UNIVERSITY OF THE WESTERN CAPE

DEPARTMENT OF ECONOMICS

# A comparative analysis of multidimensional poverty in South Africa focusing on the Western Cape and Eastern Cape between 1996 and 2016

by

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## DECLARATION

I declare that *A comparative analysis of multidimensional poverty in South Africa focusing on the Western Cape and Eastern Cape between 1996 and 2016* is my own work, that it has not been submitted for any degree or examination in any university, and that all the sources that I have used or quoted have been indicated and acknowledged by complete references.

**Eden-Lee Draai**

Signature: 

Date: 27 October 2022

**ABSTRACT**

Remarkable progress has been made in South Africa since the transition from Apartheid to a democracy. Despite this, socio-economic challenges persist, and poverty remains a major problem in post-apartheid South Africa. Considerable efforts have been undertaken by the government to alleviate poverty among the people of South Africa by implementing various policies and programmes. Unfortunately, the nature of these programmes has not demonstrated a large impact on changing poverty holistically and on a sustained basis as the extent of poverty is still very different across provinces.

When trying to understand the nature and extent of poverty, many local studies focus on the money-metric approach to measuring poverty. However, poverty is a multidimensional concept hence, this thesis will concentrate on measuring multidimensional non-money-metric poverty levels and trends. By applying the fuzzy sets approach, this thesis aims to determine how poverty levels and trends of non-money-metric poverty in South Africa have changed between 1996 and 2016. After which the Western Cape and Eastern Cape will be compared by investigating the differences in multidimensional poverty levels and trends between the two provinces. The data utilised are the 10% sample Censuses of 1996, 2001 and 2011 as well as the Community Surveys of 2007 and 2016.

The descriptive statistics of this thesis revealed that South Africa's deprivation levels, as measured by the seven non-monetary dimensions, declined between 1996 and 2016. This decline indicates that there has been improvements and government's efforts are paying off.

However, the legacy of Apartheid remains despite the progress made as deprivation was more prevalent among the Black race group, female-headed households as well as those residing in rural areas and provinces such as the Eastern Cape and Limpopo. Additionally, this thesis compared the deprivation levels and trends between the Western Cape and Eastern Cape. The gaps between the two provinces were evident and overall, the Eastern Cape was worse-off while the Western Cape was better-off.

**Keywords:** multidimensional poverty, fuzzy set index, Western Cape, Eastern Cape, South Africa

**JEL codes:** I30, I31, I32, I38

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## LIST OF ABBREVIATIONS

| | |
|---|---|
| AMPS | All-Media Products Survey |
| APRYD | Agricultural Partnership for Youth Development |
| AsgiSA | Accelerated and Shared Growth Initiative of South Africa |
| BUF | Buffalo City |
| CBN | Cost-of-basic needs |
| CDF | Cumulative density function |
| CPT | City of Cape Town |
| CS | Community Survey |
| DC | District Council |
| DoSD | Department of Social Development |
| EC | Eastern Cape |
| FA | Factor Analysis |
| FEI | Food-energy intake |
| FGT | Foster-Greer-Thorbecke |
| FPL | Food Poverty Line |
| FS | Free State |
| GAU | Gauteng |
| GEAR | Growth, Employment and Redistribution |
| GHS | General Household Survey |
| HDI | Human Development Index |
| IES | Income and Expenditure Survey |
| IDP | Integrated Development Plan |
| KZN | KwaZulu-Natal |
| LBPL | Lower bound poverty line |
| LIM | Limpopo |
| MCA | Multiple Correspondence Analysis |
| MPI | Multidimensional Poverty Index |
| MPU | Mpumalanga |
| NDP | National Development Plan |
| NC | Northern Cape |
| NGP | New Growth Plan |
| NIDS | National Income Dynamics Study |

| | |
|---|---|
| NMA | Nelson Mandela Bay |
| NW | North West |
| OECD | The Organisation for Economic Co-operation and Development |
| OHS | October Household Survey |
| OLS | Ordinary Least Squares |
| PCA | Principal Components Analysis |
| PGDP | Provincial Growth and Development Plan |
| PSLSD | Project for Statistics on Living Standards and Development |
| QLFS | Quarterly Labour Force Survey |
| RDP | Reconstruction and Development Program |
| RSA | Republic of South Africa |
| SRMI | Sequential regression multiple imputation |
| Stats SA | Statistics South Africa |
| TFR | Totally Fuzzy and Relative approach |
| UBPL | Upper bound poverty line |
| WC | Western Cape |

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# CHAPTER ONE: INTRODUCTION

## 1.1 Background

Remarkable progress has been made in the country since the changeover from Apartheid to a democracy. Despite this, socio-economic challenges persist, poverty is still a major problem, and the country remains a highly unequal society (World Bank, 2018; Leibbrandt, Ranchhod & Green, 2018). Considerable efforts have been undertaken and many programmes[1] were created and implemented to alleviate poverty and inequality among the people of South Africa that stemmed from the Apartheid regime (World Bank, 2018). Unfortunately, the nature of these programmes has not demonstrated a large impact on changing poverty holistically and on a sustained basis. This could partly be due to the lack of understanding the challenges of dealing with poverty, since poverty is complex and multi-facetted (Department of Social Services and Poverty Alleviation, 2005).

In South Africa, many studies (e.g., Van der Berg, Burger, Burger, Louw & Yu, 2005; Leibbrandt, Poswell, Naidoo, Welch & Woolard, 2005; Hoogeveen & Özler, 2006; Armstrong, Lekezwa & Siebrits, 2008; Yu, 2009; Bhorat, Van der Westhuizen & Jacobs, 2009; Posel & Rogan, 2012; Zizzamia, Schotte & Leibbrandt, 2019) have been performed to identify poverty trends since 1994 and majority of the research and studies are based on the monetary approach in measuring poverty. The money-metric approach uses income and expenditure levels to identify the poor (Finn, Leibbrandt & Oosthuizen, 2014: 8). By doing so, a poverty line is utilised to assess the proportion of a population who has an income lower than the minimum level that is necessary to survive in South Africa.

Income and expenditure are sound indicators to use when estimating poverty levels. However, these indicators have limitations as poverty comprises of more aspects other than low levels of income and expenditure (Fransman, 2017). The money-metric approach is therefore known as a one-dimensional framework as it does not capture the various facets that make up poverty and it limits the way in which poverty can be measured (Stats SA, 2014). Due to the limits of one-dimensional frameworks, this thesis will focus on the non-money-metric approach which is also known as the multidimensional concept.

[1] Examples of these programmes are the Growth, Employment and Redistribution (GEAR), Reconstruction and Development Program (RDP), Accelerated and Shared Growth Initiative of South Africa (AsgiSA), New Growth Plan (NGP) as well as the National Development Plan 2030 (NDP).

The multidimensional concept of poverty seeks to understand poverty beyond monetary deprivations (World Bank, 2022). This implies that non-money-metric poverty can be looked at from different dimensions such as being educationally deprived, poor health, the absence of access to clean water, experiencing a sense of isolation, being vulnerable and powerless (Gallant, 2012).

### 1.2 Problem statement

The studies that were done to address multidimensional poverty only analysed non-money-metric poverty from a national perspective. Together with this national focus, this thesis will also focus on studying non-money-metric poverty within two specific provinces, the Western Cape, and the Eastern Cape. The Western Cape is part of South Africa's wealthiest provinces (Oosthuizen & Nieuwoudt, 2002; Khumalo, 2022). Whereas, in contrast, the Eastern Cape province is known for its position as being one of the most poverty-stricken provinces in South Africa (Khumalo, 2022).

The Western Cape province is seen as a popular inter-provincial migration[2] destination to the residents of the Eastern Cape. Out of the nine provinces in South Africa, the Western Cape stands out as one of the most desirable locations for labour migrants (Yu, 2021). Yu (2021) found that 53.64% of inter-provincial migrants into the Western Cape came from the Eastern Cape. Additionally, Yu (2021) also observed that more than 70% of inter-provincial migrants to the Western Cape chose to settle in Cape Town. The mentioned results suggest that the Western Cape is associated with better living conditions and employment opportunities. In contrast, the Eastern Cape is a province that is largely rural with limited employment opportunities (Daniel, 2018). According to Stats SA (2015) 86% of the inter-provincial migrants from the Eastern Cape to the Western Cape are from the Black race group while young children and their young adult parents are dominant compared to inter-provincial migrants elsewhere. More reasons as to why the Western Cape is more desirable than the Eastern Cape will surface throughout this thesis.

From this, the following research questions arise: How has multidimensional poverty changed in South Africa between 1996 and 2016? What explains the differences in multidimensional poverty between the Western Cape and the Eastern Cape?

[2] The term inter-provincial migration refers to people moving from one province to another within the same country (Kleinhans & Yu, 2020).

To answer the above research questions, this thesis opts to employ the Totally Fuzzy and Relative (TFR) methodology[3] together with the Census and Community Survey (CS) data. Five datasets are adopted, that is the 10% sample Censuses of 1996, 2001 and 2011 as well as the Community Surveys of 2007 and 2016, performed by Statistics South Africa (Stats SA).

By using the above-mentioned methodology, an index of deprivation will be constructed to assess the degree of multidimensional poverty between 1996 and 2016 in South Africa and specifically the Western Cape and the Eastern Cape. The fuzzy set index does not require a certain minimum measuring line, as in the case of the money-metric approach. Therefore, it is important to understand the approach that is used to measure multidimensional poverty, as it influences how we interpret and understand poverty.

Lastly, this study will contribute to the existing literature on multidimensional poverty in the country. This thesis will analyse the levels and patterns of poverty in the country, focusing particularly on the Western Cape and Eastern Cape since the changeover to a democracy. A more recent dataset of 2016 which has not been extensively used by other researchers will be added to the already existing datasets that have been used before. The non-money-metric poverty assessment would have had a lengthier time span had the most recent census data been available, but due to the global Covid-19 pandemic, the census had to be postponed and only took place from February 2022. The data will not be available at the time of writing.

### 1.3 Research questions and objectives of the study

As identified from the previous section, the two main research questions of the thesis are:

- How has multidimensional poverty changed in South Africa between 1996 and 2016?
- What explains the differences in multidimensional poverty between the Western Cape and Eastern Cape?

The purpose of this thesis will be to:

- Determine the levels and trends of non-money-metric poverty in South Africa from 1996 - 2016 by using demographic and geographical variables.
- Examine the differences in multidimensional poverty between the Western Cape and Eastern Cape.

[3] The TFR methodology will be discussed in detail in Chapter Four, Section 4.2.

### 1.4 Outline of the study

This study will be organised into six chapters. Chapter One will present a general introduction to the research topic. The chapter will also provide the background, statement of the problem, research questions and objectives, as well as the outline of the thesis.

Chapter Two intends to examine the conceptual and theoretical framework underpinning the study. It will examine the key concepts of poverty, poverty theories and the five dimensions of poverty. Additionally, an in-depth comparison of the money-metric approach and the non-money-metric approach will be provided. Thereafter, Chapter Three will review local empirical studies of the past that evaluated money-metric and non-money-metric poverty from several datasets. The focus of these studies link to the data used in this thesis, to study multi-faceted poverty.

Next, Chapter Four will firstly, consist of a detailed description of the methodology i.e., the fuzzy sets methodology, its origin and how the fuzzy set will be employed in the study. Additionally, the chapter will also discuss the Ordinary Least Squares. Secondly, the data being used will be discussed. Next, the limitations are highlighted which is then followed by the horizontal and vertical weights and the index showing those who are deprived. The chapter will then be concluded.

Chapter Five will provide an analysis of the empirical results estimated using the methodology and data of Chapter Four. An empirical analysis will be performed nationally after which it will then compare the results of the Western Cape and the Eastern Cape. In addition, an OLS regression will be presented to examine whether the independent variables are associated with deprivation. To conclude, the results of this thesis will be reiterated in Chapter Six and this chapter will also include a few policy suggestions.

# CHAPTER TWO: LITERATURE REVIEW - CONCEPTS, DIMENSIONS AND MEASUREMENT OF POVERTY

## 2.1 Introduction

This Chapter consist of six sections. Section 2.2 reviews poverty concepts, while Section 2.3 discusses the various theories of the impoverished. Next, Section 2.4 outlines the poverty dimensions, while Section 2.5 explains the differences between the monetary and the non-monetary approaches to poverty. Section 2.6 ends the chapter.

## 2.2 Defining the concept of poverty

Poverty is a concept known by many and in general is said to exist when individuals lack the means to fulfil their basic needs. Yet, it is difficult to provide a clear and generally accepted definition of poverty because of the complexities related to the concept and the fact that it is viewed in different ways by different people (Naidoo, 2007: 6). This implies that those who have and those who do not have both view poverty differently.

The South African Participatory Poverty Assessment survey, which was steered in 1998, mention that those who live in poverty see poverty as being homeless, unemployed, and having very limited employment opportunities, insufficient wages, the absence of security, poor access to clean water and nutrition, as well as having a lack of quality education opportunities.

On the other hand, those who are living comfortably, described those living in poverty as individuals who do not have sufficient revenue which they assume are because of bad decision making by the poor (Naidoo, 2007: 6). Hence, when looking at poverty from different perspectives, it is not easy to provide an exact and accurate description of poverty.

Similarly, when looking at existing literature, different authors also provide different definitions of poverty. For example, according to the Concise Oxford dictionary poverty is defined as “the state of lacking adequate means to live comfortably and the want of things or needs indispensable to life”. On the other hand, the World Bank (2000) describes poverty as “the pronounced deprivation of well-being, comprising different dimensions”. Abulencia (2022) expressed poverty as “being deprived of food and not having the necessities to go about your daily life such as clean water and quality education”.

Deprivation which plays a vital role in poverty, can be defined as the lack of material benefits or resources that are necessities in a society (Oxford dictionary, 2021). Noble, Zembe & Wright (2014) citing Townsend (1987) defined deprivation as the lack of having material possessions, social and human capital as well as the absence of decent housing and basic services.

## 2.3 Theoretical framework

Poverty can be based on various theories. These theories are necessary as it presents a systematic way of understanding events, behaviours, or situations (Stark, 2009). Therefore, it is important that the basis of poverty is determined for the correct poverty reduction policies to be made.

### 2.3.1 Behavioural/Decision-based theory

The behavioural based theory is also recognised as the decision-based theory, and it is founded on the laissez-faire ethos. This theory proposes that people experience poverty because of their economic decisions. According to Sameti, Esfahani & Haghighi (2012) this theory has to do with factors that incite poverty, such as, welfare participation, the attitude of the individual as well as human capital. Additionally, this theory implies that individuals who are poor are responsible for their circumstances since they are not motivated, and their productivity is low (Sameti *et al*., 2012). Ultimately, the theory suggests that the poor decide their own economic circumstances and social well-being. Therefore, the onus to change an individual's economic circumstances is on the individuals themselves and not on the government (Fransman, 2017: 19).

### 2.3.2 The "sub-culture" of poverty theory

The sub-culture of poverty theory assumes that poor individuals have different beliefs, values and behavioural norms compared to those individuals who are not poor (Sameti *et al.*, 2012: 47). According to Wilson (2017) this culture of poverty endures poverty by normalising its supporting value orientations such as helplessness, the quest for fulfilment, dependency, marginality as well as powerlessness. It is said that individuals become poor due to psychological behaviours that they have learnt. Furthermore, this is also grounded on the idea that poverty can create more poverty. Thus, it is believed that poverty is passed on through generations and results in a continuous cycle of being poor. However, criticisms have been widespread and severe with regards to this theory of poverty, by focusing on the notion that

the poor are anything but passive in the face of social and economic oppression (Wilson, 2017).

### 2.3.3 Opportunity theory

In contrast, the opportunity theory, retaliates against the "sub-culture of poverty theory" and argues that individuals are not poor because of psychological behaviours that are associated with poverty (Fransman, 2017: 8). This theory is based on the notion that individuals are poor because they have restricted access to opportunities as well as limited human capital when compared to those individuals who are wealthy (Sameti *et al.*, 2012). They also went further by stating that the government's system is designed in a manner that it only tends to favour certain groups (Sameti *et al.*, 2012).

### 2.3.4 Poverty as a structural failing theory

The idea that poverty is caused by structural flaws in the economy or various institutional settings and that these flaws tend to benefit some groups over others is at the heart of the idea that poverty is a structural failing. Generally, certain groups are favoured based on gender, class, and race (Addae-Korankye, 2014: 151). Moreover, structural poverty is considered rather serious since it can do more permanent damage which could be because of factors such as skills shortages and limited resources (Fransman, 2017: 8). To a large extent, low levels of human capital investment and structural unemployment can also be linked to the notion of structural failing.

The above-mentioned theories provide a foundation as to which the non-money-metric approach to poverty can be based on. However, poverty can be caused by many other factors and is not only restricted to the above-mentioned theories.

## 2.4 The dimensions of poverty

### 2.4.1 Five dimensions of poverty

It is incorrectly perceived by many people that poverty is only about low income. In fact, poverty is a multidimensional concept which consists of various monetary and non-monetary dimensions. Five dimensions of poverty were identified by The World Bank (2000) and Woolard & Leibbrandt (1999). These five dimensions exemplify the circumstances and conditions that the poor endures.

#### 2.4.1.1 Poverty Proper

Poverty proper as a dimension relates to having inadequate income and assets. In line with the World Bank (2000) traditionally, the relationship between income and consumption defines poverty. Hence, an individual can experience poverty by having a lack of monetary resources and assets.

#### 2.4.1.2 Health and education

The health and education dimension, refer to a population that is characterized by an increased fatality and infant mortality ratio as well as elevated incidences with the lack of receiving the right amount of nutrition, being ill and disabled (World Bank, 2000). This is also paired with receiving poor quality education. According to Enstrom & Pettersson (2016) when suffering from malnutrition, learning abilities diminishes. Suhrcke & de Paz Nieves (2011) agrees that a relationship exists between the well-being and educational outcomes of individuals. When viewing poverty from an income and consumption standpoint, the incapacity to fulfil basic needs in turn indicates that difficulties might occur to maintain a nutritious lifestyle. According to Enstrom & Pettersson (2016) the lack of financial resources makes it difficult for many families to afford healthy food and in turn education becomes less of a priority as individuals focus on searching for enough food to get through the day. Consequently, a poor health status is associated with poor educational outcomes and vice versa.

#### 2.4.1.3 Vulnerability

Being vulnerable as a poor individual, means the possibility to be exposed to a crisis, being defenceless against deprivation and the threat of becoming even more poor. Vulnerability also refers to the risk of being subjected to unexpected events and several other dangers such as violence, criminality as well as natural disasters. Woolard & Leibbrandt (1999) states that vulnerability is the function of external risks, shocks, and stress. The vulnerability dimension is difficult to measure since it is a dynamic concept. Therefore, it cannot be measured merely by observing households once (World Bank, 2000).

#### 2.4.1.4 Voicelessness and powerlessness

Feeling helpless in light of current social, economic, cultural and political structures, is the notion of what the voiceless and powerless dimension is based on (Woolard & Leibbrandt, 1999). Powerlessness replicates the lack of capacity to claim rights and to protest against

exploitation (Engberg-Pedersen & Ravnborg, 2010). This dimension is harder to measure since it is less tangible.

#### 2.4.1.5 Isolation

Isolation as a dimension, refers to being physically and socially isolated (Woolard and Leibbrandt, 1999). Being physically isolated refers to the location where individuals reside. This implies that some individuals may reside in a location that lessens their contact with other individuals whether it is family, friends or just being isolated in general. In addition, individuals could also have inadequate access to basic goods and services as a result of the location where they are situated. These locations could include rural areas.

### 2.4.2 Objective and subjective identification

Since poverty is a complex concept, it can be measured objectively as well as subjectively. The objective identification involves quantitative measures which consist of economical, educational as well as biological deprivation. Subjectively, it involves the qualitative measures, and this includes experiences, social conditions, political and livelihood problems, for example, the lack of jobs (Govender, Kambaran, Patchett, Ruddle, Torr & Van Zyl, 2006).

When linking the objective and subjective identification perspectives to the five dimensions of poverty, the dimensions 'poverty proper' and 'physical weakness' can be categorised under the objective perspective. While 'isolation', 'vulnerability' and 'powerlessness' can be grouped under the subjective perspective.

Therefore, when considering these dimensions, poverty is much more than having a lack of income. Poverty is also ultimately the deprivation of opportunity as it certainly denies individuals from choices and various chances for living a comfortable life.

### 2.4.3 Temporary poverty versus chronic poverty

Temporary poverty occurs when people find themselves going through short term periods of hardship followed by periods of prosperity. Chronic poverty on the other hand is observed over the long-term. This indicates that chronically poor individuals experience deprivation over many years and often their entire lives. According to Haughton & Khandker (2009) individuals who consistently have average per capita consumption that is at or below the poverty level are said to be living in chronic poverty.

### 2.4.4 Absolute poverty versus relative poverty

Absolute poverty refers to the nutritional and essential requirements, for example, clothes, water, and shelter that are necessary to satisfy the minimum basic needs of human-beings (Philip & Rayhan, 2004). This type of poverty is thus, measured by a set poverty line. Engberg-Pedersen & Ravnborg (2010) agrees that absolute poverty quantifies the amount of people who are beneath the poverty line.

In contrast, relative poverty is portrayed when an individual's means of living, and income is much worse than the general standard of living. This type of poverty does not categorize people as poor by linking them with a fixed poverty line as with absolute poverty (Engberg-Pedersen & Ravnborg, 2010). The relative approach, therefore, refers to poverty in proportion to what is regarded as acceptable based on the living standards of a specific community, and it goes beyond basic psychological needs (Falkingham & Namazie, 2002).

## 2.5 Money-metric approach versus non-money-metric approach

### 2.5.1 Money-metric approach

#### 2.5.1.1 Defining the money-metric approach

The monetary approach is the traditional and most used to explain and measure poverty. Very often, the money-metric approach is utilised since it is considered appropriate on its own and it is also seen as an adequate proxy for poverty (Maxwell, 1999: 3). A poverty line is generally used to indicate whether an individual or household is poor or not. This poverty line is a threshold for the minimum income level that is mandatory to have a decent livelihood.

#### 2.5.1.2 Advantages and disadvantages of the money-metric approach

As mentioned, the money-metric approach is a one-dimensional framework as income and expenditure is used to measure poverty. Although the money-metric approach is one-dimensional, it has various advantages. It is reader friendly as it allows an average individual to understand especially when using the poverty rate and poverty gap methods. The monetary approach computes mandatory data easily. It is also much easier to compare changes that may occur in poverty over a certain period of time (Van der Walt, 2004).

However, there are also shortcomings that may occur. Elements such as income and consumption are not enough to capture all the facets of poverty (Finn, Leibbrandt & Woolard, 2013: 2). Many researchers believe that there are different dimensions to poverty and the traditional approach only studies one dimension at a time and it places a limit on measuring

poverty (Van der Walt, 2004). Even though income and expenditure are crucial for poverty measurement, the monetary approach is not always sufficient for measuring a multidimensional concept (Pabuķcu, 2017).

Furthermore, the money-metric method fails to capture living conditions of poor individuals because of market failures (Burger, Van der Berg, Van der Walt & Yu, 2017). This implies that some individuals can manage to pay for accommodation while others must resort to informal dwellings because of the lack of available housing. This approach may also fail to capture things that money cannot buy such as a sense of belonging and individual self-esteem, to mention a few. Services such as free government services are also not taken into consideration when measuring poverty based on monetary terms only.

2.5.1.3 Measurements of the money-metric approach

For the correct poverty alleviation plans to be made, the measurement of poverty is important because it assists in identifying the most deprived and vulnerable individuals or households in a society. Over the years, research and literature on poverty have grown and resulted in various methods and techniques being developed. Three steps need to be undertaken when measuring money-metric poverty (Haughton & Khandker, 2009). Firstly, define an indicator. Secondly, establish a poverty line and thirdly, generate a summary statistic.

2.5.1.4 Welfare Indicator

For monetary poverty to be measured, it is essential to firstly identify "well-being" in some way (Budlender, Leibbrandt & Woolard, 2015). There are three primary indicators of welfare namely, income, non-income as well as a composite indicator consisting of both income and non-income data (Shea, 1997). Poverty can, therefore, be analysed from a monetary perspective, a non-monetary way or a composite angle depending on which welfare indicator is used. For the purpose of the money-metric approach, this thesis will only focus on the income indicator.

- The income indicator

The means through which one acquires the needs required for a minimal level of living is considered to be one's income. Whereas consumption signifies the purchasing of the necessities (Van der Walt, 2004). When consumption or income are split by the number of household members, it produces the per capita income or expenditure (Haughton & Khandker, 2009).

Once a decision has been made to utilise money-metric welfare indicators, the next step is to decide which indicator should be used between income or consumption data (Budlender *et al*., 2015). From the perspective of a developing country, assessing an individual's spending habits on products and services would be the greatest way to determine their level of welfare. Furthermore, when implementing this approach, people's well-being is equivalent to their utility. This implies that each person decides for themselves what they value and the degree to how much they value it (Budlender *et al.*, 2015).

2.5.1.5 Poverty line

The poverty line is used to divide a population into two clusters based on some measure such as income or expenditure. If an individual or household finds themselves below the line of poverty, they are regarded as poor. In contrast, if they are above the poverty threshold, they are observed as non-poor (Woolard & Leibbrandt, 2006; Van der Walt, 2004).

For example, a household with an income of R1000 or higher would be considered non-poor if the poverty threshold is R1000, while a household receiving less than R1000 would be considered poor. However, this brings up the following question: can this be true? Someone who earns R1001 is most likely similarly poor as someone who earns R999. For that reason, a poverty line is an imperfect theory and is problematic. However, according to Woolard & Leibbrandt (2006: 18) for the purpose of this analysis, a line needs to be drawn *somewhere* for poverty to be understood correctly. Additionally, questions are also raised about how much the proportion of poor will change if the poverty line is changed. This is discussed below when upper and lower bound poverty lines, as well as relative lines, are discussed.

Poverty lines can take the form of an absolute poverty line or a relative poverty line. Woolard & Leibbrandt (2006) state that the distinction among the mentioned poverty thresholds is that a relative poverty line moves with a society's living standards whereas an absolute poverty threshold does not. This is an important distinction as it will affect the way in which poverty reduction policies will be perceived. The two poverty lines are examined below.

- Absolute poverty line

Absolute poverty lines are characterized by a prescribed level of income or expenditure for a distinct basket of food that has adequate nutrition. Over time, an absolute poverty line remains fixed and will only adjust for inflation. This indicates that this measure can be used

to track poverty over time, and it can also be used to evaluate the influence of several programmes and policies of poverty (Haughton & Khandker, 2009).

The development of an absolute poverty line is determined by consumption levels (suppose this is the welfare measure) that is required for a basket of goods and services to be categorized as "non-poor". An individual is regarded as poor if their consumption is less than this measuring line. An individual or household's well-being is exclusively correlated with their own consumption or actual income. Their position relatively or a change in society's standard of living does not influence well-being (Budlender *et al*., 2015: 7). This poverty line has tended to predominate in developing countries such as South Africa (Budlender *et al*., 2015).

An example of absolute poverty thresholds in a South African context (prices of the year 2000, per capita, monthly) were suggested by Woolard & Leibbrandt (2006) when they used the consumption basket from the Income and Expenditure Survey (IES) 2000 data. Firstly, reference was made to a food poverty line (FPL) which was valued at R211. This sum represented the cost of purchasing enough food items to cover the average person's daily dietary energy needs for a month. Secondly, a monthly income of R322 was determined to be the lower bound poverty line (LBPL). This amount comprised of R211 for food items and R111 for basic non-food items. Lastly, the upper bound poverty line (UBPL), was established at R593 per month comprising of both food (R211) and non-food items (R382). In 2020, the food poverty line stands at R585, the LBPL at R840 while the UBPL was R1268 (per person per month) (Stats SA, 2020).

- Relative poverty line

In contrast, relative poverty lines are about social norms and are directly connected with a population's living conditions. When employed, this poverty line is prone to be a derived function from the national average or median income (Budlender *et al*., 2015). For example, the Organisation for Economic Co-operation and Development (OECD) sets its poverty lines between 50% to 60% of median national income. Thus, a person will be classified as poor if their income falls below this line (Budlender *et al*., 2015 citing OECD, 2014). This method of defining a relative poverty line thus, implies that as the living standards of society changes, the amount of income needed for an individual to be regarded as "better-off" will also adjust.

Additionally, a relative poverty threshold is mainly focused on the population's poorest segment and this percentage is often 40%. Lastly, while absolute poverty lines dominate in developing countries, developed countries are likely to use relative poverty lines (Leibbrandt & Woolard, 2006, citing Ravallion, 2012).

Furthermore, additional comparisons such as subjective and objective poverty lines can also be established as explained below.

- Subjective poverty line

A subjective poverty line employs a "subjective" approach which contends that the best people to define poverty are the poor individuals (Budlender *et al*., 2015). This highlights how important it is to include poor individuals when establishing what poverty is comprised of as they are more aware of the requirements for survival.

Therefore, in a nutshell, subjective poverty lines are made up of personal judgements on what they consider to be an acceptable minimal standard of living in society (Ravallion, 1992). Survey responses is the main tool used for this approach.

- Objective poverty line

Objective methods of setting poverty lines are often assessed based on nutritional requirements for leading a healthy and active lifestyle and to participate fully in society (Ravallion, 1998). In practice, two main techniques can be employed when creating objective poverty lines, namely food-energy intake (FEI) as well as the cost-of-basic needs (CBN) method (Shea, 1997; Ravallion, 2008).

Between the two approaches, the most used is the CBN approach. This method assembles a basket of goods and services that are necessary for a minimum standard of living associated with the society in which households live. Haughton & Khandker (2009) mentions that although the CBN approach considers food (calorie intake) as well as non-food products, the main measurement of the poverty line is money. In practice, four steps are used to construct a poverty line for the CBN approach. These steps were outlined by Haughton & Khandker, 2009; Ravallion, 1992; Woolard & Leibbrandt, 2006 below:

- Identify the food items that are consumed by the poor. Note that this percentage can differ from country to country.

- Next, a nutritional requirement for good health must be decided on. For example, the 2100 calories per individual per day is widely used. After which an estimate of the expense linked with the diet should be determined (at market price). This component is called the food component and is denoted as $z^F$ .
- A non-food component is also added and is denoted as $z^{NF}$ .
- Lastly, the poverty line ($z^{BN}$) is given by: $z^{BN} = z^F + z^{NF}$.

However, the CBN method has a few disadvantages. First off, the process ought to result in poverty levels that are comparable across nations, but that is not the case. This could be because the poor consume different kinds of food in the different parts of the world (Woolard & Leibbrandt, 2006). Secondly, the pricing of items that the poor buy is crucial for the CBN strategy. This is especially needed when evaluations are made over time and across regions. Thus, when price data is unavailable, it could lead to complications in the steps mentioned above (Haughton & Khandker, 2009). Lastly, the poverty line can change for different regions of a country and is not always consistent. This may be relevant because there may be a difference in the cost of goods and services for rural and urban locations.

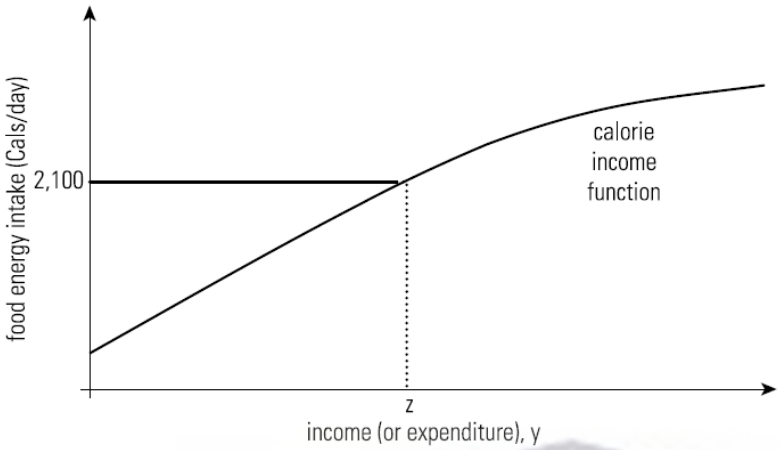
The FEI method is the second method that can be used to create a poverty line. The goal is to determine the level of consumption or income that enables households to buy enough food to meet their energy needs (Haughton & Khandker, 2009). Consumption includes non-food items as well since no matter how poor households are, they do typically spend on some clothing and shelter.



Figure 2.1 presents a function of calorie income. Food energy consumption increases together with an increase in income or expenditure. The rise in the daily caloric intake does not, however, occur at the same rate as increases in spending or income. Thus, the daily calorie rise is substantially slower.

Food energy intake (daily calories) is plotted against either income or expenditure to produce this function. The 2100 calories per day for instance, is used as it is considered the calorie norm. The 2100 calories per day, therefore, signifies the essential dietary need. Furthermore, point *z* represents the expenditure or income at which the required calorie intake (in this case 2100 calories daily) is achieved.

Figure 2.1: Calorie Income Function




Source: Haughton & Khandker, 2009: 55.

Just like the CBN method has shortcomings, so does the FEI approach. A calorie norm is frequently used to establish the amount of food needed. However, the food energy requirement might not be reasonable as the calorie intake of people vary, and depends on factors such as their gender, age, and their career (Govender *et al.*, 2006). People require different levels of calories due to the variations in activity levels and their metabolisms.

Additionally, households do not have the same preferences and their consumption behaviours differs, and these consumption behaviours are not taken into account. This becomes clear when the different regions, particularly urban and rural, are compared. For example, urban individuals often consume less calories at the same level of income compared to those residing in rural areas (Govender *et al.*, 2006). Therefore, using poverty lines based on a calorie standard will likely generate poverty lines that are not constant and may differ as food energy requirements differ.

As previously indicated, provision is made for non-food goods. However, there are some problems that occur when determining the allowance for non-food consumption. Woolard & Leibbrandt (1999) states that the difficulty that comes with this is that both children and adults consume non-food items and there is no reason to be of the opinion that non-food expenditure is in proportion to caloric needs.

