the last few years. In terms of gender, the patterns are consistent over the period. Females are more likely than males to live in households with no earned income. Where there is earned income, it is likely to be lower than that of households in which males live.

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Chapter 5

# Income distribution in South Africa: a social accounting matrix approach

Anemé Malan

## Introduction

Apartheid left a legacy of poverty and inequality in South Africa. Despite the wealth of the country – South Africa's average level of per capita income ranks it amongst the world's upper middle-income countries (Malan, 1998:109) – a large proportion of the population has not benefited from SouthAfrica's resources.

The aim of this paper is to show how a social accountingmatrix (SAM)may be used to analyse South Africa's income distribution. Analysis of households is an important feature of a SAM. Comprehensive and reliable data on households are therefore essential in order to use this analytical tool. Important data sources for the compilation of a SAM are those derived from South Africa's population census, the income and expenditure survey (IES) and the October household surveys (OHS) conducted by Stats SA.

The SAM is an extension of the conventional input-output (I-O) framework with emphasis on the household sector. The emphasis on households is particularly significant, since the SAM provides a framework, within the context of national accounts, in which the activities of households are clearly distinguished. Indeed the household is the basic unit within which significant decisions are taken on important economic variables such as expenditure and saving. The development of the SAM, with the household as the focal point, should be viewed against the fact that conventional national accounts often do not provide sufficient information, nor a framework, to properly investigate and address important policy issues, such as household income distribution, personal savings and employment.

The I-O table is a widely used matrix framework providing detailed and coherently arranged information on the flow of goods and services, and on the structure of production costs. Disaggregated linkages between the industries (sectors) in the I-O framework are further developed in the supply and use tables (SU-tables), through a specification of output of product groups by industry.The SU-tables opt for a structure of rows and columns, which is most suitable to describe the economic processes under consideration, namely the process of production and consumption of products. However, these matrices do not incorporate the interrelations between value added and final expenditure. By extending the I-O framework, to show the entire circular flow of income at a meso-level, one captures an essential feature of a SAM.

A SAM can therefore be defined as a presentation of national accounts in a matrix that elaborates on the linkages between SU-tables and institutional sector accounts. It is a presentation of the System of National Accounts (SNA) in matrix terms which incorporates whatever degree of detail might be of special interest. To date, builders of SAMs have exploited the available flexibility to highlight special interests and concerns, to display the various interconnections, and to disaggregate the household sector to show the link between income generation and consumption. The power of a SAM, as well as the System of NationalAccounts (SNA), comes from choosing the appropriate type of disaggregation to study the topic of interest. In addition to a flexible application and the inclusion of various

components, a SAM may incorporate more extensive adjustments, of satellite accounting nature, to meet specific analytical purposes.

## Income distribution and the social accountingmatrix

This paper is based on the final SAMs for South Africa for 1978 and 1988 and the preliminary unpublished SAM for 1993. These were all based on the 1968 SNA. To distinguish between income categories or groups the 1978, 1988 and 1993 SAMs provided for five income categories (quintiles) for each population group. In 1988 and 1993 a sixth income category was obtained by dividing the top quintile into two deciles, i.e. 81-90% and 91-100%, compared with the seven income categories that were used for the 1978 SAM where the fifth quintile was divided into three, i.e. 81-90%, 91-95% and 96-100%. To define income categories, households were identified first, after which a per capita household income was allocated to each member of the household by dividing the total income of a household by the number of members in that household. By definition the average of all such per capita household incomes (e.g. over all households) is equal to the per capita income of the population, in other words the total personal income per head of the population. The same applies per population group.

Quintiles are based on households ranked by per capita household income. In order to isolate the economic behaviour of the very rich, the top quintile (Q5)wasfurther subdivided (cf. Table 1). Given the wide differences in mean income between population groups, it was impossible to develop a single income stratification that would provide workable detail for each race. Consequently income groupings were chosen separately for each race, based solely on within race income distributions. Income class designations are usually preceded with a letter designation indicating the relevant population group, e.g.A (African), C (coloured), I (Indian) and W (white).

