

Southern Africa Labour and Development Research Unit



Profiling Multidimensional Poverty and Inequality in Kenya and Zambia at Sub-National Levels

by

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Acknowledgements

This work forms part of the Governing Food Systems to Alleviate Poverty in Secondary Cities in Africa project (branded as Consuming Urban Poverty), funded under the ESRC-DFID Joint Fund for Poverty Alleviation Research (Poverty in urban spaces theme). The support of the Economic and Social Research Council (UK) and the UK Department for International Development is gratefully acknowledged (grant number is ES/L008610/1). This report will also be distributed as a Consuming Urban Poverty Project working paper. <https://consumingurbanpoverty.wordpress.com/working-papers/>

Muna Shifa also acknowledges the Governing Food Systems to Alleviate Poverty in Secondary Cities project and the National Research Foundation (NRF) for supporting her post-doctoral research. Murray Leibbrandt acknowledges the Research Chairs Initiative of the South African National Research Foundation and the South African Department of Science and Technology for funding his work as the Research Chair in Poverty and Inequality.

Recommended citation

Shifa, M., Leibbrandt, M. (2017). Profiling Multidimensional Poverty and Inequality in Kenya and Zambia at Sub-National Levels. A Southern Africa Labour and Development Research Unit Working Paper Number 209 Cape Town: SALDRU, University of Cape Town

ISBN: 978-1-928281-70-2

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Saldru Working Paper 209
University of Cape Town
September 2017

Abstract

Persistent spatial disparities in poverty remain prevalent in most developing and transition economies. However, spatial analyses of poverty in poor countries are generally limited to rural-urban or provincial breakdowns. In addition, despite the fact that poverty is a multidimensional phenomenon, existing sub-national level poverty analyses mainly use money metric indicators of individual welfare. In this study, we use census data to estimate multidimensional poverty at lower levels of geographic disaggregation in Zambia and Kenya. Our results show that, in general, the extent of multidimensional poverty is significantly higher in rural areas than urban areas in both countries. However, although deprivation levels in access to basic services are relatively lower in large urban centres such as Nairobi and Mombasa in the case of Kenya, and Lusaka, Livingstone, and Ndola in Zambia, these urban centres are also areas where deprivation levels have increased significantly over time. These findings suggest that the extent of provision of basic services in urban centres do not match to the extent required to accommodate the rapid urban growth that has occurred over the last few decades in both countries. Furthermore, there are large differences in poverty within urban areas and even within cities. For instance, constituency level estimates show that within Nairobi city, the incidence of poverty varies from 20% in Westland constituency to 41% in Langata constituency. In the case of Zambia, within Lusaka city, the incidence of poverty ranges widely, from 17% in Kabwata constituency to 53-55% in Chawama and Kanyama constituencies. An examination of inequality, measured either with the Gini coefficient for income and the variance for multiple deprivation levels, reveals important variations in intra-regional inequities across regions. This inequality picture cuts across the poverty status of regions. These results highlight the importance of sufficient level of geographic disaggregation in poverty analysis in order to identify disadvantaged areas within rural and urban regions of a country.

1. Introduction

Following the adoption of the United Nations millennium development goals (MDGs), significant progress has been made in improving average living conditions in many developing countries. However, persistent spatial disparities in living standards are still prevalent in most developing/transition economies (Deichmann, 1999; Daimon, 2001; Kanbur & Venables, 2005; Grant, 2010; Alkire, Housseini & Series, 2014). For instance, many studies in Africa have shown that there are large regional differences in human development between those who are living in urban areas and those living in rural or remote areas in a given country (Christiaensen, Demery, & Paternostro, 2005; Abdulai & Hulme, 2015). In addition, some studies have shown that spatial poverty traps exist not only in remote or rural areas but also in urban areas of many developing countries (Hyman, Larrea & Farrow, 2005; Grant, 2010).

With the exception of a few studies, spatial analysis of poverty in poor countries is limited to a rural-urban or provincial breakdown. This is because existing household surveys often suffer from small sample problems as sample sizes are too small to be representative at a low level of geographic disaggregation. In addition, the few existing studies that examine patterns of poverty and deprivation at a very low level of geographic disaggregation use income or consumption to measure poverty (de la Fuente, Murr, & Rascón, 2015; Hyman et al., 2005). This is despite the consensus that poverty and well-being are multidimensional concepts. One of the reasons for this consensus is that large within country geographical differences in the incidence of poverty are often related to lack of access to assets that support livelihoods or opportunities, and lack of access to basic services such as health, education, and infrastructure (Christiaensen et al., 2005; Grant, 2010; Alkire, et al., 2014). The interconnectedness of various deprivations means that more emphasis should be given to tackling these institutional and social obstacles instead of focusing only on income poverty (Sen, 1992a; Alkire & Santos, 2010).

Inequalities in living standards due to spatial differences is important for policymakers for two reasons (Kanbur & Venables, 2005). First, inequality due to regional disparities is one component of overall national inequality. Thus, a rise in spatial disparity can be associated with a rise in overall inequality. Second, large disparities in development between a country's regions can have an adverse effect on social and political stability, especially when regional disparities align with ethnic, racial, religious, or political divisions (Stewart, 2000; Kanbur & Venables, 2005; Muhula, 2009). In turn, these factors have important implications for poverty reduction. Although economic growth is necessary for poverty reduction, the extent to which economic growth reduces poverty depends on how the growth pattern affects income distribution in a given country (Ferreira, Leite, & Ravallion, 2010). Likewise, violent conflict and political instability are among a number of factors that may contribute to persistent poverty in poor countries (Luckham et al, 2001; Goodhand, 2003).

In this study, we estimate multidimensional poverty at lower levels of geographic aggregations such as districts and constituencies using data from Zambia and Kenya. After experiencing significant economic decline in previous decades, both countries have achieved higher economic growth since 2000. However, the high levels of economic growth have not translated into significant reductions in poverty in both countries. In the case of Kenya, the proportion of people living below the national income poverty line have increased from 46.1% in 2006 to 50.8% in 2008 and then reduced slightly to 49.8% in 2012 (KIPPRA, 2013). During the period 2006-2012 the number of people who were living below the income poverty line in Kenya increased by 3.3 million (KIPPRA, 2013). During the

period 2003-2010, the incidence of income poverty in Zambia reduced only by 9%, from 66.5% to 60.5% (Miniva Chibuye, 2011).

In recent years both countries have adopted a constituency development fund (CDF) approach for a devaluation of resources to fund various community-based projects (see Kimenyi, 2005 for Kenya and ZIPAR, 2015 for Zambia). Thus, multidimensional poverty estimates at district and constituency levels can help policymakers to identify areas facing multiple deprivations for geographic targeting. We use recent population census data for both countries. The population census datasets provide information on basic living standard indicators including access to safe drinking water, sanitation, electricity, housing conditions, and asset ownership. We follow the Alkire and Santos's (2010) counting approach to estimate a multidimensional poverty index (MPI). In calculating the MPI, poverty is characterized as inadequate access to basic services (e.g. education, health, water, sanitation), as well as an inadequate asset base to support livelihoods.

We start, in section 2, with a discussion of the data and methodology used to estimate multidimensional poverty. Section 3 presents poverty estimates for both countries and we compare deprivation levels in access to basic goods and services over time. Section 4 provides a summary of our main findings.

2. Data and Methodology

2.1. Data sources

To construct multidimensional poverty measures, we use data from the 2009 Kenyan population census 10% sample and the 2010 Zambian population census (10% sample). Both censuses provide information on various welfare indicators including the level of education, household asset holdings, and access to basic services such as water, sanitation, and electricity. In the case of Kenya, after dropping households and individuals with missing information in at least one indicator¹, the sample size comprises of 867,201 households and 3,634,070 individuals (38,610,097 total population size). The corresponding figures for Zambia are 250,384 households and 1,233,437, individuals (13,092,666 total population size).

In order to compare access to basic services at district/county levels over time, we use 5% sample data from the 1999 Kenyan population census and 10% sample data from the 2000 Zambian population census. Although the 1999 Kenyan population census and the 2000 Zambian population census have collected information on living standard indicators, most of these variables are not coded consistently across the different census years. Thus, an analysis of progress in multidimensional poverty is problematic. For this reason, we only use some of the comparable living standard indicators such as access to electricity, water, sanitation, and education to compare changes over time.

In addition, we use income poverty estimates at district (Zambia) and county (Kenya) levels from recent small-area poverty mapping exercises in both countries. In the case of Kenya, small-area income poverty estimates are calculated by combining the 2009 Kenyan census data with the 2005 Kenya Integrated Household Budget Survey (KIHBS). In the case of Zambia, the small-area poverty

¹ We have missing values only for Kenya (less than 1% of the sample).

mapping is based on data from the 2010 Zambia's Living Conditions Monitoring Survey (LCMS) and the 2010 Census of Population and Housing, and some auxiliary data (mainly from administrative records) that can be linked to the survey and census (De la Fuente et al., 2015).² We compare results from our multidimensional poverty estimates at district (Zambia) and county (Kenya) levels with those obtained using the traditional small-areas income poverty estimates in the two countries.

2.2. Methodology

The conceptual framework for calculating the MPI is Sen's Capability approach (Sen 1992b). According to this approach, poverty is defined as the lack of some basic capabilities to function rather than the lowness of income. The key objection to using only income as a welfare indicator is that the capability of individuals or groups to convert income or other resources into valuable functionings depends on several other factors including personal characteristics (e.g. physical and mental conditions), social norms (e.g. the role of women), and environmental factors (e.g. availability of public goods) (Sen 1992b). The relevant functionings people value may vary from elementary functionings such as being well nourished, being adequately clothed and sheltered, avoiding preventable morbidity to more complex functionings such as being able to appear in public without shame (Sen 1992b).

Although poverty is conceptualised as a failure of basic capabilities, due to the difficulty of measuring capabilities we focus on some elementary functionings to measure acute poverty (Sen 1992b). There are various approaches in the literature to determining what dimensions to be considered, how each dimension is to be measured, and how they are to be aggregated (see Alkire & Santos, 2010 for a review). In this paper, we follow the Alkire and Santos's (2011) approach to estimating the MPI. Four dimensions are considered - education, health, assets, and living standard indicators. These dimensions are relevant as, in both countries, each is stipulated in the national development goals as a measure of progress in human development. For aggregation purposes, the four dimensions are equally weighted, so that each of them receives a 1/4 weight. Each indicator within each dimension is also equally weighted. The choice of weights is always a value judgment and, thus by assigning equal weights, we are attaching equal importance to each dimension and each indicator within each dimension. This choice follows the approach used by Alike and Santos (2010) and UNDP's updated MPI specification (Kovacevic & Calderón, 2014). Table 1 presents a list of indicators, deprivation cut-offs, and weights for each indicator used in our poverty analysis. The deprivation cut-offs for most of the indicators consider here are in line with the MGD guidelines (see Alike & Santos 2010).

² We thank IPUMS- International for providing us with all the census datasets used, and the Kenyan National Bureau of Statistics (KNBS) for the disaggregated income poverty estimates.

Table 1: The dimensions, indicators, deprivation thresholds, and weights of the MPI

Indicator	Deprived if...	Weight
Education		1/4
Years of Schooling	Children aged less than 16 years who are not at the expected age-adjusted years of schooling and for those who are aged 16 and above not completed at least 8 years of schooling.	1/4
Health		1/4
Disability or morbidity	Has any Morbidity	1/4
Living standards		1/4
Electricity	If no access to electricity.	1/20
Sanitation	Sanitation facility is pit latrine uncovered, bucket latrine, bush, Cess Pool, or other.	1/20
Drinking water	Drinking water source is not any of the following: Borehole, piped, protected well, protected spring.	1/20
Flooring	Floor is earth (dirt, sand, or dung floor).	1/20
Cooking Fuel	Cooking fuel is dung, wood or charcoal.	1/20
Assets		1/4
Asset ownership*	Not having at least one asset related to access to information (radio, TV, telephone) and not having at least one asset related to mobility (bike, motorbike, car, truck, animal cart, motorboat) or at least one asset related to livelihoods (refrigerator or livestock)	1/4

Note: * We use similar indicators for both countries except for asset holdings. We follow the updated version of the UNDP's MPI specification (see Kovacevic & Calderón, 2014) in determining deprivations in asset holdings. Individuals are not deprived in livestock if they live in a household which has a horse, or a cattle, or two goats, or two sheep, or 10 chickens. However, information on livestock number is available in the case of Kenya but not for Zambia (only information on whether or not they raise livestock is available). Thus, the asset deprivation cut-off differs slightly in the two countries.