2.5.1.6 Summary statistic

After establishing an indicator for welfare and a poverty line, the last step provides the tools required to determine the actual levels of poverty for a population under consideration (Govender *et al*, 2006). This step generates a summary statistic that combines the welfare indicator relative to the poverty line (Haughton & Khandker, 2009).

There is a great amount of literature on the different measurements of poverty. However, the most used measurements of money-metric poverty are those suggested by Foster, Greer and Thorbecke (FGT) (1984). The poverty indices are introduced below:

$P_a = \frac{1}{n}\sum_{i=1}^{q}(\frac{z - y_i}{z})^a \mid (y_i \leq z)$

Where:

$P_a$ = measure of poverty

q = number of people

$n$ = total number of people

$z$ = poverty line

$y_i$ = income of the i-th person in the population

The headcount index (denoted as $P_0$), poverty gap index (denoted as $P_1$) and the squared poverty gap index (also known as poverty severity index and denoted as $P_2$) can be derived from the equation above (Ravallion, 1992). The mentioned indices will briefly be explained below.

- Headcount Index ($P_0$)

The headcount index is used to calculate the population's share of the poor. Ravallion (1992) state that the headcount index "is a measure of the prevalence of poverty". Basically, the headcount index is calculated as follow: $P_0 = \frac{N_p}{N}$ where N is the sample and $N_p$ represents the number of impoverished people. Thus, if 60 respondents out of a sample of 300 are poor, then $P_0$ = 60/300 = 0.2 (20%). An advantage of this index is that it is a widely used indicator of poverty. It is popular because it can easily be understood and measured (Haughton &

Khandker, 2009). A disadvantage of the headcount index is that it does not show how destitute the poor are.

Consider the following hypothetical example in Table 2.1:

Table 2.1: Headcount rates of poverty in hypothetical Country Blue and Red, Poverty line: R150

| | Expenditure of each individual in the country | | | | Headcount Poverty Rate ($P_0$) |
|---|---|---|---|---|---|
| Country Blue | 180 | 180 | 125 | 125 | 50% |
| Country Red | 180 | 180 | 100 | 100 | 50% |

Source: Fransman, 2017: 30.

From this example, it is evident that Country Red is worse-off than Country Blue even though both countries' poverty headcount rates are 50%. Country Red is worse-off because its two poor residents earn only R100 as opposed to the two poor residents of Country Blue earning R125 each (Fransman, 2017). This shows that if those who are below the poverty threshold become poorer, the headcount index stays the same.

- Poverty Gap Index ($P_1$)

Next, Ravallion (1992) states that the depth of poverty is measured by the poverty gap index. The poverty gap index is seen as a better measure than the headcount index because the poverty gap index shows the total poverty deficit of the impoverished in relation to the poverty line. Therefore, it can be said that the poverty gap index measures the degree to which individuals fall below the poverty line after which it is then expressed as a percentage of the poverty line (Haughton & Khandker, 2009). Technically, the poverty gap ($G_i$) is determined by subtracting the poverty line (z) from the real income ($Y_i$) received by those living in poverty. It is vital to remember that the poverty gap is regarded as zero for everyone else. This implies that the poverty gap index's total does not consider income or expenses that are beyond the poverty level (Fransman, 2017). Formally, $P_1 = \frac{1}{N} \Sigma_{i=0}^{n} \frac{G_i}{z}$

Consider this hypothetical example in Table 2.2 and Table 2.3:

Table 2.2: Poverty gap index of hypothetical Country Blue, Poverty line: R150

| Expenditure of each individual | 180 | 180 | 125 | 125 | Poverty gap index: |
|---|---|---|---|---|---|
| Poverty gap | 0 | 0 | 25 | 25 | = 0.0835 |
| $Gi_z$ | 0 | 0 | 0.167 | 0.167 | = [0.334/4] |

Source: Fransman, 2017: 31.

Table 2.3: Poverty gap index of hypothetical Country Red, Poverty line: R150

| Expenditure of each individual | 180 | 180 | 100 | 100 | Poverty gap index: |
|---|---|---|---|---|---|
| Poverty gap | 0 | 0 | 50 | 50 | = 0.1670 |
| $Gi_z$ | 0 | 0 | 0.333 | 0.333 | = [0.666/4] |

Source: Fransman, 2017: 32.

These two cases demonstrate that even though both countries have a $P_0$ of 50%, $P_1$ differed for each nation. $P_1$ is higher for Country Red than for Country Blue. As shown by Country Red's poverty gap of 50 against Country Blue's poverty gap of 25, a larger income is required to end absolute poverty in the Red country.

- Squared Poverty Gap (Poverty severity) Index ($P_2$)

The squared poverty gap index measures the severity of poverty. This index differs from the above-mentioned indices as it is a poverty measurement that takes inequality into account. By doing so, this statistic averages the squares of the poverty gaps in relation to the poverty threshold (Haughton & Khandker, 2009). Although equal weights are not specified in this instance, the approach calls for the weighted summation of poverty gaps. Weights are distributed based on the poverty line. More specifically, heavier weights are given to households that are thought to be in a worse financial situation. Formally, $P_2 = \frac{1}{N}\sum_{i=1}^{n}(\frac{G_i}{z})$

An advantage of this index is that it is useful for comparing policies aimed at reaching the poor. However, it is not easy to interpret as with the poverty gap index and headcount index (Ravallion, 1992). Thus, it is not widely used.

For example:

Table 2.4: Squared poverty gap index of hypothetical Country Blue, Poverty line: R150

| Expenditure of each individual | 180 | 180 | 125 | 125 | Squared poverty gap: |
|---|---|---|---|---|---|
| Poverty gap | 0 | 0 | 25 | 25 | = 0.014 |
| $Gi_z$ | 0 | 0 | 0.167 | 0.167 | = [0.056/4] |
| $(Gi_z)^2$ | 0 | 0 | 0.028 | 0.028 | |

Source: Fransman, 2017: 33.

Table 2.5: Squared poverty gap index of hypothetical Country Red, Poverty line: R150

| Expenditure of each individual | 180 | 180 | 100 | 100 | Squared poverty gap: |
|---|---|---|---|---|---|
| Poverty gap | 0 | 0 | 50 | 50 | = 0.055 |
| $Gi_z$ | 0 | 0 | 0.333 | 0.333 | = [0.222/4] |
| $(Gi_z)^2$ | 0 | 0 | 0.111 | 0.111 | |

Source: Fransman, 2017: 34.

When Country Blue and Country Red are compared, Country Red's poverty is more severe, as evidenced by a larger squared poverty gap ratio. Thus $P_2$ is higher for Country Red because the indicator gives more weight to the poverty gap of the households that are worst-off.

Lastly, the three poverty measures by FGT can be summarized as follow: $P_0$ answers the question "how many households or individuals are poor?" $P_1$ answers the question "what is the depth of their poverty?" Lastly, $P_2$ answers the question "what is the severity of their poverty?" (Ravallion, 1992; Shea, 1997).



### 2.5.2 Non-money-metric approach

#### 2.5.2.1 Defining the non-money-metric approach

Multidimensional poverty can be defined as the deprivation that is experienced by a poor individual on a daily basis (Stats SA, 2014). This suggests that the non-money-metric approach has to do with deprivation suffered in non-monetary terms. These non-monetary experiences are associated with the absence of education, poor health, and malnutrition, limited access to basic public services like water, electricity, and sanitation, inadequate access to private asset ownership, social exclusion, and feelings of vulnerability to external events (Stats SA, 2014; World Bank, 2000; World Bank, 2022). It is evident that non-money-metric poverty consists of many dimensions.

Thus, the necessity to directly assess poverty through its numerous dimensions is one of the reasons why the multidimensional approach was developed (Van der Walt, 2004). A great deal of the developments of multidimensional poverty are owed to authors such as Sen (1976), Sen (1983) and Sen (1985).[4] According to Burger *et al*. (2004) Sen and other authors have shown that a concept such as welfare is complex, and it cannot sufficiently be captured by income and expenditure only. Van der Walt (2004) agrees that the studies done by Sen (1983) relating to capabilities and functions, play an important part in advocating the use of the multidimensional approach to measuring poverty.

2.5.2.2 Advantages and disadvantages of the non-money-metric approach

There are various advantages with regards to multidimensional approaches. This approach addresses the concepts of horizontal vagueness as well as vertical vagueness of poverty (Qizilbash, 2002; Van der Walt, 2004; Naidoo, 2007; Neff, 2013). The horizontal and vertical vagueness stems from the dimensions of poverty. The concept of horizontal vagueness implies that whenever an individual does not have the bare necessities to live a decent life, then that person will be viewed as deprived (Van der Walt, 2004). According to Qizilbash (2002) horizontal vagueness states that some indicators contribute more to poverty than others and this is dependent on factors such as time and place. Vertical vagueness states that there is no agreement which level of education is acceptable, since when going from one place to another, society's requirements differ (Qizilbash, 2002). Moreover, the multidimensional approach provides a clearer and accurate view of poverty compared to the one-dimensional approach.

However, just like the traditional approach has shortcomings, so does the multidimensional approach. There is no agreement as to what aspects of well-being should be incorporated when analysing poverty. For example, education, health, nutrition, water, employment, and safety, just to mention a few, are the dimensions listed by Klasen (2000). Whereas Qizilbash (2002) believes that sanitation, nutrition, and health should be used as dimensions. The ambiguity can lead to uncertainty when determining which dimensions should be incorporated. Unlike the money-metric approach, which is easy to interpret and compact into a survey, it could be difficult to incorporate some of these dimensions into a quantitative survey (Burger *et al.*, 2017).

[4] See Sen (1976), Sen (1983) and Sen (1985) for detailed discussions.

2.5.2.3 Measurements of non-money-metric poverty

As a result of drawbacks in measuring poverty according to the money-metric approach, many statistical techniques for measuring non-money-metric poverty have evolved. The statistical techniques capture poverty by studying a variety of dimensions (Fransman, 2017). Finn, Leibbrandt & Woolard (2013) points out that multidimensional poverty indices also lead to better policy-making.

The Principal Components Analysis (PCA), Factor Analysis (FA), Multiple Correspondence Analysis (MCA), Multidimensional Poverty Index (MPI) as well as the fuzzy set index also known as the Totally Fuzzy Relative (TFR) approach forms part of the statistical techniques. These approaches were introduced to create a non-income welfare index that captures the different aspects of deprivation. Additionally, it also takes into consideration access to public services. Below the PCA, FA, MCA and MPI techniques will be discussed. The TFR approach will be discussed briefly in this section and will have a detailed discussion in Chapter Four.

2.5.2.4 Principal Components Analysis

The concept of the PCA method was first used by Karl Pearson in 1901. It is a multivariate technique that can be used to derive an asset index (Schiel, 2012; Bhorat, Stanwix & Yu, 2014). The asset index is a representation of the long-term wealth of a given household. The index is constructed based on the notion that in the long-term, the wealth of households describes the variance in asset variables (Schiel, 2012). Schiel (2012) points out that the PCA approach is a linear combination of all the variables and the maximum variance is extracted from the variables. This analysis is applied multiple times after which it then forms a principal component.

The PCA method can be appealing for various purposes. Firstly, it is fairly intuitive to obtain shared information from a set of variables that are related to each other (Bhorat *et al*., 2014: 4). Secondly, weights are allocated to each element in the analysis, and it can be easily interpreted as the weight given to a particular variable is associated to the data provided. An example provided by Bhorat *et al*. (2014) explains that if the ownership of one asset is indicative of the ownership of other assets in the in a given population, these assets receive a positive weight in the PCA. On the other hand, if the distribution of assets across households is unequal, then these assets receive a higher weight. However, a downside of using an asset measure such as the PCA is that although one possesses assets, or receive basic services, does

not suggest that it is quality. Being able to consistently get water in a private house, is different from having access to piped water running for a few hours per day. This method is unable to capture the mentioned disparities.

2.5.2.5 Factor Analysis

Similar to the PCA method is the FA method which is also used to create a non-money-metric measure of well-being. Unlike the PCA method, the FA approach is more focused on data exploration rather than dimensional reduction (Moser and Felton, 2007: 5). The FA method calculates the coefficients or weights for each asset variable's dimension, and then uses those coefficients to calculate the public asset index. If households receive a low score on the asset index, they will be considered asset poor. Whereas households with a high score will be group as well-off (Bhorat *et al*., 2014).

An advantage of the FA is that poverty indicators can be constructed without restrictions. This is where the FA method differs slightly from the PCA method, as the FA does make leeway for errors to occur. With the FA method the quantity of variability is estimated because of common factors. Unlike the PCA method that employs the procedure of maximum variance (Schiel, 2012: 4).

The difficulty of providing an intuitive understanding of deprivation levels or the overall poverty index is a downside of the FA. As a result, when poverty analysis is carried out using the asset index scores, it is less likely to set an absolute cut-off to identify the poor (Alkire, Foster, Santos, Seth, Ballon, & Roche, 2015: 39).

2.5.2.6 Multiple Correspondence Analysis

Just like the above-mentioned PCA and FA methods, the MCA is also a technique that can be employed. However, MCA is the opposite of the PCA method. The PCA needs linear restrictions on the categories and assumes normally distributed variables, as it does not perform as well with categorical data as the MCA technique (Adams, Gallant, Jansen & Yu, 2015).

Ultimately, the MCA is employed to create a composite indicator for a given household (Njong & Ningay, 2008). This indicates that dimensionality is reduced and when used in a normative setting, with the aim of creating an aggregate achievement value, the poor can be identified, and poverty indices can be constructed. An advantage of the MCA method is that

it can be used for the selection and the categorisation of indicators when multidimensional measures are derived (Alkire *et al*., 2015: 37).

2.5.2.7 Multidimensional Poverty Index

The MPI approach by Alkire and Foster, is an axiomatic approach to studying multidimensional poverty. This approach is formulated on an "intuitive" as well as an "axiomatic" approach where deprivations are identified (Rogan, 2016). The MPI, thus, allows researchers to study acute poverty. Acute poverty accounts for those individuals or households who do not qualify for the agreed upon international standards. Moreover, the MPI complements the conventional income and spending metrics since it identifies the hardships that people or households must endure. These deprivations are based on education, health, and living standards.

Advantages of the MPI is that it accounts for the headcount as well as the intensity of poverty. Furthermore, this approach takes into account demographic as well as geographical characteristics when identifying the poor. The MPI method is thus, known as a transparent and intuitive measure (Stats SA, 2014b).

2.5.2.8 Totally Fuzzy and Relative (TFR) approach

The TFR approach is another technique that was developed to deal with a complex concept such as poverty. The TFR approach also known as the fuzzy sets, can be employed to identify the absolute poor (those that are highly deprived) as well as those who are not poor (those that are less deprived) (Van der Walt, 2004).

With the traditional approach, there are no "partially poor" individuals since you either poor or non-poor, depending on a critical level such as the poverty line. However, with the fuzzy sets approach, it allows people to belong to the "partially poor" category. The minimum level and the maximum level are the two key levels in the fuzzy technique (Burger *et al*., 2004; Van der Walt, 2004). The minimum level represents those who are definitely poor. While the maximum level represents those who do not belong to the set of poor. In reality, there are individuals or households who do not belong to the minimum level, nor do they belong to the maximum level, hence this methodology allows individuals or households to fall between these two levels. Thus, they will "partially" belong to the set of poor.

The methodology of fuzzy sets allows for the derivation of deprivation levels without putting arbitrary numbers on the categories that make up a poverty dimension. Instead, weights are

determined on how frequently the population experiences deprivation. Thus, if a population commonly experiences deprivation in a certain dimension, less weight will be allotted to that particular dimension. In contrast, if deprivation is less frequent, a dimension will be given more weight (Burger *et al*., 2004; Fransman, 2017).

According to Costa & De Angelis (2008) the fuzzy sets has three main advantages. Firstly, it determines household's relative deprivation levels. Secondly, the approach estimates the mean deprivation index of the given set of households. Thirdly, it measures the relative deprivation and poverty levels that are associated with the dimensions of poverty undertaken by the study (Costa & De Angelis, 2008).

**2.6 Conclusion**

Chapter Two reviewed the concept of poverty and the theories of poverty namely, behavioural/decision-based theory, the sub-culture of poverty theory, opportunity theory as well as poverty as a structural failing after which the chapter also mentioned the five dimensions of poverty namely, poverty proper, health and education, vulnerability, voicelessness, and powerlessness as well as isolation.

Furthermore, an in-depth comparison between the monetary approach and the non-monetary approach was discussed in detail. This included a discussion on the advantages and disadvantages of these approaches as well as the measurement tools used.

The literature found that although the money-metric approach is a one-dimensional framework, the approach still has a few advantages. However, the main shortcoming of the money-metric approach is that elements such as income and consumption are not enough to capture all the facets of poverty. In contrast, the non-money-metric approach, which is known as a multidimensional framework, provides a clearer view of poverty compared to the one-dimensional framework as the non-money-metric approach takes many dimensions such as poor health, education, malnutrition, sanitation, refuse removal, water, dwelling type etc., into account when capturing poverty.

# CHAPTER THREE: EMPIRICAL LITERATURE REVIEW OF POVERTY TRENDS IN SOUTH AFRICA

## 3.1 Introduction

In Chapter Three, past empirical literature on poverty levels and trends since South Africa transitioned to a democracy using monetary and non-monetary approaches is presented. The chapter is categorized as follows: Section 3.2 discusses the results of studies that used the money-metric approach. Next, Section 3.3 examines the results of studies using non-money-metric approaches. Lastly, Section 3.4 ends the chapter.

## 3.2 Review of studies on poverty trends using money-metric approaches

The money-metric approach to assessing poverty is predominantly in monetary terms and the emphasis is generally on variables such as expenditure, consumption, or income. Therefore, this section will look at local studies that made use of the money-metric approach to measuring poverty in relation to different datasets.

Leibbrandt, Poswell, Naidoo, Welch & Woolard (2005) measured changes in poverty and inequality in the country from 1996 to 2001 by using census data. The changes in poverty were determined by employing the R250 per month (1996 pricing) and US$2 per day poverty lines. For both censuses, Leibbrandt *et al*. (2005) made the decision to change the incomes of children below the age of 15 years to zero. In addition, before per capita income was obtained, families with an unknown household income were omitted.

Overall, the analysis showed that from 1996 to 2001, the headcount ratios for both poverty lines increased. The headcount ratio rose from 0.50 at the poverty line of R250 per month to 0.55. Similar to this, the headcount ratio for people living below the poverty threshold of $2 per day increased from 0.26 to 0.28. Using the R250 per month poverty line, the poverty ratio climbed from 0.59 to 0.65 between 1996 and 2001 when zero income households were included. Another rise in the headcount ratio from 0.40 to 0.44 for the two censuses was seen for the $2 poverty line (Leibbrandt *et al*., 2005).

By using the IES 1995 and 2000 data, Hoogeveen & Özler (2006) investigated poverty in the country. Hoogeveen & Özler (2006) used the same poverty lines namely the lower bound poverty line (LBPL) of R322 and the upper bound poverty line (UBPL) equivalent to R593 (in 2000 prices) per capita per month. In addition, the study also applied the international $2 per day poverty line equating to R174 (in 2000 prices) per month.

Results indicated that when using the LBPL of R322 per month, 58% of the population were regarded as poor in both 1995 and 2000. When applying the $2 poverty line, the headcount ratio grew from 0.32 to 0.34. From a race perspective, the Black race group were the poorest followed by Coloureds, Asians, and Indians. There has been a variation in the levels of poverty across provinces. In 2000, the Western Cape province experienced the lowest poverty headcount rate. In contrast, the Eastern Cape experienced an increase in extreme poverty from 49% to 56%.

Armstrong, Lekezwa & Siebrits (2008) utilised the Income and Expenditure Survey (IES) 2005 and the 2006 General Household Survey (GHS) to present a poverty profile based on South Africa. Majority of the analysis was centred around the IES 2005 data. Like Hoogeveen & Özler (2006), Armstrong *et al.* (2008) used the LBPL and UBPL of R322 and R593 (in 2000 prices) per capita per month respectively.

The outcomes revealed that 33.2% of households showed consumption levels below the LBPL while 53.3% of households spent less than the UBPL. When looking at the nine provinces in South Africa, the poverty rates differed significantly. The poverty rates ranged between 24.9% and 28.8% in Gauteng and the Western Cape respectively. Whereas the poverty rates ranged from 57.6% in the Eastern Cape and 64.6% in Limpopo.

Overall, the study uncovered that the Black race group, female-headed households, elderly people, those with low levels of education and households residing in rural areas such as Limpopo, KwaZulu-Natal, and the Eastern Cape experienced poverty more intensely. Lastly, social grants played an important role in alleviating extreme poverty (Armstrong *et al.*, 2008).

A study conducted by Bhorat, Van der Westhuizen & Jacobs (2009) analysed the 1995 IES as well as the 2005/2006 IES data. The empirical results found that regardless of the racial composition or gender of the head of the household, many individuals felt substantial rises in their nominal per capita household incomes for the period. When taking inflation into consideration, the rise in real income at aggregate level was 11.5%. When looking at it from a race perspective, White as well as Coloured individuals felt the highest growth in their real income with 40.5% and 35.2% respectively.

People living in male-headed households encountered a rise of 24% in their real income. Individuals from the Black race group and persons who are steered by female-headed households have not experienced any statistically significant changes with regards to income in real terms. Overall, the evidence does suggest all South Africans experienced some form of

increase in their earnings (in nominal terms) between the years 1995 and 2005 (Bhorat *et al.*, 2009).

Yu (2009) looked at the 1996 Census and Census of 2001 together with the Community Survey 2007 data. Poverty lines of R211, R322 and R593 (prices in the year 2000) were utilised. In both the Census of 1996 and 2001 as well as in the 2007 Community Survey, there was a great share of households with unspecified or zero income. As a result, Yu (2009) ascribed the revenue of these households by method of a sequential regression multiple imputation (SRMI) at both the person and household levels (i.e., SRMI1 and SRMI2 respectively). Whereas Leibbrandt *et al*. (2005) excluded families with an unknown household income.

The results showed that the cumulative density functions (CDF's) indicated that poverty grew between both censuses. However, a swift decrease took place between 2001 and 2007. Along with the CDF's, the headcount ratios showed that for each poverty line, the headcount poverty rate had increased for all racial groups between the two censuses. However, a rapid decrease occurred between 2001 and 2007 again.

Posel & Rogan (2012) analysed poverty by focusing on gendered poverty trends, using the October Household Survey (OHS) of 1997 and 1999 together with the 2004 and 2006 GHS. A poverty line proposed by Hoogeveen & Özler (2006) namely R322 per capita monthly was used. To evaluate the complexity and extent of poverty, several measures of per capita monthly household income were taken into consideration. This included earned income, earned income and social grant income as well as earned income together with social grant income. Household expenditure was used as a representative for income in zero-income households.

Overall, despite the initial increase in the poverty rates from 1997 to 1999, Posel and Rogan (2012) found that a decrease in poverty occurred from 1997 to 2006. From 1999 to 2004, the headcount poverty ratios declined from 63.6% to 61.6% when social grant income and household expenditure were included as income sources. Regarding gendered poverty trends, results indicate that the reduction in poverty rates benefited males and male-headed households as there had been significantly higher poverty ratios for females and for female-headed households. The outcome of this study concurs with the results found by Bhorat *et al*. (2009) who also observed that households steered by females did not experience significant changes as their male counterparts regarding income.

Finn & Leibbrandt (2016) looked at the National Income Dynamics Study (NIDS) data and examined the causes of South Africa moving into and out of poverty. The period of the study was from 2008 to 2014/2015 and the focus was on absolute poverty rather than relative poverty. A poverty line of R1283 per capita per month (in January 2015 price levels) was used in the analysis. In addition, two transition matrices were considered, the changeover into and out of poverty. With regard to the matrices of transition, almost three quarters of those who were poor in wave one, were also grouped as poor in wave four. On the contrary, 79% of those who were not poor in wave one, were also non-poor in wave four, while between 2008 and 2014/2015, 21% transitioned into poverty.

Just like Finn & Leibbrandt (2016), Zizzamia, Schotte & Leibbrandt (2019) also used the NIDS between 2008 and 2017 to review poverty and inequality in the country. Instead of using income, they used expenditure as a measure for the economic well-being of households. This is like the study by Armstrong *et al*. (2008) who also employed household consumption data to measure poverty. An UBPL conducted by Stats SA was set at R1503 (in March 2017) per individual monthly and the FPL was set at R515. These poverty lines were used to identify whether households were poor or not.

The study found that on average individuals who live beneath the FPL were likely stuck in extreme poverty. The chance of completely exiting poverty and rising above the UBPL was on average 10% over the full period under consideration. On the other hand, 40% of individuals with consumption levels between the two poverty lines, maintained their poverty status and experienced high levels of increasing and decreasing mobility over time. The trend, therefore, suggests a steady reduction in poverty between 2008 and 2017 (Zizzamia *et al.*, 2019).

Historically, South Africa has been classified as a very unequal society (Bhorat *et al.*, 2009: 1). Therefore, even though studies show that money-metric poverty levels have decreased since the transition, it still comes at no shock that inequality between individuals and households still exist in the different parts of South Africa by looking at it from a monetary perspective.

### 3.3 Review of studies using non-money-metric approaches

#### 3.3.1 Studies using different multidimensional approaches

This section will look at studies that used different multidimensional approaches as mentioned in the previous chapter (PCA, FA, MCA, and MPI) to measuring poverty in South Africa.

Bhorat, Stanwix & Yu (2014) investigated non-income welfare in South Africa from 1993 to 2010. In the analysis the 1993 Project for Statistics on Living Standards and Development (PSLSD) as well as the 2008 and 2010/11 NIDS data was used. An asset index was created by employing the PCA method.

It was found that access to services or ownership of assets were linked with above average non-income welfare. Access to electricity, a toilet with a flushing mechanism or chemical toilet, piped water, living in a formal residence, high-quality wall materials, and having a refrigerator or television were given bigger positive weights. Whereas negative weights were expected for wood or dung used for food preparation, the use of candles as a source of light, and medium-quality material of the dwelling. Overall, the results showed that non-income poverty dropped over the years under investigation. Additionally, Black households in particular, experienced the largest decrease in non-income poverty (Bhorat *et al.*, 2014).

The 2014 paper by Bhorat, Van der Westhuizen & Yu assessed the degree to which non-income welfare has improved since the country became a democracy. The attention was on public assets between 1993 and 2011. Four datasets, the 1993 PSLSD, 1999 OHS as well as the 2005 and 2011 GHS were utilised in the study together with the FA method. When the public asset index was constructed, seven public asset variables (type of dwelling, the material of the roof and walls, the source of drinking water, the primary energy source for cooking, the primary energy source for lighting and sanitary facilities) were used.

Bhorat *et al*. (2014) found that over the 18-year period, there has been a sturdy growth in access to public assets. More households had decent material for their roof, high-quality wall material, a flush or chemical toilet, piped water, electricity for cooking, and electricity for lighting. Nevertheless, the formal housing variable reduced from 74.2% to 69.8% between 1999 and 2005. This decline could be attributed to the large number of households staying in informal dwellings as some households moved to urban and semi-urban areas looking for employment and thus, remained in an informal dwelling.

Adams, Gallant, Jansen & Yu (2015) investigated non-money-metric poverty trends and applied the MCA method. By using the 2005, 2008 and 2012 GHS, the study examined the quality of public assets and services in relation to the perception of households receiving these services. This was done to evaluate the effectiveness of delivering governmental services and assets. Two indices were constructed. Eight factors including the type of dwelling, the material of the dwelling's roof and walls, the availability of water and sanitation services, the fuel used for cooking and lighting, and the removal of refuse, were used to calculate index one's measure of accessibility to public resources and services. While index two measured their perceived quality and was derived by using five variables (roof condition, wall condition, water service quality received from the municipality, sharing of sanitation facilities, and regularity of the removal of refuse).

As assessed by the two indices, the results indicated that overall, poverty declined from 2005 to 2012. The improvement in welfare was largely experienced by Blacks. The Eastern Cape continues to be the province with the highest poverty levels. However, with that being said, the province had experienced improvement in access to services as well as the perceived quality (Adams *et al*., 2015).

The re-examination of the multidimensional poverty index of the country was done by Jackson (2021) using the GHS 2018 data. The MPI was constructed by including two methods namely, method A and method B. Method A included seven variables such as education, health, standard of living (ownership of assets), economic activity as well as vulnerability and isolation. Whereas method B retained the initial Alkire and Santos dimensions known as education, health, and standard of living accompanied by equally weighted dimensions.

Overall, the findings revealed that by adding the extra dimensions and indicators to method A, led to a slight increase in MPI poverty. The poverty increase is largely found in the intensity of poverty in both method A and B, as the headcount ratios were found to be lower.

On the multidimensional front, the most deprived were Black females living in Limpopo and the Eastern Cape. Both method A and B showed similar results with slight disparities in estimates. Much of the poverty was caused by the standard of living variable for both method A and B. Particularly, access to services and facilities followed by ownership of assets and the type of dwelling. Surprisingly, in terms of MPI contributors, isolation and vulnerability

outranked health and economic activity as the fourth and fifth biggest factors respectively (Jackson, 2021).

### 3.3.2 Studies using the TFR approach

In this section, local past empirical studies of existing literature that specifically made use of the fuzzy set methodology to measuring poverty in South Africa will now be reviewed.

Qizilbash (2002) used the fuzzy set approach to explore South Africa's vulnerability and definite poverty in dimensions such as human or financial poverty and the quality of life. The paper made use of the 1996 Census dataset and the focal point of the paper was on inter-provincial ranking in the above-mentioned dimensions. The seven relevant indicators are expenditure of the household, educational attainment, the source of water, removal of refuse, energy source used for cooking, the number of rooms per household and employment are applied. The analysis revealed that depending on which dimension one focuses on (human or financial poverty), the rankings of provinces changed remarkably.

When focusing specifically on the human dimension, six indicators remain (household expenditure relates to the money-metric approach) as the mentioned indicators are directly linked to people's living conditions. Overall, the Eastern Cape and Northern Cape was the provinces that were worst-off while Gauteng and the Western Cape were the best (Qizilbash, 2002).

The 2004 paper by Burger *et al*. used the fuzzy set methodology to focus on municipal and district level deprivation in the Western Cape and Eastern Cape. The 10% sample Censuses of 1996 and 2001 was analysed. The non-money-metric variables used in the derivation of the index were type of dwelling, energy as main source for cooking, derived household income, access to water, telephone access, refuse removal, sanitation facilities, education, and employment.

Burger *et al*. (2004) found that there has been an overall decline in the welfare of the Western Cape. Out of the 33 magisterial districts, ten districts have experienced the highest surge in average poverty namely, Wellington, Somerset West, Strand, Kuilsriver, Hermanus, Cape, Montagu, Caledon, Bellville, and Paarl. The extraordinary deprivation observed in the Western Cape is as a result of the large inflow to Cape Town and its surrounding areas. Furthermore, the Western Cape also noted an increase of deprivation in dwellings in the areas

neighbouring Cape Town. With this, crowding was also stated to be excessive in most municipal districts.

Overall, a decrease in deprivation levels was experienced by the Eastern Cape. Out of the 78 Eastern Cape magisterial districts, 42 magisterial districts showed improvements in their welfare. This overall reduction of deprivation occurred although higher deprivation occurred in the water category. The deprivation of water was worse for 52 of the 78 magisterial districts.

Van der Walt (2004) looked at the Eastern Cape's deprivation levels and how it varies within the province by using the Census of 1996. Large disparities among the various districts of the Eastern Cape with regards to poverty were established.

The Western district and Nelson Mandela Metro deprivation levels were much lower than that of the Eastern districts of O.R Tambo and Alfred Nzo. The study also confirmed that the deprivation levels differed across the races of individuals as well as their placement. This conclusion is like the study conducted by Burger *et al*. (2004), Naidoo (2007) and Burger *et al.* (2017) who also found that race and area play an important role when it comes to deprivation. From a race perspective, it shows that White households had the lowest levels of deprivation while Black households had the highest levels of deprivation. In addition, urban areas had lower levels of deprivation while those living in rural areas had the highest levels of deprivation.

Naidoo (2007) made use of the data from the 1996 and 2001 Census and found that the Western Cape had the smallest deprivation index of 0.14 whereas the Eastern Cape had the highest deprivation index of 0.54. While in 2001, the Western Cape's deprivation index dropped to 0.11 and was still the lowest deprivation index of the nine provinces. The Eastern Cape's deprivation level declined to 0.41, the highest of the nine provinces. The above-mentioned improvement of deprivation levels in the different provinces, indicates a substantial improvement in South Africa's deprivation levels.

Gallant (2012) applied the fuzzy set index to study multidimensional poverty in South Africa since the transition from 1996 to 2007. The Census 1996, 2001 and the 2007 Community Survey (CS) datasets were used. The analysis revealed that the average index of deprivation was larger for households in the Eastern Cape and Limpopo. While, on the other hand, it was the lowest for the Western Cape and Gauteng households. Burger *et al.* (2017) obtained similar results.

In terms of race, the Black race group showed the biggest fall in their average deprivation for the period of the study. However, the Black race group remains the race group with the highest deprivation compared to the other races. When focusing on gender, the analysis showed that households headed by females had the highest mean deprivation in all three years. Furthermore, household heads in Limpopo and the Eastern Cape were the least well off, with deprivation increasing with lower educational attainment. However, household heads who had higher educational attainment displayed lower average deprivation levels for all provinces (Gallant, 2012).

The study conducted by Burger *et al.* (2017) analysed the 10% sample Censuses of the years 1996, 2001 and 2011 together with the 2007 CS. The authors conducted a deprivation index of which nine different dimensions of deprivation was used. The focus of the study was by race and area in which they found a momentous improvement in the poverty levels within South Africa among the period 1996 to 2011.