Table 1: Income class (household per capita income) designation

| Quintile (income category) | Percentage of the population | Population numbers by quintile: June 1988* 1 000 | | | | |
|---|---|---|---|---|---|---|
| | | African | Coloured | Indian | White | Total |
| Q1 | 0-20 | 5 294 | 629 | 189 | 994 | 7 106 |
| Q2 | 21-40 | 5 294 | 629 | 189 | 994 | 7 106 |
| Q3 | 41-60 | 5 294 | 629 | 189 | 994 | 7 106 |
| Q4 | 61-80 | 5 294 | 629 | 189 | 994 | 7 106 |
| Q51 | 81-90 | 2 647 | 315 | 95 | 497 | 3 554 |
| Q52 | 91-100 | 2 647 | 315 | 95 | 497 | 3 554 |
| **Total** | | **26 472** | **3 146** | **947** | **4 969** | **35 532** |

***Based on the results of the 1991 population census.**
**Source: Final social accountingmatrix for South Africa, 1988 – Report No. 04-03-02 (1988)**

As the SAM is an input-output model, it suffers from the same limitations as all I-O models i.e. they are static models based on linear homogeneous production functions. In using an I-O framework for forecasting, it is assumed that the direct (or technical) coefficients remain constant for the forecast period. This implies that neither input substitution owing to price changes, nor technological changes, take place. The analysis, therefore, is only an indication, since it investigates the potential effects of income redistribution on the basis of an existing (fixed) set of relationships. The current distribution of income in SouthAfrica, as well as expenditure patterns of the different income groups is quantified. Analysis of expenditure patterns indicates aggregate demand shifts that could occur, as relative income balances shift between the different groups in the future. The effect of income redistribution on current economic activity is indicated in this paper, since it affects the long-term growth potential of the economy and has implications for economic policy.

A key characteristic of the SAM is the stratification of households in ways that facilitate analyses of the impact of income redistribution. The first disaggregation is by population group, paralleling existing classifications used in the SouthAfrican statistical system. Within these groups, households are further subdivided into income categories (quintiles) based on per capita household incomes. Household incomes in turn are divided into income from property, wage income from thirteen occupational categories, transfer payments from government, and transfers from relatives. Conventionally, income distribution patterns are examined on the basis of individual earnings.

The SAM, however, uses per capita incomes calculated for the household unit for two reasons. Firstly, there is a wide variation in the number of workers per household, as well as in dependency ratios. The variation is bound both within and between population groups, reflecting South Africa's cultural heterogeneity as well as social and economic conditions affecting employment. Deriving per capita figures for each household establishes a common basis for comparison between groups. Secondly, the household, and not the individual, is taken as the effective expenditure unit. Thus, income categories defined in the SAM relate directly to consumption pattern differentials.

In order to stratify the population by income class, each population group was divided into quintiles based on per capita household incomes. The abbreviated notation for these classes is given in Table 1.

**Income distribution in SouthAfrica**

Comparative income data from the 1978, 1988 and 1993 SAMs are presented in Table 2. Population shares are given for the purpose of comparison. As may be expected, Africans provide the two extremes.Whereas for 1993, 76,0% of the RSA population received 45,2% of personal income, and whites, constituting 12,8% of the population received 41,9% of the income. This share distribution indicates a slight improvement from 1978 when Africans constituted 72,4% of the population and received 27,1% of personal income, and whites, constituting 15,8% of the population, received 62,4% of the income.

Table 2: Income distribution in the South African economy

| Population | Population shares (% of total) | | | Annual personal income (income as % of the total) | | | Annual personal per capita income** (Rands) | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1978 | June 1988* | 1993* | 1978 | 1988 | 1993 | 1978 | 1988 | 1993 |
| African | 72,4 | 74,5 | 76,0 | 27,1 | 33,7 | 45,2 | 352 | 1 679 | 4 180 |
| Coloured | 9,0 | 8,9 | 8,6 | 7,4 | 8,1 | 9,4 | 771 | 3 373 | 7 737 |
| Indian | 2,8 | 2,7 | 2,6 | 3,1 | 4,0 | 3,5 | 1 043 | 5 529 | 9 691 |
| White | 15,8 | 14,0 | 12,8 | 62,4 | 54,3 | 41,9 | 3 719 | 14 405 | 22 970 |
| **Total** | **100,0** | **100,0** | **100,0** | **100,0** | **100,0** | **100,0** | **940** | **3 712** | **7 038** |

*** Based on the results of the 1991 population census.**
**** The total personal income per head of the population.**
**Sources: Stats SA (1993 and 1995) and CEAS (1986)**

The number of individuals in each quintile differs significantly between population groups. Themore relevant comparisons in Table 2 are therefore between per capita household incomes for each group. Per capita incomes forAfrican households of R4 180 per annum for 1993 are almost one-half of that of the coloureds and Indians and less than one-fifth of the per capita income of the whites. This indicates an improvement from 1978, with income for African households of R352 per annum remaining almost the same in relation to coloured households but improving slightly from the one-third of Indian and the one-tenth of white households.