The MPI identifies multiple deprivations at the individual level. For each individual, deprivation scores in each indicator are calculated. A given individual is considered deprived if the individual achievement in that indicator is below the deprivation cut-off for that indicator. Then deprivation scores for each indicator are summed using their weights to identify multidimensionally poor individuals. Using a poverty cut-off (k) = 33.3% (1/3 of the weighted indicators) we identify the poor and the non-poor individuals. The incidence of poverty is measured as the multidimensional headcount ratio (H):

$$H=q/n$$

Where q is the number of people who are multimemensionally poor and n is the total population. The intensity of poverty (A), which reflects the average proportion of deprivations poor people experience can be expressed as:

$$A = \frac{\sum C_i(k)}{q}$$

Where $C_i(k)$ is the deprivation score of the poor (the censored deprivation score of individual i), q is the number of people who are multidimensionally poor, and k is a poverty cut-off. The MPI value is the product of the multidimensional poverty headcount ratio (H) and the intensity of poverty (A):

$$MPI = H \times A$$

The MPI can be decomposed by geographical regions (e.g. province, rural, urban, etc.). The contribution of a given sub-population group j (with population share of $\frac{n_j}{n}$) to MPI is expressed as:

$$\frac{(n_j / n) \times MPI_j}{MPI}$$

Following Seth and Alkire's (2014) approach, we use the following formula to estimate inequality in deprivation levels:

$$I(C) = \frac{4}{n} \sum_{i=1}^n [c_i - \mu(c_i)]^2$$

Where C_i indicates a weighed deprivation levels for each individual, and $\mu(C_i)$ indicates average deprivation scores for each spatial unit (i.e. province, county or district).

3. Results

In this section, we present results of MPI estimates for both Kenya (2009) and Zambia (2010) for various levels of geographic disaggregation. In addition, we compare results from our multidimensional poverty and inequality estimates at district (Zambia) and county (Kenya) levels with those obtained using the traditional small-area income poverty estimates. We also present a comparison of welfare across two census periods using some of the living standard indicators that are comparable across time.

3.1. Multidimensional poverty in Kenya

Table 2 provides multidimensional poverty estimates for Kenya by province and rural and urban regions. The MPI for Kenya is 0.287, with the figure being relatively higher in rural and peri-urban areas compared to core-urban areas. Likewise, the headcount ratio figure shows that the incidence of multidimensional poverty is 54.6% in Kenya with the figure being relatively higher in rural areas (60.5%) and peri-urban areas (52.2%) compared to core urban areas (38%). The average intensity among the poor is 52.5% suggesting that the average poor in Kenya are deprived of 52.5% of the weighted indicators. Decomposing the MPI by rural and urban areas shows that while core-urban areas constitute 23.3% of the population share, the contribution of core-urban areas to total MPI is

only 14.5%. In contrast, the contribution of rural areas to the total MPI is 78.5%, which is greater than the share of the rural population to the total population (69.1%). These figures indicate that rural areas bear a disproportionate share of poverty.

Looking beyond the rural and urban averages, Table 2 and Figure 1 show the existence of large within country differences in the extent of multidimensional poverty in Kenya. Province level estimates indicate that the MPI is the highest in North-eastern province (0.47) followed by Coast and Rift Valley provinces (0.33 and 0.32), while the figure is the lowest in Nairobi province (0.126) followed by Central province (0.198). Rift Valley and Coast provinces also have relatively higher deprivation inequality measures with the variance of weighted deprivations of 0.19, while the figure is the lowest in Nairobi 0.13. The headcount poverty estimates indicate that the percentage of people who are multidimensionally poor is 81.5% in North-eastern province, while the figure is 41.2% and 27.4% in Central and Nairobi provinces respectively. Decomposition of the MPI by provinces shows that the Rift Valley province contributes the highest to the total MPI (28.7%) followed by Nyanza (14.3%) and Eastern (14.8%) provinces. The contribution of the poorest province, North-eastern, is 10% which is greater than its population share (6.1%). These patterns of regional disparities in poverty levels are in line with marked differences in economic and employment opportunities in the country. Gross domestic product in Nairobi province is about 6 times higher than the level in the poorest province (i.e. North-eastern), and the number of formal employments in Nairobi is 27 times higher than the figure in North-eastern province (Omolo, 2012).

Table 2: Multidimensional poverty estimates in Kenya, 2009 (Poverty cut-off =33.3%)

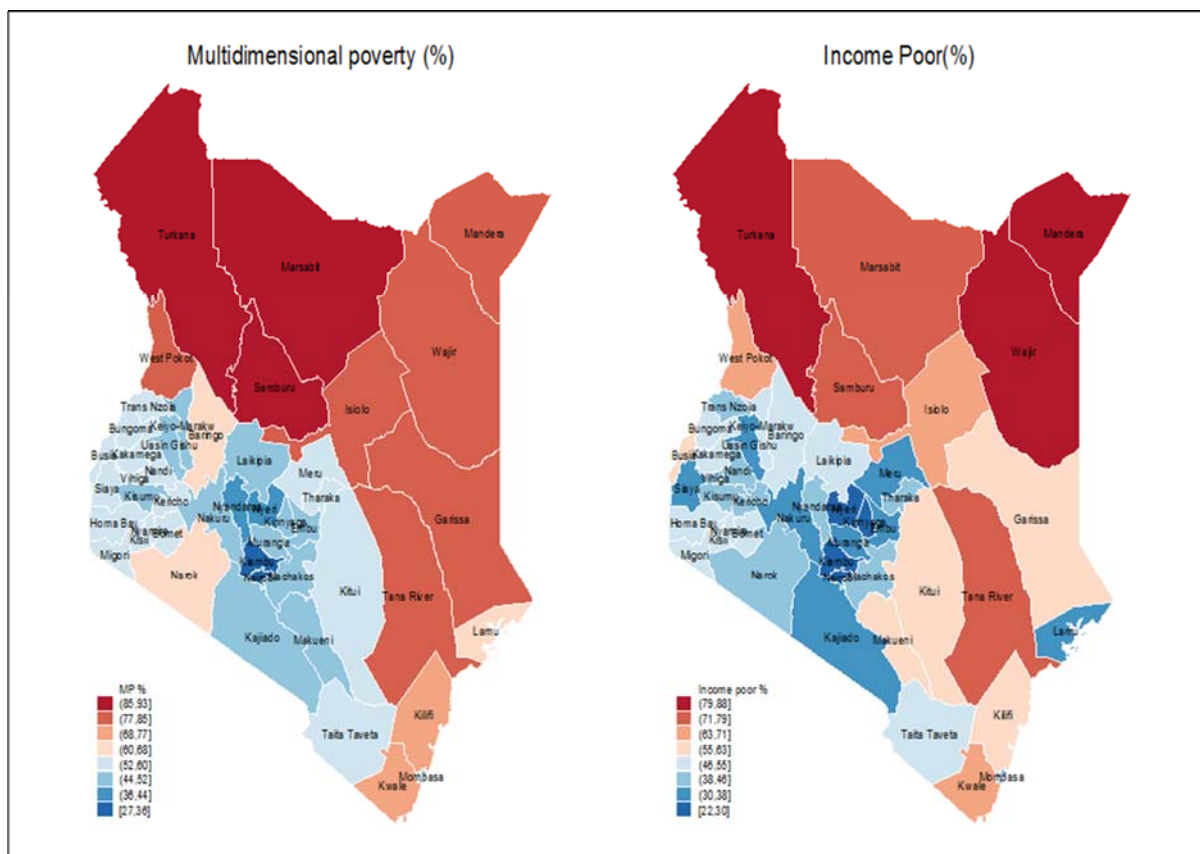
	MPI	Incidence of poverty (H%)	Average Intensity (A%)	Contribution to MPI (%)	Population share (%)	Inequality in deprivation (variance)
Kenya	0.287	54.6	52.5			0.18
Provinces						
Nairobi	0.126	27.4	46.0	3.5	8.0	0.13
Central	0.198	41.2	48.1	7.8	11.3	0.14
Coast	0.329	61.8	53.2	9.7	8.4	0.19
Eastern	0.287	55.2	52.1	14.8	14.8	0.17
North-eastern	0.470	81.5	57.7	10.0	6.1	0.15
Nyanza	0.289	55.5	52.1	14.3	14.1	0.17
Rift valley	0.319	58.5	54.5	28.7	25.9	0.19
Western	0.284	56.5	50.2	11.2	11.4	0.16
Rural	0.326	60.5	53.9	78.5	69.1	0.18
Core urban	0.179	38.0	47.0	14.5	23.3	0.15
Peri urban	0.264	52.2	50.6	7.0	7.6	0.16
Gender						
Male	0.280	53.6	52.2			
Female	0.294	55.6	52.9			

Source: Own estimates using data from Kenyan population Census (2009).

The patterns of regional disparities are also reflected in Table 1A in the Appendix, which provides income and multidimensional poverty and inequality estimates by county. Figure 1 maps values of

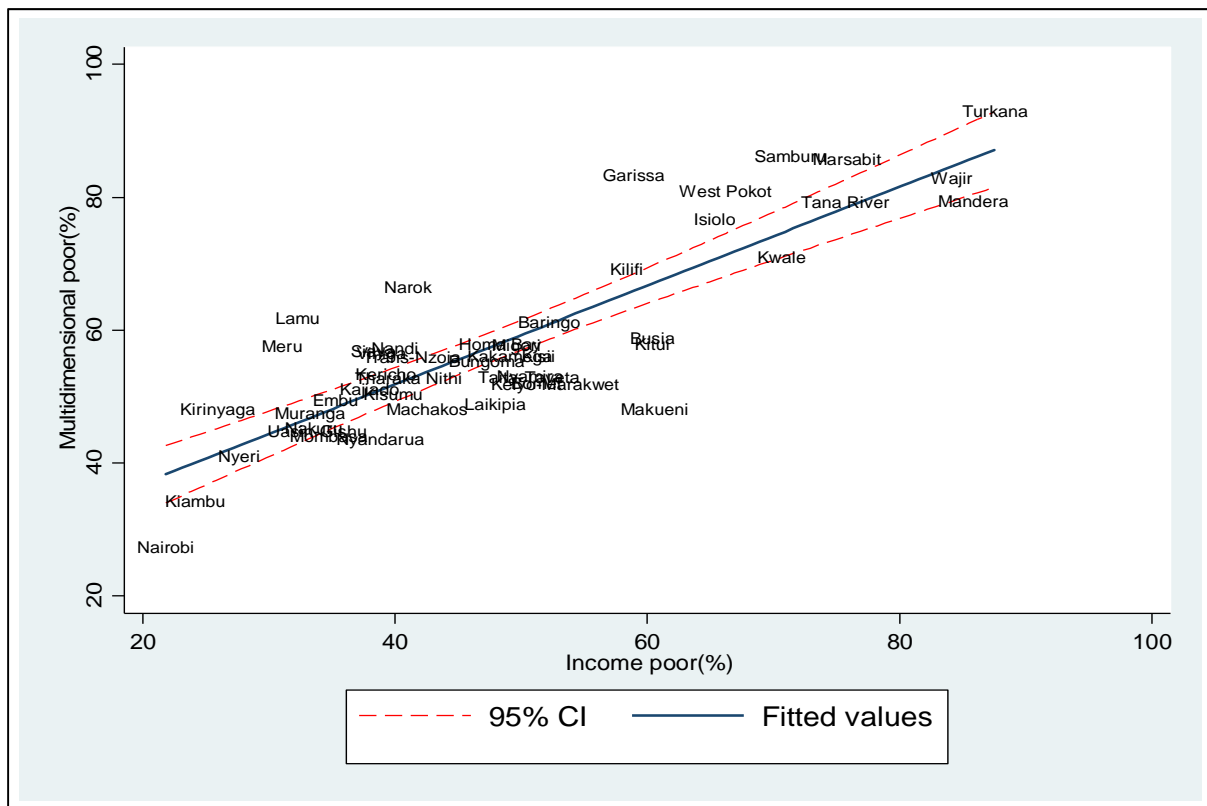
income³ and multidimensional headcount ratios across counties. Blue shaded areas represent counties with fewer poverty levels while red shaded areas represent higher poverty levels. The darker the shading the more pronounced the poverty (either high or low). The incidence of multidimensional poverty (MP) is relatively low in five counties (Nairobi (27%), Kiambu (34%), Nyeri(41%), Nyandarua(41%); and Mombasa(44%)), while the figure is greater than 70% in ten other counties with the figure reaching 93% in Turkana, and 86% in Mandera and Samburu counties. Among ten poorest counties, income poverty is also greater than 70% in seven of the counties, the figure ranging from 59-66% for the rest of the three counties.

Figure 1. Income and multidimensional poverty by county (Kenya, 2009)



estimates. The spearman rank correlation coefficient between the two poverty measures is 0.75 ($p < 0.000$).

Figure 2: Relationship between income and multidimensional poverty by county (Kenya 2009)



Source: Own multidimensional estimations and income poverty estimates obtained from KNBS office.