Overall, the indices displayed a decline in deprivation across all nine provinces. The Western Cape had a mean deprivation level of 0.21 whereas Limpopo had a mean deprivation level of 0.62 in 1996. Where 0 represents that households are not deprived and 1 represents that households are indeed deprived. In 2011, the Western Cape's level of deprivation had somewhat dropped to 0.17 and the poverty level in Limpopo has decreased to 0.44. Furthermore, the findings suggest that there is racial poverty dominance. Although the levels of deprivation of the various races differ per province, the Black population group suffered much higher deprivation levels than White South Africans. Both Naidoo (2007) and Burger *et al.* (2017) found that race and location continue to play a vital role in the explanation of the different patterns of deprivation.

In conclusion, when looking at the past empirical results of the above-mentioned studies, it is clear that when using the fuzzy sets index, one can look at poverty by using different deprivation dimensions. The overall conclusion remained the same, that the Eastern Cape is worse off than the other eight provinces and the Black race group steered by female-headed households remains the most affected.

Lastly, none of these studies used the recently available Community Survey 2016 dataset and that is why this study will add to existing literature and provide more updated results on non-money-metric poverty.

### 3.4 Conclusion

Chapter Three provided insight on poverty levels and trends locally by reviewing past empirical literature from both the money-metric and non-money-metric viewpoints. Upon reviewing the existing local literature, overall, whether money-metric or non-money-metric, poverty has declined since the transition.

Although, the datasets and poverty lines differed for each study from the monetary perspective, the overall finding was that poverty rates increased between 1994 to 2000 after which there was a gradual decline in money-metric poverty from the 2000's. However, those individuals who already lived below the poverty line were most likely to be trapped there.

From the non-money-metric perspective, of the studies that used the MPI, MCA, PCA and FA methodologies to measuring poverty, results show that overall non-income poverty declined since the transition. Households in different provinces experienced improvement in access to public services and ownership of assets. This could be as a result of improved service delivery by the South African government.

Studies that adopted the fuzzy sets approach to measuring multidimensional poverty, displayed that since 1994 poverty has declined. Despite this, it was noted that majority of the households that were classed as poor were from the Black race. In terms of provinces, the Eastern Cape and Limpopo performed the worst while Gauteng and the Western Cape performed the best.

# CHAPTER FOUR: METHODOLOGY AND DATA

## 4.1 Introduction

Chapter Four's purpose is to provide a detailed explanation of the methodology and data used. Section 4.2 will discuss the fuzzy set methodology employed in this thesis. Section 4.3 will examine the datasets used. The derivation of the vertical and horizontal weights will be discussed in Section 4.4. Next, Section 4.5 will discuss the limitations with regards to the use of the datasets after which Section 4.6 will conclude the chapter.

## 4.2 Methodology

### 4.2.1 The fuzzy set methodology

The fuzzy set is a mathematical approach and was initiated in 1965 by professor Lofti A. Zadeh (Zadeh, 1965). The idea of the fuzzy set is to "provide an ideal framework to deal with problems in which there does not exist a definite criterion for discerning what elements belong or do not belong to a given set*"* (Miceli, 1998: 5). This implies that the fuzzy set can be used to identify poor individuals. The methodology can be applied to measure multidimensional poverty since there are households who are in a state of deprivation that they should certainly be categorized as poor, while other households maintain a certain level of welfare where they should definitely not be categorized as poor (Qizilbash, 2002). However, there are certain households who are not poor but are certainly not rich, hence, there is uncertainty as to which category they should be categorized in, and that is where the fuzzy set approach is useful.

An advantage of this methodology is that it does not require a particular measuring line as with the money-metric approach. The methodology also adds more value than other conventional methods of poverty since, by looking at many dimensions of poverty simultaneously, one can get a clear image of an individual or household's poverty status and their well-being.

Moreover, when making use of the fuzzy set methodology, it allows for the use of more than one dimension of poverty when a household's poverty status is measured. The degree of membership to the set of deprived people in each dimension serves as the measurement criterion, according to Van der Walt (2004). The membership function serves as an indicator for deprivation and shows the overall deprivation of every household in relation to its surroundings (Van der Walt, 2004; Naidoo, 2007). Furthermore, many definitions for the

membership function can be found when looking at existing literature. However, a description of the membership function was provided in 1995 by Cheli & Lemmi, known as the Totally Fuzzy and Relative methodology of which this thesis will make use.

The approach by Cheli & Lemmi (1995) will now be discussed. When continuing with the membership function, it was proposed that it should be given by the degree of membership to a particular fuzzy subset. For example, if X is allowed to be a set, then *x* can become an element of X. The fuzzy subset of X can be defined as: A = {*x*, μA (*x*)} for all *x* ε X. In addition, X is μA (*x*) with the interval between 0 and 1 representing the mapping of X. The latter shows the extent of membership of x to A. Thus, μA (*x*) is the membership function to the extent that should μA (*x*) = 0, x does not belong to the fuzzy subset of A. However, if μA (*x*) = 1 then x in its entirety is a member of A but if 0 < μA (*x*) < 1, then x only partly belongs to A. Lastly, as μA (*x*) gets closer to 1, the degree of membership with respect to A increases.

The above-mentioned, can also be applied to analyse poverty. For example, X can be used to represent poverty as a set of k dimensions. Let $X = \{X_1, X_2, X_3 \ldots, X_k\}$ in a population of say "n" households or individuals. The function of membership of the $i^{th}$ individual in dimension $X_j$ can be represented by δ(χij). There can also be *m* categories of deprivation in existence in say dimension $X_j$. The poverty categories can be arranged in accordance with the risk of poverty. Therefore, if there is an increasing order of $x^{(1)}j$, it would reflect the lowest poverty risk. In contrast, the maximum risk of poverty would be reflected by $x^{(m)}j$. Thus, $X_j = \{x^{(1)}j\ x^{(2)}j, \ldots, x^{(m)}j\}$ and $x^{(1)}j, < x^{(2)}j, < \ldots, < x^{(m)}j$ with respect to risk of poverty.

The Totally Fuzzy and Relative approach membership function of Cheli & Lemmi (1995) is defined below:

$$\delta(xij) = \begin{cases} 0 \\ \delta(x_j^{(\lambda-1)}) + \frac{F\left(x_j^{(\lambda)}\right) - F(x_j^{(\lambda-1)})}{1 - F(x_j^{(1)})} \end{cases} \text{if } x\text{ij} = x_j^{(1)}$$

$$xij = x_j^{(\lambda)},\ \lambda = 2, \ldots, m$$

where F ($x_j^{(\lambda)}$) is the cumulative distributive function of $x_j^{(\lambda)}$.

Cerioli & Zani (1990) suggested the first definition which states that there should be at least a minimum and maximum critical level. The minimum critical level implies that the household is absolutely poor whereas the maximum critical level indicates that the household is

considered not poor. However, Cheli & Lemmi (1995) criticised aspects of this definition mentioned by Cerioli & Zani (1990) and thus, provided a second definition for the membership function.

The criticisms of Cheli & Lemmi (1995) were that by setting a maximum and minimum limitation to define a set is arbitrary. As an improvement, their method permits critical levels to agree with the minimum and maximum categories in every dimension. Furthermore, the methodology by Cheli & Lemmi (1995) tackles the problems of vertical and horizontal vagueness of poverty. The weights of the dimensions are the horizontal weights, and the assigned values of each category in the different dimensions are the vertical weights. Another difference is that Cheli & Lemmi (1995) has a non-linear functional form as opposed to Cerioli & Zani's (1990) linear membership function. Consequently, the non-linear functional form allows the poverty rating for each dimension to be determined by the degree of deprivation that individuals are experiencing (Gallant, 2012).

Therefore, the composite poverty index value can be calculated as follows:

$\delta_p(xi) = \sum_{j=1}^{k} wj\delta(xij)\ \forall i = 1, \ldots, n$

$w_j$ indicates the weight of dimension $X_j$ and = $\sum_j^k w_j = 1$.

For every individual there is a weighted sum of the degree of membership estimated with regards to the dimensions of deprivation. The preferred weighting system is that of Cerioli & Zani since each dimension's weight is the inverse function of the number of individuals who are deprived with respect to the reference population.

The weighting function is:

$w_j$ = log $(\frac{1}{\bar{\delta}(xj)})$, where $\bar{\delta}(x_j) = \frac{1}{n}\sum_{i=1}^{n}\delta(x_{ij})$, with $\bar{\delta}(x_j)$, representing the mean deprivation occurring in dimension $X_j$.

Lastly, to derive poverty as a subset of the population, the mean of the subset can be calculated as follow: $\frac{1}{n}\sum_{i=1}^{n}\delta p(x_i)$, where there are n observations in a subset. Finally, the deprivation index ranges between 0 and 1 which ultimately means that the higher the value of the index, the more deprived the household will be.

### 4.3 Data

This thesis will be analysing multidimensional poverty at five points in time: 1996, 2001, 2007, 2011, and 2016. The data that will be used is cross-sectional data sourced from the 10% sample Censuses of 1996, 2001 and 2011 as well as the Community Surveys of 2007 and 2016, performed by Stats SA.

The Census data provides an accurate picture of how many individuals are living in the country as well as their living conditions and access to basic services. Comprehensive information regarding the non-money-metric indicators is provided which allows the study of deprivation by demographic and geographic factors. In 1996, the post-apartheid government conducted its first population Census. Typically, the Census is held every five years, but because of the lack of capacity within Stats SA, the interval was extended to 10 years (Yu, 2009). However, when this decision was made, a void of information among Census 2001 and Census 2011 occurred. As a result, the Community Survey (in this case CS 2007) was performed in the place of the 2006 Census and the intention was to provide information like the two censuses (Yu, 2009).

The Community Survey is described as a large-scale survey which aims to supply government and the private sector with information such as population and household statistics at a municipal level (Stats SA, 2016). This survey provides abundant information on demographics, educational levels, economic behaviours, ownership of assets and access to basic services. It differs from other surveys as it allows the examination of non-money-metric factors of poverty in greater detail. The focus of the survey is on non-money-metric poverty with respect to demographic factors such as race and gender as well as smaller geographical units such as district councils and municipalities (Stats SA, 2016).

In this thesis, a 10%-unit level sample of all households and all individuals counted in the censuses from the years 1996, 2001, and 2011 was used. Household records were clearly divided by province and District Councils (DC). The records within each DC were further separated by local authority and enumeration area (Burger *et al*., 2017). However, it is believed that these censuses do not accurately encapsulate the makeup and size of the population. In 1996 and 2001, post-enumeration surveys found undercounts of more than 10% and slightly over 20% respectively (Burger *et al*., 2004; Burger *et al*., 2017). Sample weights have been adjusted to account for these undercounts, yet demographers still found

several inconsistencies between the censuses even with these corrections. However, for the purpose the censuses are used here, this will not affect the outcomes of this analysis.

Table 4.1 displays the seven non-monetary variables that will be incorporated when obtaining the deprivation of households. These aspects assist to determine the relative deprivation, social exclusion as well as the incapacity of households to reach a living standard that is decent (Gallant, 2012).

The rankings applied in this thesis are like that of Klasen (2000), Qizilbash (2002), Burger *et al*. (2004), Van der Walt (2004), Gallant (2012) and Burger *et al*. (2017) with some slight differences. The first difference to note is that this thesis only included seven dimensions[5] whereas the mentioned studies above included nine dimensions. The rankings applied in this study when looking at the energy variable for cooking will rank animal dung and wood together like Gallant (2012). Whereas Van der Walt (2004) and Burger *et al*. (2004) ranked wood above animal dung and in contrast Klasen (2000) and Qizilbash (2002) ranked animal dung above wood. Regarding the access to water dimension, having a tap on the dwelling, a tap in the premises and a public tap will be grouped together and the categories borehole, rain-water tank, well, dam, river, stream, and spring are grouped together under the "other" category for this thesis. Dwelling as a dimension will include formal house or flat, flatlet or single room, traditional hut as well as informal dwelling. Whereas Burger *et al*. (2004) and Van der Walt (2004) had individual categories such as single room or flatlet, traditional hut, shack and homeless.

This thesis will have categories for educational attainment such as above matric, matric, incomplete secondary, incomplete primary, and no schooling. Whereas Burger *et al*. (2004) and Van der Walt (2004) included an additional category, namely complete primary, and Burger *et al*. (2017) included complete secondary as an additional category. The household income variable will be excluded from this thesis because of some problems that were noted by researchers. The problems of the income variable will be discussed later under the limitations section. Lastly, instead of using individuals as a statistical unit, households will be used. Thus, the results of this thesis will be at a household level as the dimensions used were measured at a household level.

[5] The reasons why this thesis only included seven dimensions will be discussed in Section 4.4.

Table 4.1: The seven non-monetary categories and its deprivation dimensions

| Rank | Census 1996 | Census 2001 | Community Survey 2007 | Census 2011 | Community Survey 2016 |
|---|---|---|---|---|---|
| **FUEL SOURCE FOR COOKING** | | | | | |
| 1. Electricity | Electricity direct from authority | Electricity | Electricity | Electricity | Electricity |
| | Electricity from other source | | | | Electricity from other source |
| | | Solar | Solar | Solar | Solar |
| 2. Gas | Gas | Gas | Gas | Gas | Gas |
| 3. Paraffin/Coal | Paraffin | Paraffin | Paraffin | Paraffin | Paraffin |
| | Coal | Coal | Coal | Coal | Coal |
| 4. Wood/Dung | Other | Wood | Wood | Wood | Wood |
| | Wood | Animal dung | Animal dung | Animal dung | Animal dung |
| | Animal dung | Other | Other | Other | Other |
| | Unspecified | | | None | None |
| **WATER** | | | | | |
| 1. Tap in dwelling | Piped water in dwelling | Piped water (tap) inside dwelling | Piped water inside dwelling | Piped water inside dwelling | Piped water inside dwelling |
| 2. Tap in premises | Piped water on site | Piped water (tap) inside yard | Piped water inside yard | Piped water inside yard | Piped water inside yard |
| 3. Public tap | Public tap | Piped water on community stand: distance less than 200m | Piped water outside yard | Piped water on community stand: distance less than 200m | Piped water on community stands outside yard |
| | | Piped water on community stand: distance more than 200m | | Piped water on community stand: distance more than 200m | Public communal tap |
| 4. Other | Watercarrier/tanker | Borehole | Others | Borehole | Borehole in the yard |
| | Borehole/ rain-water tank/well | Spring | Borehole | Spring | Borehole outside the yard |
| | Dam/river/stream/spring | Rainwater tank | Spring | Rain-water tank | Spring |
| | Other | Dam/pool/stagnant water | Dam/pool | Dam/pool/stagnant water | Rainwater tank |
| | Unspecified | River/stream | River/stream | River/stream | Neighbour's tap |
| | | Water vendor | Water vendor | Water-vendor | Flowing water/stream/river |
| | | Other | Rainwater tank | Water tanker | Water carrier/tanker |
| | | | | Other | Well |
| | | | | | Other |
| **REFUSE REMOVAL** | | | | | |
| 1: Removed once a week | Removed by local authority at least once a week | Removed by local authority at least once a week | Removed by local authority at least once a week | Removed by local authority at least once a week | Removed by local authority/private company/community members at least once a week |
| 2: Removed less often | Removed by local authority less often | Removed by local authority less often | Removed by local authority less often | Removed by local authority less often | Removed by local authority/private company/community members less often |
| 3: Communal refuse dump | Communal refuse dump | Communal refuse dump | Communal refuse dump | Communal refuse dump | Communal refuse dump |
| | | | | | Communal container |
| 4: Own refuse dump | Own refuse dump | Own refuse dump | Own refuse dump | Own refuse dump | Own refuse dump |
| 5: Other | No rubbish disposal | None | No rubbish disposal | No rubbish disposal | No rubbish disposal |
| | Other | | Other | Other | Other |
| | Unspecified | | | | |

Table 4.1: Continued

| | | | | | |
|---|---|---|---|---|---|
| **SANITATION** | | | | | |
| 1: Toilet facility | Flush or chemical toilet | Flush toilet (connected to sewerage system) | Flushed toilet (connected to sewerage system) | Flush toilet (connected to sewerage system) | Flush toilet (connected to sewerage system) |
| | | Flush toilet (with septic tank) | Flush toilet (with septic tank) | Flush toilet (with septic tank) | Flush toilet (with septic tank) |
| | | Chemical toilet | Chemical toilet | Chemical toilet | Chemical toilet |
| 2: Pit latrine | Pit latrine | Pit toilet with ventilation (VIP) | Dry toilet facility | Pit toilet with ventilation | Pit toilet with ventilation |
| | | Pit toilet without ventilation | Pit toilet with ventilation | Pit toilet without ventilation | Pit toilet without ventilation |
| | | | Pit toilet without ventilation | | Ecological toilet (e.g., urine diversion, enviroloo etc. |
| 3. Bucket latrine | Bucket latrine | Bucket latrine | Bucket toilet system | Bucket toilet system | Bucket toilet (collected by municipality) |
| | | | | | Bucket toilet (emptied by household) |
| 4. Other | None of the above | None | None | None | None |
| | Unspecified | | | | Other |
| **DWELLING TYPE** | | | | | |
| 1: Formal house/flat | House or brick structure | House or brick structure on a separate stand | House or brick structure on a separate stand | House or brick structure on a separate stand | House or brick structure on a separate stand |
| | Flat in a block of flats | Flat in block of flats | Flat in block of flats | Flat in block of flats | Flat in block of flats |
| | Town/cluster/semi-detached house | Town/cluster/semi-detached house | Town/cluster/semi-detached house | Town/cluster/semi-detached house | Town/cluster/semi-detached house |
| | Unit in a retirement village | | | | |
| 2: Single room or flatlet or traditional hut | Tradition dwelling/hut | Traditional dwelling/hut | Traditional dwelling/hut/ structure made | Traditional dwelling/hut/structure made | Traditional dwelling/hut/structure made |
| | House/flat/room in backyard | House/flat/room in backyard | House/ flat/ room in backyard | House/flat/room in backyard | House/flat/room in backyard |
| | Room/flatlet not in backyard | Room/flatlet not in backyard | Room/ flatlet not in backyard | Room/flatlet not in backyard | Room/flatlet not in backyard |
| | Caravan or tent | Caravan or tent | Caravan or tent | Caravan or tent | Caravan or tent |
| 3: Informal dwelling | Informal dwelling/shack in backyard | Informal dwelling/shack in backyard | Informal dwelling/ shack in backyard | Informal dwelling/shack in backyard | Informal dwelling/shack in backyard |
| | Informal dwelling/shack elsewhere | Informal dwelling/shack NOT in backyard | Informal dwelling/ shack not in backyard | Informal dwelling/shack not in backyard | Informal dwelling/shack not in backyard |
| | Other dwelling type | Private ship/ boat | Private ship/ boat | | |
| | Unspecified dwelling type | | Workers' hostel (bed/ room) | | |
| | | | Other | Other | Other |

Table 4.1: Continued

| | | | | | |
|---|---|---|---|---|---|
| **LANDLINE TELEPHONE OR CELLPHONE** | | | | | |
| 1. Yes | In this dwelling/ cellular phone | Telephone in dwelling and cellphone | Telephone or cell phone | Telephone or cell phone | Telephone or cell phone |
| | | Telephone in dwelling only | | | |
| | | Cellphone only | | | |
| 2. No | At a neighbour nearby | At a neighbour nearby | None of both | None of both | None of both |
| | At a public telephone nearby | At a public telephone nearby | | | |
| | At another location nearby e.g., work | At another location nearby e.g., work | | | |
| | At another location not nearby | At another location not nearby | | | |
| | No access to a telephone | No access to a telephone | | | |
| | Unspecified | | | | |
| **EDUCATIONAL ATTAINMENT OF HOUSEHOLD HEAD** | | | | | |
| 1. Above Matric | Matric + cert/dip | Matric + cert/dip | Matric + cert/dip | Matric + cert/dip | Matric + cert/dip |
| | Degree | Degree | Degree | Degree | Degree |
| 2: Matric | Matric | Matric | Matric | Matric | Matric |
| 3: Incomplete secondary | Incomplete secondary | Incomplete secondary | Incomplete secondary | Incomplete secondary | Incomplete secondary |
| 4: Incomplete primary | Incomplete primary | Incomplete primary | Incomplete primary | Incomplete primary | Incomplete primary |
| 5: No schooling | No schooling | No schooling | No schooling | No schooling | No schooling |

### 4.4 Limitations

The following shortcomings need to be highlighted regarding the data. The first problem relates to the problematic income variable. According to Yu (2009) the income data of the census must be treated with care due to the deficiencies across the surveys. It was found that there were a great proportion of households that stated zero or income that were unspecified. By including households that might have incorrectly stated zero income can lead to poverty levels that are over-estimated (Yu, 2009).[6] For example, in Census 1996, 13% of households reported zero income and in Census 2001, 21% of households recorded zero income[7], and 8.2% in CS 2007. In addition, the percentage of households with unspecified income in Census 1996 were 11.5%, 16.4% in Census 2001, and 11.1% in CS 2007 (Yu, 2009). Income data for the 2016 Community Survey was collected however, the data was not released. As a result of the unreliable income variable, it was decided to exclude income as a dimension.

In the Census 2011 and CS 2007 and 2016 surveys, not much detail was asked about the dimension landline telephone or cellphone ownership. The mentioned questionnaires only enquired whether respondents have a landline telephone or cellphone where they reside, or whether they have a cellphone or not. Compared to Census 1996 and 2001, the questionnaire asked respondents to specify the location of the landline telephone in detail. Therefore, for this dimension, only two groups of deprivation could be derived because of the drawback of the landline telephone and cellphone question in Census 2001 as well as CS 2007 and 2016. The two categories are "having either landline telephone or cellphone in dwelling" and "having no landline telephone and cellphone in dwelling".

The limitation of the 2016 Community Survey dataset is that Stats SA did not release the labour market variable information; hence a variable such as employment/unemployment will not be added to the fuzzy set index for the year 2016. As a result, it was decided not to add employment as a dimension in this thesis.

In addition, the dimension crowding, which is household size divided by the total number of rooms, for 2016 could not be calculated since questions regarding the total number of rooms were not asked. Even though the crowding dimension could be calculated for Census 1996, Census 2001, CS 2007, and Census 2011, the decision was made to completely omit

[6] See Yu (2009) for a more detailed discussion on the problematic income variable.
[7] Before hot deck imputation was conducted by Stats SA.

crowding as a dimension or else Census 1996, Census 2001, CS 2007, and Census 2011 would not be comparable with CS 2016 data. It is important that dimensions are consistent.

### 4.5 Deriving the vertical and horizontal weights

In this section, two weight sets are calculated, namely the vertical and horizontal weights.[8] Table 4.2 shows the percentage of households in each ranking category in each dimension for the years 1996, 2001, 2007, 2011, and 2016.[9]

Over the 1996 to 2016 period, the percentage of households having access to services showed great improvements in electricity, toilet facility, formal dwelling (even though there was a decrease in 2016) and telephone or cellphone. It is positive to see that the proportion of households using wood or dung as a cooking source decreased significantly from 25% in 1996 to 8.39% in 2016. More households now have access to a toilet facility rather than using a pit latrine or a bucket latrine. The percentage of households who occupied traditional or informal dwellings has decreased while the percentage of households occupying dwellings that are formal has increased.

Dimensions that showed some increase between 1996 and 2016 are the removal of refuse once a week and the educational attainment of the household head that at least had matric and above matric.

For the year 2016, electricity, formal dwelling, toilet facility and landline telephone or cellphone had the highest percentages. This means that majority of South Africans had access to the mentioned categories in 2016. However, it is still worrisome that in 2016 only about 11.43% of the household heads had an education attainment level above matric (i.e., a diploma or degree).

[8] The methodological background to the vertical and horizontal weights are discussed in Section 4.2 on page 38.
[9] See Tables A.1 – A.5 (pages 108 – 112) in the Appendix regarding the proportion of households in each ranking category between 1996 and 2016.

Table 4.2: Proportion of households in each ranking category in each dimension

| Dimension | Rank | Categories | Census 1996 | Census 2001 | CS 2007 | Census 2011 | CS 2016 |
|---|---|---|---|---|---|---|---|
| Fuel source for cooking | 1 | Electricity | 46.86% | 51.52% | 66.45% | 74.08% | 82.96% |
| | 2 | Gas | 3.16% | 2.55% | 2.01% | 3.54% | 2.98% |
| | 3 | Paraffin/Coal | 24.98% | 24.23% | 16.00% | 9.21% | 5.67% |
| | 4 | Wood/Dung | 25.00% | 21.70% | 15.54% | 13.17% | 8.39% |
| Water | 1 | Tap in dwelling | 43.64% | 32.19% | 47.18% | 46.31% | 44.58% |
| | 2 | Tap in premises | 16.52% | 29.02% | 22.28% | 27.18% | 29.97% |
| | 3 | Public tap | 19.43% | 23.31% | 19.22% | 17.81% | 13.53% |
| | 4 | Other | 20.41% | 15.48% | 11.32% | 8.70% | 11.92% |
| Refuse removal | 1 | Removed once a week | 50.85% | 55.33% | 59.91% | 62.15% | 61.19% |
| | 2 | Remove less often | 2.21% | 1.54% | 1.68% | 1.52% | 2.89% |
| | 3 | Communal refuse dump | 3.18% | 1.75% | 2.15% | 1.88% | 5.03% |
| | 4 | Own refuse dump | 32.41% | 32.69% | 28.79% | 28.14% | 25.90% |
| | 5 | No access | 11.35% | 8.69% | 7.45% | 6.31% | 4.98% |
| Sanitation | 1 | Toilet facility | 49.92% | 53.70% | 58.14% | 62.71% | 67.78% |
| | 2 | Pit latrine | 32.62% | 28.57% | 31.44% | 27.96% | 25.97% |
| | 3 | Bucket latrine | 4.60% | 4.08% | 2.18% | 2.06% | 2.24% |
| | 4 | None | 12.86% | 13.64% | 8.24% | 7.27% | 4.01% |
| Dwelling type | 1 | Formal house/flat | 57.49% | 63.74% | 66.73% | 73.91% | 71.91% |
| | 2 | Single room/flatlet or traditional hut | 25.36% | 19.72% | 15.61% | 11.71% | 14.27% |
| | 3 | Informal dwelling | 17.14% | 16.54% | 17.65% | 14.39% | 13.82% |
| Telephone | 1 | Landline telephone in dwelling or cellphone | 28.31% | 42.36% | 76.78% | 89.86% | 94.49% |
| | 2 | No landline telephone in dwelling and no cellphone | 71.69% | 57.64% | 23.22% | 10.14% | 5.51% |
| Educational attainment of household head | 1 | Above matric | 7.45% | 8.83% | 10.03% | 12.47% | 11.43% |
| | 2 | Matric | 12.45% | 15.92% | 14.36% | 23.24% | 28.21% |
| | 3 | Incomplete secondary | 37.85% | 35.10% | 41.06% | 37.06% | 38.27% |
| | 4 | Incomplete primary | 18.41% | 18.04% | 20.81% | 15.73% | 12.78% |
| | 5 | No schooling | 23.84% | 22.11% | 13.75% | 11.51% | 9.32% |

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Table 4.3: Vertical weights in each ranking category in each dimension

| Dimension | Rank | Categories | Census 1996 | Census 2001 | CS 2007 | Census 2011 | CS 2016 |
|---|---|---|---|---|---|---|---|
| Fuel source for cooking | 1 | Electricity | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| | 2 | Gas | 0.0595 | 0.0526 | 0.0599 | 0.1366 | 0.1749 |
| | 3 | Paraffin/Coal | 0.5295 | 0.5524 | 0.5368 | 0.4919 | 0.5076 |
| | 4 | Wood/Dung | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Water | 1 | Tap in dwelling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| | 2 | Tap in premises | 0.2931 | 0.4280 | 0.4218 | 0.5062 | 0.5408 |
| | 3 | Public tap | 0.6379 | 0.7717 | 0.7857 | 0.8380 | 0.7849 |
| | 4 | Other | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Refuse removal | 1 | Removed once a week | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| | 2 | Removed less often | 0.0450 | 0.0345 | 0.0419 | 0.0402 | 0.0745 |
| | 3 | Communal refuse dump | 0.1097 | 0.0737 | 0.0956 | 0.0898 | 0.2041 |
| | 4 | Own refuse dump | 0.7691 | 0.8055 | 0.8141 | 0.8333 | 0.8716 |
| | 5 | No access | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Sanitation | 1 | Toilet facility | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| | 2 | Pit latrine | 0.6514 | 0.6172 | 0.7511 | 0.7498 | 0.8060 |
| | 3 | Bucket latrine | 0.7432 | 0.7053 | 0.8032 | 0.8050 | 0.8755 |
| | 4 | None | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Dwelling type | 1 | Formal house/flat | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| | 2 | Single room/flatlet or traditional hut | 0.5967 | 0.5438 | 0.4693 | 0.4487 | 0.5080 |
| | 3 | Informal dwelling | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Telephone | 1 | Landline telephone in dwelling or cellphone | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| | 2 | No landline telephone in dwelling and no cellphone | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Educational attainment of household head | 1 | Above matric | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| | 2 | Matric | 0.1345 | 0.1746 | 0.1596 | 0.2655 | 0.3185 |
| | 3 | Incomplete secondary | 0.5435 | 0.5596 | 0.6159 | 0.6888 | 0.7505 |
| | 4 | Incomplete primary | 0.7424 | 0.7575 | 0.8472 | 0.8685 | 0.8948 |
| | 5 | No schooling | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Table 4.3 presents the vertical weights within each category for the seven dimensions for the period 1996 to 2016. The allocated values in the different categories within the different dimensions are the vertical weights. The vertical weight values are between 0 and 1.

Table 4.4 reveals the mean vertical weight in each dimension for the five datasets.[10] Education had the greatest average vertical weights and as a result, this dimension will have a smaller horizontal weight, indicating greater deprivation in this dimension.

The energy, sanitation and refuse removal dimensions revealed improvements as their mean vertical weights were lower over the years. Higher horizontal weights will be allocated to the mentioned dimensions. Furthermore, across all five surveys, the telephone dimension's mean vertical weight declined drastically. This indicates that additional households at least have access to a cellphone. For that reason, the landline telephone and cellphone dimension will have a higher horizontal weight.

Table 4.4: Average vertical weight in each dimension

| | **Census 1996** | **Census 2001** | **CS 2007** | **Census 2011** | **CS 2016** |
|---|---|---|---|---|---|
| Dwelling | 0.3228 | 0.2726 | 0.2498 | 0.1964 | 0.2107 |
| Energy | 0.3842 | 0.3522 | 0.2425 | 0.1819 | 0.1179 |
| Water | 0.3765 | 0.4589 | 0.3582 | 0.3739 | 0.3875 |
| Sanitation | 0.3753 | 0.3416 | 0.3360 | 0.2989 | 0.2690 |
| Refuse | 0.3673 | 0.3520 | 0.3117 | 0.2999 | 0.2880 |
| Telephone | 0.7169 | 0.5764 | 0.2322 | 0.1014 | 0.0551 |
| Education | 0.5976 | 0.5819 | 0.5896 | 0.5686 | 0.5846 |

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Horizontal weights in all seven dimensions for the period 1996 to 2016 is shown in Table 4.5. The horizontal weights are the dimension weights and are assigned based on the prevalence of those who are deprived (Burger *et al.*, 2017). Education (from 1996 - 2016) has lower horizontal weights compared to the other variables over the period. The relatively lower weights indicate a greater occurrence of deprivation. The low weights assigned to education in 2016 could be due to the absence of tertiary qualifications among a high proportion of South Africans.

[10] Refer to Table A.6 (pages 113 - 114) in the Appendix regarding the average vertical weight in each dimension between 1996 and 2016.

The dimension experiencing the greatest change over the mentioned period was the landline telephone and cellphone dimension. In 1996, a telephone was not deemed as a crucial form of deprivation hence the low weight. However, the weight share was higher in 2016. Landline telephones and cellphones have rapidly increased over the years, thus, not having a telephone or cellphone in 2016 was considered a more important form of deprivation.

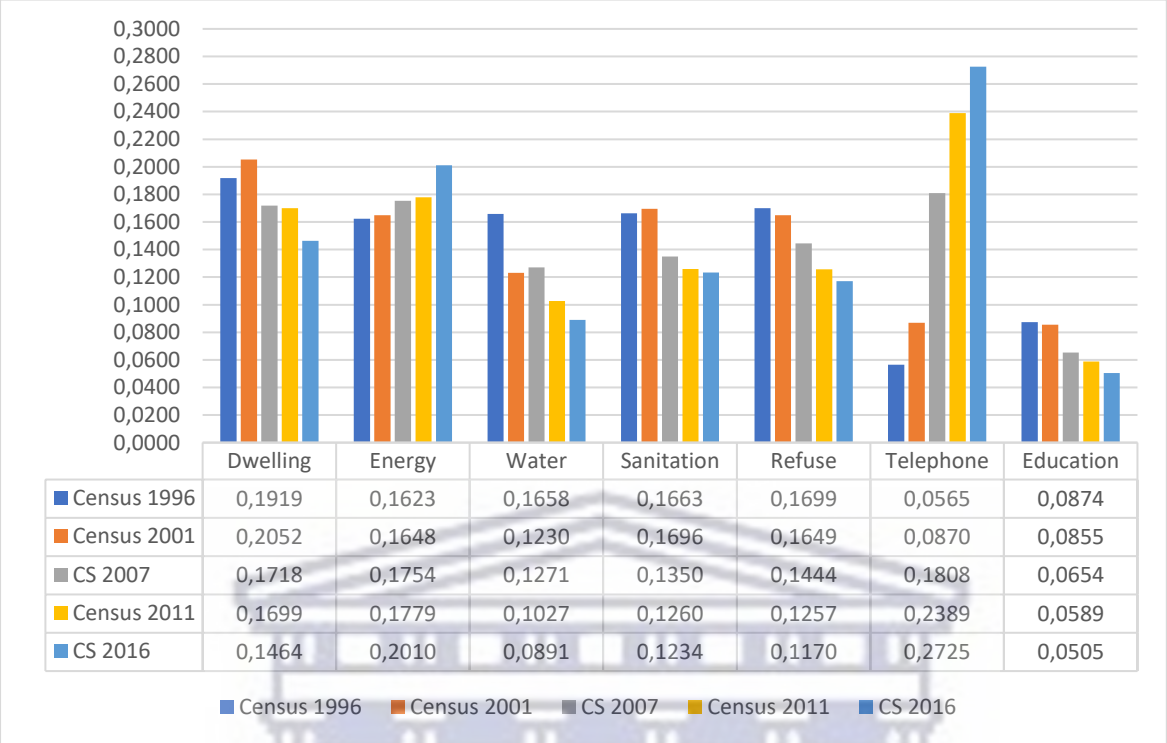
Dwelling and energy received the greatest weight share in all five datasets. Followed by sanitation and refuse removal. Even though Burger *et al*. (2017) had nine dimensions compared to the seven dimensions of this thesis, these horizontal weight results coincide with that of Burger *et al*. (2017) as they also found that dwelling, energy, refuse, and sanitation were important contributors in their study between 1996 and 2011.