Table 3: Propensity to save* by quintile (%)

| Quintile | African | | | Coloured | | | Indian | | | White | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1978 | 1988 | 1993 | 1978 | 1988 | 1993 | 1978 | 1988 | 1993 | 1978 | 1988 | 1993 |
| Q1 | 0,22 | 0,50 | 1,30 | 0,00 | 0,00 | 0,00 | 0,00 | 0,96 | 3,02 | 7,36 | 2,39 | 2,32 |
| Q2 | 1,40 | 0,52 | 1,17 | 1,04 | 1,03 | 1,31 | 1,28 | 0,77 | 2,55 | 5,57 | 1,99 | 2,17 |
| Q3 | 0,65 | 1,15 | 2,58 | 2,37 | 1,22 | 1,59 | 1,70 | 0,89 | 3,07 | 4,86 | 2,70 | 3,12 |
| Q4 | 3,77 | 2,29 | 5,33 | 6,42 | 3,51 | 4,93 | 1,98 | 0,88 | 3,11 | 7,47 | 2,80 | 3,12 |
| Q51 | 5,89 | 2,60 | 6,50 | 10,90 | 4,73 | 6,95 | 3,04 | 1,61 | 5,77 | 12,20 | 3,75 | 4,26 |
| Q52 | 7,89 | 2,56 | 7,15 | 13,23 | 5,67 | 8,29 | 6,03 | 2,26 | 8,14 | 20,01 | 7,60 | 7,80 |
| **Total** | **5,30** | **2,05** | **5,13** | **8,23** | **3,64** | **5,06** | **3,25** | **1,33** | **4,67** | **11,17** | **3,87** | **4,22** |

*** Savings as percentage of personal disposable income.**
**Sources: Stats SA (1993 and 1995) and CEAS (1986)**

As may be expected, saving rates generally increase with higher incomes. In 1993 white savings averaged 4,0% of personal disposable income compared to an average saving rate of 5,0% for Africans as seen in Table 3. This represents an improvement in the average saving rate among Africans from the 1988 average of 2,0%.

Table 4: Tax patterns in South Africa* (%)