There are also geographical divides when we look at inequality measures such as the Gini coefficient for income and the variance for multiple deprivation levels. These results are presented in Table A1 in the Appendix. Income Gini estimates suggest that income inequality is relatively higher (>0.55) in Kwale, Kilifi, and Tana River counties, which are all located in the Coast province. In contrast, income inequality is the lowest in Turkana (0.28) followed by West Pokot and Wajir counties, which are among the poorest counties, while the figure is 0.34 in the richest counties such as Nairobi and Kiambu. A relatively higher level of inequality in non-income deprivation indicators is observed in Baringo, Kajiado, and Isiolo counties. Unlike the income poverty and multidimensional poverty estimates, the rank correlation coefficient for the income Gini and the variance measures is only 0.47 ($P < 0.0008$) suggesting a much lower correspondence between the income Gini and the variance of deprivations measures.

In general, county level poverty estimates suggest that both income and multidimensional poverty levels are relatively lower in counties that are predominantly urban such as Nairobi, Kiambu, Nyeri, and Mombasa (Figure 1A in the appendix). When we disaggregate the poverty estimates further by constituencies, this reveals greater variations in poverty levels (Table 2A in the appendix). For instance, although the incidence of MP is only 27% in Nairobi County, the figure varies within the county from 20.7% in Westland constituency to 33.2% in Kamukunji, and 41.2% in Langata constituencies. Likewise, within Mombasa County, the incidence of MP is 25.6% in Mvita

constituency while the figure is greater than 40% in other three constituencies. Using the 2009 Kenyan population census, Shifa and Lebbrandt (2016) find that although multidimensional poverty estimates are relatively lower in large cities such as Nairobi, Ruiru, and Mombasa, the incidence of poverty in the poorest two locations in Nairobi (with poverty levels of 61% and 74%) is at least 15 times higher than in the richest two locations (with poverty estimates of less than 5%). Likewise, the incidence of multidimensional poverty in the poorest location in Mombasa is about eight times higher than in the richest location. These findings suggest that comparing living standards across different regions based on average figures masks large within regional inequalities.

3.2. Multidimensional poverty in Zambia

Table 3 presents MPI estimates for Zambia by province.⁴ At the aggregate level, the MPI and the incidence of poverty for Zambia are 0.326 and 59.3% respectively. The average intensity among the poor is 54.9% suggesting that the average poor in Zambia are deprived of 54.9% of the weighted indicators. Multidimensional poverty estimates for females are higher than that of males and the national average. In addition, Table 3 shows large differences in the prevalence of poverty across the provinces of Zambia. The percentage of individuals who are multidimensionally poor is relatively lower in Lusaka (44.8%) and Copperbelt (43.6%) provinces, while it ranges between 68-77% in six other provinces. When we decompose the MPI by province, we find that the Eastern province is the largest contributor, contributing about 14% to the overall MPI. The Southern province follows with a contribution of 11.6%. The contributions of Lusaka and Copperbelt provinces are 11.5% and 10.5% respectively, which are lower than their population shares. Although poverty is relatively lower in the Lusaka and Copperbelt provinces, inequality measured using the variance of weighted deprivations is the highest in Copperbelt province (0.22) followed by Lusaka (0.20).

⁴ We could not estimate poverty for urban and rural areas because there is no variable in the data that identifies rural and urban areas.

Table 3: Multidimensional poverty estimates in Zambia, 2010 (Poverty cut-off =33.3%)

	MPI	Incidence of poverty (H%)	Average Intensity (A%)	Contr. to MPI (%)	Pop. Share (%)	Inequality in deprivation
Zambia	0.326	59.3	54.9			0.22
Provinces						
Central	0.309	57.3	53.9	9.4	9.9	0.18
Copperbelt	0.222	43.6	51.0	10.4	15.3	0.22
Eastern	0.377	68.4	55.1	14.1	12.2	0.17
Luapula	0.414	71.4	58.0	9.6	7.5	0.18
Lusaka	0.220	44.8	49.2	11.5	16.9	0.20
Muchinga	0.397	69.3	57.3	6.6	5.4	0.17
Northern	0.419	72.0	58.3	10.8	8.4	0.18
North western	0.389	68.1	57.1	6.5	5.5	0.19
Southern	0.311	57.7	53.9	11.6	12.1	0.19
Western	0.460	77.1	59.6	9.4	6.7	0.18
Gender						
Female	0.340	61.1	55.6			
Male	0.311	57.5	54.0			

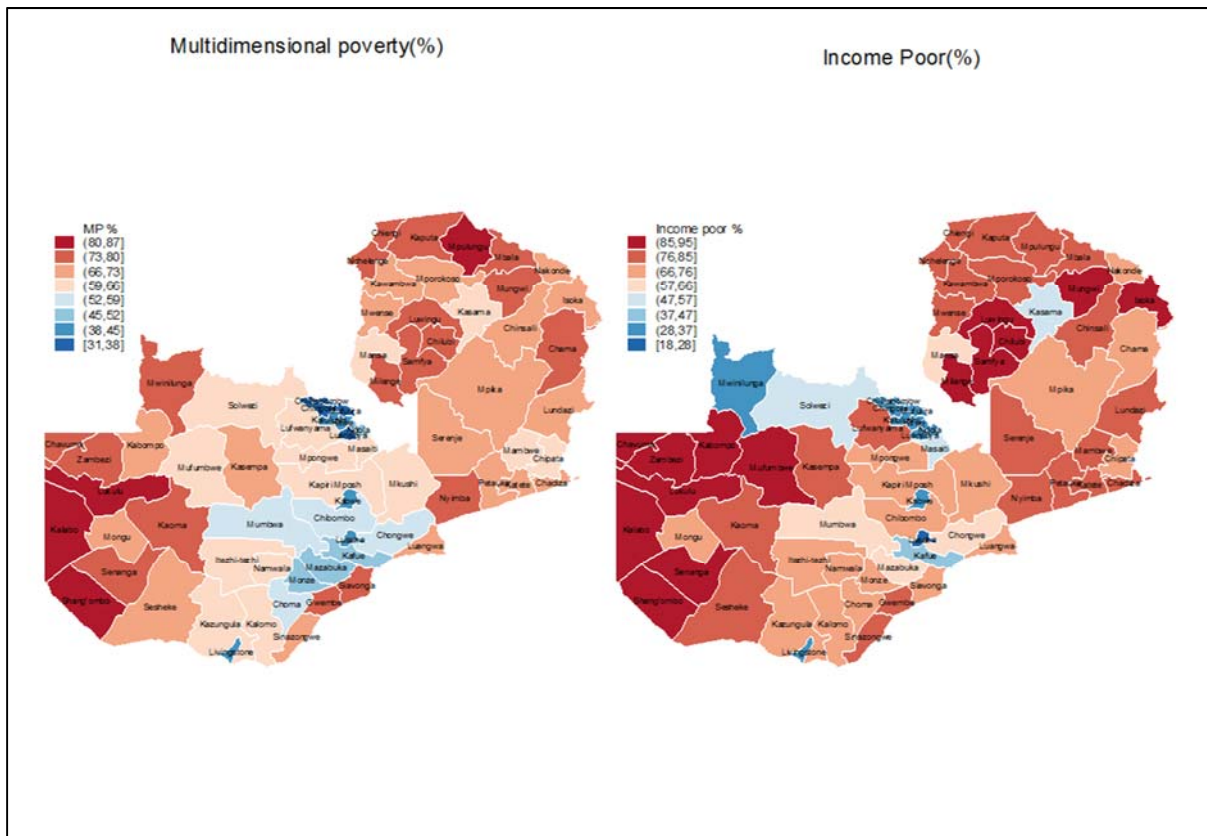
Source: Own calculations based on Zambian population census (2010).

A further disaggregation at district and constituency levels also shows large disparities in poverty levels within provinces and across different districts of the same country (Table 1B and 2B in the Appendix). Figure 3 maps the incidence of income poverty and MP estimates by districts.⁵ The incidence of multidimensional poverty ranges from 31% to 39% in five relatively less poor districts (Livingstone, Luanshya, Chingola, Mufulira, and Chililabomb), while the figure ranges from 80% to 87% in the poorest five districts (Shang'ombo, Kalabo, Lukulu, Mpulungu, and Senanga). Among the five richest districts four of them are located in the Copperbelt province (Livingstone is located in the Southern province), while four of the five poorest districts are located in the Western province.⁶

⁵ District level income poverty estimates are obtained from a small-area poverty mapping exercise (De la Fuente et al., 2015). The poverty line for the income poverty estimates is K146, 009. We have obtained shape files from New York University website: <https://geo.nyu.edu/catalog/stanford-yc436vm9005>.

⁶ Using a first-order dominance approach, a study by Masumbu and Mahrt (2014) also find similar welfare rankings of districts in Zambia.

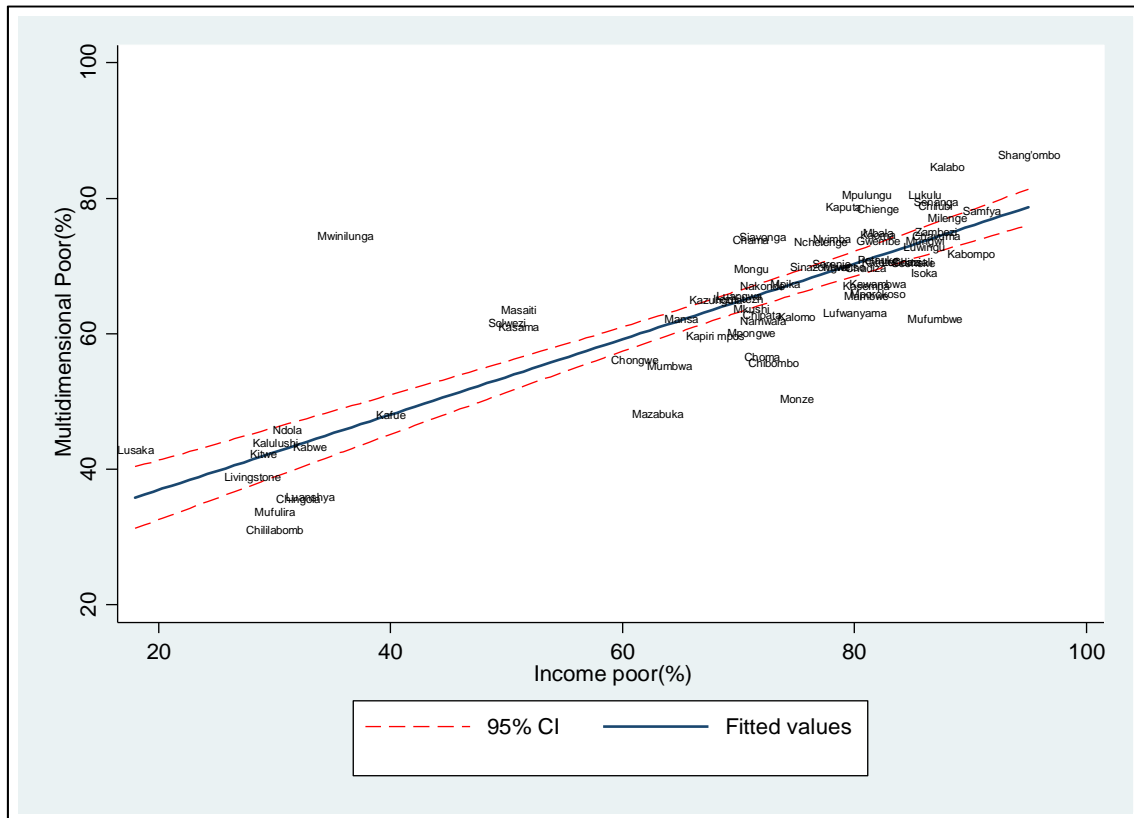
Figure 3: Income and multidimensional poverty by District (Zambia, 2010)



Source: Own multidimensional estimations and income poverty estimates obtained from De la Fuente et al. (2015)

The incidence of MP is 42% and 43% in the two largest urban districts such as Kitwe and Lusaka respectively. Lusaka is the least poor district when it comes to income poverty with only 18% of the population being considered income poor. The figure ranges between 28-33% in the nine relatively less income poor districts (Kabwe, Luanshya, Chingola, Ndola, Kalulushi, Mufulira, Chililabomb, Kitwe, Livingstone). These districts are also largely urban. In contrast, the incidence of income poverty is greater than 60% in 57 of the 72 districts with the figure ranging from 88% to 95% in five of the income poor districts (Milenge, Kalabo, Kabompo, Samfya, and Shang’ombo). Looking at the relationship between the incidence of income poverty and multidimensional poverty, estimates suggest a high correlation between measures of income and multidimensional poverty at district levels (Figure 4) with the spearman rank correlation coefficient being 0.8 ($p < 0.000$).

Figure 4: Relationship between income and multidimensional poverty by district (Zambia 2010)



Source: Own multidimensional poverty estimations and income poverty estimates are obtained from De la Fuente et al (2015).