Table 4.5: Horizontal weight in each dimension

| | **Census 1996** | **Census 2001** | **CS 2007** | **Census 2011** | **CS 2016** |
|---|---|---|---|---|---|
| Dwelling | 0.1919 | 0.2052 | 0.1718 | 0.1699 | 0.1464 |
| Energy | 0.1623 | 0.1648 | 0.1754 | 0.1779 | 0.2010 |
| Water | 0.1658 | 0.1230 | 0.1271 | 0.1027 | 0.0891 |
| Sanitation | 0.1663 | 0.1696 | 0.1350 | 0.1260 | 0.1234 |
| Refuse | 0.1699 | 0.1649 | 0.1444 | 0.1257 | 0.1170 |
| Telephone | 0.0565 | 0.0870 | 0.1808 | 0.2389 | 0.2725 |
| Education | 0.0874 | 0.0855 | 0.0654 | 0.0589 | 0.0505 |
| | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Figure 4.1: Horizontal weight in each dimension




| | Dwelling | Energy | Water | Sanitation | Refuse | Telephone | Education |
|---|---|---|---|---|---|---|---|
| Census 1996 | 0,1919 | 0,1623 | 0,1658 | 0,1663 | 0,1699 | 0,0565 | 0,0874 |
| Census 2001 | 0,2052 | 0,1648 | 0,1230 | 0,1696 | 0,1649 | 0,0870 | 0,0855 |
| CS 2007 | 0,1718 | 0,1754 | 0,1271 | 0,1350 | 0,1444 | 0,1808 | 0,0654 |
| Census 2011 | 0,1699 | 0,1779 | 0,1027 | 0,1260 | 0,1257 | 0,2389 | 0,0589 |
| CS 2016 | 0,1464 | 0,2010 | 0,0891 | 0,1234 | 0,1170 | 0,2725 | 0,0505 |

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

The horizontal weights in all seven dimensions across the five surveys are displayed in Figure 4.1. From Figure 4.1, the telephone dimension had the highest increase between 1996 and 2016.

The purpose of this thesis is to focus on the rendering of services and as shown in Table 4.5 and Figure 4.1, the derived index of poverty will be influenced by public service delivery indicators. The index will include one labour market variable namely, education and the remaining six dimensions are linked to service delivery variables. Four of the six dimensions namely, the type of energy used for cooking, access to water, sanitation and refuse removal dimensions are directly affected by the delivery of services from the government (Burger *et al*., 2017).

## 4.6 Conclusion

Chapter Four explained the fuzzy sets methodology and the data used to analyse non-money-metric poverty. This section provided a synopsis of the fuzzy set index by discussing the origin of the methodology and how the methodology will be employed. The datasets used in this study were also presented after which the limitations of the datasets were highlighted. Lastly, the vertical as well as the horizontal weights were derived for each of the five

datasets. To obtain the deprivation index in Chapter Five, the mentioned vertical and horizontal weights will be used. After which the statistics of the levels of deprivation in South Africa and specifically the Western Cape and Eastern Cape since South Africa became a democracy will be evaluated.

# CHAPTER FIVE: EMPIRICAL ANALYSIS

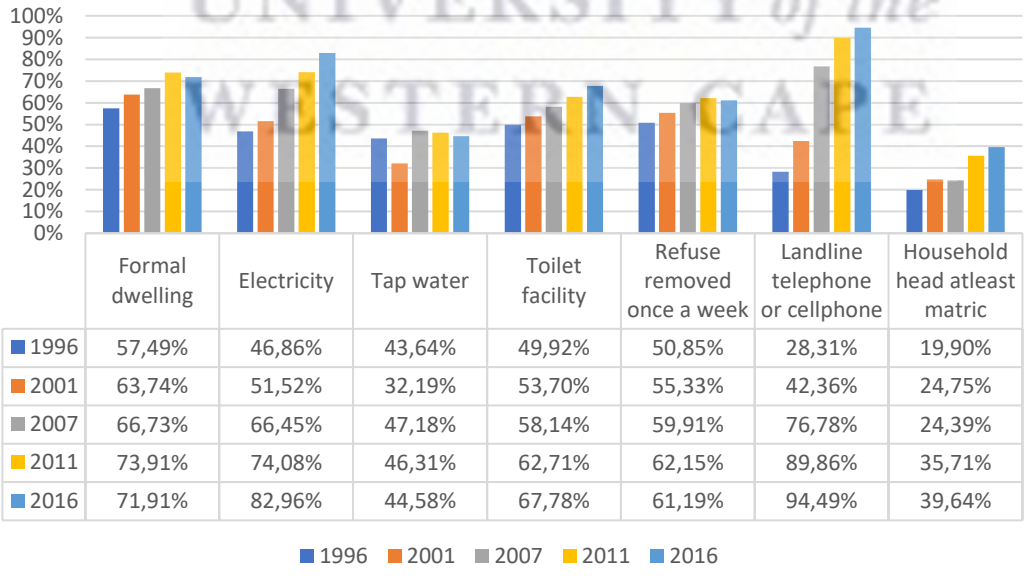
## 5.1 Introduction

The goal of this chapter is to assess the multidimensional deprivation levels and trends of South Africa between 1996 and 2016. Together with this national focus, the main aim will also be to evaluate and discuss the deprivation levels and trends of specifically the Western Cape and the Eastern Cape. In Section 5.2 descriptive statistics of the population are derived by using the deprivation index obtained from the fuzzy set methodology in Chapter Four. Next, Section 5.3 focuses on the Western Cape and Eastern Cape by comparing the two province's poverty levels and trends by looking at district councils and local municipalities. Section 5.4 analyses the OLS regression to examine whether the independent variables are associated with deprivation. Lastly, Section 5.5 ends the chapter.

## 5.2 Descriptive statistics of multidimensional poverty levels and trends in South Africa

In this section, this thesis reviews whether the government has been successful in providing basic services to the citizens of the country. The percentage of households with decent welfare in dimensions such as formal dwelling, electricity, tap water, toilet facility, refuse removal once a week, landline telephone or cellphone as well as the household head with at least matric are shown in Figure 5.1.

Figure 5.1: The percentage of households with decent welfare in each category




| | Formal dwelling | Electricity | Tap water | Toilet facility | Refuse removed once a week | Landline telephone or cellphone | Household head atleast matric |
|---|---|---|---|---|---|---|---|
| 1996 | 57,49% | 46,86% | 43,64% | 49,92% | 50,85% | 28,31% | 19,90% |
| 2001 | 63,74% | 51,52% | 32,19% | 53,70% | 55,33% | 42,36% | 24,75% |
| 2007 | 66,73% | 66,45% | 47,18% | 58,14% | 59,91% | 76,78% | 24,39% |
| 2011 | 73,91% | 74,08% | 46,31% | 62,71% | 62,15% | 89,86% | 35,71% |
| 2016 | 71,91% | 82,96% | 44,58% | 67,78% | 61,19% | 94,49% | 39,64% |

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

The categories that improved between 1996 and 2016 are electricity, toilet facility as well as landline telephone and cellphone. Although there is still much more that can be done, the above findings are encouraging given government's continuous efforts to provide better basic services since 1994.

One of the government's objectives to providing better service delivery was to make sure that households had access to electricity and that indigent households[11] should be provided with additional support in obtaining electricity. As a result, 50 kWh of free electricity per household per month are provided to indigent households (South African government, 2022). Figure 5.1 shows that since 1996, households using electricity as the main energy source for food preparation improved. In 2016, about 82.96% of households used electricity as a cooking source compared to 46.86% in 1996.

Another goal of the government is to aid households in the country with access to decent toilet facilities. Government ensures that indigent households receive up to R50 per month or a 100% subsidy for sewerage and sanitation services, however, these subsidised services vary from municipality to municipality (Stats SA, 2018). It is encouraging to see the increasing trend of households who have access to a toilet facility. Figure 5.1 indicates that 67.78% of households in 2016 had flushed toilets compared to 49.92% in 1996.

Furthermore, the tremendous increase in households owning landline telephones and/or cellphones could perhaps be due to households having better access due to the affordability of these landline telephones or cellphones. Another argument is that people would feel deprived if they lacked access to a cellphone and majority of the people around them has either a landline telephone and/or cellphone available (Gallant, 2012). The need to own a cellphone in 2016 could be linked to Veblen's theory of conspicuous consumption[12] as individuals especially those who are regarded as poor, purchase visible products (in this case cellphones) to fit in or gain social status (Madyibi, 2017). Individuals want to own as much as other people in their group of reference, hence they obtain these visible products through expenditure patterns (Madyibi, 2017 citing Veblen, 2003).

According to Stats SA (2016), having access to safe and quality drinking water is a right as it is linked to the health and well-being of South Africans. It is disappointing to see the

[11] Municipalities in South Africa determine their own criteria for identifying indigents. In 2017, most municipalities classified an indigent household as a family earning a combined income of R3200 per month or less (Stats SA, 2018).
[12] Veblen (1899) identified consumer behaviour and termed it "conspicuous consumption" (Madyibi, 2017)

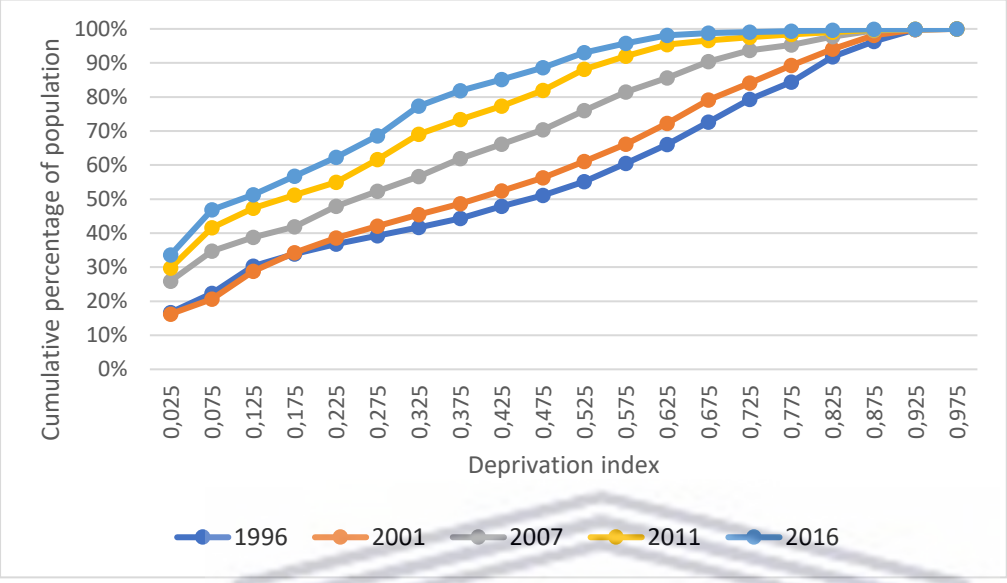
percentage of households having access to tap water declined in 2001, then increased in 2007 before decreasing again in 2011 and a further decrease in 2016.

Formal dwelling and refuse removed once a week showed an upward trend from 1996 to 2011 after which both declined in 2016. Formal dwelling showed a steady increase in the percentage of households living in formal structures such as a house or brick structure over time from 57.49% in 1996 to 73.91% in 2011 after which the percentage declined to 71.91% in 2016. Similarly, the proportion of households whose refuse is removed once a week has improved but at a sluggish rate. Lastly, household heads with at least matric was the only category that had a decline between 2001 and 2007.

Figure 5.2 illustrates the cumulative distribution of deprivation in South Africa from 1996 to 2016. The cumulative distribution curve for 1996 is below the curves for 2001, 2007, 2011 and 2016. This implies that deprivation levels were at its highest in 1996. The curve also bulges to the right which further indicates higher levels of deprivation. However, improvements for the whole population occurred from 2001 onwards until 2016. The figure illustrates that the curve for 2016 is above the 1996, 2001, 2007 and 2011 curves indicating that a larger cumulative percentage of South Africans had reduced deprivation levels by 2016.

Additionally, in 2016, a greater cumulative percentage (56.77%) of the population had a deprivation index of 0.175 or below, compared to the percentages for 1996 (34.28%), 2001 (34.28%), 2007 (41.89%) and 2011 (51.20%) which were lower. The smaller the deprivation index, the less deprived households are and vice versa. Thus, in 2016 about half of the given population had lower deprivation levels.

Figure 5.2: Cumulative distribution of deprivation in South Africa, 1996 – 2016




Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

The average deprivation in South Africa is shown by Figure 5.3. As illustrated, there is a downward trend of average deprivation in South Africa as a decrease from 0.4383 in 1996 to 0.2068 in 2016 occurred. In addition, all nine provinces experienced somewhat of a decline in their mean deprivation indices from 1996 to 2016.

In 1996, there was a significant gap in the mean deprivation figures of the Western Cape, Gauteng, and the Northern Cape (between 0.1 and 0.3) in contrast with Limpopo and the Eastern Cape (around 0.6 for both provinces). These results coincide with Burger *et al.* (2017) in their analysis between 1996 and 2011. The divide in the results found in 1996 could be due to the fact that the Western Cape, Gauteng and the Northern Cape did not inherit homelands[13] in Apartheid whereas Limpopo and the Eastern Cape did (Burger *et al.*, 2004; Burger *et al.*, 2017). Hence, results for the residents of Limpopo and the Eastern Cape showed a greater average deprivation index compared to households in the Western Cape, Gauteng, and Northern Cape, showing a much lower mean deprivation index. Noble *et al.* (2014) agrees that significantly high levels of deprivation and poverty continue to persist in former homeland areas compared to the rest of South Africa.

[13] In 1951, the Bantu Authorities Act established "homelands" for different Black African groups. Thus, homelands are areas in South Africa where the country's Black African population was forced to live during the years of Apartheid. Former homelands in the Eastern Cape included Transkei and Ciskei. Gazankulu, Lebowa and Venda were former homelands in Limpopo (Noble, Zembe & Wright, 2014).

In 2016, households of the Eastern Cape and Limpopo were the most deprived as they experienced the highest mean deprivation index compared to the rest of the country with their indices being 0.2806 and 0.3583 respectively. Whereas households living in the Western Cape and Gauteng provinces were less deprived showing a much lower mean deprivation index of 0.0930 and 0.1155 respectively. This outcome is expected as the Eastern Cape and Limpopo has larger amounts of households living in rural zones compared to the Western Cape and Gauteng.

Figure 5.3: Mean deprivation index by province, 1996 – 2016

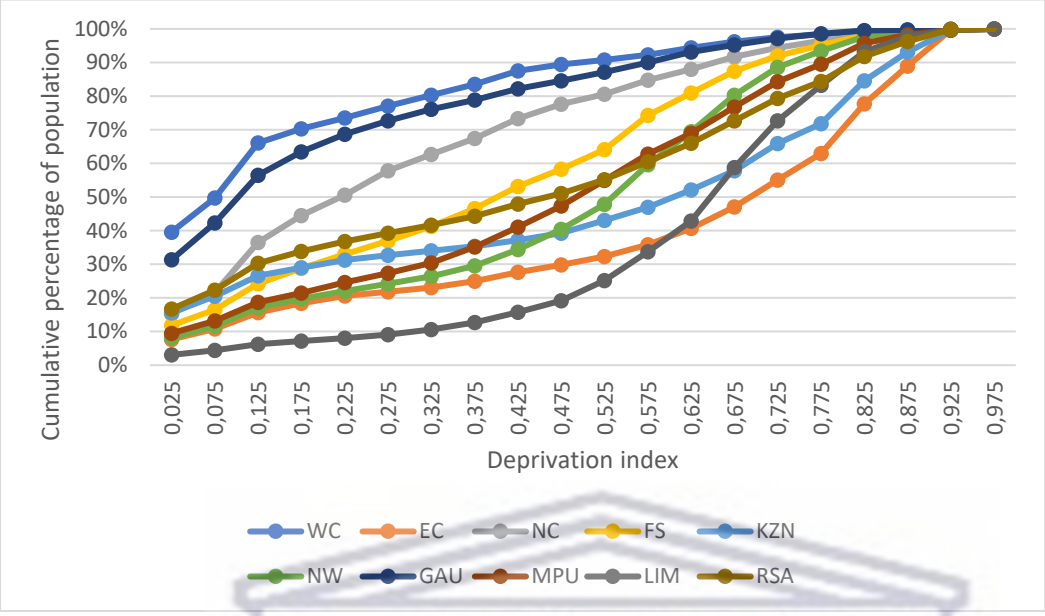

| | WC | EC | NC | FS | KZN | NW | GAU | MPU | LIM | RSA |
|---|---|---|---|---|---|---|---|---|---|---|
| Census 1996 | 0,1814 | 0,6033 | 0,3032 | 0,4028 | 0,5157 | 0,4888 | 0,2144 | 0,4742 | 0,6202 | 0,4383 |
| Census 2001 | 0,1802 | 0,5594 | 0,2898 | 0,4000 | 0,4752 | 0,4606 | 0,2199 | 0,4603 | 0,5856 | 0,4105 |
| CS 2007 | 0,1244 | 0,4643 | 0,2166 | 0,2621 | 0,3803 | 0,3567 | 0,1636 | 0,3456 | 0,4842 | 0,3157 |
| Census 2011 | 0,1166 | 0,3493 | 0,2254 | 0,1964 | 0,3021 | 0,2880 | 0,1231 | 0,2893 | 0,3941 | 0,2455 |
| CS 2016 | 0,0930 | 0,2806 | 0,2017 | 0,1673 | 0,2573 | 0,2422 | 0,1155 | 0,2592 | 0,3583 | 0,2068 |

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Figures 5.4 - 5.8 illustrates the cumulative distribution curves for 1996, 2001, 2007, 2011 and 2016 for each province.[14] In Figure 5.4 the cumulative distribution curves of the Western Cape, Gauteng, and the Northern Cape indicates non-deprivation. This shows that a larger percentage of households had a deprivation index that was low. Additionally, the mentioned provinces cumulative distribution curves fall above the national curve. KwaZulu-Natal, North West, Mpumalanga, Eastern Cape and Limpopo's cumulative distribution curves were below the South African curve. The Eastern Cape and Limpopo performed the worst as the shape of these curves bulge toward the right, with a greater percentage of households being deprived.

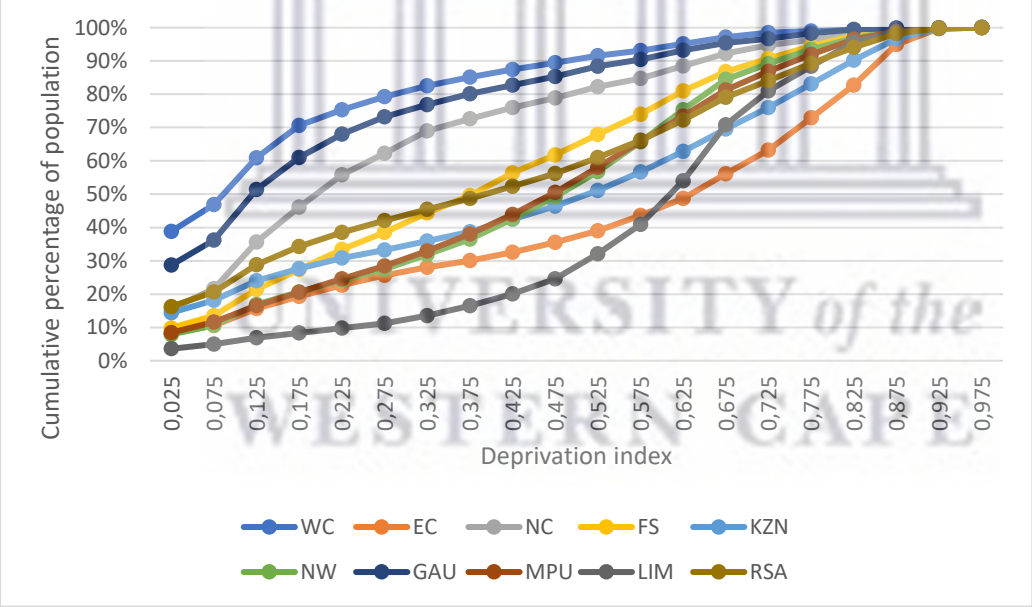
[14] Refer to Figures A.1 – A.7 (pages 130 – 133) in the Appendix for the cumulative distributive functions per province for the period 1996 – 2016.

Figure 5.4: Cumulative distribution of deprivation by province, Census 1996




Source: Own calculations using Census 1996 data.

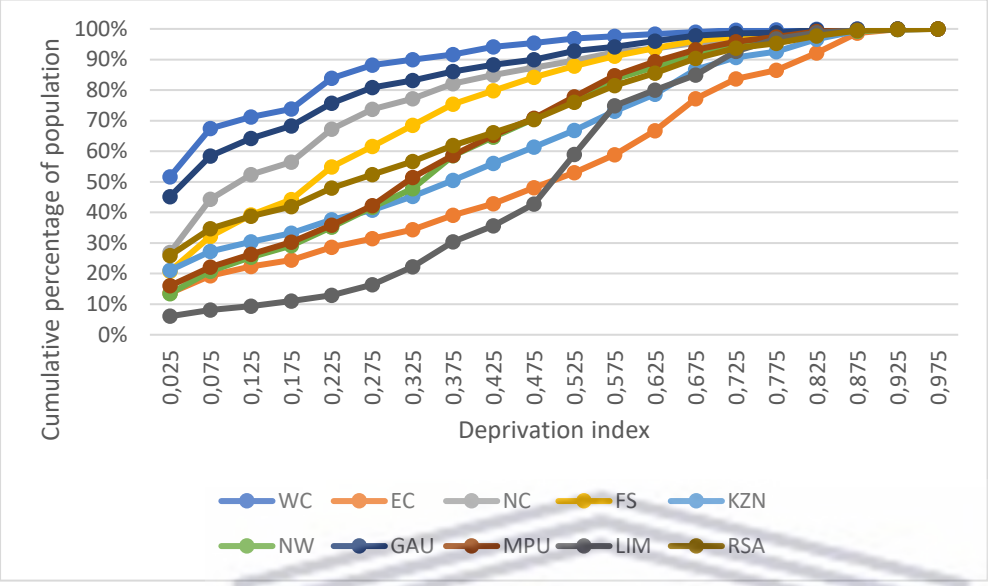
Figure 5.5: Cumulative distribution of deprivation by province, Census 2001




Source: Own calculations using Census 2001 data.

In Figure 5.5 there is a slight improvement from the previous 1996 figure to 2001. However, the curve shapes of 2001 endured similar patterns to that of 1996. The Western Cape, Northern Cape, and Gauteng's curves of cumulative distribution bulge toward non-deprivation. Minor improvements occurred in 2001, however, the Eastern Cape and Limpopo remains the worst performing provinces with their cumulative distribution curves falling below the South African curve.

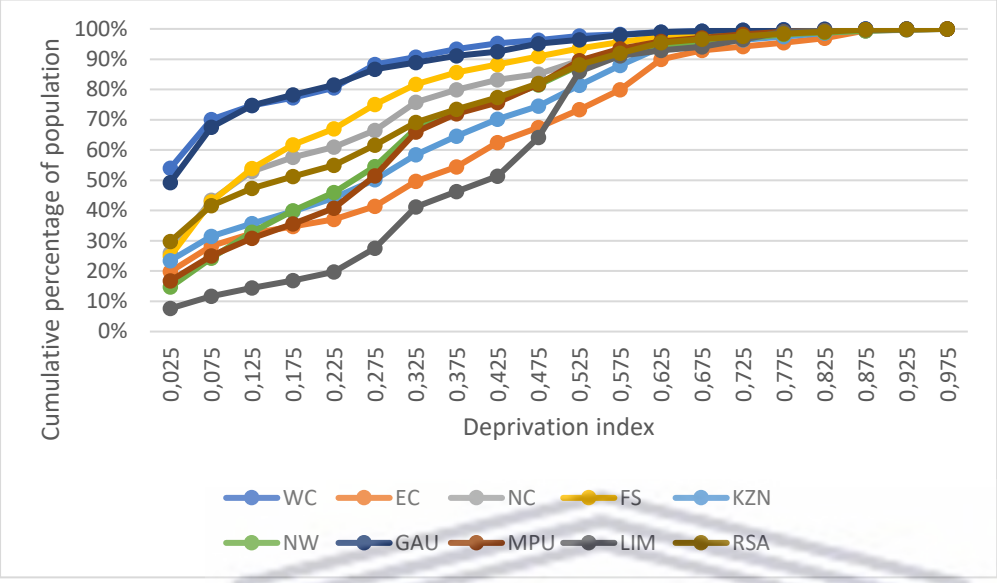
Figure 5.6: Cumulative distribution of deprivation by province, CS 2007




Source: Own calculations using CS 2007 data.

In Figure 5.6, the province that showed the best improvement between 2001 and 2007 and for the most part moved above South Africa's cumulative distribution curve, is the Free State. In addition, some improvement is also shown by Mpumalanga and North West province. At an index of 0.375 or below, the cumulative percentage of households amplified from 38.07% to 58.61% in Mpumalanga between 2001 and 2007. Similarly, for the North West province, when the deprivation index was 0.375 or below, the cumulative percentage of households increased from 36.49% to 58.61%. This implies that more households experienced lower levels of deprivation. In contrast, the Eastern Cape and Limpopo's cumulative distribution curves continues to bulge rightward in 2007.

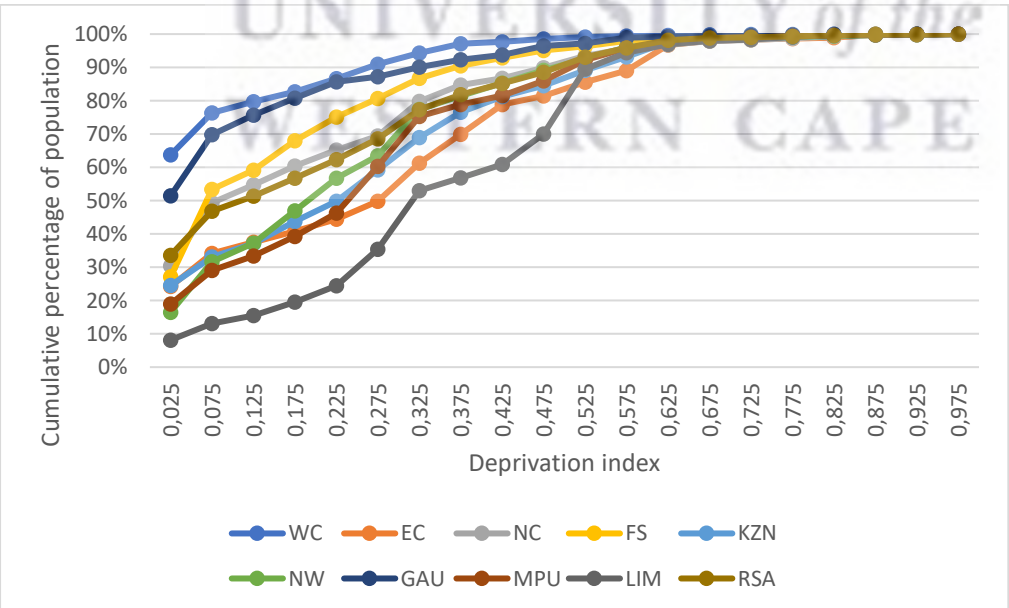
Figure 5.7: Cumulative distribution of deprivation by province, Census 2011




Source: Own calculations using Census 2011 data.

The cumulative distribution curves by province for 2011 are displayed by Figure 5.7. Although KwaZulu-Natal's cumulative distribution curve still fall below that of South Africa's cumulative distribution curve, it has shown improvement from 2007 to 2011. With a deprivation index of 0.375 or below, KwaZulu-Natal's cumulative percentage of the population improved to 64.52% from 50.49%.

Figure 5.8: Cumulative distribution of deprivation by province, CS 2016




Source: Own calculations using CS 2016 data.

Figure 5.8 shows the cumulative distribution curves by province for 2016. The Western Cape, Gauteng, Northern Cape as well as the Free State's cumulative distribution curves lay above the national cumulative distribution curve, and it shows that these provinces are the better performers. In contrast, the Eastern Cape and Limpopo's cumulative distribution curves are once again lower than the national curve.

When comparing the curve shapes of all nine provinces from 2011 to 2016, further improvement has occurred as all the curves bulge more leftward than right (compared to 1996, 2001, 2007, and 2011). Much progress has occurred from the two most deprived provinces, the Eastern Cape and Limpopo. In 2011, the Eastern Cape's cumulative percentage of the population increased from 54.45% to 69.91% in 2016 at a deprivation index of 0.375 or below. Additionally, in 2011, Limpopo's cumulative percentage of the population was 46.24% and increased to 56.81% in 2016 at a deprivation index of 0.375 or below.

Regarding South Africa's cumulative distribution curves, a difference can be seen between 1996 and 2016. In 1996, only 30.3% of the cumulative population had a deprivation index of 0.125 in comparison with 51.31% of the population in 2016. The implication is that about half of the population in 2016 had lower deprivation levels and was better off than in 1996.

Overall, the trends found that the Western Cape, Gauteng and Northern Cape were the best performing provinces as their cumulative distribution curves were above South Africa's cumulative distribution curve at every point. The Eastern Cape and Limpopo did not perform well as their curves were consistently below South Africa's cumulative distribution curve.

The average deprivation for all the population groups in each province is summarized in Table 5.1. The average deprivation level of each race group varies per province of which the Western Cape shows the lowest average deprivation levels. Although the Western Cape had the lowest average deprivation levels, the Black race group in this province were worse off than the Black race group in Gauteng. The results of Table 5.1 agree with Figure 5.9 as it also illustrates that the Black race had the highest mean deprivation.

Coloureds living in Gauteng experienced the lowest average deprivation levels throughout all five surveys. This is an interesting result as one would think that the Western Cape would have showed the lowest mean deprivation levels for the Coloured race group as majority of the Coloured households live in the Western Cape.

Over the period, all four race groups experienced a decline in mean deprivation levels. However, the Black race, despite showing the greatest average deprivation over the years, enjoyed the largest decline in mean deprivation (0.5365 to 0.2371) between 1996 and 2016 compared to the other races. Eradicating Black poverty was the primary policy objective of the ANC government since the advent of democracy in 1994 (Fourie, 2006). Hence the decline in deprivation levels experienced by Blacks is as a result of government's programmes and action policies where the more disadvantaged groups are targeted as the key recipients of basic service delivery programmes. In their respective investigations, Burger *et al.* (2004) and Gallant (2012), also found that the Black race showed the greatest growth in welfare and a decrease in mean deprivation.

In contrast, between 1996 and 2016, the White population showed a slight decline in their average deprivation (0.0556 to 0.0436). These low levels of deprivation are expected as the White population was the richest race group under Apartheid. Cleophas (2019) argues that despite the efforts of the South African government post 1994 to eradicate the mismatch between Black and White people, White South Africans still enjoy similar privileges as under Apartheid. Thus, the deprivation levels are the smallest among White South Africans.