| Quintile | Direct tax | | | Indirect tax | | |
|---|---|---|---|---|---|---|
| | **1978** | **1988** | **1993** | **1978** | **1988** | **1993** |
| A-Q1 | 0,68 | 0,29 | 2,69 | 5,09 | 12,08 | 12,36 |
| A-Q2 | 0,67 | 0,19 | 1,56 | 5,54 | 9,35 | 8,45 |
| A-Q3 | 0,62 | 0,36 | 2,85 | 6,27 | 9,59 | 8,51 |
| A-Q4 | 2,76 | 0,89 | 7,09 | 6,55 | 8,43 | 7,46 |
| A-Q51 | 3,28 | 1,79 | 14,16 | 6,26 | 7,03 | 6,21 |
| A-Q52 | 2,75 | 3,35 | 25,97 | 7,40 | 11,95 | 10,33 |
| **African** | **2,49** | **1,78** | **14,10** | **6,71** | **9,84** | **8,69** |
| C-Q1 | 0,00 | 0,00 | 0,00 | 6,89 | 12,45 | 11,76 |
| C-Q2 | 0,63 | 1,21 | 3,42 | 8,46 | 10,84 | 10,43 |
| C-Q3 | 2,00 | 1,48 | 4,28 | 7,87 | 9,31 | 9,16 |
| C-Q4 | 4,08 | 5,01 | 14,46 | 7,43 | 9,38 | 9,19 |
| C-Q51 | 5,96 | 6,99 | 20,11 | 7,08 | 7,95 | 7,77 |
| C-Q52 | 8,85 | 6,87 | 19,76 | 6,88 | 7,49 | 7,32 |
| **Coloured** | **5,36** | **4,86** | **13,95** | **7,30** | **8,81** | **8,59** |
| I-Q1 | 0,00 | 1,83 | 2,26 | 6,30 | 8,74 | 9,15 |
| I-Q2 | 1,01 | 2,89 | 3,75 | 7,49 | 8,09 | 8,87 |
| I-Q3 | 2,64 | 5,23 | 6,94 | 7,26 | 7,85 | 8,80 |
| I-Q4 | 3,90 | 8,64 | 11,66 | 7,01 | 7,27 | 8,30 |
| I-Q51 | 4,99 | 12,70 | 17,05 | 6,48 | 7,29 | 8,28 |
| I-Q52 | 8,28 | 16,13 | 21,43 | 5,27 | 5,81 | 6,52 |
| **Indian** | **4,90** | **9,80** | **13,00** | **6,39** | **7,14** | **8,01** |
| W-Q1 | 6,40 | 9,37 | 5,58 | 6,68 | 6,96 | 6,35 |
| W-Q2 | 8,65 | 14,12 | 9,34 | 6,49 | 7,12 | 7,23 |
| W-Q3 | 10,13 | 16,86 | 11,88 | 6,26 | 6,91 | 7,47 |
| W-Q4 | 12,33 | 16,69 | 11,40 | 5,98 | 7,28 | 7,62 |
| W-Q51 | 14,17 | 20,76 | 14,60 | 5,55 | 7,15 | 7,71 |
| W-Q52 | 14,64 | 21,29 | 13,78 | 4,89 | 7,09 | 7,04 |
| **White** | **12,24** | **17,71** | **11,91** | **5,73** | **7,11** | **7,33** |

*** Tax payments as percentage of total household per capita income.**
**Note: It is assumed that in the case of indirect taxes on both final and intermediate products, tax payment is shifted onto the final consumer.**
**Source: Stats SA**

Within each group, the higher per capita income quintiles save considerably more than the lower incomes. The decline in white savings rates at the middle-income levels is atypical in 1978 and 1988 as seen by the 1993 figure. It is also informative to note that the propensity to save of all four population groups decreased from 1978 to 1988 but shows an improvement for 1993.

**Tax patterns of households**

The structure of taxes paid by population group and income level is illustrated in Table 4. Direct tax, which consists of personal income tax, reflects a strongly progressive structure. Indirect taxes, inclusive of general sales tax/value added tax and other indirect taxes, have a slightly regressive structure. Indirect taxes paid by the different population groups remained almost unchanged from 1978 to 1993, while the payment of direct taxes increased for every population group except whites. The latter is in accordance with the income distribution patterns in South Africa (cf. Table 3). This resulted in a total tax structure that is just barely progressive in each case.

## The economic impact of changing the distribution of income

A SAM can be used to evaluate the potential impacts of policy changes or developmental programmes on various households or population groups. King (Malan, 1998:105) gives some examples of using the SAM in achieving this through the analysis of multipliers; for identifying areas of the economy which will not be affected by particular changes in expenditures; and for analysing regional effects from development projects on the domestic economy.

The variousmultipliers are computed with the aid of inverse coefficients. They represent the sum total of the multiplier effects of the various industries. Multipliers can measure the effect of an external variable on the economy. This measurement can be refined if the direct, indirect and the derived impacts of the variable are taken into account.Measurement of the impact by means of multipliers can be done for example in terms of production, income, capital formation and employment.

The simplest impactmultiplier in respect of an individual industry is known as the Type I multiplier. It can be calculated for each industry by adding the relevant elements of the inverse-coefficientsmatrix. A Type I industry multiplier does not give a complete picture of the impact in cases where the change of a variable has a dual interlinked interaction effect. The Type II multiplier is calculated similarly to Type I, except that the household sector is taken into account, ensuring that allowance is made for the reciprocal relationship between income and consumption, and between consumption and income.