Figure 4 also shows a high level of polarization in the level of development between urban and rural districts in Zambia (see also Figure 1B in the appendix). Based on both income and multidimensional poverty measures, in general, urban districts are less poor than rural districts in Zambia. In addition, a further disaggregation of poverty estimates into consistencies within each district reveals large disparities in poverty levels both in urban and rural districts (Table 2B in the appendix). For example, within Lusaka district, the percentage of people who are multidimensionally poor ranges from 17-23% in Kabwata and Lusaka central constituencies to 53-55% in Chawama and Kanyama constituencies. Likewise, within Kitwe district, the incidence of poverty ranges from 28% in Wusakile constituency to 52% in Chimawemw constituency. Overall, the constituency level poverty estimates show that although on average urban districts are less poor than rural districts in Zambia, there are also large differences in poverty rates within large urban districts.

Comparing poverty rates in Zambia with that of Kenya indicates that the level of multidimensional poverty in Zambia is higher than the level in Kenya. However, regional disparities are higher in Kenya than Zambia. For instance, the MPI in the poorest province (North-eastern) in Kenya is three times higher than that of the richest province (Nairobi), while the MPI in the poorest province (Western) in Zambia is about twice higher than in the richest province (Lusaka or Copperbelt). The estimated coefficient of variation for province level MPI is 0.307 for Kenya, while the figure is 0.224 for Zambia. We find similar coefficient of variation estimates when we use county/district level MPI estimates.

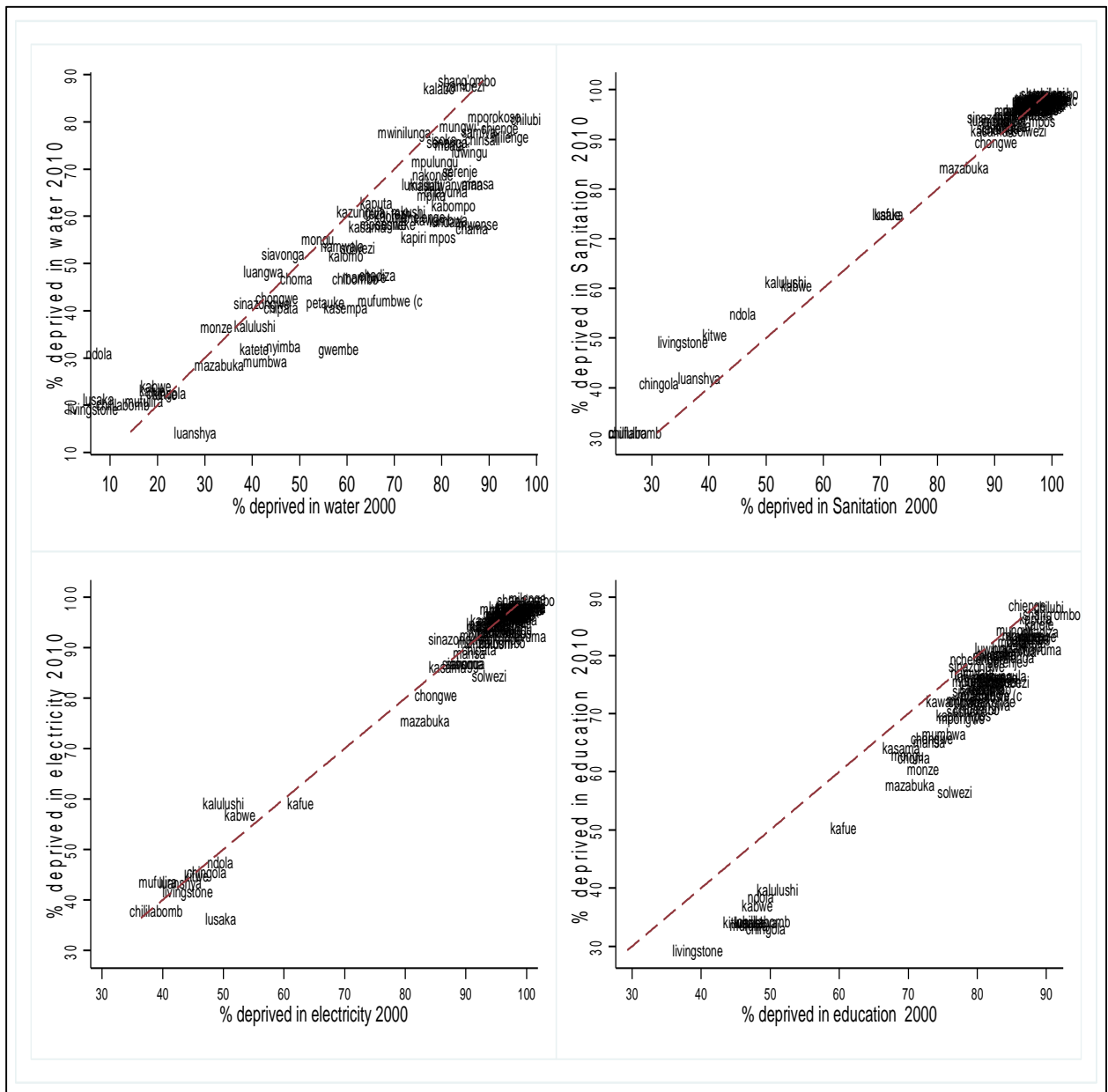
3.3. Change over time in access to basic services

Given that not all of the variables used to calculate the MPI in this study are consistently measured across different census years comparing multidimensional poverty estimates over time is problematic. For this reason, in this section, we restrict our analysis to those welfare indicators that are comparable across two census years in order to compare living standards over time. In the case of Zambia, we looked at changes in deprivation levels in access to electricity, safe drinking water, improved sanitation, and deprivation in education for those who were aged 18 years and above (deprived if a person has not completed second stage lower primary education, which is nine years of schooling). Figure 5 shows the relationship in deprivation levels in each of these indicators for 2000 and 2010 at a district level. In addition, Figure 2B (in the appendix) provides the percentage changes in deprivation levels for each indicator by district.

The results in Figure 5 show significant persistence in the levels of deprivation in all four indicators between 2000 and 2010. In particular, during both periods large gaps exist in the level of deprivations in education, access to electricity, and improved sanitation. Among the four indicators, improvements in the level of deprivation are observed mainly in education and access to safe drinking water. Figure 2B indicates that the proportion of individuals aged 18 and above with less than nine years of education has declined in all districts, except in Chiengi district (increased by 1.7%). However, the extent of the decline in education deprivation is not uniform across districts. While the figure decreased by more than 20% in 11 districts, which are mainly urban (Chingola, Chililabomb, Luanshya, Mufulira, Lusaka, Solwezi, Livingstone, Kitwe, Kabwe, Kalulushi, Ndola), it decreased by less than 3% in 10 other districts (Mbala, Gwembe, Namwala, Kaputa, Chilubi, Chinsali, Sinazongwe, Luwingu, Mungwi, Nchelenge).

Likewise, the proportion of individuals with no access to electricity decreased over time in 55 of the districts. Large declines were observed in Lusaka, (26.4%), followed by Solwezi (10%), and Mazabuka (9%). In contrast, the figure increased in 15 other districts with the highest increase being observed in Kalulushi (18.3%), followed by Mufulira (11.5%), and Kabwe (8.1%), which are largely urban districts. In many of the districts, there is a significant reduction in the percentage of people who don't have access to safe drinking water and improved sanitation services. However, the percentage of people who are deprived of access to safe drinking water and improved sanitation increased significantly in major urban districts of Zambia. For instance, the extent of deprivation in safe drinking water increased by more than 20% in 7 districts (Kafue, Kabwe, Mufulira, Chililabomb, Lusaka, Livingstone, and Ndola). The highest increase is observed in Ndola (308%) followed by Livingston (212%), and Lusaka (189%).

Figure 5: Deprivations in education and access to basic services by district (Zambia, 2000 & 2010)



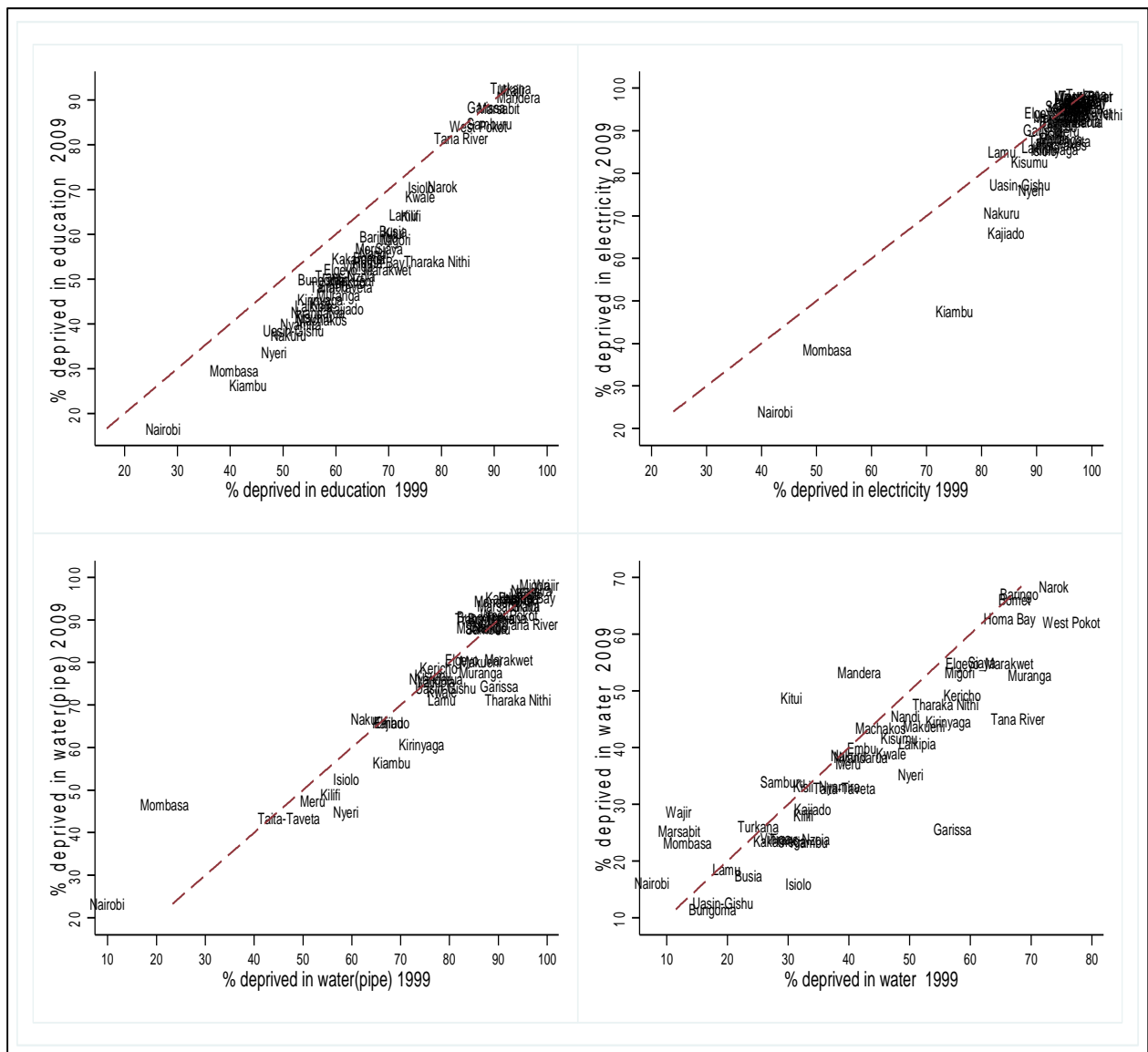
Source: Own estimates using data from the 2000 and 2010 Zambian population censuses.

Looking at access to improved sanitation services, deprivation levels increased in 33 of the districts, with the figure increasing by 10-40% in Luanshya, Chililabomb, Kalulushi, Ndola Mufulira, Kitwe, Chingola, and Livingstone districts, while the figure increased by 5.2% in Lusaka and by 9.7% in Kabwe districts. These results indicate that although the level of deprivation in access to safe drinking water and access to sanitation services in many of the large urban districts is lower than rural districts, the change over time figure indicates that major urban districts are the areas where deprivation levels have increased significantly.

Figure 6 and Figure 2A (in the appendix) provide estimates of changes in deprivation levels in education, access to piped water, and electricity in the case of Kenya. Deprivation in education is calculated for those who were aged 18 years and above (deprived if not completed second stage lower primary education, which is eight years of schooling). The use of piped water may not be

appropriate in defining deprivation levels in rural areas where access to safe drinking water also includes water from a protected well, a protected spring and a borehole. However, in the 1999 population census information on whether or not water sources from well and spring were protected was not collected. In order to capture changes in rural areas, we calculate a second variable indicating deprivation in water considering water obtained from well, spring, and a borehole as safe (irrespective of whether it is protected or not) in both 2009 and 1999.⁷

Figure 6: County level deprivations in education and access to basic services (Kenya, 1999 & 2009)



Source: Own estimates using data from the 1999 and 2009 Kenyan population censuses.