Table 5.1: Mean deprivation by race of household head per province, 1996 - 2016

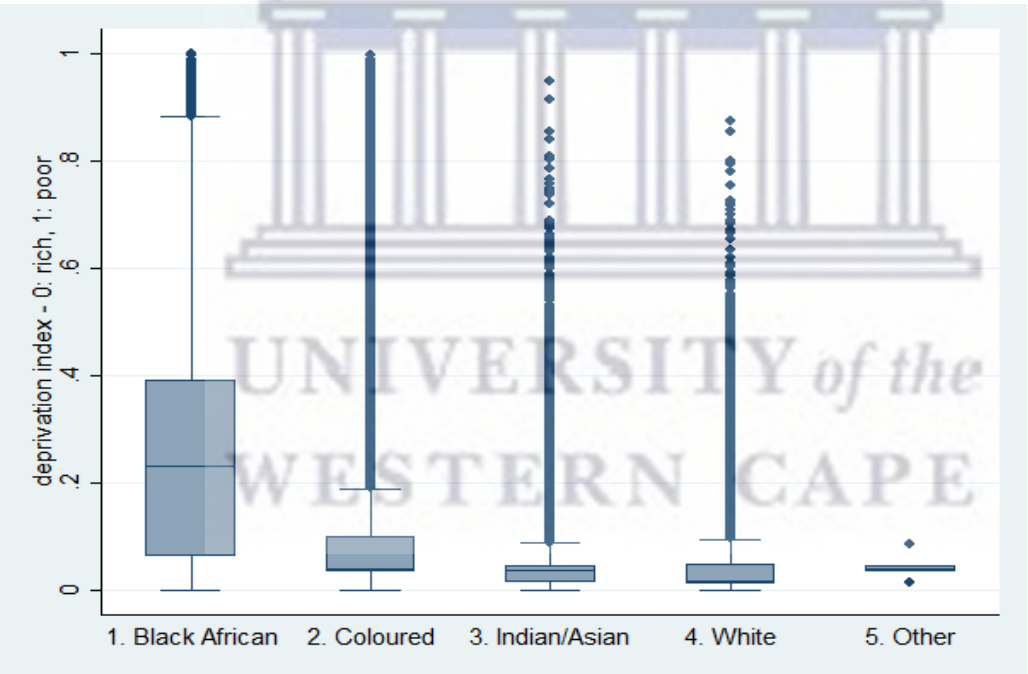
| | **Black** | | | | | **Coloured** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **1996** | **2001** | **2007** | **2011** | **2016** | **1996** | **2001** | **2007** | **2011** | **2016** |
| WC | 0.3845 | 0.3404 | 0.2034 | 0.1753 | 0.1351 | 0.1616 | 0.1549 | 0.1128 | 0.1072 | 0.0779 |
| EC | 0.6606 | 0.6149 | 0.5097 | 0.3895 | 0.3120 | 0.2496 | 0.2294 | 0.1628 | 0.1382 | 0.1035 |
| NC | 0.3606 | 0.3397 | 0.2612 | 0.2662 | 0.2359 | 0.3263 | 0.2996 | 0.2246 | 0.2031 | 0.1811 |
| FS | 0.4565 | 0.4353 | 0.2879 | 0.2135 | 0.1778 | 0.2536 | 0.2881 | 0.1858 | 0.1477 | 0.1257 |
| KZN | 0.6175 | 0.5478 | 0.4355 | 0.3427 | 0.2853 | 0.1293 | 0.1119 | 0.0782 | 0.0777 | 0.0628 |
| NW | 0.5224 | 0.4868 | 0.3770 | 0.3076 | 0.2544 | 0.2913 | 0.3022 | 0.2463 | 0.1812 | 0.1470 |
| GAU | 0.2839 | 0.2762 | 0.2059 | 0.1473 | 0.1305 | 0.1137 | 0.1162 | 0.0812 | 0.0669 | 0.0559 |
| MPU | 0.5197 | 0.4904 | 0.3740 | 0.3066 | 0.2702 | 0.2393 | 0.2223 | 0.1413 | 0.1304 | 0.1089 |
| LIM | 0.6333 | 0.5973 | 0.4936 | 0.4034 | 0.3646 | 0.3718 | 0.2894 | 0.2008 | 0.1652 | 0.1867 |
| RSA | 0.5365 | 0.4890 | 0.3780 | 0.2892 | 0.2371 | 0.1921 | 0.1801 | 0.1317 | 0.1184 | 0.0921 |

Table 5.1: Continued

| | Indian | | | | | White | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **1996** | **2001** | **2007** | **2011** | **2016** | **1996** | **2001** | **2007** | **2011** | **2016** |
| WC | 0.0534 | 0.0574 | 0.0469 | 0.0519 | 0.0353 | 0.0398 | 0.0399 | 0.0294 | 0.0322 | 0.0324 |
| EC | 0.0987 | 0.0634 | 0.0834 | 0.0841 | 0.0697 | 0.0616 | 0.0561 | 0.0512 | 0.0444 | 0.0496 |
| NC | 0.1123 | 0.1195 | 0.1375 | 0.1789 | 0.1029 | 0.0764 | 0.0835 | 0.0623 | 0.0598 | 0.0690 |
| FS | 0.0861 | 0.0490 | 0.0467 | 0.0634 | 0.0717 | 0.0624 | 0.0657 | 0.0543 | 0.0460 | 0.0521 |
| KZN | 0.0757 | 0.0754 | 0.0570 | 0.0478 | 0.0447 | 0.0515 | 0.0505 | 0.0358 | 0.0406 | 0.0393 |
| NW | 0.0767 | 0.0750 | 0.1244 | 0.1011 | 0.1150 | 0.0828 | 0.0812 | 0.0739 | 0.0683 | 0.0713 |
| GAU | 0.0535 | 0.0506 | 0.0400 | 0.0326 | 0.0396 | 0.0508 | 0.0480 | 0.0342 | 0.0297 | 0.0388 |
| MPU | 0.0752 | 0.0659 | 0.0633 | 0.0991 | 0.0654 | 0.0748 | 0.0654 | 0.0456 | 0.0472 | 0.0575 |
| LIM | 0.1498 | 0.0712 | 0.0936 | 0.0893 | 0.1137 | 0.1116 | 0.0935 | 0.0750 | 0.0700 | 0.0973 |
| RSA | 0.0724 | 0.0698 | 0.0538 | 0.0476 | 0.0460 | 0.0556 | 0.0527 | 0.0396 | 0.0378 | 0.0436 |

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

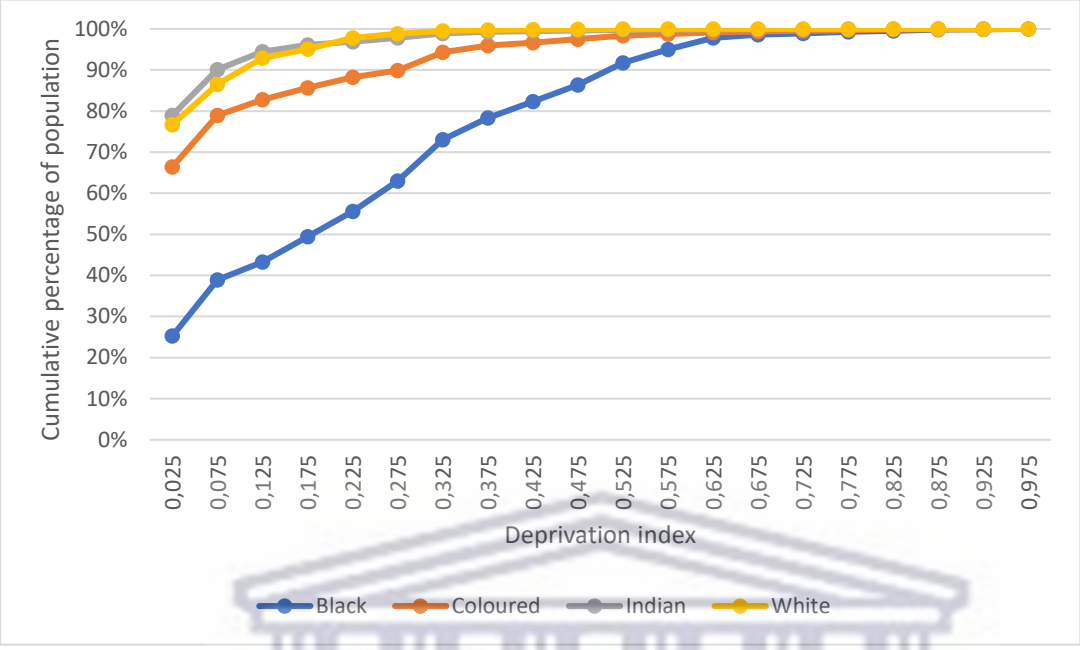
Figure 5.9: Distribution of deprivation by population group, CS 2016




Source: Own calculations using CS 2016 data.

Figure 5.9 shows the deprivation of each race group by way of a box-and-whisker plot. The figure reveals that the variation of deprivation is the greatest for the Black race.

Figure 5.10: Cumulative distribution of deprivation by race, CS 2016



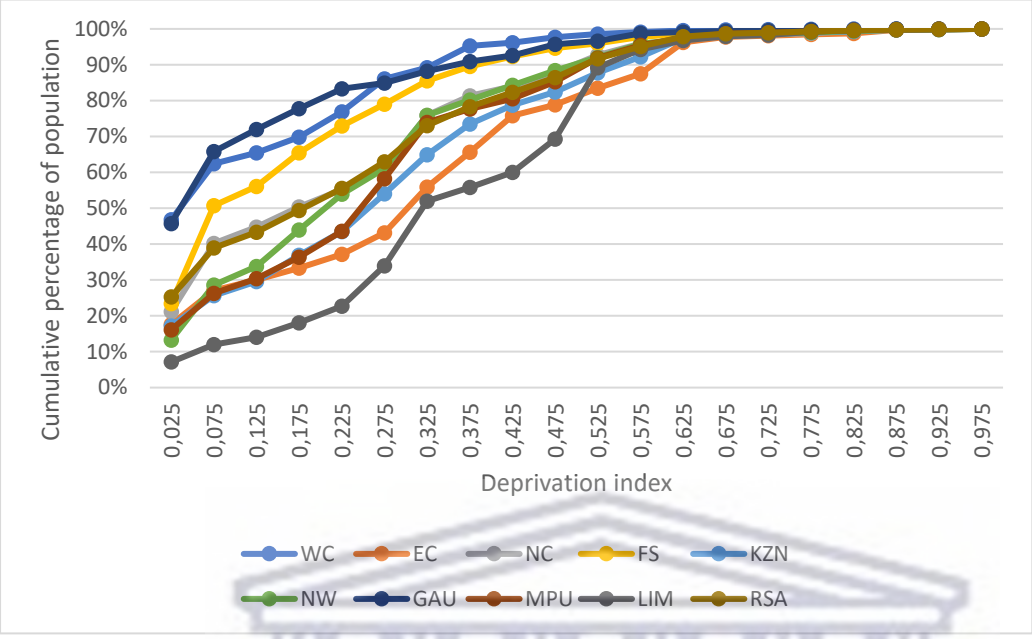

Source: Own calculations using CS 2016 data.

The cumulative distribution curves for each race are shown by Figure 5.10. It is evident from the cumulative functions that by evaluating the various race groups, results show that poverty does indeed have a racial element. The cumulative distribution curve for Blacks is far below the other race groups. Furthermore, the curves of the White, Indian, and Coloured groups bulge to the left, indicating that a higher proportion of these groups are closer to non-deprivation. Whereas in divergence, the curve of the Black race group is far below and does not bulge to the left.

Figures 5.11, 5.12, 5.13 and 5.14 illustrates the cumulative distribution curves of each province for Blacks, Coloureds, Indians, and Whites in 2016.[15] When comparing these curves, it is evident that provincial differences regarding the levels of deprivation for Blacks and Whites as seen in Figure 5.14, exists.

[15] See Figures A.8 – A.11 (pages 133 – 135) in the Appendix for the cumulative distributive functions of each race group between 1996 and 2016.

Figure 5.11: Cumulative distribution of deprivation by province for Blacks, CS 2016

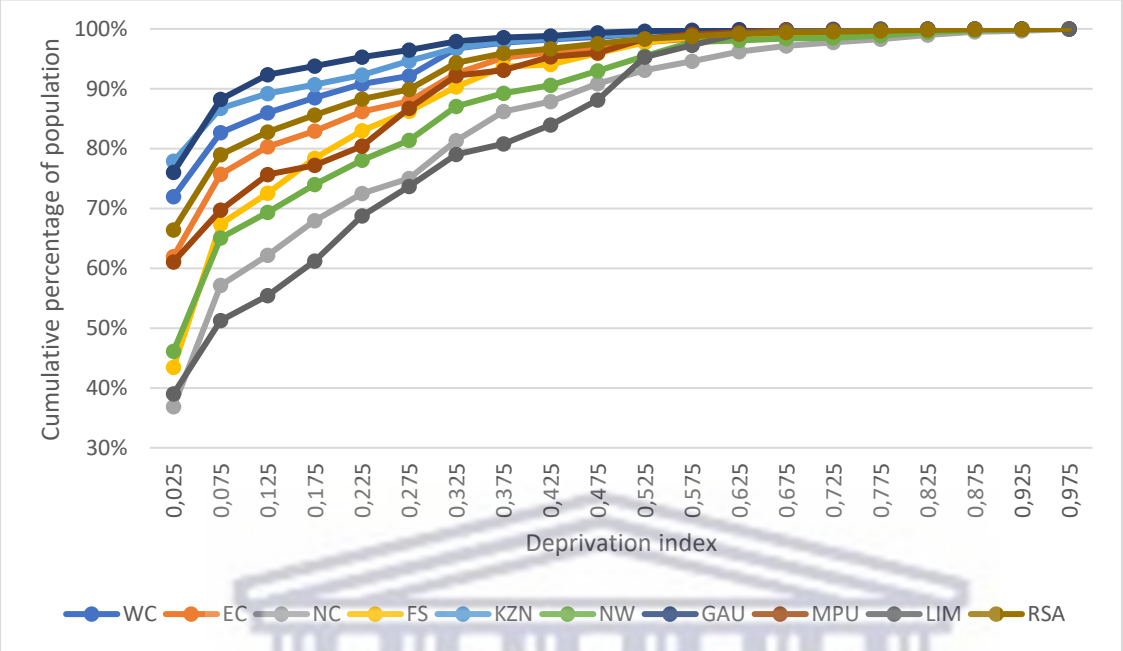



Source: Own calculations using CS 2016 data.

Figure 5.11 show that the curve of deprivation for the Black race group is better in Gauteng, the Western Cape as well as the Free State since a greater cumulative percentage show that lower levels of households are deprived. KwaZulu-Natal performed poorly together with the Eastern Cape and Limpopo.

When observing the cumulative distribution curve shapes for Coloureds in Figure 5.12 below, the curves indicate low levels of deprivation in KwaZulu-Natal, Gauteng, and the Western Cape. The Limpopo province shows the poorest results.

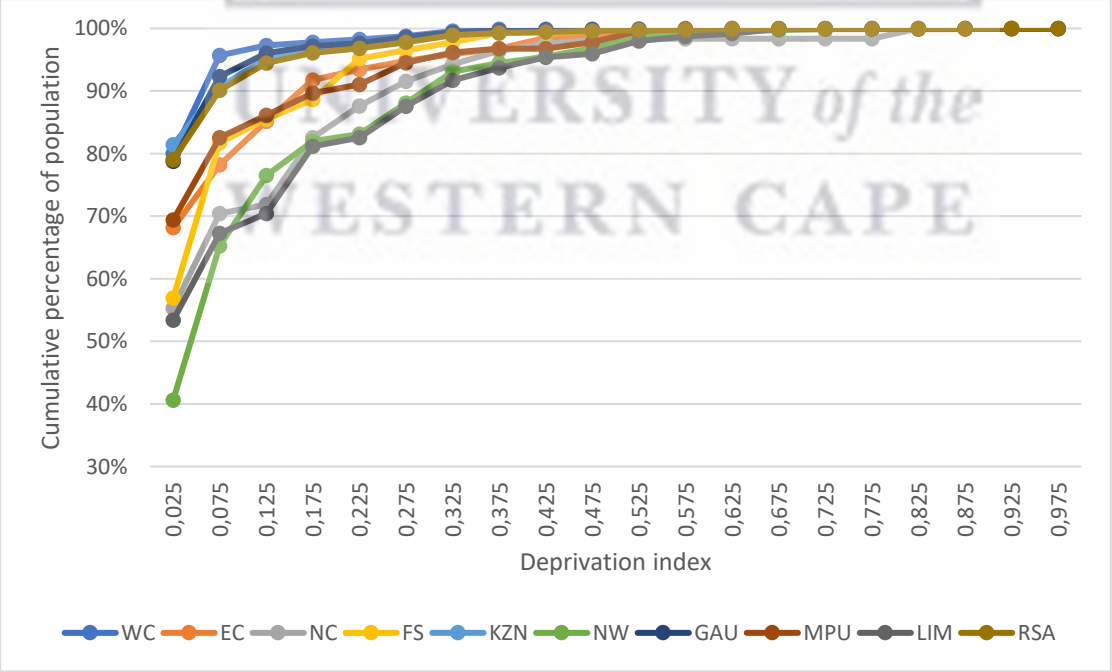
Figure 5.12: Cumulative distribution of deprivation by province for Coloureds, CS 2016




Source: Own calculations using CS 2016 data.

The Indian population is closer to non-deprivation than the Coloured and White race groups, as evidenced by the bulging to the left of the curves. This is shown in Figure 5.13.

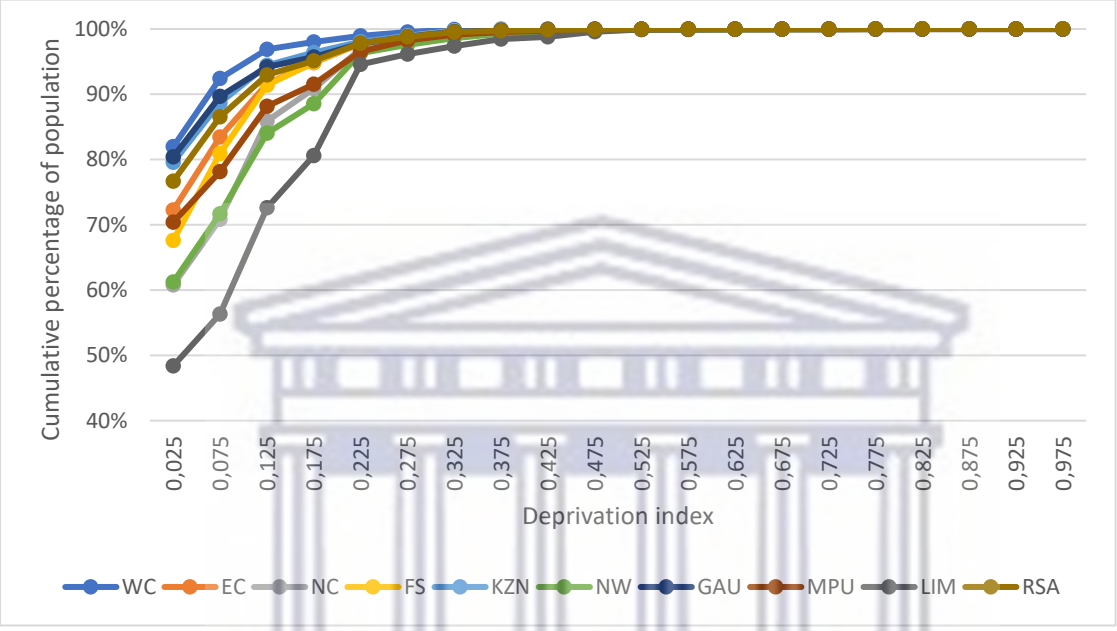
Figure 5.13: Cumulative distribution of deprivation by province for Indians, CS 2016




Source: Own calculations using CS 2016 data.

Figure 5.14 displays the cumulative distribution curves for Whites for each province. For the White race group, a greater cumulative percentage of households had low deprivation levels as the curve for Whites are the least varied. The assumption that race and poverty are related, is emphasized as the levels of average deprivation are higher for Blacks than for Whites.

Figure 5.14: Cumulative distribution of deprivation by province for Whites, CS 2016




Source: Own calculations using CS 2016 data.

The average deprivation for male and female-headed households per province between 1996 and 2016 is given by Table 5.2. The country's female-headed household levels of average deprivation were notably higher compared to the male heads across all five surveys. Female heads showed a swift decline in the mean deprivation index from 0.5228 in 1996 to 0.2316 in 2016.

Moreover, the Western Cape and Gauteng, had the smallest average levels of deprivation for households headed by males and females. This is in contrast to the provinces of Limpopo and the Eastern Cape which had the greatest mean levels of deprivation for both male-headed and female-headed households.

As mentioned in the beginning of this thesis, South Africa is renowned for having the highest level of inequality in the world. These inequalities do not only occur between the rich and the poor but can also occur between men and women (in this instance between male-headed and female-headed households). There are many causes for the greater levels of poverty and

deprivation in households led by women. Rogan (2016) agrees that women and those residing with females as household heads suffer most. Rogan (2016) suggest that one of the motives for the high deprivation among female household heads are due to the disadvantages faced in the labour market by these women. Similarly, the Department of Women South Africa (2015) explains that historically, women in each race group have relatively been disadvantaged in terms of access to education. This resulted in women being unskilled and unable to enter the labour market.

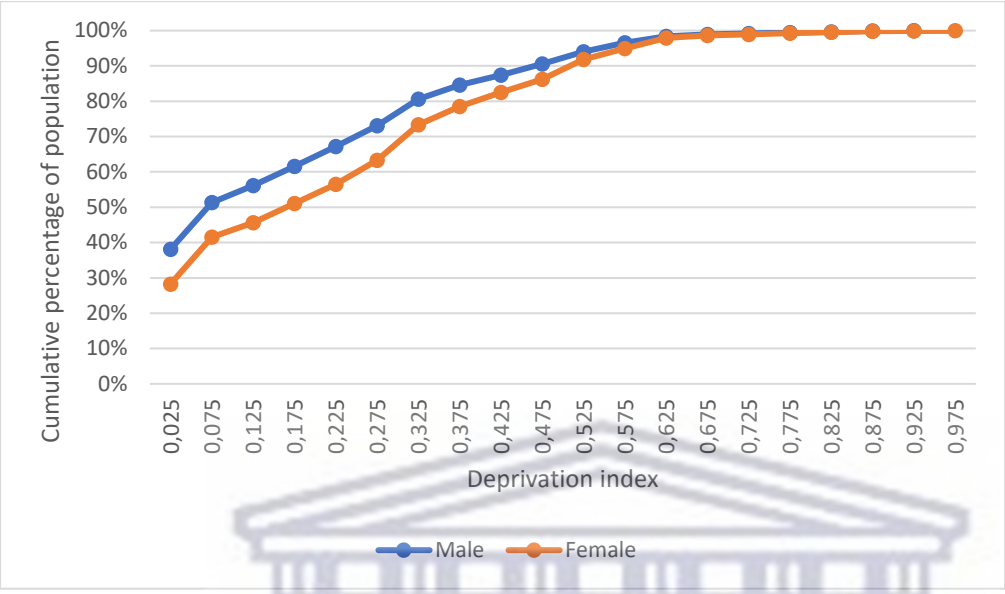
Furthermore, gendered poverty can also be caused by social norms such that men are assigned as the "bread-winner" and relegate women to do unpaid work within the household (Department of Women South Africa, 2015). Cheteni, Khamfula & Mah (2019) agrees that gendered poverty is caused by a patriarchal society or a cultural system that view females less than males. The resultant effect being labour market wage differences being less for females than for their male counter parts (Cheteni *et al*., 2019). According to the Western Cape Government (2020) a legacy of racial oppression and marginalisation, unequal access asset ownership and women's unequal burden of unpaid work all contribute to the exclusion of women from the mainstream economy and their lack of access to economic opportunities.

Table 5.2: Mean deprivation by gender of household head per province, 1996 – 2016

| | **Male** | | | | | **Female** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **1996** | **2001** | **2007** | **2011** | **2016** | **1996** | **2001** | **2007** | **2011** | **2016** |
| WC | 0.1768 | 0.1739 | 0.1190 | 0.1141 | 0.0901 | 0.1947 | 0.1933 | 0.1353 | 0.1210 | 0.0975 |
| EC | 0.5371 | 0.5116 | 0.4259 | 0.3183 | 0.2511 | 0.6613 | 0.6024 | 0.4982 | 0.3774 | 0.3053 |
| NC | 0.3067 | 0.2937 | 0.2174 | 0.2235 | 0.1978 | 0.2954 | 0.2828 | 0.2154 | 0.2281 | 0.2069 |
| FS | 0.3884 | 0.3876 | 0.2554 | 0.1931 | 0.1642 | 0.4308 | 0.4176 | 0.2721 | 0.2006 | 0.1711 |
| KZN | 0.4597 | 0.4208 | 0.3338 | 0.2661 | 0.2294 | 0.5975 | 0.5338 | 0.4302 | 0.3364 | 0.2819 |
| NW | 0.4603 | 0.4431 | 0.3383 | 0.2794 | 0.2342 | 0.5319 | 0.4830 | 0.3827 | 0.2999 | 0.2533 |
| GAU | 0.2085 | 0.2111 | 0.1599 | 0.1233 | 0.1159 | 0.2293 | 0.2353 | 0.1708 | 0.1226 | 0.1150 |
| MPU | 0.4395 | 0.4293 | 0.3139 | 0.2680 | 0.2424 | 0.5310 | 0.4994 | 0.3889 | 0.3153 | 0.2799 |
| LIM | 0.5830 | 0.5513 | 0.4549 | 0.3672 | 0.3346 | 0.6526 | 0.6130 | 0.5094 | 0.4176 | 0.3783 |
| RSA | 0.3831 | 0.3644 | 0.2766 | 0.2184 | 0.1858 | 0.5228 | 0.4679 | 0.3673 | 0.2791 | 0.2316 |

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Figure 5.15: Cumulative distribution of deprivation by gender, CS 2016




Source: Own calculations using CS 2016 data.

Figure 5.15 displays the male and female cumulative distribution curves for household heads.[16] From the figure, 56.14% of the population's cumulative percentage are for males with an index of 0.125, whereas only 45.61% are for females. This outcome confirms that being deprived is also connected with gender. The results of Figure 5.15 corresponds with the outcome of Table 5.2, where the mean index of deprivation for female-headed households were greater than for male-headed households in all nine provinces for 2016. The cumulative distribution function for households headed by a male is above the curve for households headed by a female as illustrated in Figure 5.15.

Table 5.3 displays the average deprivation by educational attainment of the household head for all nine provinces. Theoretically, it is expected that the more educated someone is, the greater the possibility of employment and therefore, a lower risk of being deprived.

From Table 5.3, household heads with higher educational attainment levels, has minor mean deprivation levels for each province. Moreover, it is evident that there are discrepancies among the educational categories pertaining to the provinces. Once again, the deprived provinces are Limpopo and the Eastern Cape, with their deprivation getting worse the lower the household heads level of education.

[16] Refer to Figures A.12 – A.13 (pages 135 – 136) in the Appendix for the cumulative distributive functions of males and females for the period 1996 to 2016.

Table 5.3: Mean deprivation by educational attainment of household head per province, 1996 - 2016

| | Above matric | | | | | Matric | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **1996** | **2001** | **2007** | **2011** | **2016** | **1996** | **2001** | **2007** | **2011** | **2016** |
| WC | 0.0191 | 0.0271 | 0.0170 | 0.0186 | 0.0198 | 0.0653 | 0.0867 | 0.0586 | 0.0758 | 0.0639 |
| EC | 0.1992 | 0.1840 | 0.1409 | 0.1079 | 0.1107 | 0.2621 | 0.2503 | 0.1930 | 0.1675 | 0.1564 |
| NC | 0.0486 | 0.0507 | 0.0387 | 0.0502 | 0.0611 | 0.0966 | 0.1096 | 0.0765 | 0.1159 | 0.1259 |
| FS | 0.0674 | 0.0803 | 0.0486 | 0.0406 | 0.0512 | 0.1469 | 0.2009 | 0.1166 | 0.1198 | 0.1165 |
| KZN | 0.0706 | 0.0923 | 0.0710 | 0.0632 | 0.0987 | 0.1635 | 0.1827 | 0.1391 | 0.1578 | 0.1608 |
| NW | 0.1154 | 0.1265 | 0.1161 | 0.0751 | 0.0795 | 0.2344 | 0.2474 | 0.1861 | 0.1736 | 0.1665 |
| GAU | 0.0286 | 0.0396 | 0.0232 | 0.0210 | 0.0256 | 0.0949 | 0.1273 | 0.0972 | 0.0918 | 0.0882 |
| MPU | 0.1056 | 0.1326 | 0.0889 | 0.0846 | 0.0935 | 0.2279 | 0.2497 | 0.1786 | 0.1943 | 0.1912 |
| LIM | 0.2706 | 0.2587 | 0.1999 | 0.1596 | 0.1798 | 0.4105 | 0.3956 | 0.3241 | 0.2893 | 0.2763 |
| RSA | 0.0825 | 0.0926 | 0.0648 | 0.0528 | 0.0643 | 0.1659 | 0.1820 | 0.1348 | 0.1379 | 0.1338 |
| | **Incomplete Secondary** | | | | | **Incomplete Primary** | | | | |
| | **1996** | **2001** | **2007** | **2011** | **2016** | **1996** | **2001** | **2007** | **2011** | **2016** |
| WC | 0.1790 | 0.1873 | 0.1336 | 0.1411 | 0.1178 | 02711 | 0.2672 | 0.1908 | 0.1688 | 0.1220 |
| EC | 0.5209 | 0.4754 | 0.4009 | 0.3252 | 0.2832 | 0.6785 | 0.6294 | 0.5636 | 0.4448 | 0.3733 |
| NC | 0.2314 | 0.2414 | 0.1853 | 0.2079 | 0.2039 | 0.3597 | 0.3590 | 0.2767 | 0.2890 | 0.2557 |
| FS | 0.3521 | 0.3745 | 0.2508 | 0.2097 | 0.1895 | 0.4874 | 0.4783 | 0.3225 | 0.2500 | 0.2093 |
| KZN | 0.3828 | 0.3653 | 0.2953 | 0.2735 | 0.2552 | 0.5967 | 0.5516 | 0.4728 | 0.3858 | 0.3329 |
| NW | 0.4288 | 0.4186 | 0.3125 | 0.2818 | 0.2527 | 0.5457 | 0.5261 | 0.4102 | 0.3487 | 0.2986 |
| GAU | 0.2276 | 0.2450 | 0.1859 | 0.1588 | 0.1486 | 0.3075 | 0.3353 | 0.2502 | 0.1873 | 0.1601 |
| MPU | 0.3950 | 0.4048 | 0.3059 | 0.2863 | 0.2703 | 0.5229 | 0.5110 | 0.4015 | 0.3406 | 0.3142 |
| LIM | 0.5726 | 0.5526 | 0.4521 | 0.3968 | 0.3702 | 0.6450 | 0.6241 | 0.5312 | 0.4387 | 0.4120 |
| RSA | 0.3583 | 0.3484 | 0.2728 | 0.2423 | 0.2192 | 0.5206 | 0.4972 | 0.4105 | 0.3321 | 0.2778 |
| | **No Schooling** | | | | | | | | | |
| | **1996** | **2001** | **2007** | **2011** | **2016** | | | | | |
| WC | 0.3504 | 0.3328 | 0.2220 | 0.2031 | 0.1425 | | | | | |
| EC | 0.7573 | 0.7248 | 0.6378 | 0.5228 | 0.4240 | | | | | |
| NC | 0.4509 | 0.4198 | 0.3423 | 0.3449 | 0.3008 | | | | | |
| FS | 0.5495 | 0.5124 | 0.3807 | 0.2809 | 0.2218 | | | | | |
| KZN | 0.7329 | 0.6778 | 0.5915 | 0.4822 | 0.4031 | | | | | |
| NW | 0.6105 | 0.5824 | 0.4877 | 0.4052 | 0.3371 | | | | | |
| GAU | 0.3624 | 0.3612 | 0.2818 | 0.2188 | 0.1865 | | | | | |
| MPU | 0.5962 | 0.5731 | 0.4738 | 0.3931 | 0.3529 | | | | | |
| LIM | 0.6962 | 0.6666 | 0.5740 | 0.4843 | 0.4465 | | | | | |
| RSA | 0.6457 | 0.6157 | 0.5238 | 0.4269 | 0.3556 | | | | | |

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Table 5.4: Mean deprivation by area type per province, 1996 - 2001

| | Urban | | Rural | |
|---|---|---|---|---|
| | **1996** | **2001** | **1996** | **2001** |
| WC | 0.1604 | 0.1643 | 0.3496 | 0.3223 |
| EC | 0.2607 | 0.2697 | 0.7758 | 0.7344 |
| NC | 0.2434 | 0.2331 | 0.4558 | 0.5132 |
| FS | 0.3301 | 0.3489 | 0.5760 | 0.5702 |
| KZN | 0.2201 | 0.2244 | 0.7396 | 0.6769 |
| NW | 0.2765 | 0.2917 | 0.6051 | 0.5747 |
| GAU | 0.2081 | 0.2118 | 0.4327 | 0.4803 |
| MPU | 0.2847 | 0.2927 | 0.5960 | 0.5770 |
| LIM | 0.2423 | 0.2805 | 0.6632 | 0.6204 |
| RSA | 0.2274 | 0.2343 | 0.6774 | 0.6387 |

Source: Own calculations using Census 1996 and Census 2001 data.

Table 5.4 displays the mean deprivation by area type per province between 1996 and 2016. Poverty is not equally spread across urban and rural areas. For the years 1996 and 2001, poverty is prevalent in rural areas rather than in urban areas. Burger *et al.* (2004) and Gallant (2012) also found that poverty is greater in rural areas than in urban areas. The mean deprivation in rural areas is the lowest for the Western Cape and the highest for the Eastern Cape. This could be because the Western Cape is more urbanised, and the Eastern Cape is largely rural where poverty is greater.

The Western Cape's mean deprivation in the rural areas for 1996 and 2001 are about half of the deprivation levels nationally. In contrast, majority of the Eastern Cape's households reside in rural areas and their mean deprivation levels are significantly higher than observed on a national level. Burger *et al*. (2017) mentions that the high deprivation levels in the Eastern Cape and Limpopo are as a result of the great amount of homeland areas[17] in these provinces because of Apartheid and underinvestment. Similarly, Sithole (2014) mentions that the extreme deprivation in former homelands is directly linked to the neglect of these homelands.

There is no data available regarding the area type for CS 2007 hence the below table reports the mean deprivation by area type for the years 2011 and 2016. For the years 2011 and 2016, the rural areas consist of traditional and farms in the mentioned surveys. Poverty is once again more prevalent in the rural areas than in urban areas. Nevertheless, a decline of poverty levels in rural areas occurred.

[17] Section 5.2, page 55 provides an explanation of homeland areas.

Table 5.4: Continuation of mean deprivation by area type per province, 2011 - 2016

| | Urban | | Traditional | | Farms | |
|---|---|---|---|---|---|---|
| | **2011** | **2016** | **2011** | **2016** | **2011** | **2016** |
| WC | 0.1083 | 0.0902 | 0.0000 | 0.0000 | 0.2231 | 0.1471 |
| EC | 0.1536 | 0.1286 | 0.5277 | 0.4450 | 0.3862 | 0.2965 |
| NC | 0.1684 | 0.1528 | 0.3886 | 0.3479 | 0.3699 | 0.3261 |
| FS | 0.1677 | 0.1430 | 0.3258 | 0.3078 | 0.3885 | 0.3204 |
| KZN | 0.1290 | 0.1170 | 0.4553 | 0.3813 | 0.4775 | 0.4214 |
| NW | 0.1702 | 0.1410 | 0.3758 | 0.3252 | 0.4184 | 0.3921 |
| GAU | 0.1177 | 0.1103 | 0.3423 | 0.2992 | 0.3020 | 0.2776 |
| MPU | 0.1694 | 0.1558 | 0.3646 | 0.3312 | 0.4457 | 0.4248 |
| LIM | 0.1314 | 0.1224 | 0.4481 | 0.4119 | 0.3608 | 0.3301 |
| RSA | 0.1318 | 0.1173 | 0.4445 | 0.3844 | 0.3858 | 0.3406 |

Source: Own calculations using Census 2011 and CS 2016 data.