Different kinds of Type II multipliers can be calculated depending on the way in which the marginal propensity to consume is estimated for the output of each industry namely:

- output multipliers, which measure the direct, indirect and derived output impact for a particular industry in rand units for each R1, change in an autonomous component of final demand;
- income multipliers, which reflect the change in value added, that is directly, indirectly and derivatively attributable to an autonomous change in the demand for the final output of an industry;
- capital multipliers, which reflect the need for net domestic fixed investment as a result of an autonomous change in the final demand for the output of the industry, concerned; and
- employment multipliers which reflect the need for employment arising from an autonomous change in the final demand for the output of an industry.

In this paper the Type II income multipliers were calculated from the information contained in the 1978, 1988 and 1993 SAMs. These multipliers reflect comprehensive multiplier effects within the economy, since not only inter-industry interactions are included, but also the relationships between

income and consumption, consumption and production, and, finally, production and income. The relationship between the initial spending and the total effects generated by the spending is known as the multiplier effect of the sector, or more generally, as the impact of the sector on the economy. For this reason the study ofmultipliers is also known as impact analysis.

The strength of impact analysis is that it can provide a sensitivity analysis. It allows effective comparisons to be made for the impact of demand between all sectors for a range of economic variables such as total output, value added, remuneration and imports. It differs from a modelling approach, which allows for detailed numerical values of all elements of the SAM as well as of related economic variables to be computed.

Given the income inequalities that exist in South Africa, the effects of several redistributive options can be simulated. The most logical simulation is to allow the income of other groups, especially Africans, to grow proportionately faster than whites. It must, however, be stressed that the calculations below are for illustrative purposes only. Implementation methods are not addressed nor are possible broader consequences that could be seen in a general equilibrium framework.

**Impact on the present level of economic activity**

The impact of different income growth rates for the higher income groups (mostly whites) and the lower income groups (specifically Africans), can be measured against gross domestic product (GDP) and increased demand for import per unit of income. Direct consequences are included as well as indirect consequences which exist because of linkages between sectors of the economy. Effects on GDP and imports per unit of income are expressed asmultipliers.

*Impact on gross domestic product:* GDP multipliers per unit of incomemeasure the effect of a change in income (households' per capita income) on the economy e.g. through the redistribution of income into changes in GDP rather than translating final demand into total value of sectoral output. These multipliers then give an indication of the additional GDP created throughout the entire economy due to an increase in demand for a specific sector's output.

In Table 5, GDP multipliers per unit of income are presented in order tomeasure the effect of a change in income (of households) on the economy. By means of the mutual comparison of the multipliers in respect of the different income groups it can be determined which group has the biggest effect on the GDP, given a change in income. These multipliers increase as per capita household income declines. The total 1993 GDP multiplier forAfrican households, for example, is 1,23, which is higher than the one for white (1,03), Indian (1,17) and coloured (1,18) households. This means that if the income of African households increases by R1-00, and if the additional income is spent according to existing expenditure patterns, then the GDP will increase by R1-23. Similar patterns appear within groups. This finding implies that a redistribution of income from the higher to the lower income groups will, *ceterus paribus* (i.e. other things being equal), lead to an increase in GDP. GDP multipliers of less than 1,0 are estimated for the richest 20% of whites.

*Impact on imports:* The leakage effect attributed to imports is also regressive, as is the case with total GDPmultipliers. Total import coefficients (imports per unit of income) decrease as per capita income

Table 5: Gross domestic product generated per unit of income

| Quintile | Year | | |
|---|---|---|---|
| | 1978 | 1988 | 1993 |
| A-Q1 | 1,27 | 1,29 | 1,30 |
| A-Q2 | 1,28 | 1,28 | 1,30 |
| A-Q3 | 1,29 | 1,27 | 1,28 |
| A-Q4 | 1,22 | 1,25 | 1,26 |
| A-Q51 | 1,19 | 1,25 | 1,26 |
| A-Q52 | 1,15 | 1,14 | 1,15 |
| **African** | **1,20** | **1,22** | **1,23** |
| C-Q1 | 1,27 | 1,25 | 1,27 |
| C-Q2 | 1,23 | 1,23 | 1,25 |
| C-Q3 | 1,20 | 1,24 | 1,26 |
| C-Q4 | 1,13 | 1,17 | 1,18 |
| C-Q51 | 1,05 | 1,14 | 1,15 |
| C-Q52 | 0,99 | 1,13 | 1,14 |
| **Coloured** | **1,09** | **1,17** | **1,18** |
| I-Q1 | 1,29 | 1,27 | 1,28 |
| I-Q2 | 1,23 | 1,26 | 1,27 |
| I-Q3 | 1,21 | 1,23 | 1,24 |
| I-Q4 | 1,20 | 1,18 | 1,19 |
| I-Q51 | 1,17 | 1,12 | 1,12 |
| I-Q52 | 1,11 | 1,07 | 1,08 |
| **Indian** | **1,17** | **1,16** | **1,17** |
| W-Q1 | 1,08 | 1,16 | 1,17 |
| W-Q2 | 1,07 | 1,09 | 1,10 |
| W-Q3 | 1,06 | 1,05 | 1,06 |
| W-Q4 | 1,00 | 1,04 | 1,05 |
| W-Q51 | 0,92 | 0,97 | 0,98 |
| W-Q52 | 0,83 | 0,93 | 0,93 |
| **White** | **0,96** | **1,02** | **1,03** |