A comparison of the 1999 and 2009 scatter plots shows a clear, large persistence in the level of development across counties in Kenya. Results from Figure 6 and 2A (in the appendix) show that in

⁷ Thus, only access to water from a pond, dam, lake, river, and Jabia's are considered not safe. We could not compare deprivation levels in access to improved sanitation because the variable is not comparable in the two censuses.

all the counties deprivation in education decreased, although with significantly varying degrees. While the figure decreased by 25-39% in 10 counties (Kiambu, Nairobi, Tharaka, Nithi, Nyeri, Kajiado, Machakos, Mombasa, Nakuru, Uasin Gishu, and Kisumu), it decreased only by less than 3% in Marsabit, Tana River, Wajir, Turkana, and Garissa counties. Likewise, deprivation levels in access to electricity only increased in four counties: Samburu, Marsabit, Mandera and Lamu (increasing by less than 2%). Large declines in the level of deprivation in access to electricity are observed in Nairobi (43%) followed by Kiambu (37%), and Mombasa (26%) counties.

In contrast to access to electricity and education, the level of deprivation in access to piped water increased in many of the counties. Deprivation in access to piped water increased in 20 counties with the figure being the highest in Nairobi (138.7%), followed by Mombasa (116.2%), Mandera (5.5%), and Nakuru (5.3%). In contrast, deprivation levels in access to piped water decreased by at least 10% in nine other counties (Tharaka Nithi, Nyeri, Kirinyaga, Garissa, Kiambu, Kilifi, Isiolo, and Murang'a). If we consider as safe water sources such as wells, springs and boreholes (irrespective of whether it is protected or not), deprivation in access to water increased in nine counties only with the figure being the highest in Wajir (140%) followed by Nairobi (114.4%), Marsabit (110.9%), and Mombasa (73.9%). Among the counties where deprivation in access to water increased between 1999 and 2009, five of them (Wajir, Marsabit, Samburu, Mandera, and Turkana) are also among the seven poorest counties in multidimensional poverty terms in 2009. In addition, the results indicate that although the provision of access to safe drinking water is higher in large urban centres such as Mombasa and Nairobi, higher increases in deprivation levels are observed in both Mombasa and Nairobi counties.

4. Conclusions

Using population censuses this study provides spatially disaggregated multidimensional poverty index (MPI) estimates for Zambia and Kenya. The use of MPI as a welfare indicator allows us to identify the multiple deprivations poor people face with respect to education, health, and other living standard indicators. Poverty estimates show that there are significant within country regional disparities in the prevalence of poverty in both countries. For instance, the percentage of people who are multidimensionally poor in the poorest five counties of Kenya (Wajir, Garissa, Marsabit, Samburu, and Turkana) is at least two times higher than the figure in the richest three counties (Nairobi, Kiambu, and Nyeri). Likewise, the percentage of people who are multidimensionally poor in the poorest five districts of Zambia is two times higher than the figure in the richest five districts.

A comparison of our multidimensional poverty estimates at district (Zambia) and county (Kenya) levels with income poverty estimates suggest that areas that are characterized by high levels of multidimensional poverty also have a higher incidence of income poverty. Although we find that the extent of multidimensional poverty is significantly higher in rural and remote areas than urban areas in both countries, poverty estimates at lower levels of geographic aggregation (e.g. constituency level) show that there are also large differences in the incidence of poverty within urban areas and within large cities. In addition, looking at deprivation levels across time reveals that although the proportion of people with access to basic services such as safe drinking water and improved sanitation is higher in large urban centres in both countries, major urban areas are the areas where deprivation levels have increased significantly over time. These findings suggest that the extent of

provision of basic infrastructure services such as access to safe drinking water and improved sanitation do not match the extent required to accommodate the rapid urban growth in large urban centres in both countries.

In conclusion, we return to some of the framing issues that were raised in the introduction. Our work has shown that progress has been made in improving access to basic services in both countries. However, substantial and persistent regional disparities remain. Such large inter-regional inequalities and imbalances, which often align with other dimensions (e.g. ethnic and religious) have increasingly become a source of political and social conflict in Kenya (Muhula, 2009). Likewise, large disparities in economic and social indicators are identified as one potential risk factor for conflict in Zambia (Smith-Hohn, 2009). In recent years, both countries have started implementing various measures to reduce poverty and regional disparities. For example, the new Kenya's 2010 constitution guaranteed shared resources and political power for 47 county governments. However, the existing large intra-regional inequalities shown in this paper and other similar studies, may persist if resources are not shared equitably within a county. Indeed, there is a concern that devolution may further intensify competition for resources and power that may trigger conflict at local levels, in particular in ethnically mixed regions (Scott-Villiers et al., 2014). Thus, understanding the extent and major drivers of inequalities at a variety of levels of geographic disaggregation is critical for promoting sustainable development and stability.

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Appendix A: Kenya

Table 1A: Multidimensional and income poverty estimates at county Levels in Kenya -2009

County	MP and inequality					Income poverty and inequality		
	MPI	H (%)	A (%)	Conti (%)	variance	H(%)	Conti.	Gini
Nairobi	0.126	27	46	3.5	0.13	22	3.94	0.34
Kiambu	0.16	34	46	2.3	0.14	24	2.28	0.34
Nyeri	0.197	41	48	1.2	0.14	28	1.1	0.37
Nyandarua	0.208	44	48	1.1	0.12	39	1.33	0.39
Mombasa	0.209	44	48	1.7	0.16	35	1.88	0.37
Uasin-Gishu	0.215	45	48	1.7	0.14	34	1.73	0.37
Nakuru	0.22	45	49	3.2	0.15	34	3.08	0.38
Kirinyaga	0.237	48	49	1.1	0.15	26	0.8	0.35
Muranga	0.238	48	50	2	0.15	33	1.83	0.36
Machakos	0.24	48	50	2.4	0.15	43	2.72	0.4
Makueni	0.241	48	50	2	0.14	61	3.12	0.38
Embu	0.25	50	51	1.2	0.16	35	1.06	0.38
Kisumu	0.252	50	50	2.2	0.16	40	2.23	0.43
Laikipia	0.255	49	52	0.9	0.17	48	1.09	0.37
Taita-Taveta	0.263	53	50	0.7	0.16	50	0.82	0.44
Kajiado	0.264	51	52	1.6	0.19	38	1.51	0.4
Bomet	0.265	52	51	1.7	0.13	51	2.18	0.34
Nyamira	0.268	53	50	1.5	0.15	51	1.77	0.39
Kericho	0.269	54	50	1.8	0.15	39	1.71	0.38
Elgeyo_Marakwet	0.275	52	53	0.9	0.16	53	1.14	0.36
Tharaka Nithi	0.275	53	52	0.9	0.17	41	0.87	0.4
Bungoma	0.278	56	50	3.5	0.16	47	3.79	0.43

**Table 1A: Multidimensional and income poverty estimates at county Levels in Kenya-2009
(contd.)**

County	MP and inequality					income poverty and inequality		
	MPI	H(%)	A(%)	Conti	variance	H(%)	Conti.	Gini
Kakamega	0.28	56	50	4.3	0.16	49	4.77	0.39
Vihiga	0.28	57	50	1.4	0.16	39	1.26	0.4
Trans-Nzoia	0.282	56	50	2.1	0.16	41	1.96	0.36
Kisii	0.287	56	51	3	0.16	51	3.45	0.42
Meru	0.292	58	51	3.6	0.17	31	2.44	0.35
Nandi	0.292	57	51	2	0.15	40	1.74	0.34
Siaya	0.303	57	53	2.3	0.17	38	1.87	0.41
Busia	0.304	59	52	2	0.17	60	2.61	0.46
Kitui	0.307	58	53	2.8	0.16	60	3.48	0.39
Migori	0.307	58	53	2.6	0.17	50	2.65	0.46
Homa Bay	0.312	58	54	2.7	0.17	48	2.72	0.42
Lamu	0.327	62	53	0.3	0.17	32	0.19	0.47
Baringo	0.354	61	58	1.8	0.21	52	1.69	0.36
Narok	0.365	67	55	2.8	0.15	41	2.02	0.31
Kilifi	0.375	69	54	3.7	0.18	58	3.74	0.56
Kwale	0.394	71	55	2.3	0.17	71	2.67	0.6
Isiolo	0.441	77	58	0.6	0.19	65	0.73	0.43
Mandera	0.455	80	57	4.3	0.15	86	4.69	0.33
Tana River	0.465	79	59	1	0.17	76	1.06	0.62
Wajir	0.48	83	58	2.9	0.14	84	2.59	0.32
Garissa	0.486	83	58	2.8	0.15	59	1.46	0.44
West Pokot	0.496	81	61	2.3	0.18	66	1.89	0.32
Marsabit	0.527	86	61	1.4	0.17	76	1.29	0.37
Samburu	0.536	86	62	1.1	0.16	71	0.93	0.33
Turkana	0.618	93	67	4.7	0.12	88	4.13	0.28

Source: Own multidimensional estimations based on the 2009 Kenyan census, and income poverty estimates obtained from KNBS.

Table 2A: Multidimensional poverty estimates at constituency levels in Kenya-2009.

County	Constituency	MPI	Headcount	Intensity
Nairobi	Dagoretti	0.141	31.4	45.1
Nairobi	Starehe	0.131	26.9	48.6
Nairobi	Kamukunji	0.164	33.2	49.2
Nairobi	Makadara	0.125	28.2	44.3
Nairobi	Embakasi	0.102	22.7	44.9
Nairobi	Kasarani	0.113	24.2	46.7
Nairobi	Westlands	0.096	20.7	46.1
Nairobi	Lang'ata	0.186	41.2	45.0
Nyandarua	Kipipiri	0.218	45.0	48.4
Nyandarua	Kinangop	0.199	42.5	46.8
Nyandarua	Ndaragwa	0.195	41.2	47.4
Nyandarua	Ol kalou	0.218	45.1	48.4
Nyeri	Kieni	0.205	43.0	47.6
Nyeri	Tetu	0.193	40.9	47.3
Nyeri	Othaya	0.199	41.7	47.7
Nyeri	Mukurwe-ini	0.215	43.4	49.5
Nyeri	Nyeri town	0.172	36.2	47.5
Nyeri	Mathira	0.198	41.5	47.6
Kirinyaga	Mwea	0.260	51.5	50.5
Kirinyaga	Ndia	0.224	46.3	48.4
Kirinyaga	Kerugoya/kutus	0.221	45.8	48.3
Kirinyaga	Gichugu	0.226	46.6	48.5
Murang'a	Mathioya	0.228	47.4	48.1
Murang'a	Kandara	0.250	49.1	51.0
Murang'a	Gatanga	0.221	45.2	48.8
Murang'a	Kangema	0.232	48.4	47.9
Murang'a	Kigumo	0.258	50.4	51.2
Murang'a	Kiharu	0.216	44.0	49.1
Murang'a	Maragwa	0.260	50.0	52.0
Kiambu	Gatundu south	0.201	42.4	47.4
Kiambu	Gatundu north	0.215	45.9	46.9
Kiambu	Limuru	0.190	41.6	45.6
Kiambu	Kabete	0.141	31.3	44.9
Kiambu	Juja	0.123	26.6	46.1
Kiambu	Githunguri	0.182	38.5	47.2
Kiambu	Kiambaa	0.148	32.4	45.7

Table 2A: Multidimensional poverty estimates at constituency levels in Kenya-2009 (Contd.)

County	constituency	MPI	Headcount	Intensity
Kiambu	Lari	0.222	45.7	48.6
Mombasa	Mvita	0.118	25.6	46.2
Mombasa	Likoni	0.230	48.4	47.4
Mombasa	Changamwe	0.226	47.8	47.3
Mombasa	Kisauni	0.206	43.1	47.8
Kwale	Msambweni	0.374	67.9	55.0
Kwale	Kinango	0.432	75.9	57.0
Kwale	Matuga	0.376	69.8	53.9
Kilifi	Bahari	0.342	66.3	51.5
Kilifi	Malindi	0.307	59.4	51.7
Kilifi	Kaloleni	0.408	74.4	54.9
Kilifi	Ganze	0.445	77.5	57.4
Kilifi	Magarini	0.437	75.2	58.1
Tanariver	Galole	0.428	74.2	57.7
Tanariver	Bura	0.506	84.8	59.6
Tanariver	Garsen	0.453	77.9	58.1
Lamu	Lamu east	0.457	83.9	54.4
Lamu	Lamu west	0.299	57.1	52.3
Taitataveta	Wundanyi	0.248	49.0	50.7
Taitataveta	Voi	0.269	55.6	48.4
Taitataveta	Taveta	0.262	51.9	50.5
Taitataveta	Mwatate	0.269	54.3	49.5
Marsabit	North horr	0.637	94.7	67.3
Marsabit	Laisamis	0.608	94.1	64.6
Marsabit	Moyale	0.451	79.4	56.7
Marsabit	Saku	0.410	74.2	55.3
Isiolo	Isiolo north	0.415	72.8	57.1
Isiolo	Isiolo south	0.499	85.6	58.4
Meru	Igembe	0.363	69.0	52.7
Meru	Tigania west	0.281	56.0	50.2
Meru	North imenti	0.208	44.4	46.9
Meru	Central imenti	0.207	43.2	47.8
Meru	Tigania east	0.350	66.6	52.6
Meru	South imenti	0.227	46.9	48.3
Meru	Ntonyiri	0.375	71.4	52.5
Tharaka	Tharaka	0.328	60.6	54.1
Tharaka	Nithi	0.246	48.4	50.7

Table 2A: Multidimensional poverty estimates at constituency levels in Kenya-2009 (Contd.)