### 5.3 Differences in multidimensional poverty between Western Cape and Eastern Cape

In Section 5.3, a closer examination of non-money-metric poverty levels and trends between the Western Cape and Eastern Cape from 1996 to 2016 will be done. From the analysis in Section 5.2, it is evident that the Western Cape performed much better than the Eastern Cape and these results clearly show the gap between the two provinces.

The Western Cape is the second richest province in the country (Khumalo, 2022; Western Cape Government, 2019). By 2016, the province consisted of a total of 30 municipalities. These are grouped by region into one Metropolitan municipality, which is the City of Cape Town, five district municipalities as well as 24 local municipalities (Western Cape Government, 2019). Whereas the Eastern Cape is among South Africa's poorest provinces and by 2016 consisted of a total of two Metropolitan municipalities namely Buffalo City and Nelson Mandela Bay, six district municipalities which are further broken-down into 31 local municipalities (Eastern Cape Government, 2021).

As mentioned in Chapter One of this thesis, poverty in the Western Cape is less severe relative to the other provinces in the country and because of that many individuals especially from the Eastern Cape province migrate to the Western Cape (Burger *et al*, 2004; Bekker, 2002). The Western Cape has greater economic activity hence the reason for these movements is poverty-driven (Bekker, 2002). According to Stats SA (2016) the highest percentage of those that migrated from the Eastern Cape departed to the Western Cape. In 2016, the Western Cape had a net-migration of 1 304 614 of which 1 593 553 was migrants into the province and 288 939 migrating out of the province. In contrast, the Eastern Cape

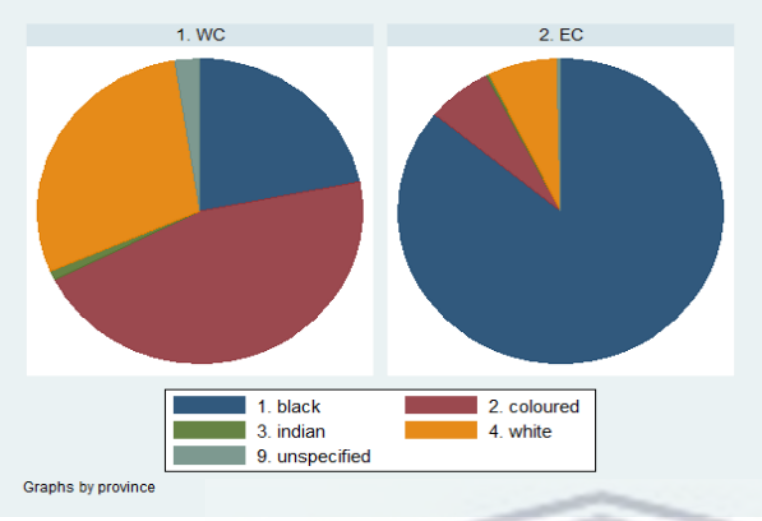
had a net-migration of -1 593 417 of which 320 619 was in-migration and 1 914 036 was out-migration (Stats SA, 2016).

Key questions were asked in the CS 2016 questionnaire regarding inter-provincial migration such as question 3.7.2.15 (in which province did the person live before moving to this place?) and question 3.7.2.18 (what was the main reason for moving to this place?). It was found that migrants see this as an opportunity to upgrade their living standards, to receive better service delivery and to move into a new dwelling (Oosthuizen & Nieuwoudt, 2002; Stats SA, 2016).

Kleinhans & Yu (2020) citing Van der Berg (2002) analysed the 1996 Census and found that 90% of inter-provincial migrants into the Western Cape are from the Eastern Cape. Between 2001 to 2011, Jacobs (2014) discovered that 52% of migrants into the Western Cape were from the Eastern Cape. Also using Census 2011 data, Kleinhans & Yu (2020) found that 53.64% of the migrants into the Western Cape came from the Eastern Cape. Considering this, migration from the rural areas to the cities is a significant component of the history of South Africa (Alexander, 2021). According to Alexander (2021) this is a direct result of previous Apartheid laws confining the poor into the rural areas. Burger *et al*. (2004) citing Van der Berg *et al*. (2004) concludes that migrating from rural to urban areas is not the answer to rural poverty, however, it should be viewed as an indication of how severe rural poverty actually is. Although the subject of migration is not the main aim of this thesis, it is worth mentioning as it does play a role in multidimensional poverty.

Figures 5.16 - 5.20 uses pie charts to compare the racial composition between the Western Cape and the Eastern Cape. Burger *et al*. (2004), Van der Walt (2004), Naidoo (2007), and Burger *et al*. (2017) are consistent in their views that both race and geography serve a vital role in explaining deprivation and poverty. In Figure 5.16, the racial composition differs a lot across the two provinces in 1996. In the Western Cape, the Coloured population is most dominant followed by the White group and then the Black race. Whereas in the Eastern Cape, Blacks are most dominant. The share of Whites and Coloureds residing in the Eastern Cape is much smaller than in the Western Cape.

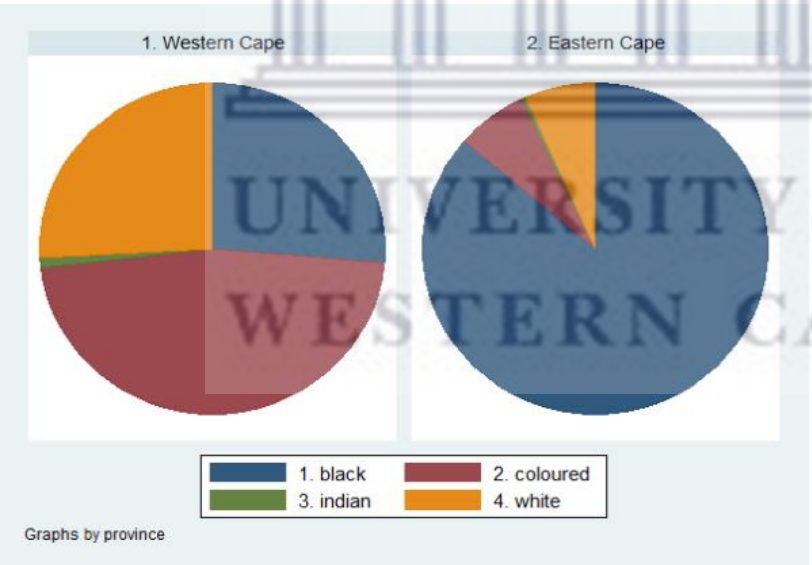
Figure 5.16: Racial composition by province, Census 1996




Source: Own calculations using Census 1996 data.

Figure 5.17 illustrates the racial composition for 2001 and the Western Cape is once again dominated by the Coloured race. However, the share of Blacks has grown larger compared to 1996. Not much change has occurred in the Eastern Cape since 1996.

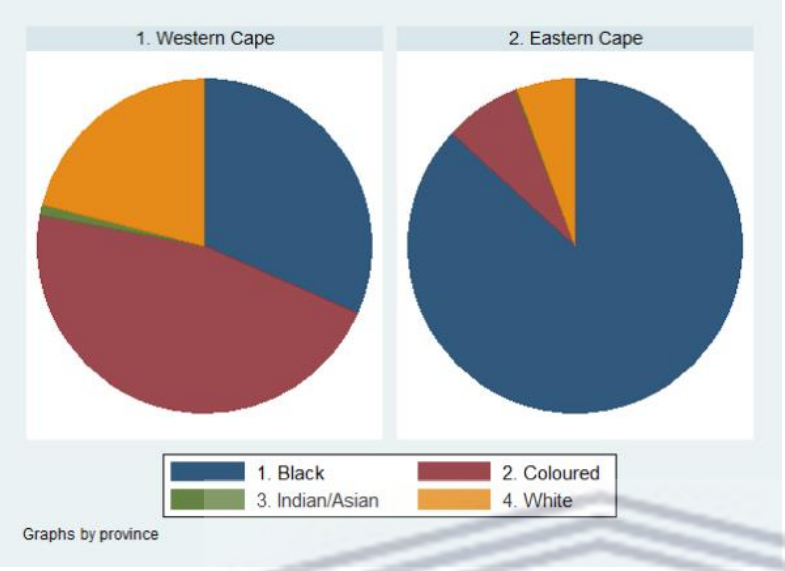
Figure 5.17: Racial composition by province, Census 2001




Source: Own calculations using Census 2001 data.

Figure 5.18 illustrates an increase in the growth of the Black population group residing in the Western Cape. However, the Coloured population remained dominant.

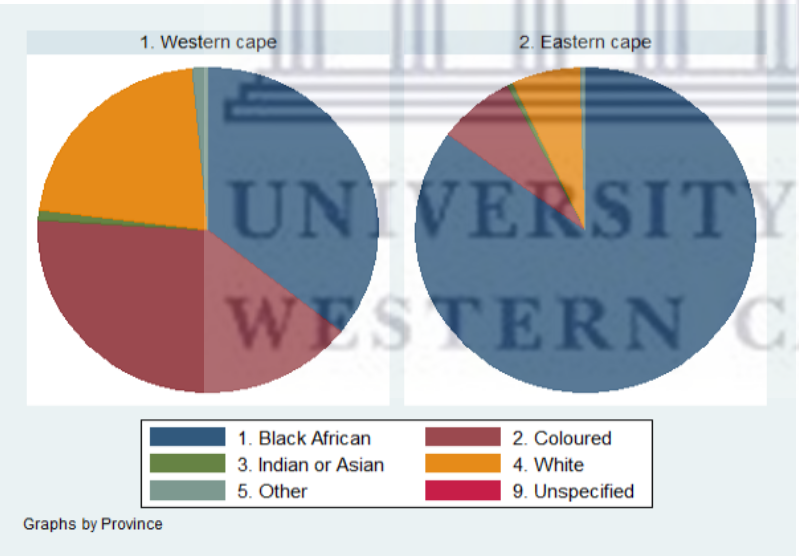
Figure 5.18: Racial composition by province, CS 2007




Source: Own calculations using CS 2007 data.

Once again, in 2011 (Figure 5.19), the Black population share increased in the Western Cape to a point where it was similar to the Coloured population residing in the Western Cape.

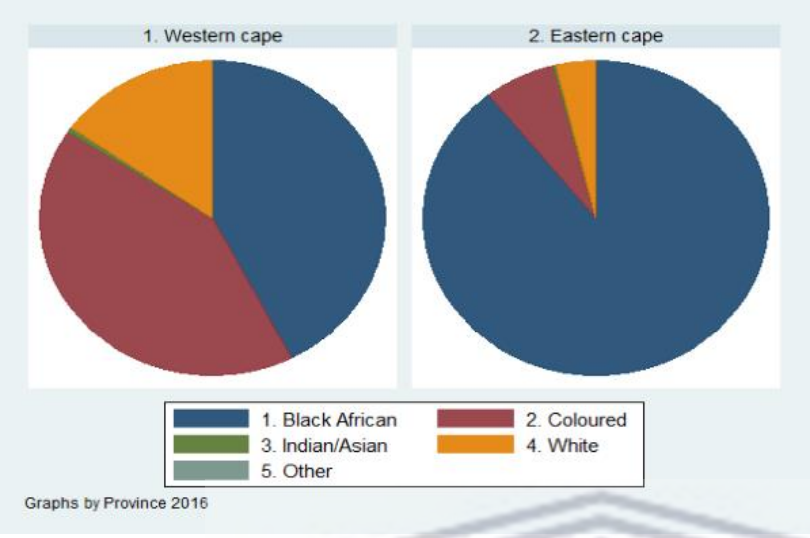
Figure 5.19: Racial composition by province, Census 2011




Source: Own calculations using Census 2011 data.

When looking at Figure 5.20 and comparing it with Figure 5.16, one can see that the share of the Black households residing in the Western Cape has grown tremendously from 1996 until 2016.

Figure 5.20: Racial composition by province, CS 2016




Source: Own calculations using CS 2016 data.

Table 5.5: Mean deprivation by race of household head for WC and EC, 1996 – 2016

| | Black | | | | | Coloured | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **1996** | **2001** | **2007** | **2011** | **2016** | **1996** | **2001** | **2007** | **2011** | **2016** |
| WC | 0.3845 | 0.3404 | 0.2034 | 0.1753 | 0.1351 | 0.1616 | 0.1549 | 0.1128 | 0.1072 | 0.0779 |
| EC | 0.6606 | 0.6149 | 0.5097 | 0.3895 | 0.3120 | 0.2496 | 0.2294 | 0.1628 | 0.1382 | 0.1035 |
| RSA | 0.5365 | 0.4890 | 0.3780 | 0.2892 | 0.2371 | 0.1921 | 0.1801 | 0.1317 | 0.1184 | 0.0921 |
| | **Indian** | | | | | **White** | | | | |
| | **1996** | **2001** | **2007** | **2011** | **2016** | **1996** | **2001** | **2007** | **2011** | **2016** |
| WC | 0.0534 | 0.0574 | 0.0469 | 0.0519 | 0.0353 | 0.0398 | 0.0399 | 0.0294 | 0.0322 | 0.0324 |
| EC | 0.0987 | 0.0634 | 0.0834 | 0.0841 | 0.0697 | 0.0616 | 0.0561 | 0.0512 | 0.0444 | 0.0496 |
| RSA | 0.0724 | 0.0698 | 0.0538 | 0.0476 | 0.0460 | 0.0556 | 0.0527 | 0.0396 | 0.0378 | 0.0436 |

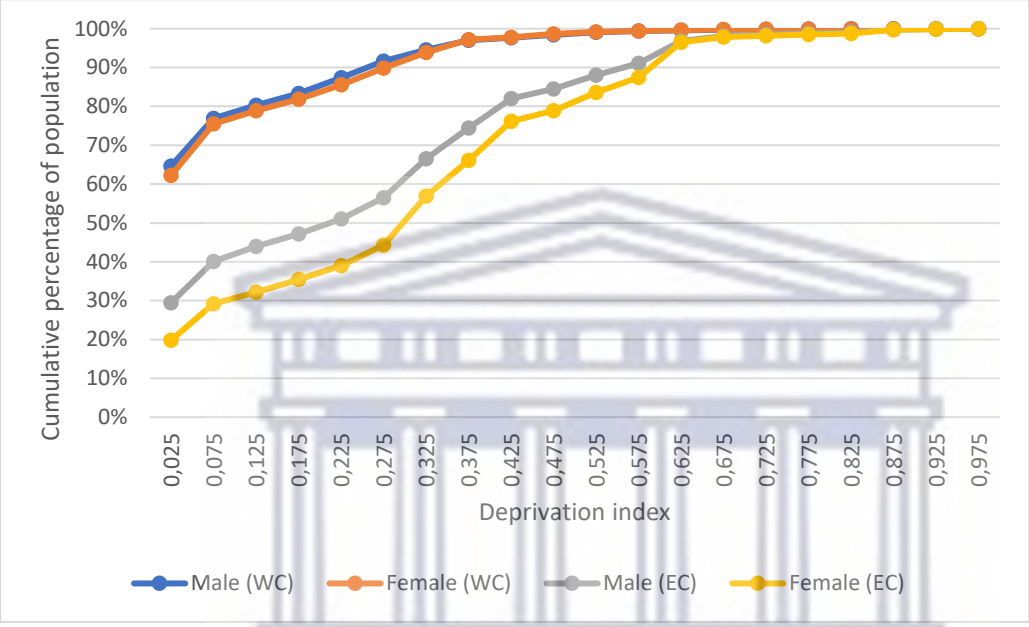
Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Table 5.5 reveals each race group's average deprivation for the Western Cape and Eastern Cape between 1996 and 2016. Blacks in the Eastern Cape were much more deprived compared to the Black race group in the Western Cape. Additionally, the Eastern Cape's deprivation levels for the Black race group were also above the national average for the entire period. However, there has been a decline in the average deprivation levels for the Eastern Cape from 0.6606 in 1996 to 0.3120 in 2016. While the Western Cape's average deprivation levels for the Black race group declined from 0.3845 in 1996 to 0.1351 in 2016. With this being said, the Black race group remains the most deprived race group in both provinces.

Even though the Western Cape had lower average deprivation levels for the Coloured race group compared to the Eastern Cape, the difference was not as huge as with the Black race

group. In 2016, the average deprivation level of Coloureds in the Western Cape was 0.0779 while the Coloured race group in the Eastern Cape had an average deprivation of 0.1035. The Indian and White race group had much lower mean deprivation levels for both the Western Cape and the Eastern Cape for the period 1996 to 2016 compared to the Black and Coloured race groups.

Figure 5.21: Cumulative distribution of deprivation by gender for WC and EC, CS 2016



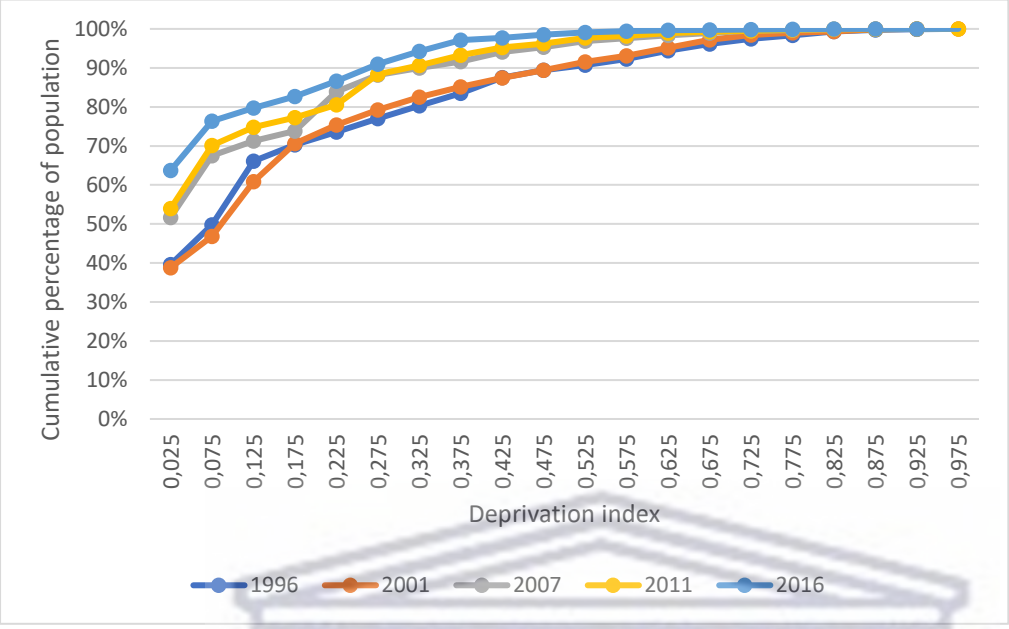

Source: Own calculations using CS 2016 data.

Figure 5.21 displays the male and female cumulative distribution curves for household heads residing in the Western Cape and the Eastern Cape in 2016. Both the male and female cumulative distribution curves of the Western Cape is above those of the Eastern Cape.

For the Western Cape, 80.3% of the cumulative population for males and 78.9% for females had a deprivation index of 0.125. Whereas for the Eastern Cape, only 43.9% of the cumulative population for males and only 32.2% for females had a deprivation index of 0.125.[18]

[18] Some reasons why female-headed households are more deprived is mentioned in Chapter Five, Section 5.2 on pages 66 - 67 of this thesis.

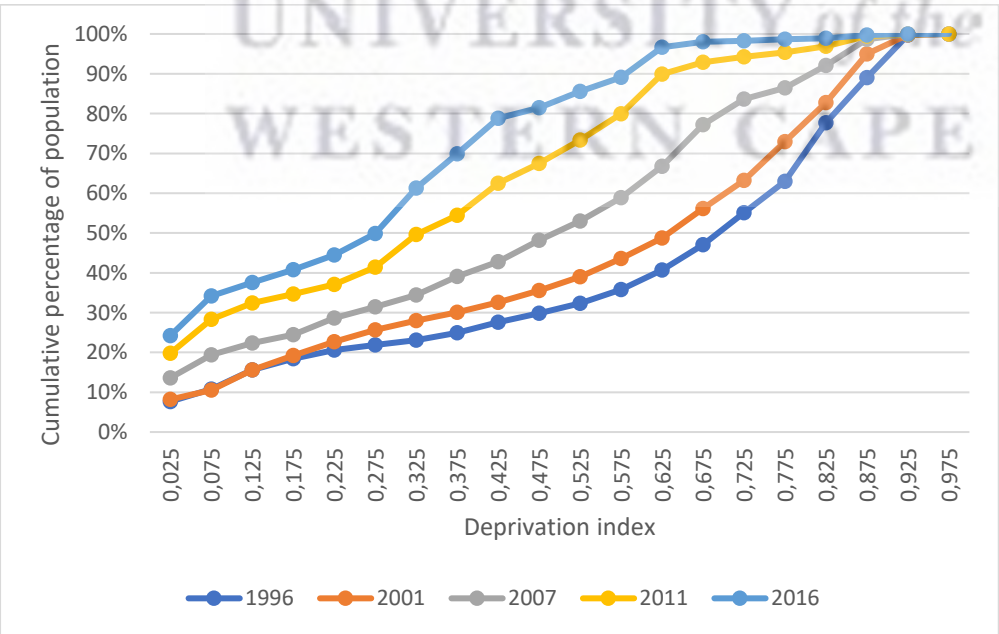
Figure 5.22: Cumulative distributive functions in Western Cape, 1996 - 2016




Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Figure 5.22 displays the cumulative distribution curves for the Western Cape from 1996 to 2016. There has been an overall improvement in deprivation levels over the period. From Figure 5.22, the distribution curve for 2016 is above the cumulative distribution curve for 1996.

Figure 5.23: Cumulative distributive functions in Eastern Cape, 1996 - 2016




Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

In contrast, Figure 5.23 displays the cumulative distribution curves for the Eastern Cape from 1996 to 2016. The cumulative distribution curves of the Eastern Cape are widely spread compared to the curves of the Western Cape. The cumulative distribution curves for 1996, 2001 and 2007 bulge more to the right. Whereas the cumulative distribution curves for 2011 and 2016 bulge more to the left. Nevertheless, there has been an improvement since 1996 as the cumulative distribution curves of all the remaining years that is, 2001, 2007, 2011 and, 2016 is above the curve for 1996.

Overall, Figure 5.22 and Figure 5.23, clearly showed that poverty dominance between the two provinces exists. The position of the cumulative distribution curves of the Eastern Cape relative to that of the Western Cape is a clear sign of the disparity in levels of inequality between these two provinces.

The figures and tables in Section 5.2 looked at deprivation mainly from a South African perspective. By using the deprivation index, the following tables and figures will look at deprivation in the Western Cape and the Eastern Cape, that is, the metropolitan municipalities, district councils as well as local municipalities.

In addition to the limitations already discussed in Chapter Four, more restrictions exist and needs to be stated. The first limitation connects to the matching of the different DC's across the censuses and community surveys used in this thesis.[19] The main problem is that over the years, some district councils changed their names, some districts have been separated from each other and some districts have integrated. The second issue relates to municipalities, because it is unlikely that municipalities across all five datasets will match 100%. Taking the mentioned limitations into consideration, only the results of 2011 and 2016 will be discussed as this is where majority of district councils and municipalities matched for both the Western Cape and the Eastern Cape.

Table 5.6 reveals the percentages of households in each ranking category in each dimension in the Western Cape for the year 2016. As mentioned, the Western Cape consists of five District Councils namely West Coast (DC 1), Cape Winelands (DC 2), Overberg (DC 3), Eden (DC 4) and Central Karoo (DC 5) as well as one Metropolitan municipality namely the City of Cape Town (CPT). Overall, it can be seen that the bulk of the households residing in the Western Cape had access to the seven categories in 2016.

[19] The comparability of district councils across censuses and community surveys between 1996 – 2016 can be found in the Appendix, Table A.7 (pages 115 – 116).

Majority of households lived in formal houses (79.5%) and DC 5 showed the greatest percentage with 97.5% of households residing in a brick or structured dwelling. Since the Western Cape is more urbanised, traditional, or informal housing only accounts for 3.4% and 17.1% respectively of all housing in the Western Cape. Additionally, all five DC's had over 90% of households with access to electricity as a cooking measure as well as a toilet facility. The only worrisome category is once again the level of education as only 14.2% of the household-heads in the province had above matric and 29.4% matriculated. Regarding education, DC 5 had the lowest percentage of household-heads with above matric.

Table 5.6: Proportion of households in each ranking category in each dimension for DC's in WC, CS 2016

| | | **CS 2016: Western Cape** | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | **CPT** | **DC 1** | **DC 2** | **DC 3** | **DC 4** | **DC 5** | **WC** |
| Dwelling | 1: Formal house/flat | 78.3% | 82.9% | 80.0% | 79.4% | 83.0% | 97.5% | 79.5% |
| | 2: Single room or flatlet or traditional hut | 3.6% | 4.4% | 1.9% | 3.8% | 3.5% | 2.0% | 3.4% |
| | 3: Informal dwelling | 18.1% | 12.7% | 18.1% | 16.8% | 13.5% | 0.6% | 17.1% |
| Fuel source for cooking | 1. Electricity | 91.5% | 88.5% | 89.4% | 80.5% | 87.7% | 88.3% | 90.1% |
| | 2. Gas | 6.9% | 7.8% | 6.0% | 15.1% | 8.5% | 5.9% | 7.4% |
| | 3. Paraffin/Coal | 1.2% | 2.5% | 3.1% | 3.2% | 1.7% | 0.5% | 1.6% |
| | 4. Wood/Dung | 0.4% | 1.2% | 1.6% | 1.3% | 2.1% | 5.4% | 0.9% |
| Water | 1. Tap in dwelling | 76.7% | 80.0% | 77.3% | 78.6% | 75.7% | 73.7% | 77.0% |
| | 2. Tap in premises | 11.3% | 11.7% | 9.5% | 9.7% | 15.9% | 20.9% | 11.6% |
| | 3. Public tap | 11.6% | 4.1% | 11.3% | 9.3% | 5.1% | 0.1% | 10.2% |
| | 4. Other | 0.5% | 4.3% | 1.8% | 2.4% | 3.4% | 5.3% | 1.3% |
| Sanitation | 1: Toilet facility | 94.3% | 92.6% | 96.9% | 95.7% | 94.3% | 97.1% | 94.6% |
| | 2: Pit latrine | 0.1% | 0.4% | 0.1% | 0.1% | 2.3% | 0.4% | 0.4% |
| | 3. Bucket latrine | 4.5% | 4.5% | 1.4% | 1.1% | 1.6% | 0.7% | 3.6% |
| | 4. Other | 1.1% | 2.6% | 1.6% | 3.1% | 1.8% | 1.7% | 1.4% |
| Refuse removal | 1: Removed once a week | 87.8% | 83.4% | 81.7% | 87.1% | 88.8% | 90.9% | 86.9% |
| | 2: Removed less often | 3.1% | 1.7% | 4.7% | 1.8% | 2.7% | 0.6% | 3.0% |
| | 3: Communal refuse dump | 7.5% | 2.2% | 6.2% | 6.4% | 2.6% | 1.2% | 6.4% |
| | 4: Own refuse dump | 0.4% | 9.9% | 5.4% | 3.1% | 3.8% | 6.1% | 2.2% |
| | 5: No access | 1.2% | 2.7% | 2.1% | 1.6% | 2.2% | 1.2% | 1.5% |
| Telephone | 1: Landline telephone or cellphone | 95.7% | 91.8% | 92.5% | 93.2% | 90.7% | 84.4% | 94.3% |
| | 2: None of both | 4.4% | 8.2% | 7.5% | 6.8% | 9.3% | 15.6% | 5.7% |
| Education of household head | 1. Above matric | 16.3% | 9.3% | 10.1% | 11.8% | 11.2% | 4.6% | 14.2% |
| | 2: Matric | 30.4% | 27.8% | 25.3% | 24.8% | 31.0% | 27.0% | 29.4% |
| | 3: Incomplete secondary | 41.4% | 44.2% | 46.4% | 44.1% | 40.4% | 42.6% | 42.2% |
| | 4: Incomplete primary | 9.3% | 14.1% | 15.1% | 15.4% | 13.7% | 18.7% | 11.1% |
| | 5: No schooling | 2.6% | 4.6% | 3.2% | 3.9% | 3.7% | 7.2% | 3.0% |

Source: Own calculations using CS 2016 data.

The percentages shown in Table 5.7 for the Eastern Cape paints a different picture from what was seen in Table 5.6 for the Western Cape. The gap between the two provinces is once again evident.

As mentioned, the Eastern Cape has six district councils namely Cacadu (DC 10), Amathole (DC 12), Chris Hani (DC 13), Joe Gqabi (DC 14), O.R. Tambo (DC 15), Alfred Nzo (DC 44) as well as two Metropolitan municipalities namely Buffalo City (BUF) and Nelson Mandela Bay (NMA). It is important to note that the Joe Gqabi District (DC 14) was first known as the Ukhahlamba District Municipality in 2011 before the name change occurred in 2016.

In the various districts of the Eastern Cape, substantial differences in the circumstances of households are seen. In the dwelling dimension, deprivation was the lowest in DC 10 and NMA with 84.9% and 87.9% of households residing in formal dwellings respectively. Whereas DC 15 and DC 44 had the lowest percentage of households with only 38.2% and 36.8% having access to formal brick houses respectively. While over 59% of households residing in DC 15 and DC 44 lived in single rooms, flatlets, or traditional huts. This is expected, as these two districts contain areas of the former Transkei. Hence the more East the district is situated, the more deprivation will increase (Van der Walt, 2004). Therefore, given the locational characteristics of the Eastern Cape, the high percentage of households residing in traditional or informal dwellings is not surprising.

When observing the other dimensions, Table 5.7 specifies that more than 70% of the households in the Metro's used electricity to cook, while 35.7% of households in DC 44 used wood or animal dung for cooking. The access to water dimension is a concern as the two Metro's are the only areas where more than 50% of households had a tap in their dwelling. While DC 10, DC 12, DC 13, DC 14, DC 15, and DC 44 only had 48.1%, 12.5%, 22.5%, 19.3%, 6.5% and 2.9% access to a tap in their dwelling respectively.

As in this case, Alfred Nzo performed the poorest out of all eight districts. Results showed that 47.3% of households had electricity, 55.7% made use of other sources for water such as a water carrier, flowing water, stream, or river. Only 9.2% had toilet facilities in stark contrast to the 82.2% of households who made use of a pit latrine. Only 5.4% had access to refuse removal once a week and 11.8% of the household-heads had matric.

It was expected that the Western Cape would perform much better than the Eastern Cape. However, these results also show that deprivation is also experienced differently in the

various areas of the Eastern Cape. Some districts have more access to these seven dimensions while others do not, even in a province such as the Eastern Cape.