**Source: Stats SA**

increases. According to Table 6, the average import leakage effect is 19% for African expenditures, compared with 15% for white expenditures for 1978, against 21% forAfrican expenditures and 17% for white expenditures for 1993. Table 6 distinguishes between direct and indirect import leakages. Direct import leakages, seen in isolation, are progressive, as the theory would suggest. The rich tend to spend more of their money on imported goods and services. Watches, cameras, electronic equipment and especially automobiles are examples of income-elastic goods with a high import content.

The poor, however, have substantially greater propensities to consume than do the rich. Their domestic expenditures stimulate production throughout the economy. This production requires intermediate goods and services, both from within and outside South Africa. This higher stimulus from expenditures of the poor generates a similarly higher demand for imported intermediate goods

Table 6: Impact on imports per unit income

| | Total | | | Direct | | | Indirect | | |
|---|---|---|---|---|---|---|---|---|---|
| | **1978** | **1988** | **1993** | **1978** | **1988** | **1993** | **1978** | **1988** | **1993** |
| A-Q1 | 0,20 | 0,22 | 0,22 | 0,02 | 0,03 | 0,03 | 0,18 | 0,19 | 0,19 |
| A-Q2 | 0,20 | 0,22 | 0,22 | 0,03 | 0,03 | 0,03 | 0,18 | 0,19 | 0,19 |
| A-Q3 | 0,21 | 0,22 | 0,22 | 0,03 | 0,03 | 0,03 | 0,18 | 0,19 | 0,19 |
| A-Q4 | 0,20 | 0,22 | 0,22 | 0,04 | 0,03 | 0,03 | 0,17 | 0,19 | 0,19 |
| A-Q51 | 0,19 | 0,22 | 0,22 | 0,04 | 0,03 | 0,03 | 0,16 | 0,19 | 0,19 |
| A-Q52 | 0,19 | 0,20 | 0,20 | 0,03 | 0,03 | 0,03 | 0,16 | 0,17 | 0,17 |
| **African** | **0,19** | **0,21** | **0,21** | **0,03** | **0,03** | **0,03** | **0,17** | **0,18** | **0,18** |
| C-Q1 | 0,21 | 0,21 | 0,21 | 0,04 | 0,03 | 0,03 | 0,18 | 0,18 | 0,18 |
| C-Q2 | 0,20 | 0,21 | 0,21 | 0,04 | 0,03 | 0,03 | 0,17 | 0,18 | 0,18 |
| C-Q3 | 0,20 | 0,21 | 0,21 | 0,04 | 0,04 | 0,04 | 0,16 | 0,18 | 0,18 |
| C-Q4 | 0,18 | 0,20 | 0,20 | 0,05 | 0,03 | 0,03 | 0,14 | 0,17 | 0,17 |
| C-Q51 | 0,17 | 0,19 | 0,19 | 0,05 | 0,03 | 0,03 | 0,13 | 0,17 | 0,16 |
| C-Q52 | 0,16 | 0,19 | 0,19 | 0,05 | 0,03 | 0,03 | 0,12 | 0,16 | 0,16 |
| **Coloured** | **0,18** | **0,20** | **0,20** | **0,05** | **0,03** | **0,03** | **0,16** | **0,17** | **0,17** |
| I-Q1 | 0,20 | 0,21 | 0,21 | 0,04 | 0,03 | 0,03 | 0,16 | 0,18 | 0,18 |
| I-Q2 | 0,20 | 0,21 | 0,21 | 0,05 | 0,03 | 0,03 | 0,15 | 0,18 | 0,18 |
| I-Q3 | 0,19 | 0,20 | 0,20 | 0,05 | 0,03 | 0,03 | 0,15 | 0,18 | 0,17 |
| I-Q4 | 0,19 | 0,20 | 0,20 | 0,05 | 0,03 | 0,03 | 0,14 | 0,17 | 0,17 |
| I-Q51 | 0,19 | 0,19 | 0,19 | 0,06 | 0,03 | 0,03 | 0,13 | 0,16 | 0,16 |
| I-Q52 | 0,18 | 0,18 | 0,18 | 0,06 | 0,03 | 0,03 | 0,13 | 0,15 | 0,15 |
| **Indian** | **0,19** | **0,20** | **0,20** | **0,06** | **0,03** | **0,03** | **0,14** | **0,17** | **0,17** |
| W-Q1 | 0,17 | 0,19 | 0,19 | 0,05 | 0,03 | 0,03 | 0,12 | 0,16 | 0,16 |
| W-Q2 | 0,16 | 0,18 | 0,18 | 0,06 | 0,02 | 0,02 | 0,11 | 0,16 | 0,16 |
| W-Q3 | 0,16 | 0,17 | 0,17 | 0,06 | 0,02 | 0,02 | 0,11 | 0,15 | 0,15 |
| W-Q4 | 0,15 | 0,17 | 0,17 | 0,06 | 0,02 | 0,02 | 0,10 | 0,15 | 0,15 |
| W-Q51 | 0,14 | 0,16 | 0,16 | 0,06 | 0,02 | 0,02 | 0,09 | 0,14 | 0,14 |
| W-Q52 | 0,13 | 0,15 | 0,15 | 0,06 | 0,02 | 0,02 | 0,08 | 0,13 | 0,13 |
| **White** | **0,15** | **0,17** | **0,17** | **0,06** | **0,02** | **0,02** | **0,09** | **0,15** | **0,15** |