County	constituency	MPI	Headcount	Intensity
Embu	Siakago	0.289	55.3	52.3
Embu	Runyenjes	0.257	50.8	50.5
Embu	Manyatta	0.221	44.9	49.2
Embu	Gachoka	0.252	49.7	50.6
Kitui	Kitui central	0.281	54.6	51.5
Kitui	Mwingi south	0.285	54.7	52.1
Kitui	Kitui west	0.252	50.3	50.1
Kitui	Kitui south	0.316	59.1	53.5
Kitui	Mwingi north	0.362	65.5	55.2
Kitui	Mutito	0.338	62.1	54.5
Machakos	Kathiani	0.224	46.3	48.4
Machakos	Masinga	0.265	50.7	52.3
Machakos	Machakos town	0.234	47.8	48.9
Machakos	Kangundo	0.237	47.5	49.8
Machakos	Mwala	0.250	50.3	49.8
Machakos	Yatta	0.247	48.3	51.1
Makueni	Mbooni	0.267	50.8	52.5
Makueni	Kibwezi	0.232	48.1	48.2
Makueni	Makueni	0.224	45.5	49.3
Makueni	Kilome	0.239	47.6	50.2
Makueni	Kaiti	0.253	49.9	50.7
Garissa	Lagdera	0.546	91.0	60.0
Garissa	Ijara	0.464	79.9	58.0
Garissa	Dujis	0.397	71.7	55.4
Garissa	Fafi	0.530	90.6	58.5
Wajir	Wajir west	0.503	85.0	59.2
Wajir	Wajir north	0.492	82.5	59.6
Wajir	Wajir east	0.461	82.0	56.2
Wajir	Wajir south	0.470	82.3	57.0
Mandera	Mandera east	0.434	79.7	54.5
Mandera	Mandera west	0.491	80.9	60.7
Mandera	Mandera central	0.442	78.2	56.5
Siaya	Rarieda	0.300	54.4	55.2
Siaya	Bondo	0.280	52.5	53.4
Siaya	Gem	0.324	60.8	53.3
Siaya	Alego	0.308	57.3	53.7
Siaya	Ugenya	0.302	58.4	51.8

Table 2A: Multidimensional poverty estimates at constituency levels in Kenya-2009 (Contd.)

County	constituency	MPI	Headcount	Intensity
Kisumu	Kisumu town east	0.213	46.0	46.2
Kisumu	Kisumu rural	0.303	56.6	53.5
Kisumu	Nyando	0.259	51.1	50.6
Kisumu	Nyakachi	0.263	51.4	51.1
Kisumu	Muhoroni	0.285	55.1	51.8
Kisumu	Kisumu town west	0.222	45.1	49.3
Migori	Nyatike	0.353	62.9	56.2
Migori	Migori	0.316	60.0	52.6
Migori	Rongo	0.281	53.9	52.1
Migori	Kuria	0.294	56.2	52.4
Migori	Uriri	0.309	58.2	53.1
Homabay	Gwasi	0.346	62.8	55.2
Homabay	Karachuonyo	0.297	55.5	53.6
Homabay	Rangwe	0.306	57.1	53.5
Homabay	Ndhiwa	0.343	61.6	55.7
Homabay	Kasipul kabondo	0.284	55.0	51.7
Homabay	Mbita	0.320	58.5	54.7
Kisii	Kitutu chache	0.300	58.6	51.3
Kisii	Bobasi	0.279	54.5	51.1
Kisii	Bonchari	0.309	59.1	52.2
Kisii	Nyaribari masaba	0.253	49.7	50.9
Kisii	Bomachoge	0.296	58.0	51.0
Kisii	Nyaribari chache	0.246	50.9	48.4
Kisii	South mugirango	0.313	60.3	51.8
Nyamira	West mugirango	0.267	53.0	50.3
Nyamira	N. Mugirango bor	0.284	55.3	51.4
Nyamira	Kitutu masaba	0.249	50.8	49.1
Turkana	Turkana south	0.567	88.2	64.3
Turkana	Turkana central	0.609	92.1	66.1
Turkana	Turkana north	0.656	96.5	67.9
Westpokot	Sigor	0.474	79.2	59.8
Westpokot	Kacheliba	0.607	92.5	65.7
Westpokot	Kapenguria	0.420	72.7	57.7
Samburu	Samburu east	0.573	89.9	63.8
Samburu	Samburu west	0.523	84.9	61.6
Transnzoia	Saboti	0.270	54.9	49.1
Transnzoia	Kwanza	0.309	59.8	51.7

Table 2A: Multidimensional poverty estimates at constituency levels in Kenya-2009 (Contd.)

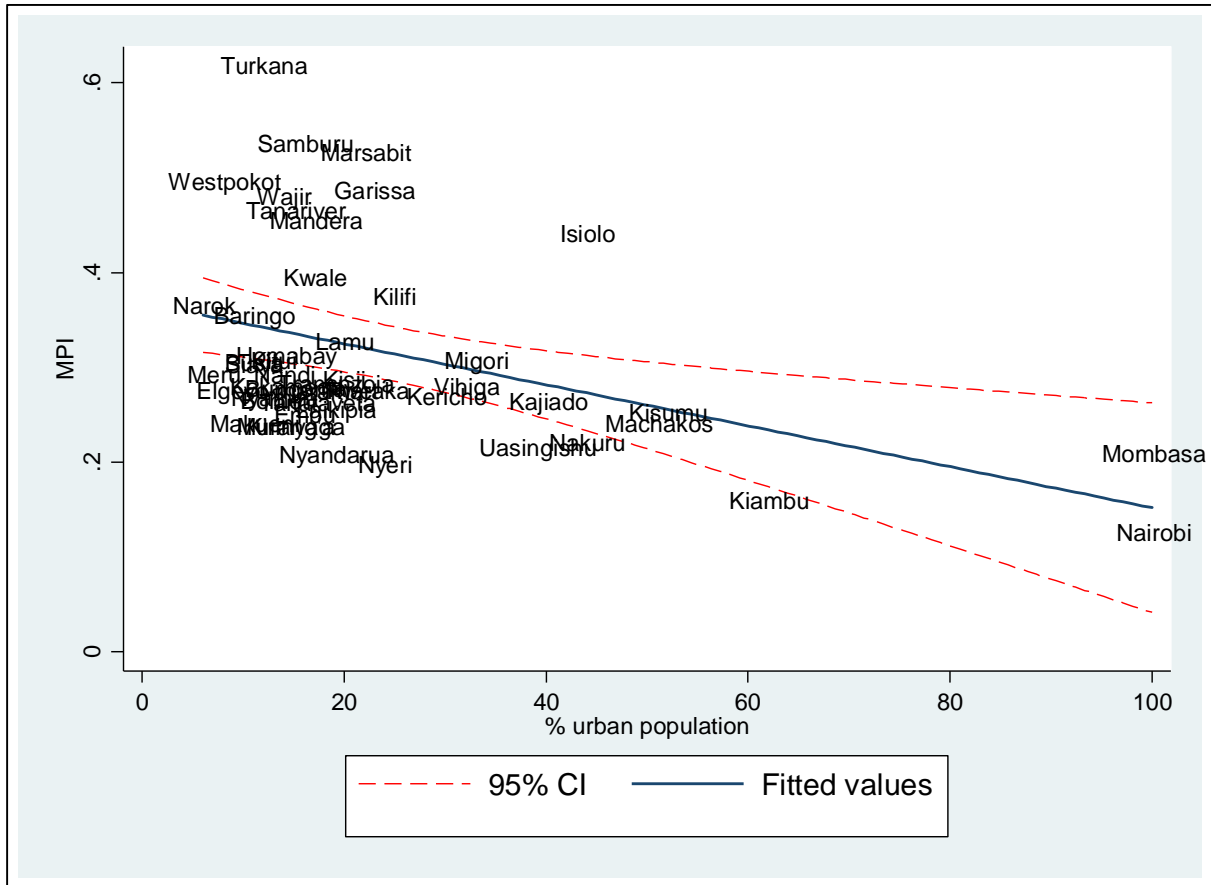
County	constituency	MPI	Headcount	Intensity
Transzoia	Cheranganyi	0.272	53.6	50.8
Baringo	Baringo central	0.289	53.8	53.7
Baringo	Baringo east	0.598	90.8	65.9
Baringo	Eldama ravine	0.237	47.0	50.4
Baringo	Mogotio	0.273	51.1	53.5
Baringo	Baringo north	0.307	55.6	55.2
Uasingishu	Eldoret north	0.223	46.5	48.0
Uasingishu	Eldoret south	0.220	46.1	47.9
Uasingishu	Eldoret east	0.194	40.8	47.5
Elgeyo-marakwet	Marakwet east	0.369	64.7	57.0
Elgeyo-marakwet	Keiyo south	0.239	46.4	51.5
Elgeyo-marakwet	Keiyo north	0.232	45.4	51.2
Elgeyo-marakwet	Marakwet west	0.273	52.7	51.9
Nandi	Emgwen	0.288	56.4	51.0
Nandi	Aldai	0.296	57.3	51.6
Nandi	Mosop	0.262	52.1	50.3
Nandi	Tinderet	0.320	62.7	51.0
Laikipia	Laikipia east	0.256	48.9	52.4
Laikipia	Laikipia west	0.254	49.2	51.6
Nakuru	Kuresoi	0.284	55.1	51.6
Nakuru	Nakuru town	0.132	29.2	45.0
Nakuru	Molo	0.261	53.2	49.0
Nakuru	Subukia	0.202	42.4	47.6
Nakuru	Rongai	0.231	46.1	50.1
Nakuru	Naivasha	0.222	47.1	47.1
Narok	Narok north	0.351	65.7	53.3
Narok	Kilgoris	0.347	64.1	54.1
Narok	Narok south	0.393	69.3	56.6
Kajiado	Kajiado south	0.347	65.1	53.3
Kajiado	Kajiado north	0.200	40.8	49.1
Kajiado	Kajiado central	0.342	63.9	53.5
Kericho	Ainamoi	0.259	51.8	50.0
Kericho	Belgut	0.275	55.6	49.6
Kericho	Buret	0.249	49.0	50.8
Kericho	Kipkelion	0.289	56.5	51.1
Bomet	Chepalungu	0.268	52.1	51.4
Bomet	Bomet	0.267	51.8	51.5

Table 2A: Multidimensional poverty estimates at constituency levels in Kenya-2009(Contd.)