Table 5.7: Proportion of households in each ranking category in each dimension for DC's in EC, CS 2016

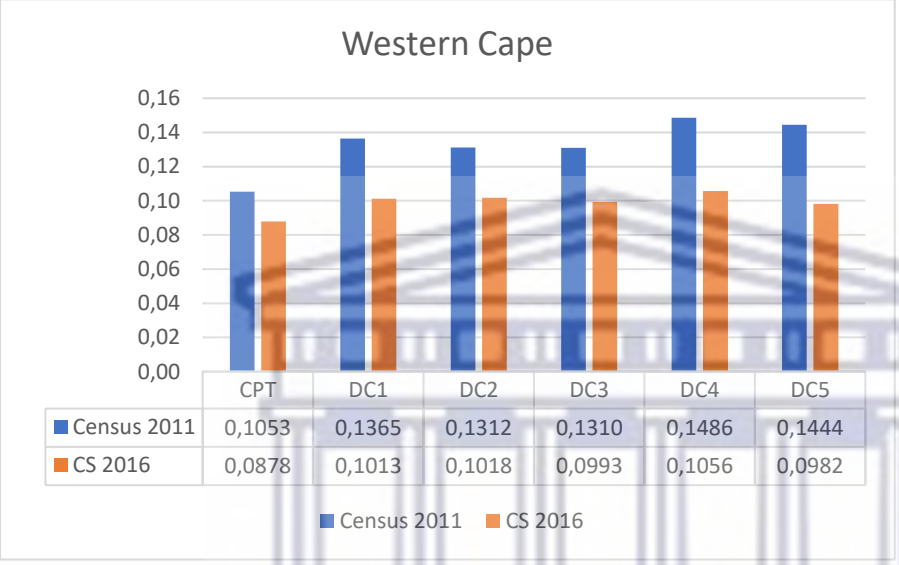
| | | **CS 2016: Eastern Cape** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **BUF** | **DC 10** | **DC 12** | **DC 13** | **DC 14** | **DC 15** | **DC 44** | **NMA** | **EC** |
| Dwelling | 1: Formal house/flat | 64.1% | 84.9% | 52.3% | 54.3% | 65.4% | 38.2% | 36.8% | 87.9% | 60.8% |
| | 2: Single room/flatlet/ traditional hut | 10.2% | 4.5% | 42.1% | 41.0% | 29.9% | 59.6% | 59.3% | 4.8% | 30.9% |
| | 3: Informal dwelling | 25.7% | 10.6% | 5.7% | 4.7% | 4.8% | 2.2% | 4.0% | 7.3% | 8.3% |
| Fuel source for cooking | 1. Electricity | 81.7% | 88.1% | 76.7% | 83.5% | 73.6% | 67.1% | 47.3% | 91.4% | 77.1% |
| | 2. Gas | 4.0% | 4.4% | 2.5% | 2.6% | 5.4% | 2.5% | 7.0% | 4.1% | 3.9% |
| | 3. Paraffin/Coal | 12.2% | 5.1% | 8.8% | 6.3% | 8.2% | 5.6% | 10.1% | 3.7% | 7.2% |
| | 4. Wood/Dung | 2.1% | 2.4% | 12.0% | 7.6% | 12.8% | 24.8% | 35.7% | 0.8% | 11.9% |
| Water | 1. Tap in dwelling | 50.3% | 48.1% | 12.5% | 22.5% | 19.3% | 6.5% | 2.9% | 77.3% | 33.7% |
| | 2. Tap in premises | 19.8% | 35.8% | 12.9% | 21.7% | 26.9% | 12.6% | 13.1% | 16.0% | 18.0% |
| | 3. Public tap | 26.1% | 7.9% | 44.3% | 36.3% | 24.5% | 18.7% | 28.4% | 5.1% | 22.4% |
| | 4. Other | 3.8% | 8.3% | 30.4% | 19.6% | 29.2% | 62.2% | 55.7% | 1.5% | 25.9% |
| Sanitation | 1: Toilet facility | 78.3% | 82.1% | 24.8% | 43.2% | 43.0% | 25.2% | 9.2% | 93.3% | 52.7% |
| | 2: Pit latrine | 15.8% | 6.9% | 59.7% | 40.2% | 47.8% | 64.5% | 82.2% | 0.7% | 37.4% |
| | 3. Bucket latrine | 1.2% | 5.5% | 0.6% | 1.5% | 1.3% | 1.4% | 0.5% | 4.6% | 2.2% |
| | 4. Other | 4.8% | 5.5% | 15.0% | 15.2% | 7.9% | 8.9% | 8.1% | 1.4% | 7.7% |
| Refuse removal | 1: Removed once a week | 57.1% | 82.9% | 17.6% | 27.2% | 34.4% | 9.1% | 5.4% | 84.8% | 41.7% |
| | 2: Removed less often | 2.7% | 1.3% | 0.8% | 1.9% | 1.4% | 0.7% | 0.5% | 5.6% | 2.2% |
| | 3: Communal refuse dump | 9.6% | 3.9% | 4.8% | 5.0% | 2.2% | 3.8% | 2.6% | 4.0% | 4.7% |
| | 4: Own refuse dump | 24.5% | 8.4% | 68.1% | 55.4% | 55.8% | 75.7% | 80.7% | 2.5% | 44.0% |
| | 5: No access | 6.2% | 3.5% | 8.8% | 10.6% | 6.2% | 10.8% | 10.9% | 3.1% | 7.4% |
| Telephone | 1: Landline telephone or cellphone | 93.1% | 88.5% | 90.5% | 90.1% | 88.3% | 92.5% | 92.0% | 93.6% | 91.7% |
| | 2: None of both | 6.9% | 11.5% | 9.5% | 9.9% | 11.7% | 7.5% | 8.0% | 6.4% | 8.3% |
| Education of household head | 1. Above matric | 15.3% | 7.1% | 6.0% | 7.1% | 6.0% | 6.6% | 5.1% | 12.7% | 8.9% |
| | 2: Matric | 26.8% | 21.7% | 16.0% | 15.6% | 15.7% | 14.9% | 11.8% | 31.1% | 20.4% |
| | 3: Incomplete secondary | 41.9% | 45.6% | 45.1% | 41.6% | 46.2% | 42.2% | 47.0% | 43.5% | 43.7% |
| | 4: Incomplete primary | 10.5% | 19.0% | 19.8% | 20.0% | 22.0% | 18.2% | 24.7% | 9.5% | 16.6% |
| | 5: No schooling | 5.4% | 6.6% | 13.1% | 15.7% | 10.2% | 18.1% | 11.4% | 3.2% | 10.2% |

Source: Own calculations using CS 2016 data.

The average deprivation experienced by each DC is shown in Figure 5.24 for the Western Cape and Figure 5.25 for the Eastern Cape between 2011 and 2016.

For the Western Cape, each DC as well as the Metropolitan municipality experienced a decline in their mean deprivation between 2011 and 2016. Although the mean deprivation in the Eastern Cape is much higher (between 0.1 and 0.5) compared to the Western Cape (between 0.1 and 0.2), the Eastern Cape's districts and metro's also experienced a decline in their average deprivation.[20]

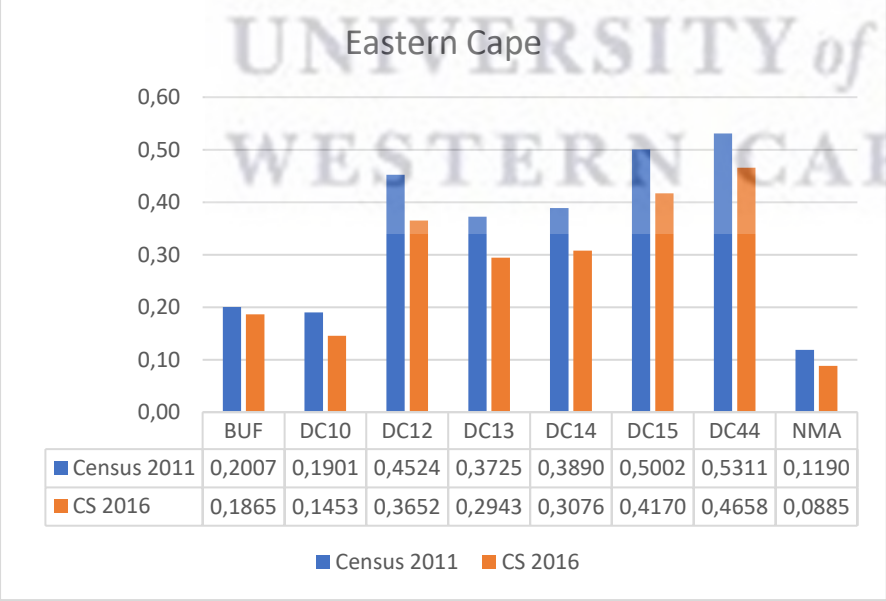
Figure 5.24: Mean deprivation index by DC for WC, 2011 - 2016




| | CPT | DC1 | DC2 | DC3 | DC4 | DC5 |
|---|---|---|---|---|---|---|
| Census 2011 | 0,1053 | 0,1365 | 0,1312 | 0,1310 | 0,1486 | 0,1444 |
| CS 2016 | 0,0878 | 0,1013 | 0,1018 | 0,0993 | 0,1056 | 0,0982 |

Source: Own calculations using Census 2011 and CS 2016 data.

Figure 5.25: Mean deprivation index by DC for EC, 2011 - 2016




| | BUF | DC10 | DC12 | DC13 | DC14 | DC15 | DC44 | NMA |
|---|---|---|---|---|---|---|---|---|
| Census 2011 | 0,2007 | 0,1901 | 0,4524 | 0,3725 | 0,3890 | 0,5002 | 0,5311 | 0,1190 |
| CS 2016 | 0,1865 | 0,1453 | 0,3652 | 0,2943 | 0,3076 | 0,4170 | 0,4658 | 0,0885 |

Source: Own calculations using Census 2011 and CS 2016 data.

[20] Tables A.8 and A.9 (pages 117 – 118) in the Appendix shows the mean deprivation experienced by each DC in the WC and EC for the years 1996, 2001 and 2007.

Table 5.8 displays the variation in mean deprivation by district councils between 2011 and 2016 in the Western Cape. All district councils showed improvement in their mean deprivation. The district that improved the best was DC 15 with a -0.0462 difference between 2011 and 2016. While the City of Cape Town (-0.0174) had the lowest decrease between 2011 and 2016.

Table 5.8: The change in mean deprivation for WC by district council between 2011 and 2016

| Western Cape | | | | |
|---|---|---|---|---|
| **District council name** | **District council code** | **Census 2011** | **CS 2016** | **Difference** |
| City of Cape Town | CPT | 0.1053 | 0.0878 | -0.0174 |
| West Coast | DC 1 | 0.1365 | 0.1013 | -0.0352 |
| Cape Winelands | DC 2 | 0.1312 | 0.1018 | -0.0295 |
| Overberg | DC 3 | 0.1310 | 0.0993 | -0.0317 |
| Eden | DC 4 | 0.1486 | 0.1056 | -0.0429 |
| Central Karoo | DC 5 | 0.1444 | 0.0982 | -0.0462 |

Source: Own calculations using Census 2011 and CS 2016 data.

Table 5.9 displays the change in average deprivation levels by district councils between 2011 and 2016 in the Eastern Cape. Once again, all district councils showed an improvement in lowering their mean deprivation. The district that experienced the greatest improvement was DC 12 with a -0.0873 difference between 2011 and 2016. While Buffalo City had the lowest decrease between 2011 and 2016 with -0.0142.

Table 5.9: The change in mean deprivation for EC by district council between 2011 and 2016

| Eastern Cape | | | | |
|---|---|---|---|---|
| **District council name** | **District council code** | **Census 2011** | **CS 2016** | **Difference** |
| Buffalo City | BUF | 0.2007 | 0.1865 | -0.0142 |
| Cacadu | DC 10 | 0.1901 | 0.1453 | -0.0448 |
| Amathole | DC 12 | 0.4524 | 0.3652 | -0.0873 |
| Chris Hani | DC 13 | 0.3725 | 0.2943 | -0.0783 |
| Ukhahlamba/Joe Gqabi | DC 14 | 0.3890 | 0.3076 | -0.0814 |
| O.R. Tambo | DC 15 | 0.5002 | 0.4170 | -0.0832 |
| Alfred Nzo | DC 44 | 0.5311 | 0.4658 | -0.0653 |
| Nelson Mandela Bay | NMA | 0.1190 | 0.0885 | -0.0305 |

Source: Own calculations using Census 2011 and CS 2016 data.

Table 5.10 shows the mean deprivation by local municipality in the Western Cape for 2011 and 2016 by using the deprivation index.[21] The top five local municipalities with the lowest mean deprivation in 2011 was Saldanha Bay, the City of Cape Town, Mossel Bay, Overstrand and Drakenstein with a mean deprivation of 0.0902, 0.1053, 0.1089, 0.1130 and 0.1131 respectively. In contrast, the municipalities with the highest mean deprivation and who were the bottom five municipalities of the Western Cape were Kannaland, Matzikama, Oudtshoorn, Cederberg and Prince Albert with their mean deprivation being 0.2013, 0.1938, 0.1907, 0.1860 and 0.1817 respectively.

While in 2016, only two of the five municipalities of 2011 remained in the top five, that is Drakenstein (0.0787) and the City of Cape Town (0.0878), followed by Hessequa (0.0824), Beaufort West (0.0848) and Swartland (0.0870). Whereas four of the worst performing municipalities remained in the bottom five namely, Kannaland (0.1744), Prince Albert (0.1459), Cederberg (0.1341) and Oudtshoorn (0.1234). The fifth municipality performing the worst was Stellenbosch (0.1322).

Overall, there has been a decrease in mean deprivation throughout all the municipalities in the Western Cape between 2011 and 2016 except Saldanha Bay and Stellenbosch who experienced increases in their mean deprivation between 2011 and 2016.

Table 5.10: Mean deprivation by local municipality in WC, 2011 - 2016

| Western Cape | | | |
|---|---|---|---|
| **Local Municipality name** | **Local municipality code** | **Census 2011** | **CS 2016** |
| 1011. CPT: City of Cape Town | 199 | 0.1053 | 0.0878 |
| 1012. WC011: Matzikama | 160 | 0.1938 | 0.1010 |
| 1013. WC012: Cederberg | 161 | 0.1860 | 0.1341 |
| 1014. WC013: Bergrivier | 162 | 0.1355 | 0.0880 |
| 1015. WC014: Saldanha Bay | 163 | 0.0902 | 0.1099 |
| 1016. WC015: Swartland | 164 | 0.1228 | 0.0870 |
| 1017. WC022: Witzenberg | 165 | 0.1328 | 0.0958 |

[21] Tables A.10 (page 119) and A.12 (page 122) in the Appendix shows the mean deprivation by local municipality for the WC for Census 2001 and CS 2007.

Table 5.10: Continued

| Western Cape | | | |
|---|---|---|---|
| **Local Municipality name** | **Local Municipality code** | **Census 2011** | **CS 2016** |
| 1018. WC023: Drakenstein | 166 | 0.1131 | 0.0787 |
| 1019. WC024: Stellenbosch | 167 | 0.1294 | 0.1322 |
| 1020. WC025: Breede Valley | 168 | 0.1495 | 0.1115 |
| 1021. WC026: Langeberg | 169 | 0.1471 | 0.1063 |
| 1022. WC031: Theewaterskloof | 171 | 0.1428 | 0.1073 |
| 1023. WC032: Overstrand | 172 | 0.1130 | 0.0961 |
| 1024. WC033: Cape Agulhas | 173 | 0.1216 | 0.0898 |
| 1025. WC034: Swellendam | 170 | 0.1460 | 0.0920 |
| 1026. WC041: Kannaland | 174 | 0.2013 | 0.1744 |
| 1027. WC042: Hessequa | 175 | 0.1346 | 0.0824 |
| 1028. WC043: Mossel Bay | 176 | 0.1089 | 0.0895 |
| 1029. WC044: George | 177 | 0.1406 | 0.0975 |
| 1030. WC045: Oudtshoorn | 178 | 0.1907 | 0.1234 |
| 1031. WC047: Bitou | 179 | 0.1466 | 0.1157 |
| 1032. WC048: Knysna | 180 | 0.1600 | 0.1194 |
| 1033. WC051: Laingsburg | 181 | 0.1774 | 0.1163 |
| 1034. WC052: Prince Albert | 182 | 0.1817 | 0.1459 |
| 1035. WC053: BeaufortWest | 183 | 0.1290 | 0.0848 |

Source: Own calculations using Census 2011 and CS 2016 data.

Table 5.11 shows the mean deprivation by local municipality in the Eastern Cape for 2011 and 2016.[22] The top five local municipalities with the lowest mean deprivation in 2011 was

[22] Before we look at the results, the following amalgamations that occurred in 2016 with regards to the local municipalities are worth stating. Dr Beyers Naude is a new local municipality that was established by merging the Camdeboo, Ikwezi and Baviaans local municipalities in the Sarah Baartman District of the Eastern Cape. The Walter Sisulu municipality was formed by the merging of Maletswai and Gariep local municipalities after the 2016 local municipal elections occurred. Next, Enoch Mgijima local municipality was established by the amalgamation of Tsolwana local municipality, Inkwanca local municipality and Lukhanji local municipality. Lastly, Raymond Mhlaba was established by the amalgamation of the Nkonkobe and Nxuba local municipalities.

Nelson Mandela Bay, Inxuba Yethemba, Camdeboo, Baviaans and Inkwanca with a mean deprivation of 0.1190, 0.1322, 0.1434, 0.1601 and 0.1652 respectively.[23] In contrast, the municipalities with the highest mean deprivation and who were the bottom five municipalities of the Eastern Cape was Ntabankulu, Port St Johns, Mbhashe, Mbizana and Nyandeni with their mean deprivation being 0.6061, 0.5721, 0.5612, 0.5502 and 0.5459 respectively.

While in 2016, only two of the five municipalities of 2011 remained in the top five, that is Nelson Mandela Bay (0.0885) and Inxuba Yethemba (0.1137), followed by Makana (0.1145), Dr Beyers Naude (0.1178) and Kou-Kamma (0.1287). Whereas four of the worst performing municipalities remained in the bottom five namely, Ntabankulu (0.5157), Mbizana (0.5037), Port St Johns (0.4693) and Mbhashe (0.4580). The fifth municipality performing the worst was Ngquza Hill (0.4696).

Overall, there has been a decrease in mean deprivation throughout all the municipalities in the Eastern Cape between 2011 and 2016. When comparing the mean deprivation levels of the Western Cape with the Eastern Cape, there are once again stark differences between the two provinces, with the Eastern Cape's deprivation being much higher than that of the Western Cape. In addition, the bottom five municipalities in the Eastern Cape had deprivation levels that were triple that of the bottom five municipalities in the Western Cape.



[23] Tables A.11 (pages 120 - 121) and A.13 (pages 123-124) shows the mean deprivation by local municipality of the EC for Census 2001 and CS 2007.

Table 5.11: Mean deprivation by local municipality in EC, 2011 - 2016

| | Eastern Cape | | |
|---|---|---|---|
| **Local Municipality name** | **Local municipality code** | **Census 2011** | **CS 2016** |
| 2011. BUF: Buffalo City | 260 | 0.2007 | 0.1865 |
| 2012. EC101: Dr Beyers Naude | 261/263/267 | 0.1434/0.2006/0.1601 | 0.1178 |
| 2013. EC102: Blue Crane Route | 262 | 0.1864 | 0.1546 |
| 2015. EC104: Makana | 264 | 0.1739 | 0.1145 |
| 2016. EC105: Ndlambe | 265 | 0.2119 | 0.1629 |
| 2017. EC106: Sundays River Valley | 266 | 0.2639 | 0.2058 |
| 2019. EC108: Kouga | 268 | 0.1805 | 0.1434 |
| 2020. EC109: Kou-Kamma | 269 | 0.1865 | 0.1287 |
| 2021. EC121: Mbhashe | 270 | 0.5612 | 0.4580 |
| 2022. EC122: Mnquma | 271 | 0.4720 | 0.3559 |
| 2023. EC123: Great Kei | 272 | 0.3886 | 0.3287 |
| 2024. EC124: Amahlathi | 273 | 0.3877 | 0.3269 |
| 2025. EC126: Ngqushwa | 274 | 0.4109 | 0.3297 |
| 2026. EC131: Inxuba Yethemba | 278 | 0.1322 | 0.1137 |
| 2027. EC135: Intsika Yethu | 282 | 0.5092 | 0.4230 |
| 2028. EC137: Engcobo | 284 | 0.5371 | 0.4363 |
| 2029. EC138: Sakhisizwe | 285 | 0.3988 | 0.2997 |
| 2030. EC141: Elundini | 286 | 0.5067 | 0.3947 |
| 2031. EC142: Senqu | 287 | 0.3884 | 0.3207 |
| 2032. EC153: Ngquza Hill | 290 | 0.5423 | 0.4696 |
| 2033. EC154: Port St Johns | 291 | 0.5721 | 0.4693 |
| 2034. EC155: Nyandeni | 292 | 0.5459 | 0.4392 |
| 2035. EC156: Mhlontlo | 293 | 0.5027 | 0.4283 |
| 2036. EC157: King Sabata Dalindyebo | 294 | 0.4195 | 0.3489 |

Table 5.11: Continued

| | | | |
|---|---|---|---|
| 2037. EC441: Matatiele | 295 | 0.4855 | 0.4017 |
| 2038. EC442: Umzimvubu | 296 | 0.5064 | 0.4435 |
| 2039. EC443: Mbizana | 297 | 0.5502 | 0.5037 |
| 2040. EC444: Ntabankulu | 298 | 0.6061 | 0.5157 |
| 2041. NMA: Nelson Mandela Bay | 299 | 0.1190 | 0.0885 |
| 2042. EC145: Walter Sisulu | 288/289 | 0.1859/0.1763 | 0.1537 |
| 2043. EC139: Enoch Mgijima | 279/280/281 | 0.3224/0.1652/0.2066 | 0.1867 |
| 2044. EC129: Raymond Mhlaba | 276/277 | 0.3447/0.2066 | 0.2561 |
| 2045. EC136: Emalahleni | 283 | 0.4272 | 0.3638 |

Source: Own calculations using Census 2011 and CS 2016 data.

The figures and tables shown in Section 5.3 confirms the inequality and clearly shows the multidimensional poverty levels and trends between the two provinces. It is found that the Eastern Cape is much worse off, and the Western Cape is better off. Thus, regardless of which dataset is used, these two provinces lay on the opposite ends of the spectrum, and this could partly be attributed to the legacies of Apartheid.

## 5.4 Econometric analysis

### 5.4.1 Ordinary Least Squares (OLS) Regression

A popular method for calculating the coefficients of linear regression equations that represent the connection between one or more independent variables and a dependent variable is the Ordinary Least Squares regression (Lumivero, 2023). The OLS regression is a statistical method of analysis and can be discussed in a bivariate model, that is, a model with only one independent variable (X) predicting a dependent variable (Y). However, the OLS regression can also be extended to a multivariate model (as in this case) in which there are two or more independent variables (International encyclopedia of the Social Sciences, 2023). A multivariate econometric analysis like the OLS regressions will explain whether any of the independent variables listed are possibly linked to greater levels of deprivation.

The explanatory variables are listed below:

- Gender (Male as the reference group)

- Race (White as the group of reference)
- Province dummy variables (Western Cape as reference group)
- Spline of educational attainment (No schooling - Grade 6 and Grade 7 - Grade 11)
- Dummy variables of educational level (Matric, Matric plus Certificate or Diploma, Degree or above)
- Size of the household

Table 5.12 illustrates the outcome of the OLS regressions for 1996 - 2016.

Table 5.12: OLS regressions on deprivation in South Africa, 1996 – 2016.

| **OLS regressions (dependent variable: deprivation index)** | | | | | |
|---|---|---|---|---|---|
| | **Census 1996** | **Census 2001** | **CS 2007** | **Census 2011** | **CS 2016** |
| **Variable** | **Coefficient** | | | | |
| Gender: Female | 0.0150*** | 0.0080*** | 0.0027*** | 0.0004* | 0.0032*** |
| Race: Black | 0.2357*** | 0.2012*** | 0.1426*** | 0.1097*** | 0.0879*** |
| Race: Coloured | 0.0047*** | -0.0014* | -0.0055*** | -0.0027*** | -0.0049*** |
| Race: Indian | -0.1341*** | -0.1059*** | -0.0859*** | -0.0660*** | -0.0610*** |
| Province: Eastern Cape | 0.2017*** | 0.1838*** | 0.2034*** | 0.1361*** | 0.1224 *** |
| Province: Northern Cape | 0.0404*** | 0.0322*** | 0.0488*** | 0.0529*** | 0.0741*** |
| Province: Free State | 0.0237*** | 0.0371*** | 0.0133*** | -0.0093*** | 0.0121*** |
| Province: KwaZulu-Natal | 0.1496*** | 0.1220*** | 0.1347*** | 0.0976*** | 0.1034*** |
| Province: North West | 0.0802*** | 0.0824*** | 0.0876*** | 0.0686*** | 0.0785*** |
| Province: Gauteng | -0.0715*** | -0.0489*** | -0.0154*** | -0.0326*** | -0.0119*** |
| Province: Mpumalanga | 0.0651*** | 0.0720*** | 0.0799*** | 0.0682*** | 0.0944*** |
| Province: Limpopo | 0.1782*** | 0.1776*** | 0.1964*** | 0.1618*** | 0.1860*** |
| Education spline: Incomplete primary | -0.0161*** | -0.0187*** | -0.0184*** | -0.0139*** | -0.0100*** |
| Education spline: Incomplete secondary | -0.0277*** | -0.0223*** | -0.0209*** | -0.0133*** | -0.0079*** |
| Education: Matric | -0.0529*** | -0.0675*** | -0.0571*** | -0.0596*** | -0.0575*** |
| Education: Matric + Cert/Dip | -0.0371*** | -0.0395*** | -0.0325*** | -0.0363*** | -0.0301*** |
| Education: Degree | 0.0187*** | 0.0075*** | 0.0067*** | 0.0057*** | 0.0042*** |
| Household size | -0.0023*** | -0.0026*** | -0.0044*** | -0.0038*** | -0.0015*** |
| Constant | 0.3081*** | 0.3236*** | 0.2841*** | 0.2474*** | 0.1777*** |
| | | | | | |
| R-squared | 0.5553 | 0.5232 | 0.4541 | 0.3907 | 0.3374 |
| Adjusted R-squared | 0.5553 | 0.5232 | 0.4540 | 0.3907 | 0.3374 |
| Number of observations | 802181 | 905619 | 242027 | 1194096 | 945018 |

Significance levels *** significant at 1%, ** significant at 5%, * significant at 10%.[24]
Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

[24] Refer to Tables A.14 – A.18 (pages 125 – 129) in the Appendix for the p-values and t-values of the OLS regressions for the period 1996 to 2016.

The regression analysis shows that the coefficients for females are positive throughout all five surveys. With males being the reference group, the results were expected as studies such as the Department of women South Africa (2015), Rogan (2016), Cheteni *et al*. (2019) and the Western Cape Government (2020), as mentioned in this thesis, suggested that female household heads are generally more deprived than male household heads. Regarding race, with the White race group being the reference group, the Black population group is the only race dummy that had consistent positive coefficients from 1996 to 2016. This indicates that higher deprivation levels are associated with Black households. However, when comparing the Census 1996 value of 0.2357 to that of CS 2016 being 0.0879, the decline does show an improvement in deprivation levels for this race.

Except for Gauteng, the provincial dummies are all positive compared to the reference group, the Western Cape. Households living in all the other seven provinces are significantly more likely to be deprived. In contrast, Gauteng is the only province with negative coefficients for the period. Therefore, households living in Gauteng are significantly unlikely to be deprived.

The education spline shows interesting results. The results for all five surveys are significant and has a negative relationship with deprivation. This infers that the better the level of educational attainment, the lower deprivation levels will be. However, the highest educational attainment, which is a degree, is significant but shows positive coefficients for all five datasets. The study done by Gallant (2012) yielded similar results; incomplete primary up to matric plus certificate or diploma has negative coefficients and degree had positive coefficients. We expect that the higher the educational attainment, the lower the likelihood of deprivation.



The size of the household is significant but has unexpected negative coefficients for all five datasets implying a negative relationship with deprivation. For example, if we use CS 2016, if household size increases by one person, *ceteris paribus*[25], the regression predicts that deprivation will decrease by 0.15%. Even though the number is not high in value, the negative relationship remains. Generally, one would expect that household size would have a positive relationship with deprivation as the expected level of deprivation will be higher, the more individuals in a house (i.e., overcrowding). Meyer & Nishimwe-Niyimbanira (2016) points out that significant evidence from studies conducted around the world suggest that household size and poverty are positively correlated. Similarly, a study by Sekhampu (2012)

[25] All other things being equal.

found that a higher likelihood of poverty was linked to bigger household sizes. However, this is not the case. Hence the conclusion can be made that even if the household size is large, it does not automatically imply that the level of deprivation will be high.

### 5.5 Conclusion

Chapter Five examined multidimensional deprivation levels and trends of the country and specifically the Western Cape and the Eastern Cape between 1996 and 2016. This was done by using the fuzzy sets methodology. Section 5.2 analysed the descriptive statistics of South Africa by province, ethnic group, gender, area type and educational attainment of household heads. Overall, the results discovered that there has been an improvement in multidimensional non-money-metric poverty between 1996 and 2016. However, as much as there has been an improvement in deprivation levels in South Africa, poverty persists. Those that are highly likely to be deprived are Blacks, female household heads as well as those residing in the rural areas of the Eastern Cape and Limpopo.

Section 5.3 compared the deprivation levels and trends between the Western Cape and the Eastern Cape by looking at district councils and local municipalities. It was found that the Western Cape is much better off than the Eastern Cape. The district councils that had the highest deprivation levels in the Eastern Cape were DC 15 and DC 44. These districts contain areas of the former Transkei. Regarding gender, once again female-headed households suffered the most compared to their male counterparts. However, results also suggest that female household heads residing in the Eastern Cape were worse-off than female-headed households residing in the Western Cape. Additionally, this section also looked at the top five and bottom five municipalities of the Western Cape and Eastern Cape between 2011 and 2016. As expected, municipalities in the Eastern Cape had higher deprivation levels compared to the Western Cape. It has been years after South Africa became a democracy and the Eastern Cape still bears the brunt of Apartheid legacies.

Lastly, Section 5.4 displayed the results of the OLS regressions that was done for all provinces in South Africa. The outcome reveals that the explanatory variables used were associated with deprivation.

# CHAPTER SIX: CONCLUSION

## 6.1 Introduction

As mentioned, the South African government has been invested in improving service delivery to correct the mistakes of the past. This correction ultimately affects non-income poverty levels and trends. To illustrate the non-monetary aspects of poverty, this thesis analysed multidimensional poverty levels and trends in SA and specifically the WC and EC between 1996 and 2016. This was achieved by utilising the fuzzy sets methodology together with the available census and community survey datasets. Chapter Six will review the findings of this thesis after which a few policy recommendations will be given.

## 6.2 Review of findings

Chapter Two provided a literature review and began by defining the concept of poverty as well as the theories and dimensions of poverty. Additionally, this thesis critically reviewed the dissimilarities among the money-metric and non-money-metric poverty approaches.

Chapter Three observed the existing local past empirical studies for the money-metric and non-money-metric methods. As mentioned, even though the datasets and poverty lines differed for each analysis from the monetary perspective, the overall finding was that money-metric poverty rates have risen between 1994 to 2000 after which there was a gradual decline in money-metric poverty from the 2000's. However, studies do suggest that those who lived below the poverty lines were most likely trapped there and had limited chance of escaping poverty.

Regarding income, results found that each race group faced substantial rises in their nominal per capita household incomes. On the contrary, Blacks and persons steered by female-headed households, have not experienced any significant changes regarding income in real terms. With that being said, even though there has been a decline in poverty rates, the Black race group experienced poverty more intensely than the other race groups. The fall in poverty rates benefited male-headed households as poverty was significantly higher for female-heads. Poverty rates also differed significantly between the nine provinces. GAU and the WC had lower poverty rates compared to the EC and LIM who had much higher poverty rates.

Furthermore, the studies that made use of multidimensional approaches such as the MPI, MCA, PCA and FA found that overall, there has been an improvement in access to asset

ownership. There was a constant increase in access to public assets and households had more access to public assets such as decent roof material, high-quality wall material, flushing toilets, piped water, electricity for cooking and brick structure dwellings.

For the studies using the fuzzy sets approach, an index of deprivation was used to determine who the deprived South Africans were. Empirical findings suggest that there has been a decline in the levels of deprivation across all provinces in the country. Just like the money-metric approach, the results indicated that GAU and the WC were the more privileged provinces whereas the EC and LIM were the most disadvantaged provinces. Additionally, the results clearly show race dominance as the Black population group suffered much higher deprivation levels than White South Africans. Burger *et al*. (2004), Van der Walt (2004), Naidoo (2007) and Burger *et al*. (2017) found that race and location play a vital role in the explanation of the different patterns of deprivation.

The overall conclusion remained the same regardless of which approach was used, the EC and LIM are much worse-off compared to the other seven provinces and Black and female household heads remained most affected.

Chapter Four explained the methodology and data employed in this thesis. After reviewing the various approaches to measuring multidimensional poverty in Chapter Two, it was decided that Cheli & Lemmi's fuzzy sets approach would be better. A detailed discussion on the development of the fuzzy sets approach was provided in this chapter. The data used is cross-sectional data sourced from the 10% sample Censuses of 1996, 2001 and 2011 as well as the Community Surveys of 2007 and 2016, conducted by Stats SA. The limitations of using these datasets were also raised. By using the mentioned census and community survey datasets together with the seven non-monetary variables, the vertical and horizonal weights were attained.

Moreover between 1996 to 2016, the percentage of households having access to services showed great improvements in dimensions such as electricity, toilet facility, formal dwelling and telephone or cellphone. It was positive to see that the proportion of households using wood or dung as a cooking source decreased significantly since 1996 to 2016. Considerably more households in the country had access to toilet facilities instead of using pit latrines or bucket latrines. The proportion of households who occupied traditional or informal dwellings also decreased while the proportion of households occupying formal dwellings increased. The

telephone dimension illustrated the largest difference over the mentioned period as more people had access to a telephone and/or cellphone by 2016.

The only worrisome dimension was the educational attainment of the household head as only about 11.43% of the household heads had an educational level above matric (i.e., a diploma or a degree) and only about 28.21% had matric in 2016. Thus, education had the greatest mean vertical weights. Consequently, this dimension had smaller horizontal weights over the period which indicated greater deprivation.

Chapter Five provided the empirical analysis. The descriptive statistics of non-money-metric poverty in SA from 1996 to 2016 revealed that post-apartheid deprivation levels, as measured using the seven non-monetary indicators, has declined. This decline indicates that there has been improvements and governments efforts are paying off. These improvements can be seen across all races, gender and all nine provinces in the country.

However, the Apartheid scars remained noticeable in the deprivation patterns despite the progress being made (Burger *et al*., 2017). This is true as the descriptive statistics of this thesis show that although there has been a decline in deprivation levels, the Black race group had the highest deprivation levels. Burger *et al*. (2017) points out that it is unlikely that White South Africans endure much deprivation irrespective of which province they belong to. At the provincial level, the provinces that were regarded as homelands in the Apartheid era, namely the EC and LIM were worst-off while GAU and the WC boasted with low deprivation levels.

Furthermore, it was also evident that there were differences in educational categories among the different provinces. Once again, LIM and the EC were the most disadvantaged, as deprivation deteriorated further the lower the household heads educational achievements. Deprivation was more common among female-headed households than households who were headed by males. The above-mentioned empirical findings are like those of Burger *et al*. (2004), Van der Walt (2004), Gallant (2012) and Burger *et al*. (2017).

This Chapter also compared the deprivation levels and trends between the WC and EC by looking at district councils and local municipalities. Firstly, this section of this chapter touched on the subject of migration. Many studies pointed out that more than 50% of migrants into the WC came from the EC. Their reasons for migrating varied, however, it was found that for the most part these reasons were poverty-driven. Ultimately, they see this as an

opportunity to upgrade their living standards and to receive better service delivery. When analysing poverty levels and trends by district councils and local municipalities, the gap between the two provinces were evident. In the WC, majority of the households in all five its district councils and metropolitan municipality had access to formal dwellings, electricity as a cooking source, a tap in their dwelling, toilet facilities, refuse removed once a week as well as landline telephones or cellphones. The DC's with the highest average deprivation in the Western Cape was DC 2 and DC 4.

In stark contrast, the EC had considerable differences in households' circumstances among the six district councils and the two metropolitan municipalities. Majority of the households residing in BUF, DC 10 and NMA had access to all service delivery variables. Whereas households residing in the remaining four districts mostly reside in traditional or informal dwellings, still use wood or animal dung as a cooking source, they make use of other sources of water like water carriers, streams, or rivers as well as pit latrines. These results are especially in the case of districts containing areas of the former Transkei such as DC 15 and DC 44. Hence the more east the district is situated; the more deprived households were. Although high deprivation levels were found in the EC compared to that of the WC, the EC's districts and metropolitan municipalities experienced a decline in their mean deprivation levels between 2011 and 2016.