**Source: Stats SA**

and services. Thus the indirect import multiplier is regressive, not because the final demand of the poor is more import intensive, but because their demand rises more sharply with higher income levels.

Dominated by indirect demand for imports, the overall import multiplier is regressive in structure. This is an important finding, often overlooked by researchers. It is clear that income redistribution toward the poor will result in an increase in GDP, but at the cost of an increase in demand for import. Part of this cost could be ameliorated by import substitution policies taken in conjunction with redistributive decisions.

**Redistribution options**

The coefficients in the above tables can be manipulated to show the effects of specific redistribution options. This part of the paper examines the pattern of expenditure for an equal income increment received by either whites or Africans. These differences underlie the effects of any relative change in the level of African and white income. Table 7 examines the situation where government is able to direct the next one per cent of growth in personal income (resulting from an influx of money from outside South African borders) to either all whites or to poor Africans. The stratum A-Q2 (Africans between the 20$^{th}$ and 40$^{th}$ percentiles) is used as a midpoint and therefore proxy for the poorer 60% of the African population. In each column, the additional income is assumed to be distributed among recipients in proportion to their current income, i.e. everyone gets the same percentage increase. The recipient groups were of similar size in 1988 (5,0 million total whites and 5,3 million Africans in A-Q2). The 1988 SAM identifies R132 billion in total personal income. Thus either group, hypothetically, could receive R1 320million. Given the similarity in the size of the groups, per capita rand receipts are not widely different. Expressed as a percentage of present incomes, however, the comparison is dramatic – R1 320 million would increase white income by 1,8% while it would raise incomes of Africans in A-Q2 by 34,4%.

As discussed earlier, personal savings and total taxes are lower (cf. Tables 8 and 9) and total import demand is higher (cf. Table 6) for incomes received by poor Africans. However, incomes received by A-Q2 will also result in 21% greater stimulus to domestic aggregate demand than similar incomes received and distributed proportionally among all whites.