County	constituency	MPI	Headcount	Intensity
Bomet	Konoin	0.283	57.5	49.3
Bomet	Sotik	0.247	48.5	50.9
Kakamega	Mumias	0.291	58.5	49.8
Kakamega	Matungu	0.313	62.3	50.3
Kakamega	Lugari	0.254	52.2	48.7
Kakamega	Ikolomani	0.313	61.8	50.7
Kakamega	Khwisero	0.309	60.6	51.0
Kakamega	Butere	0.310	60.4	51.3
Kakamega	Malava	0.252	51.3	49.2
Kakamega	Shinyalu	0.299	58.6	51.0
Kakamega	Lurambi	0.257	52.3	49.1
Vihiga	Vihiga	0.259	53.6	48.3
Vihiga	Hamisi	0.293	58.2	50.4
Vihiga	Sabatia	0.251	52.9	47.5
Vihiga	Emuhaya	0.299	59.3	50.5
Bungoma	Kandunyi	0.259	53.4	48.4
Bungoma	Bumula	0.309	60.7	50.9
Bungoma	Kimilili	0.249	51.0	48.8
Bungoma	Mt. Elgon	0.359	66.3	54.2
Bungoma	Sirisia	0.282	56.3	50.1
Bungoma	Webuye	0.250	51.2	48.9
Busia	Nambale	0.288	57.0	50.6
Busia	Budalangi	0.327	60.6	53.9
Busia	Butula	0.327	62.9	52.1
Busia	Amagoro	0.299	57.9	51.7
Busia	Funyula	0.307	59.4	51.7

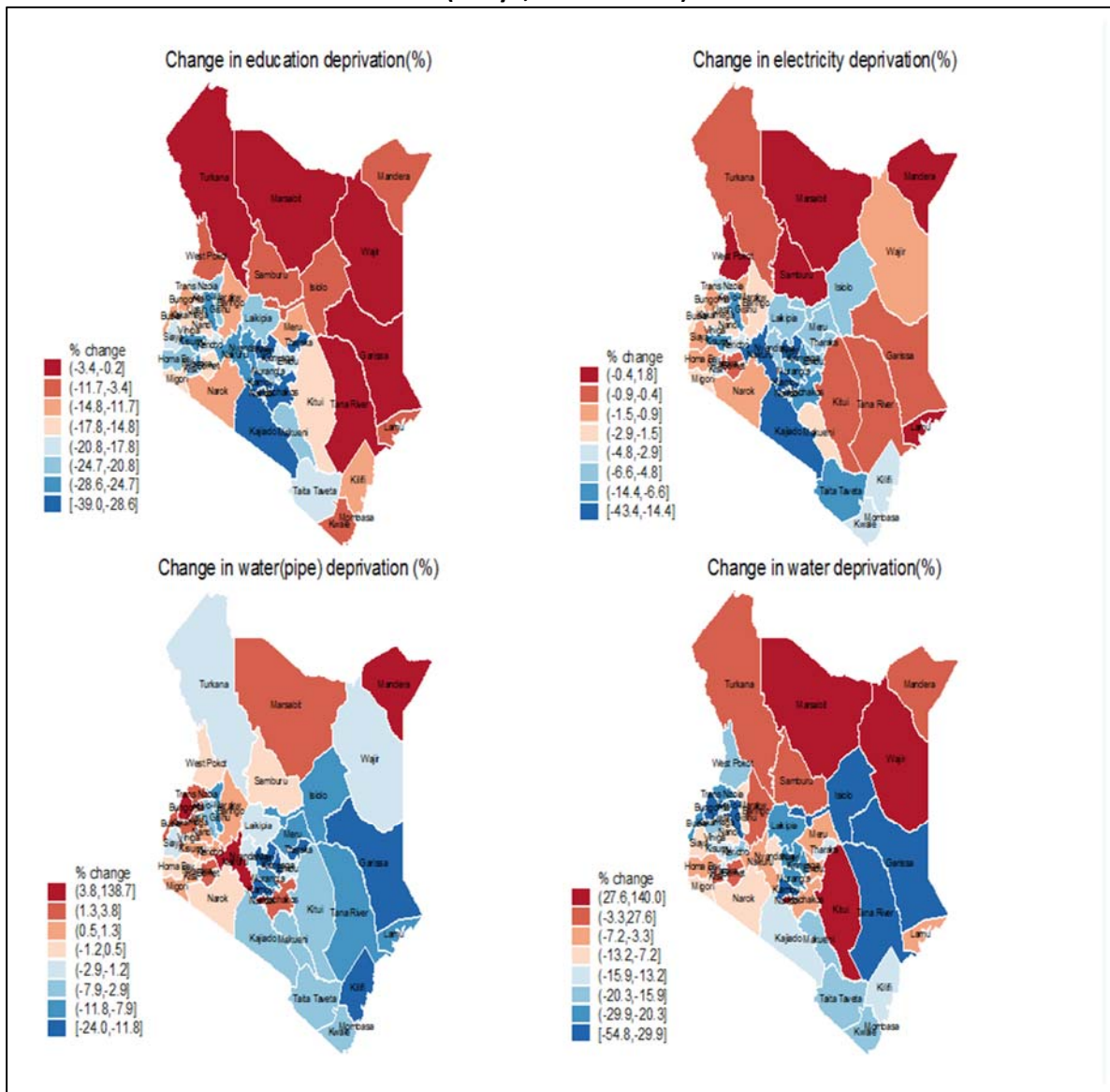
Source: Own estimates using data from Kenyan population Census (2009).

Figure 1A: Urbanization and Multidimensional poverty (Kenya, 2009)



Source: Own estimates using data from Kenyan population Census (2009).

Figure 2A: Percentage change in deprivations in education and access to basic services (Kenya, 1999 & 2009)



Source: Own estimates using data from Kenyan population Censuses (1999 and 2009).

Appendix B: Zambia

Table 1B: Multidimensional and income poverty estimates at district levels in Zambia-2010

Province	District	Multidimensional poverty estimates				income poverty estimates
		MPI	H(%)	A(%)	Variance	H(%)
Central	Kabwe	0.222	43	51	0.23	33
Central	Mumbwa	0.289	55	52	0.15	64
Central	Chibombo	0.295	56	53	0.15	73
Central	Kapiri mpos	0.322	60	54	0.16	68
Central	Mkushi	0.354	64	55	0.17	71
Central	Serenje	0.408	70	58	0.18	78
Copperbelt	Chililabomb	0.159	31	51	0.21	30
Copperbelt	Mufulira	0.168	34	50	0.21	30
Copperbelt	Chingola	0.174	36	49	0.2	32
Copperbelt	Luanshya	0.177	36	49	0.21	33
Copperbelt	Kitwe	0.21	42	50	0.22	29
Copperbelt	Kalulushi	0.224	44	51	0.22	30
Copperbelt	Ndola	0.23	46	50	0.22	31
Copperbelt	Mpongwe	0.334	60	56	0.17	71
Copperbelt	Lufwanyama	0.353	63	56	0.15	80
Copperbelt	Masaiti	0.355	64	56	0.16	51
Eastern	Chipata	0.34	63	54	0.18	72
Eastern	Mambwe	0.362	66	55	0.17	81
Eastern	Chadiza	0.387	70	55	0.16	81
Eastern	Katete	0.38	71	54	0.15	82
Eastern	Lundazi	0.404	71	57	0.16	84
Eastern	Petauke	0.39	71	55	0.16	82
Eastern	Chama	0.428	74	58	0.16	71
Eastern	Nyimba	0.416	74	56	0.17	78
Luapula	Mansa	0.351	62	56	0.19	65
Luapula	Kawambwa	0.379	67	56	0.17	82
Luapula	Mwense	0.399	70	57	0.17	79
Luapula	Nchelenge	0.423	73	58	0.17	77
Luapula	Milenge	0.457	77	59	0.16	88
Luapula	Samfya	0.471	78	60	0.17	91
Luapula	Chiengi	0.466	78	59	0.16	82
Lusaka	Lusaka	0.206	43	48	0.19	18
Lusaka	Kafue	0.249	48	52	0.22	40
Lusaka	Chongwe	0.301	56	53	0.19	61
Lusaka	Luangwa	0.368	66	56	0.19	70

Table 1B: Multidimensional and income poverty estimates at district levels in Zambia 2010(Contd.)

Province	District	Multidimensional poverty estimates				income poverty estimates
		MPI	H(%)	A(%)	variance	H(%)
North western	Solwezi	0.336	62	55	0.19	50
North western	Mufumbwe	0.346	62	56	0.17	87
North western	Kasempa	0.378	67	56	0.18	81
North western	Kabompo	0.416	72	58	0.17	90
North western	Mwinilunga	0.44	74	59	0.18	36
North western	Chavuma	0.443	75	59	0.18	87
North western	Zambezi	0.451	75	60	0.17	87
Northern	Kasama	0.339	61	55	0.19	51
Northern	Mporokoso	0.378	66	57	0.16	82
Northern	Nakonde	0.372	67	55	0.17	72
Northern	Mpika	0.385	67	57	0.18	74
Northern	Isoka	0.399	69	58	0.16	86
Northern	Chinsali	0.411	71	58	0.17	85
Northern	Luwingu	0.427	73	59	0.17	86
Northern	Mungwi	0.434	74	59	0.16	86
Northern	Mbala	0.443	75	59	0.18	82
Northern	Kaputa	0.463	79	59	0.16	79
Northern	Chilubi	0.475	79	60	0.16	87
Northern	Mpulungu	0.479	81	59	0.17	81
Southern	Livingstone	0.188	39	48	0.21	28
Southern	Mazabuka	0.252	48	52	0.19	63
Southern	Monze	0.258	50	51	0.15	75
Southern	Choma	0.302	57	53	0.18	72
Southern	Namwala	0.337	62	55	0.16	72
Southern	Kalomo	0.341	62	55	0.16	75
Southern	Kazungula	0.362	65	56	0.15	68
Southern	Itezhi tezh	0.365	65	56	0.17	70
Southern	Sinazongwe	0.395	70	57	0.19	77
Southern	Gwembe	0.412	74	56	0.16	82
Southern	Siavonga	0.426	74	57	0.2	72
Western	Mongu	0.398	70	57	0.21	71
Western	Sesheke	0.41	71	58	0.19	85
Western	Kaoma	0.437	75	58	0.18	82
Western	Senanga	0.479	80	60	0.17	87
Western	Lukulu	0.484	81	60	0.16	86
Western	Kalabo	0.525	85	62	0.15	88
Western	Shang'ombo	0.544	87	63	0.14	95

Source: Own multidimensional poverty estimations based on the 2010 Zambian population census, and income poverty estimates are obtained from De la Fuente et al(2015).

Table 2B: Multidimensional poverty estimates at constituency levels in Zambia-2010

Province	District	Cost	MPI	Headcount	Intensity
Central	Chibombo	Chisamba	0.283	53.3	53.2
Central	Chibombo	Katuba	0.311	59.5	52.4
Central	Chibombo	keembe	0.293	55.3	53.0
Central	Kabwe	bwacha	0.274	52.7	52.0
Central	Kabwe	Kabwe ce	0.184	36.5	50.4
Central	Kapiri mpos	Kapiri m	0.322	59.7	53.9
Central	Mkushi	Mkushi n	0.350	63.5	55.2
Central	Mkushi	Mkushi s	0.372	65.5	56.8
Central	Mumbwa	Mwembezh	0.294	56.8	51.8
Central	Mumbwa	Mumbwa	0.309	58.0	53.3
Central	Mumbwa	Nangoma	0.265	51.4	51.5
Central	Serenje	Chitambo	0.442	75.7	58.4
Central	Serenje	Muchinga	0.422	71.9	58.7
Central	Serenje	Serenje	0.369	64.9	56.9
Cpperbelt	Chililabomb	Chililab	0.159	31.1	51.2
Cpperbelt	Chingola	Chingola	0.187	38.6	48.6
Cpperbelt	Chingola	Nchanga	0.155	31.3	49.5
Cpperbelt	Kalulushi	Kalulush	0.224	44.0	51.0
Cpperbelt	Kitwe	Chimwemw	0.265	52.4	50.7
Cpperbelt	Kitwe	Kamfinsa	0.233	46.6	50.1
Cpperbelt	Kitwe	Kwacha	0.238	47.4	50.2
Cpperbelt	Kitwe	Nkana	0.143	31.1	45.8
Cpperbelt	Kitwe	Wusakile	0.139	28.4	49.0
Cpperbelt	Luanshya	Luanshya	0.215	42.6	50.5
Cpperbelt	Luanshya	Roan	0.110	24.2	45.4
Cpperbelt	Lufwanyama	Lufwanya	0.353	63.1	55.9
Cpperbelt	Masaiti	Kafulafu	0.379	67.7	55.9
Cpperbelt	Masaiti	Masaiti	0.339	60.7	55.9
Cpperbelt	Mpongwe	Mpongwe	0.334	60.2	55.5
Cpperbelt	Mufulira	Kankoyo	0.159	33.7	47.2
Cpperbelt	Mufulira	Kantansh	0.102	19.9	51.0
Cpperbelt	Mufulira	Mufurila	0.237	46.7	50.7
Cpperbelt	Ndola	Bwana mk	0.229	45.1	50.9
Cpperbelt	Ndola	Chifubu	0.182	38.2	47.6
Cpperbelt	Ndola	Kabushi	0.187	41.5	44.9
Cpperbelt	Ndola	Ndola	0.294	55.4	53.1
eastern	Chadiza	Chadiza	0.366	67.3	54.4

Table 2B: Multidimensional poverty estimates at constituency levels in Zambia-2010(Contd.)