Table 7: Approximate indicators of the effects of some altered income distributions in South Africa: 1988

| Item | Unit | One per cent increase in total household income | |
|---|---|---|---|
| | | **All whites** | **Africans in A-Q2** |
| Total household income | R million | 1 320 | 1 320 |
| Per capita increase | R | 260 | 245 |
| Per capita increase | % | 1,8 | 34,4 |
| Direct tax paid | R million | 230 | 2 |
| Total disposable income | R million | 1 070 | 1 298 |
| Personal savings | R million | 41 | 7 |
| New demand in RSA | R million | 1 029 | 1 291 |
| Ultimate increase in GDP | R million | 1 326 | 1 664 |
| Increase in demand for imports | R million | 221 | 286 |

Table 8 examines the situation where the government transfers one per cent of total income of whites to Africans in quintile A-Q2. The latter causes a per capita rand decrease of R143 for whites and an increase of R135 for the Africans. Expressed as a percentage of present incomes, a one per cent transfer of total white income will result in a 19% increase in income of Africans in A-Q2. This income received by A-Q2 will also result in a net new demand of R145 million, a net increase in GDP of R186 million and an increase in the demand for imports of R36 million.

Table 8: Approximate indicators of the effects of some altered income distributions in South Africa: 1988

| Item | Unit | One per cent of white income transferred to Africans in A-Q2 only | |
|---|---|---|---|
| | | All whites | Africans in A-Q2 |
| Total household income | R million | -716 | 716 |
| Per capita change | R | -143 | 135 |
| Per capita change | % | -1 | 19 |
| Direct tax paid | R million | -127 | 1 |
| Total disposable income | R million | -589 | 715 |
| Personal savings | R million | -23 | 4 |
| New demand in RSA | R million | -566 | 711 |
| Ultimate increase in GDP | R million | -730 | 916 |
| Increase in demand for imports | R million | -122 | 158 |

## Conclusion

Per capita income figures for the different income groups point to a very skewed income distribution in South Africa. As processes such as urbanisation, inward industrialisation, improved education, housing and medical services are gaining momentum, a more equitable income distribution may take place in the future.

It is important to note that income may be transferred in different ways. It can simply be transferred to some poor people to relieve poverty, or it may be transferred in order to expand education and health care, or for subsidising employment, or for giving incentives to reduce unemployment. According to Sen (Malan, 1998:113) one of the greatest reasons for optimism when comparing South Africa with other poor nations of the world, is that it has some wealth to distribute. One way of looking at South Africa is that, in terms of income levels, quality of life should be much higher. Life expectancy is lower than in other countries with similar income. Levels of mortality are high, and education levels are not as high as in other countries with similar incomes. A different perspective is to say that, for the same levels of under-development, South Africa is a relatively rich country.

According to McGrath (Malan, 1998:107) a SAM can only be used as a model if it is assumed that all its behavioural relationships contain constant marginal and average propensities or coefficients. This may well be a reasonable assumption to make when modelling the effects of small shifts in the direction of economic policy, and the result will most probably have negligible effects on the structure of production, factor payments and the distribution of household incomes. More substantial policy

changes will start to affect factor prices, production techniques, patterns of demand, propensities to invest and import, etc. and will require a fully articulated general equilibrium model with production functions, demand functions for goods and factors, market clearing procedures, investment functions, etc. to model the behavioural relationships in the economy. If the coefficients of the input-output table have been aggregated from a more detailed input-output table (as is the case for some of the South African SAMs), then changes in expenditure patterns following an income redistribution may also require a revision of the input-output coefficients, without any technical changes having occurred (Malan, 1998:108).

Possibly the best example of a complex model to stimulate the distribution of income is provided by Adelman and Robinson for a South Korean type economy for 1978 (Malan, 1998:108). A SAM provides one of the foundations for constructing such a model, but on this foundation an econometric and mathematical edifice still remains to be constructed, clearly an area for further research in South Africa.

Stats SA plans to publish a SAM according to the 1993 System of National Accounts (SNA93) during 2003. It is a publication which places a heavy burden on data sources, most notably the latest national population and housing census as well as household surveys (inclusive of income and expenditure surveys). The SNA93 introduced integrated economic accounts which form part of a SAM and is a further important data source. These accounts will be constructed by the South African Reserve Bank (SARB).

It should further be remembered that the current empirical evidence relates to static models for 1978, 1988 and 1993 and therefore does not measure changes in South African society since the political transformation of the mid nineties. This may prove to be the most important motivation for updating the SAM for South Africa.

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