Province	District	Const	MPI	Headcount	Intensity
Eastern	Chadiza	Vubwi	0.417	73.3	56.8
Eastern	Chipata	Chipanga	0.382	68.3	56.0
Eastern	Chipata	Chipata	0.277	53.1	52.1
Eastern	Chipata	Kaseneng	0.363	67.6	53.7
Eastern	Chipata	Luangeni	0.374	68.6	54.5
Eastern	Katete	Milanzi	0.398	73.1	54.4
Eastern	Katete	Mkaika	0.347	65.7	52.8
Eastern	Katete	Sinda	0.403	74.5	54.1
Eastern	Lundazi	Chasefu	0.410	71.5	57.4
Eastern	Lundazi	Lumezi	0.425	73.7	57.7
Eastern	Lundazi	Lundazi	0.383	68.0	56.3
Eastern	Mambwe	Malambo	0.362	65.7	55.1
Eastern	Nyimba	Nyimba	0.416	74.0	56.2
Eastern	Petauke	Kapoche	0.420	74.7	56.2
Eastern	Petauke	Msanzala	0.362	67.2	53.8
Eastern	Petauke	Petauke	0.386	70.5	54.7
Luapula	Chienge	Chienge	0.466	78.4	59.4
Luapula	Kawambwa	Kawambwa	0.331	60.8	54.4
Luapula	Kawambwa	Mwansabo	0.395	70.0	56.5
Luapula	Kawambwa	Pambashe	0.417	72.2	57.8
Luapula	Mansa	Bahati	0.373	65.4	57.1
Luapula	Mansa	Mansa	0.336	60.3	55.7
Luapula	Milenge	Chembe	0.457	77.2	59.2
Luapula	Mwense	Chipili	0.414	71.6	57.8
Luapula	Mwense	Mambilim	0.400	70.2	57.0
Luapula	Mwense	Mwense	0.390	68.8	56.7
Luapula	Nchelenge	Ncheleng	0.423	73.5	57.6
Luapula	Samfya	Bangweul	0.445	75.2	59.2
Luapula	Samfya	Chifunab	0.474	78.7	60.3
Luapula	Samfya	Luapula	0.555	88.0	63.1
Lusaka	Chongwe	Chongwe	0.275	52.5	52.4
Lusaka	Chongwe	Rufunsa	0.376	67.1	56.0
Lusaka	Kafue	Kafue	0.260	50.0	52.0
Lusaka	Kafue	Chilanga	0.237	46.0	51.5
Lusaka	Luangwa	Feira	0.368	65.7	55.9
Lusaka	Lusaka	Chawama	0.270	55.3	48.8
Lusaka	Lusaka	Kabwata	0.081	17.4	46.2

Table 2B: Multidimensional poverty estimates at constituency levels in Zambia-2010(Contd.)

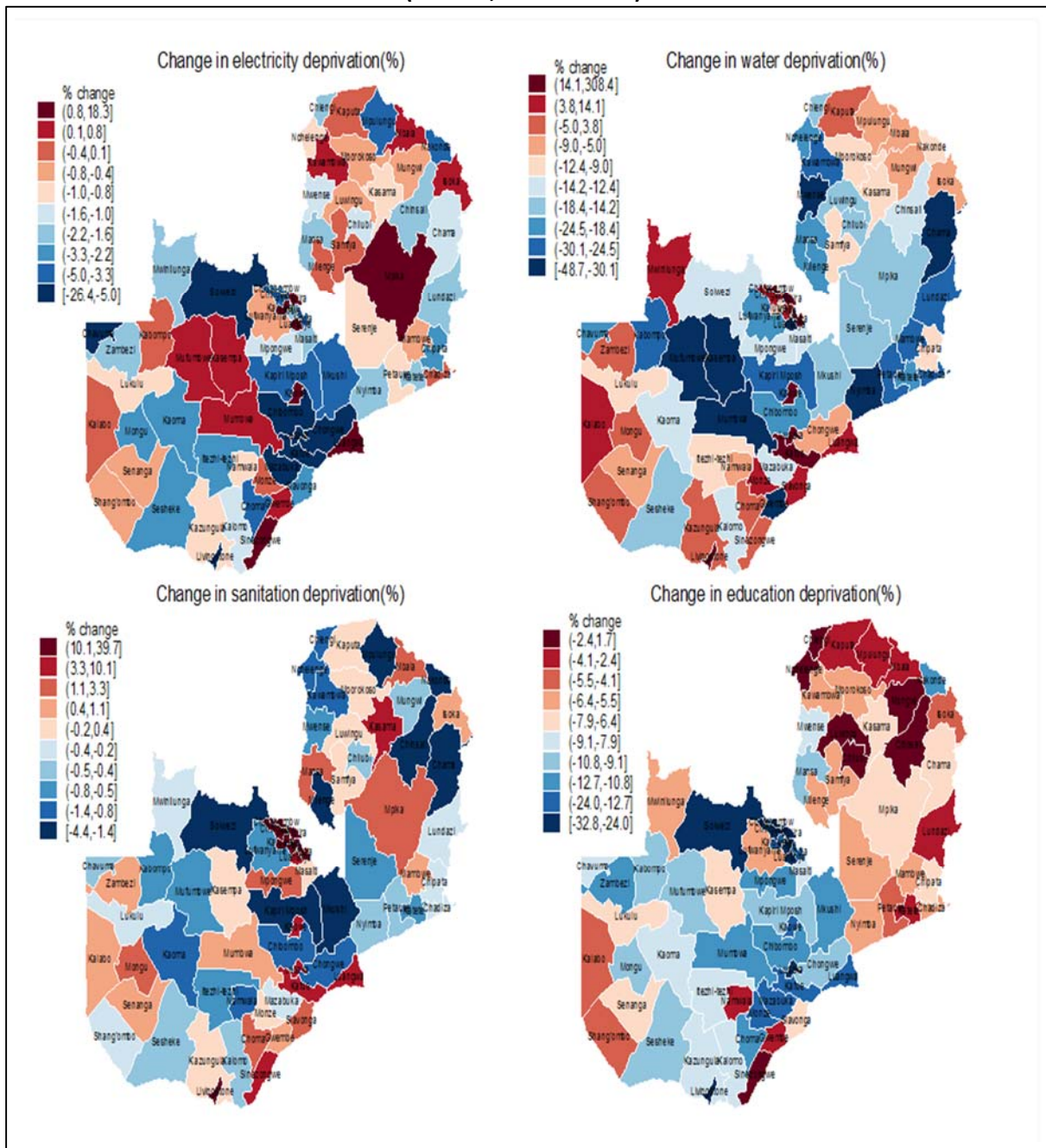
Province	District	Const	MPI	Headcount	Intensity
Lusaka	Lusaka	Kanyama	0.254	52.9	48.0
Lusaka	Lusaka	Lusaka c	0.111	22.7	49.0
Lusaka	Lusaka	Mandevu	0.253	52.0	48.6
Lusaka	Lusaka	Matero	0.202	42.9	47.2
Lusaka	Lusaka	Munali	0.156	32.8	47.7
Muchinga	Chama	Chama no	0.411	71.3	57.6
Muchinga	Chama	Chama so	0.447	76.5	58.4
Muchinga	Chinsali	Chinsali	0.403	69.7	57.8
Muchinga	Chinsali	Shiwa-ng	0.424	72.0	58.8
Muchinga	Isoka	Isoka	0.380	66.6	57.0
Muchinga	Mafinga	Mafinga	0.419	71.6	58.4
Muchinga	Mpika	Kanchibi	0.447	76.3	58.6
Muchinga	Mpika	Mfuwe	0.448	75.6	59.2
Muchinga	Mpika	Mpika	0.314	57.4	54.6
Muchinga	Nakonde	Nakonde	0.372	67.2	55.3
Northern	Chilubi	Chilubi	0.475	78.9	60.2
Northern	Kaputa	Chimbami	0.486	81.9	59.3
Northern	Kaputa	Kaputa	0.448	76.6	58.4
Northern	Kasama	Kasama c	0.316	58.0	54.5
Northern	Kasama	Lukasha	0.387	67.8	57.0
Northern	Luwingu	Lubansen	0.383	66.6	57.6
Northern	Luwingu	Lupososh	0.459	77.5	59.2
Northern	Mbala	Mbala	0.427	73.0	58.5
Northern	Mbala	Senga hi	0.462	77.5	59.7
Northern	Mporokoso	Lunte	0.392	67.8	57.8
Northern	Mporokoso	Mporokos	0.358	63.3	56.5
Northern	Mpulungu	Mpulungu	0.479	80.5	59.4
Northern	Mungwi	Malole	0.434	73.7	58.8
North western	Chavuma	Chavuma	0.443	74.5	59.4
North western	Ikelenge	Ikelenge	0.446	75.9	58.7
North western	Kabompo	Kabompo	0.413	70.9	58.2
North western	Kabompo	Kabompo	0.419	72.9	57.5
North western	Kasempa	Kasempa	0.378	67.2	56.2
North western	Mufumbwe (c	Mufumbwe	0.346	62.2	55.5
North western	Mwinilunga	Mwinilun	0.438	74.0	59.2
North western	Solwezi	Solwezi	0.289	54.8	52.8
North western	Solwezi	Solwezi	0.404	72.6	55.6

Table 2B: Multidimensional poverty estimates at constituency levels in Zambia-2010(Contd.)

Province	District	Const	MPI	Headcount	Intensity
North western	Solwezi	Solwezi	0.384	67.8	56.6
North western	Zambezi	Zambezi	0.434	73.0	59.5
North western	Zambezi	Zambezi	0.493	80.3	61.4
Southern	Choma	Choma	0.290	55.1	52.7
Southern	Choma	Mbabala	0.304	56.9	53.5
Southern	Choma	Pemba	0.321	59.2	54.2
Southern	Gwembe	Gwembe	0.412	73.7	55.8
Southern	Itezhi tezh	Itezhi t	0.365	65.2	56.0
Southern	Kalomo	Dundumwe	0.362	66.6	54.4
Southern	Kalomo	Kalomo c	0.302	56.9	53.1
Southern	Kalomo	Mapatizy	0.376	66.5	56.6
Southern	Kazungula	Katombol	0.362	65.1	55.6
Southern	Livingstone	Livingst	0.188	39.0	48.3
Southern	Mazabuka	Chikanka	0.311	57.4	54.1
Southern	Mazabuka	Magoye	0.293	55.2	53.1
Southern	Mazabuka	Mazabuka	0.188	38.1	49.4
Southern	Monze	Bweenga	0.284	55.0	51.7
Southern	Monze	Monze ce	0.241	47.4	50.8
Southern	Monze	Moomba	0.266	51.4	51.7
Southern	Namwala	Namwala	0.337	61.9	54.5
Southern	Siavonga	Siavonga	0.426	74.3	57.3
Southern	Sinazongwe	Sinazong	0.395	69.9	56.5
Western	Kalabo	Kalabo	0.500	82.4	60.7
Western	Kalabo	Liuwa	0.499	81.2	61.4
Western	Kalabo	Sikongo	0.571	89.6	63.8
Western	Kaoma	Kaoma c	0.368	65.5	56.1
Western	Kaoma	Luampa	0.488	81.3	60.1
Western	Kaoma	Mangang	0.498	83.1	59.9
Western	Lukulu	Lukulu	0.462	78.6	58.8
Western	Lukulu	Lukulu	0.529	84.7	62.5
Western	Mongu	Luena	0.422	71.9	58.7
Western	Mongu	Mongu c	0.336	62.3	54.0
Western	Mongu	Nalikwa	0.504	82.9	60.8
Western	Senanga	Nalolo	0.497	81.6	60.9
Western	Senanga	Senanga	0.464	77.9	59.6
Western	Sesheke	Mulobez	0.470	78.1	60.1
Western	Sesheke	Mwandi	0.388	68.3	56.8
Western	Sesheke	Sesheke	0.381	66.6	57.2
Western	Shang'ombo	Sinjemb	0.544	86.5	62.8

Source: Own estimates using data from the 2010 Zambian population census.

Figure 2B: Percentage change in deprivations in education and access to basic services (Zambia, 2000 & 2010)

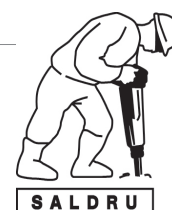


Source: Own estimates using data from the 2000 and 2010 Zambian population censuses.

southern africa labour and development research unit

The Southern Africa Labour and Development Research Unit (SALDRU) conducts research directed at improving the well-being of South Africa's poor. It was established in 1975. Over the next two decades the unit's research played a central role in documenting the human costs of apartheid. Key projects from this period included the Farm Labour Conference (1976), the Economics of Health Care Conference (1978), and the Second Carnegie Enquiry into Poverty and Development in South Africa (1983-86). At the urging of the African National Congress, from 1992-1994 SALDRU and the World Bank coordinated the Project for Statistics on Living Standards and Development (PSLSD). This project provide baseline data for the implementation of post-apartheid socio-economic policies through South Africa's first non-racial national sample survey.

In the post-apartheid period, SALDRU has continued to gather data and conduct research directed at informing and assessing anti-poverty policy. In line with its historical contribution, SALDRU's researchers continue to conduct research detailing changing patterns of well-being in South Africa and assessing the impact of government policy on the poor. Current research work falls into the following research themes: post-apartheid poverty; employment and migration dynamics; family support structures in an era of rapid social change; public works and public infrastructure programmes, financial strategies of the poor; common property resources and the poor. Key survey projects include the Langeberg Integrated Family Survey (1999), the Khayelitsha/Mitchell's Plain Survey (2000), the ongoing Cape Area Panel Study (2001-) and the Financial Diaries Project.



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