This thesis also looked at the top five and bottom five municipalities within the WC and EC and results found that those municipalities who were in the bottom five for both the WC and EC in 2011 remained in the bottom five in 2016. The bottom five municipalities in the EC had deprivation levels that were triple that of the bottom five of the WC.

From a race perspective, the Black race group had higher mean deprivation levels for the EC compared to the WC. Additionally, the average deprivation levels for the Black race group in the EC were also above the national average for the period under consideration. The Coloured race group had the second highest mean deprivation in both the WC and EC followed by the Indian and White race group with the lowest average deprivation levels. Overall, the Black race group remains the most deprived race in both the WC and EC. Regarding gender, once again female-headed households suffered the most compared to their male equivalents. However, results also propose that female-heads residing in the EC were worse-off than female-heads residing in the WC.

Moving on to the econometric analysis, the OLS regressions for South Africa reiterates that households that are headed by a female are significantly deprived. With the WC as the reference group, all other provinces except GAU were significantly likely to be deprived. The size of the household revealed interesting results as the regressions generated a negative relationship between household size and deprivation.

From the empirical analysis, the Western Cape fared much better than the Eastern Cape. Could this be because of better policy measures and governance by the Western Cape government compared to the Eastern Cape government? Even so, it is still important to note the legacies of Apartheid and how it negatively affected the different parts of the country. Although National government is in charge of creating laws and programmes aimed at eradicating poverty, it is the responsibility of Provincial and Local governments to implement these policies. This local context is where eradicating poverty and combating underdevelopment takes place. At this level, government is closest to the people and their impoverished predicament (Sithole, 2014 citing Department of Provincial and Local Government, 2000). Similarly, the Western Cape Government (2021) agrees that according to the Republic of South Africa's 1996 Constitution, the role of Local government is to foster development and ensure that the communities it serves have their basic needs met. This is because Local government is the tier of government that is closest to communities and, as a result, where services are delivered.

The Western Cape government has implemented various poverty alleviation programmes and strategies. According to the Western Cape Government (2021) some of these include the Integrated Development Plans (IDP's) such as Municipal Administration, Public Participation, Capacity Development, Municipal Performance Monitoring, Reporting and Evaluation, Service Delivery Integration as well as Community Development Worker Programmes. The focus of these programmes is on increasing access to government information and services, encouraging effective and efficient public participation between the government and the people and to implement socio-economic initiatives to enhance inhabitant's quality of live (Western Cape Government, 2021).

In order to promote sustainable rural communities, the Western Cape government has also undertaken a Comprehensive Rural Development Programme in the Western Cape. The programme coordinates all provincial departments and municipalities to provide services in a coordinated and cohesive manner, implements economic, social, and infrastructure projects to

support economic growth and improve food security through household-level interventions in rural communities. The Agricultural Partnership for Youth Development (APRYD) programme addresses disparities in educational and career possibilities for rural youth (Western Cape Government, 2020).

Faralla (2022) and Geach (2019) citing the Municipal Financial Stability Report published by Ratings Afrika, has found that the Western Cape is the best run province and the City of Cape Town the best-run metropolitan municipality in the country. According to the Western Cape Government (2020) 92% of audits in the Western Cape produced unblemished results for 2018/19. Additionally, it is noteworthy, that the Western Cape had no unauthorized spending, however, Limpopo spent R1.13 million on unauthorized spending and the Eastern Cape, the province with the lowest performance, spent R1.58 billion on unauthorized spending (Faralla, 2022).

Furthermore, poverty eradication has long been a top priority in the Eastern Cape because of the high levels of poverty. The province also includes a sizeable portion of the former Transkei and Ciskei homelands (Sithole, 2014 citing Punt *et al*, 2005). Consequently, many anti-poverty measures such as economic interventions to increase employment and self-employment opportunities, community and public works programmes, the provision of quality education, skills and health care and the promotion of access to assets, to mention a few, were also implemented in the Eastern Cape.

Additionally, the 2004 to 2014 Provincial Growth and Development Plan (PGDP) was also created in the Eastern Cape (Ngumbelo, 2021). According to Ngumbela (2021) from 2006 onward, the Department of Social Development (DoSD) was tasked with organising the provincial "war on poverty" campaign. A two-pronged strategy of putting short-term and medium- to long-term tasks into action was adopted starting in 2007. The medium- to long-term objectives were to strive towards a family-based social service model. The short-term focus being on integrating and coordinating current poverty eradication projects in eleven of the EC's local municipalities with the least level of development.

Nevertheless, a significant portion of households in the Eastern Cape continue to live in poverty, despite the existence of many intervention efforts. Ngumbela (2021) and Sithole (2014) have attributed the poor implementation of intervention programmes to dishonesty in the public sector, where employees are motivated by personal enrichment rather than by the aim of the programmes to alleviate poverty of others. It is important to note that many of the

same poverty alleviation programmes are available and apply in all provinces, however, the success of these programmes and strategies depends on how well it is implemented by the Provincial and Local governments.

### 6.3 Conclusion

There has been remarkable growth from the government in trying to rebuild and alleviate poverty in SA. Nevertheless, the legacy and crippling effects of Apartheid can clearly be seen by the descriptive evaluation of this thesis and the existing studies conducted by various researchers.

For some groups compared to others, poverty deprivation levels were seen to be much higher. As a result, these groups should be the focus of poverty alleviation efforts to a much greater level. Reference is made to the Black race group, households headed by females as well as those who reside in rural areas and provinces such as the EC and LIM. The mentioned groups should benefit more from the various forms of government aid.

Additionally, special attention should also be given to the EC especially O.R. Tambo and Alfred Nzo, as many of the households residing in these districts still make use of animal dung and wood as their main cooking source, majority still reside in informal dwellings and a pit or bucket latrine is used as their type of toilet facility. Service delivery in these areas should be questioned as government's performance in this regard is discouraging.

Moreover, as shown by the empirical evaluation of this thesis, the educational attainment of the heads of households can also be a driver of overall poverty in this country. When specifically focusing on the education aspect, Tsujita (2012) believes that education can be viewed as a tool to end the cycle of poverty and improve the chances of getting employed. Although there has been an improvement in access to education since 1994, government has not been successful in improving the quality of the education being taught to learners. According to Burger *et al*. (2017) South Africa's quality of education is far beneath international standards. Thus, government should implement a plan of action in such a way that it would actually bring about change in the quality of the education system in SA.

In conclusion, the mentioned findings of this thesis, thus, serve as a clear sign that restructuring must occur in these different parts for poverty to be completely eliminated in the country.

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## APPENDIX

Table A.1: Proportion of households in each ranking category, Census 1996

| | | Census 1996 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** | **RSA** |
| Dwelling | 1: Formal house/flat | 76.2% | 40.7% | 74.8% | 57.1% | 57.1% | 63.3% | 62.1% | 59.8% | 57.8% | 57.5% |
| | 2: Single room or flatlet or traditional hut | 6.3% | 48.1% | 10.4% | 15.6% | 15.6% | 13.3% | 12.6% | 23.4% | 36.3% | 25.4% |
| | 3: Informal dwelling | 17.5% | 11.2% | 14.9% | 14.9% | 27.3% | 23.4% | 25.4% | 16.8% | 6.0% | 17.1% |
| Fuel source for cooking | 1. Electricity | 76.5% | 21.7% | 52.4% | 42.0% | 45.7% | 33.6% | 72.9% | 35.6% | 19.4% | 46.9% |
| | 2. Gas | 4.9% | 3.3% | 9.6% | 4.0% | 3.2% | 4.7% | 1.7% | 2.4% | 1.7% | 3.2% |
| | 3. Paraffin/Coal | 13.4% | 29.3% | 18.9% | 42.9% | 20.1% | 39.7% | 23.7% | 34.9% | 14.4% | 25.0% |
| | 4. Wood/Dung | 5.2% | 45.8% | 19.1% | 11.1% | 31.0% | 22.0% | 1.8% | 27.1% | 64.5% | 25.0% |
| Water | 1. Tap in dwelling | 75.4% | 22.9% | 49.8% | 40.2% | 39.0% | 29.5% | 66.7% | 36.5% | 17.1% | 43.6% |
| | 2. Tap in premises | 13.8% | 10.0% | 33.1% | 30.0% | 8.8% | 20.3% | 17.9% | 25.7% | 17.7% | 16.5% |
| | 3. Public tap | 7.7% | 17.9% | 8.4% | 23.9% | 18.3% | 31.6% | 11.4% | 20.0% | 40.5% | 19.4% |
| | 4. Other | 3.2% | 49.2% | 8.7% | 5.8% | 33.9% | 18.7% | 4.0% | 17.8% | 24.7% | 20.4% |
| Sanitation | 1: Toilet facility | 85.7% | 28.8% | 59.7% | 45.3% | 41.6% | 31.9% | 82.8% | 37.8% | 13.0% | 49.9% |
| | 2: Pit latrine | 4.8% | 35.1% | 11.6% | 25.0% | 41.7% | 54.8% | 11.6% | 49.5% | 64.9% | 32.6% |
| | 3. Bucket latrine | 3.8% | 5.9% | 17.9% | 20.7% | 0.9% | 6.5% | 2.5% | 3.6% | 0.5% | 4.6% |
| | 4. Other | 5.7% | 30.3% | 10.8% | 9.0% | 15.8% | 6.8% | 3.0% | 9.1% | 21.7% | 12.9% |
| Refuse removal | 1: Removed once a week | 82.1% | 31.6% | 67.7% | 60.7% | 41.8% | 34.4% | 81.3% | 37.6% | 11.0% | 50.9% |
| | 2: Removed less often | 2.5% | 1.6% | 2.1% | 4.1% | 1.2% | 1.5% | 3.8% | 1.9% | 0.8% | 2.2% |
| | 3: Communal refuse dump | 3.8% | 1.7% | 5.2% | 4.3% | 2.9% | 3.9% | 3.3% | 3.3% | 3.0% | 3.2% |
| | 4: Own refuse dump | 7.8% | 41.0% | 19.3% | 24.3% | 40.6% | 51.5% | 7.2% | 46.9% | 66.1% | 32.4% |
| | 5: No access | 3.8% | 24.1% | 5.7% | 6.7% | 13.5% | 8.7% | 4.4% | 10.4% | 19.1% | 11.4% |
| Telephone | 1: Landline telephone or cellphone | 55.0% | 14.1% | 30.6% | 23.0% | 26.9% | 16.7% | 45.1% | 18.2% | 7.4% | 28.3% |
| | 2: None of both | 45.0% | 85.9% | 69.5% | 77.0% | 73.2% | 83.3% | 54.9% | 81.8% | 92.7% | 71.7% |
| Education of household head | 1. Above matric | 13.4% | 5.1% | 7.1% | 6.4% | 6.1% | 5.1% | 10.4% | 6.0% | 4.6% | 7.5% |
| | 2: Matric | 15.8% | 7.5% | 9.8% | 11.4% | 11.2% | 9.6% | 19.4% | 10.2% | 8.8% | 12.5% |
| | 3: Incomplete secondary | 46.0% | 37.7% | 36.2% | 39.1% | 34.3% | 36.0% | 44.5% | 31.4% | 27.9% | 37.9% |
| | 4: Incomplete primary | 17.2% | 23.6% | 21.2% | 23.2% | 19.9% | 21.2% | 14.6% | 16.1% | 13.6% | 18.4% |
| | 5: No schooling | 7.7% | 26.0% | 25.8% | 19.9% | 28.5% | 28.1% | 11.1% | 36.3% | 45.1% | 23.8% |

Source: Own calculations using Census 1996 data.

Table A.2: Proportion of households in each ranking category, Census 2001

| | | Census 2001 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** | **RSA** |
| Dwelling | 1: Formal house/flat | 78.3% | 47.4% | 80.3% | 62.4% | 56.7% | 68.7% | 65.4% | 67.2% | 70.7% | 63.7% |
| | 2: Single room or flatlet or traditional hut | 5.4% | 41.5% | 6.9% | 11.1% | 32.3% | 9.0% | 10.5% | 16.8% | 22.7% | 19.7% |
| | 3: Informal dwelling | 16.4% | 11.1% | 12.8% | 26.4% | 11.0% | 22.3% | 24.1% | 16.0% | 6.6% | 16.5% |
| Fuel source for cooking | 1. Electricity | 79.0% | 28.1% | 59.0% | 47.1% | 48.7% | 44.5% | 73.2% | 40.0% | 25.1% | 51.5% |
| | 2. Gas | 3.4% | 2.9% | 6.5% | 3.4% | 3.0% | 2.9% | 1.5% | 1.9% | 1.7% | 2.6% |
| | 3. Paraffin/Coal | 14.3% | 29.8% | 18.4% | 39.6% | 20.2% | 33.3% | 24.3% | 33.5% | 12.7% | 24.2% |
| | 4. Wood/Dung | 3.4% | 39.2% | 16.0% | 9.9% | 28.2% | 19.3% | 1.1% | 24.6% | 60.5% | 21.7% |
| Water | 1. Tap in dwelling | 67.3% | 17.9% | 39.4% | 22.7% | 29.6% | 18.1% | 47.1% | 21.2% | 9.4% | 32.2% |
| | 2. Tap in premises | 17.8% | 19.4% | 42.1% | 47.4% | 19.9% | 34.6% | 36.3% | 37.7% | 28.8% | 29.0% |
| | 3. Public tap | 13.2% | 25.5% | 15.1% | 25.4% | 23.8% | 33.5% | 14.0% | 27.7% | 39.7% | 23.3% |
| | 4. Other | 1.8% | 37.3% | 3.5% | 4.5% | 26.6% | 13.8% | 2.6% | 13.4% | 22.1% | 15.5% |
| Sanitation | 1: Toilet facility | 86.4% | 35.0% | 66.5% | 46.7% | 47.1% | 35.8% | 82.7% | 39.5% | 17.4% | 53.7% |
| | 2: Pit latrine | 2.1% | 28.6% | 10.1% | 22.9% | 35.7% | 50.2% | 11.4% | 47.3% | 58.7% | 28.6% |
| | 3. Bucket latrine | 3.7% | 5.7% | 11.9% | 20.4% | 1.1% | 4.5% | 2.3% | 2.8% | 0.6% | 4.1% |
| | 4. Other | 7.8% | 30.8% | 11.4% | 10.0% | 16.1% | 9.6% | 3.7% | 10.3% | 23.4% | 13.6% |
| Refuse removal | 1: Removed once a week | 87.9% | 37.2% | 68.5% | 58.0% | 49.4% | 36.2% | 84.1% | 38.3% | 14.1% | 55.3% |
| | 2: Removed less often | 1.0% | 1.4% | 3.1% | 3.2% | 1.1% | 1.0% | 2.2% | 1.7% | 0.7% | 1.5% |
| | 3: Communal refuse dump | 2.2% | 1.2% | 2.6% | 3.6% | 0.8% | 1.9% | 2.3% | 1.7% | 1.0% | 1.8% |
| | 4: Own refuse dump | 7.4% | 43.5% | 22.1% | 25.5% | 38.4% | 52.4% | 8.7% | 48.1% | 68.4% | 32.7% |
| | 5: No access | 1.5% | 16.8% | 3.7% | 9.7% | 10.3% | 8.5% | 2.6% | 10.2% | 15.8% | 8.7% |
| Telephone | 1: Landline telephone or cellphone | 63.0% | 29.0% | 41.3% | 35.1% | 38.8% | 34.4% | 56.0% | 38.2% | 28.2% | 42.4% |
| | 2: None of both | 37.0% | 71.1% | 58.7% | 64.9% | 61.2% | 65.6% | 44.0% | 61.8% | 71.8% | 57.6% |
| Education of household head | 1. Above matric | 13.3% | 6.4% | 6.3% | 6.3% | 7.3% | 5.7% | 13.3% | 6.2% | 6.5% | 8.8% |
| | 2: Matric | 20.6% | 10.4% | 13.1% | 13.5% | 14.3% | 13.2% | 23.5% | 13.4% | 10.1% | 15.9% |
| | 3: Incomplete secondary | 43.2% | 33.7% | 35.7% | 36.5% | 31.7% | 34.3% | 39.7% | 29.5% | 27.8% | 35.1% |
| | 4: Incomplete primary | 16.5% | 21.5% | 22.5% | 24.2% | 19.3% | 22.3% | 13.4% | 17.2% | 15.8% | 18.0% |
| | 5: No schooling | 6.5% | 28.1% | 22.4% | 19.5% | 27.5% | 24.5% | 10.1% | 33.8% | 39.9% | 22.1% |

Source: Own calculations using Census 2001 data.

Table A.3: Proportion of households in each ranking category, CS 2007

| | | CS 2007 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** | **RSA** |
| Dwelling | 1: Formal house/flat | 81.9% | 51.3% | 79.6% | 68.3% | 58.0% | 66.3% | 65.3% | 71.9% | 82.1% | 66.7% |
| | 2: Single room or flatlet or traditional hut | 2.5% | 40.4% | 4.4% | 7.3% | 29.9% | 6.5% | 7.7% | 10.4% | 11.0% | 15.6% |
| | 3: Informal dwelling | 15.7% | 8.3% | 16.0% | 24.4% | 12.2% | 27.2% | 27.0% | 17.7% | 7.0% | 17.7% |
| Fuel source for cooking | 1. Electricity | 88.8% | 44.6% | 81.0% | 75.3% | 61.9% | 64.9% | 81.7% | 57.7% | 40.1% | 66.5% |
| | 2. Gas | 4.1% | 2.8% | 3.7% | 2.2% | 2.4% | 1.9% | 0.9% | 1.3% | 1.0% | 2.0% |
| | 3. Paraffin/Coal | 6.2% | 23.3% | 8.0% | 18.6% | 14.1% | 22.0% | 16.9% | 23.9% | 8.1% | 16.0% |
| | 4. Wood/Dung | 0.9% | 29.3% | 7.4% | 3.9% | 21.7% | 11.2% | 0.5% | 17.1% | 50.8% | 15.5% |
| Water | 1. Tap in dwelling | 79.5% | 29.3% | 55.6% | 46.3% | 40.2% | 32.5% | 66.5% | 37.4% | 17.4% | 47.2% |
| | 2. Tap in premises | 11.6% | 13.6% | 32.5% | 40.6% | 19.3% | 29.7% | 21.0% | 34.8% | 25.2% | 22.3% |
| | 3. Public tap | 7.8% | 27.1% | 7.0% | 10.5% | 20.7% | 27.3% | 10.6% | 17.7% | 42.3% | 19.2% |
| | 4. Other | 1.1% | 30.0% | 4.9% | 2.7% | 19.9% | 10.5% | 1.9% | 10.1% | 15.1% | 11.3% |
| Sanitation | 1: Toilet facility | 92.5% | 37.5% | 75.0% | 60.6% | 46.0% | 43.9% | 85.3% | 44.1% | 18.4% | 58.1% |
| | 2: Pit latrine | 1.4% | 36.7% | 14.0% | 23.5% | 43.1% | 46.4% | 12.1% | 48.8% | 68.5% | 31.4% |
| | 3. Bucket latrine | 2.4% | 2.7% | 5.0% | 12.7% | 0.5% | 3.7% | 1.0% | 0.5% | 0.0% | 2.2% |
| | 4. Other | 3.8% | 23.1% | 5.9% | 3.2% | 10.5% | 5.9% | 1.6% | 6.6% | 13.0% | 8.2% |
| Refuse removal | 1: Removed once a week | 90.1% | 36.1% | 77.8% | 74.4% | 51.4% | 49.0% | 85.9% | 43.5% | 16.6% | 59.9% |
| | 2: Removed less often | 1.0% | 3.0% | 2.5% | 1.7% | 1.5% | 2.0% | 1.4% | 2.1% | 1.0% | 1.7% |
| | 3: Communal refuse dump | 4.0% | 1.4% | 1.5% | 1.7% | 1.8% | 1.4% | 2.5% | 3.0% | 1.2% | 2.2% |
| | 4: Own refuse dump | 3.5% | 45.6% | 15.3% | 16.8% | 35.9% | 39.1% | 6.3% | 44.9% | 68.0% | 28.8% |
| | 5: No access | 1.4% | 14.0% | 2.9% | 5.4% | 9.3% | 8.5% | 3.8% | 6.5% | 13.2% | 7.5% |
| Telephone | 1: Landline telephone or cellphone | 84.2% | 64.4% | 68.1% | 71.7% | 76.8% | 73.5% | 84.3% | 80.0% | 71.4% | 76.8% |
| | 2: None of both | 15.8% | 35.6% | 31.9% | 28.3% | 23.3% | 26.5% | 15.7% | 20.0% | 28.6% | 23.2% |
| Education of household head | 1. Above matric | 14.9% | 7.0% | 7.6% | 7.9% | 8.1% | 6.3% | 14.8% | 7.7% | 6.9% | 10.0% |
| | 2: Matric | 17.5% | 8.9% | 13.8% | 12.7% | 13.4% | 11.5% | 20.5% | 13.2% | 9.0% | 14.4% |
| | 3: Incomplete secondary | 47.5% | 41.3% | 39.6% | 41.7% | 37.6% | 38.7% | 44.8% | 36.4% | 35.9% | 41.1% |
| | 4: Incomplete primary | 16.6% | 27.1% | 23.4% | 26.7% | 22.8% | 25.5% | 14.9% | 20.6% | 20.7% | 20.8% |
| | 5: No schooling | 3.6% | 15.8% | 15.5% | 11.0% | 18.2% | 18.0% | 5.2% | 22.2% | 27.6% | 13.8% |

Source: Own calculations using CS 2007 data.

Table A.4: Proportion of households in each ranking category, Census 2011

| | | Census 2011 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** | **RSA** |
| Dwelling | 1: Formal house/flat | 78.0% | 59.6% | 80.5% | 78.7% | 69.2% | 72.6% | 73.1% | 81.8% | 87.6% | 73.9% |
| | 2: Single room or flatlet or traditional hut | 2.9% | 31.9% | 4.9% | 4.5% | 21.6% | 5.3% | 7.2% | 6.7% | 6.8% | 11.7% |
| | 3: Informal dwelling | 19.0% | 8.5% | 14.6% | 16.7% | 9.2% | 22.1% | 19.7% | 11.5% | 5.6% | 14.4% |
| Fuel source for cooking | 1. Electricity | 86.8% | 62.5% | 78.2% | 84.7% | 69.0% | 75.5% | 84.1% | 69.5% | 50.3% | 74.1% |
| | 2. Gas | 7.5% | 4.0% | 6.1% | 2.9% | 3.6% | 2.4% | 3.1% | 1.9% | 1.5% | 3.5% |
| | 3. Paraffin/Coal | 3.8% | 13.0% | 5.6% | 8.4% | 8.0% | 11.3% | 11.7% | 10.9% | 4.6% | 9.2% |
| | 4. Wood/Dung | 1.9% | 20.6% | 10.2% | 4.0% | 19.5% | 10.8% | 1.1% | 17.7% | 43.7% | 13.2% |
| Water | 1. Tap in dwelling | 75.1% | 33.0% | 45.5% | 44.6% | 39.9% | 29.5% | 62.1% | 35.7% | 18.5% | 46.3% |
| | 2. Tap in premises | 13.2% | 16.6% | 32.4% | 44.3% | 23.9% | 40.2% | 27.3% | 35.9% | 34.0% | 27.2% |
| | 3. Public tap | 10.8% | 28.3% | 19.3% | 8.8% | 22.3% | 22.1% | 8.8% | 15.8% | 33.5% | 17.8% |
| | 4. Other | 0.9% | 22.1% | 2.8% | 2.3% | 14.0% | 8.3% | 1.8% | 12.5% | 14.0% | 8.7% |
| Sanitation | 1: Toilet facility | 90.5% | 46.2% | 66.3% | 67.7% | 53.3% | 46.6% | 86.6% | 45.3% | 23.0% | 62.7% |
| | 2: Pit latrine | 1.2% | 33.9% | 19.9% | 22.1% | 35.1% | 45.3% | 9.8% | 45.8% | 67.7% | 28.0% |
| | 3. Bucket latrine | 3.6% | 2.3% | 4.1% | 5.6% | 1.8% | 1.0% | 1.7% | 0.9% | 0.6% | 2.1% |
| | 4. Other | 4.7% | 17.6% | 9.7% | 4.7% | 9.9% | 7.2% | 1.9% | 8.1% | 8.7% | 7.3% |
| Refuse removal | 1: Removed once a week | 89.6% | 41.3% | 64.2% | 71.0% | 51.6% | 48.7% | 88.3% | 42.4% | 21.2% | 62.2% |
| | 2: Removed less often | 1.3% | 2.4% | 2.4% | 1.7% | 1.6% | 1.6% | 1.5% | 1.3% | 0.7% | 1.5% |
| | 3: Communal refuse dump | 2.8% | 1.8% | 1.8% | 2.3% | 1.6% | 1.9% | 1.8% | 2.3% | 1.4% | 1.9% |
| | 4: Own refuse dump | 4.6% | 41.5% | 41.5% | 20.0% | 38.1% | 40.5% | 6.1% | 45.2% | 65.8% | 28.1% |
| | 5: No access | 1.8% | 13.1% | 13.1% | 5.0% | 7.1% | 7.4% | 2.3% | 8.8% | 10.9% | 6.3% |
| Telephone | 1: Landline telephone or cellphone | 90.9% | 82.8% | 82.2% | 88.4% | 88.8% | 87.4% | 94.7% | 91.3% | 88.8% | 89.9% |
| | 2: None of both | 9.1% | 17.2% | 17.8% | 11.6% | 11.2% | 12.6% | 5.3% | 8.7% | 11.2% | 10.1% |
| Education of household head | 1. Above matric | 16.6% | 9.5% | 8.2% | 9.8% | 9.6% | 7.5% | 18.3% | 9.4% | 8.9% | 12.5% |
| | 2: Matric | 25.3% | 16.1% | 18.3% | 21.9% | 22.9% | 20.4% | 29.8% | 22.2% | 16.8% | 23.2% |
| | 3: Incomplete secondary | 42.2% | 39.2% | 38.3% | 38.3% | 34.1% | 37.1% | 37.1% | 33.4% | 35.6% | 37.1% |
| | 4: Incomplete primary | 12.9% | 21.8% | 20.9% | 20.7% | 18.1% | 20.7% | 10.3% | 15.4% | 15.2% | 15.7% |
| | 5: No schooling | 3.1% | 13.5% | 14.4% | 9.3% | 15.3% | 14.3% | 4.6% | 19.7% | 23.5% | 11.5% |

Source: Own calculations using Census 2011 data.

Table A.5: Proportion of households in each ranking category, CS 2016

| | | CS 2016 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** | **RSA** |
| Dwelling | 1: Formal house/flat | 79.5% | 60.8% | 77.7% | 77.4% | 66.2% | 69.8% | 70.6% | 77.7% | 81.8% | 71.9% |
| | 2: Single room or flatlet or traditional hut | 3.4% | 30.9% | 8.1% | 7.9% | 24.6% | 10.3% | 11.0% | 10.2% | 12.2% | 14.3% |
| | 3: Informal dwelling | 17.1% | 8.3% | 14.1% | 14.7% | 9.2% | 20.0% | 18.4% | 12.1% | 6.0% | 13.8% |
| Fuel source for cooking | 1. Electricity | 90.1% | 77.1% | 83.3% | 90.8% | 82.0% | 84.0% | 87.9% | 79.8% | 64.0% | 83.0% |
| | 2. Gas | 7.4% | 3.9% | 7.0% | 2.7% | 2.3% | 1.8% | 2.4% | 1.3% | 1.2% | 3.0% |
| | 3. Paraffin/Coal | 1.6% | 7.2% | 2.4% | 3.9% | 3.2% | 7.6% | 9.0% | 6.6% | 2.6% | 5.7% |
| | 4. Wood/Dung | 0.9% | 11.9% | 7.2% | 2.6% | 12.5% | 6.6% | 0.8% | 12.3% | 32.2% | 8.4% |
| Water | 1. Tap in dwelling | 77.0% | 33.7% | 43.8% | 37.9% | 37.6% | 24.1% | 60.1% | 29.1% | 13.2% | 44.6% |
| | 2. Tap in premises | 11.6% | 18.0% | 33.5% | 52.6% | 28.8% | 39.7% | 29.7% | 44.3% | 35.8% | 30.0% |
| | 3. Public tap | 10.2% | 22.4% | 15.9% | 4.3% | 17.4% | 17.7% | 7.2% | 10.5% | 24.7% | 13.5% |
| | 4. Other | 1.3% | 25.9% | 6.9% | 5.2% | 16.3% | 18.4% | 3.0% | 16.1% | 26.3% | 11.9% |
| Sanitation | 1: Toilet facility | 94.6% | 52.7% | 69.5% | 74.3% | 61.6% | 48.7% | 87.8% | 49.2% | 25.3% | 67.8% |
| | 2: Pit latrine | 0.4% | 37.4% | 19.5% | 18.1% | 31.1% | 45.3% | 8.4% | 43.8% | 67.8% | 26.0% |
| | 3. Bucket latrine | 3.6% | 2.2% | 4.3% | 4.0% | 1.8% | 0.7% | 2.7% | 0.9% | 0.7% | 2.2% |
| | 4. Other | 1.4% | 7.7% | 6.7% | 3.6% | 5.6% | 5.3% | 1.1% | 6.1% | 6.3% | 4.0% |
| Refuse removal | 1: Removed once a week | 86.9% | 41.7% | 61.9% | 69.7% | 47.9% | 54.8% | 83.5% | 39.6% | 22.0% | 61.2% |
| | 2: Removed less often | 3.0% | 2.2% | 2.8% | 3.8% | 3.2% | 3.1% | 3.1% | 3.3% | 1.4% | 2.9% |
| | 3: Communal refuse dump | 6.4% | 4.7% | 4.6% | 4.3% | 5.0% | 4.3% | 5.3% | 5.4% | 3.8% | 5.0% |
| | 4: Own refuse dump | 2.2% | 44.0% | 24.1% | 17.5% | 38.6% | 32.4% | 4.3% | 43.8% | 66.1% | 25.9% |
| | 5: No access | 1.5% | 7.4% | 6.7% | 4.7% | 5.4% | 5.4% | 3.8% | 8.0% | 6.8% | 5.0% |
| Telephone | 1: Landline telephone or cellphone | 94.3% | 91.7% | 88.0% | 93.2% | 94.8% | 93.2% | 96.2% | 95.1% | 94.6% | 94.5% |
| | 2: None of both | 5.7% | 8.3% | 12.0% | 6.8% | 5.2% | 6.8% | 3.8% | 4.9% | 5.4% | 5.5% |
| Education of household head | 1. Above matric | 14.2% | 8.9% | 8.0% | 9.5% | 9.9% | 7.3% | 15.2% | 8.6% | 9.1% | 11.4% |
| | 2: Matric | 29.4% | 20.4% | 23.1% | 26.2% | 29.6% | 25.0% | 33.3% | 28.6% | 21.8% | 28.2% |
| | 3: Incomplete secondary | 42.2% | 43.7% | 40.3% | 40.2% | 34.0% | 40.2% | 37.3% | 34.4% | 38.1% | 38.3% |
| | 4: Incomplete primary | 11.1% | 16.6% | 18.1% | 16.5% | 14.2% | 16.7% | 9.3% | 12.7% | 12.6% | 12.8% |
| | 5: No schooling | 3.0% | 10.2% | 10.6% | 7.7% | 12.3% | 10.8% | 5.0% | 15.8% | 18.5% | 9.3% |

Source: Own calculations using CS 2016 data.

Table A.6: Average vertical weight in each dimension, 1996 - 2016

| | WC | EC | NC | FS | KZN | NW | GAU | MPU | LIM | RSA |
|---|---|---|---|---|---|---|---|---|---|---|
| **Census 1996** | | | | | | | | | | |
| Dwelling | 0.2126 | 0.3989 | 0.2104 | 0.3660 | 0.3569 | 0.3132 | 0.3286 | 0.3081 | 0.2760 | 0.3228 |
| Energy | 0.1259 | 0.6151 | 0.2967 | 0.3402 | 0.4181 | 0.4330 | 0.1441 | 0.4574 | 0.7223 | 0.3842 |
| Water | 0.1209 | 0.6356 | 0.2377 | 0.2991 | 0.4815 | 0.4476 | 0.1651 | 0.3810 | 0.5567 | 0.3765 |
| Sanitation | 0.1166 | 0.5751 | 0.3165 | 0.4068 | 0.4363 | 0.4732 | 0.1247 | 0.4403 | 0.6428 | 0.3753 |
| Refuse | 0.1030 | 0.5588 | 0.2121 | 0.2598 | 0.4515 | 0.4879 | 0.1049 | 0.4688 | 0.7031 | 0.3673 |
| Telephone | 0.4504 | 0.8586 | 0.6945 | 0.7702 | 0.7315 | 0.8334 | 0.5487 | 0.8181 | 0.9265 | 0.7169 |
| Education | 0.4752 | 0.6507 | 0.6251 | 0.5986 | 0.6342 | 0.6465 | 0.4877 | 0.6671 | 0.7150 | 0.5976 |
| **Census 2001** | | | | | | | | | | |
| | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** | **RSA** |
| Dwelling | 0.1928 | 0.3365 | 0.1657 | 0.3249 | 0.2859 | 0.2721 | 0.2984 | 0.2514 | 0.1898 | 0.2726 |
| Energy | 0.1145 | 0.5584 | 0.2651 | 0.3198 | 0.3946 | 0.3789 | 0.1455 | 0.4321 | 0.6758 | 0.3522 |
| Water | 0.1951 | 0.6526 | 0.3309 | 0.4440 | 0.5355 | 0.5451 | 0.2890 | 0.5089 | 0.6510 | 0.4589 |
| Sanitation | 0.1175 | 0.5243 | 0.2609 | 0.3856 | 0.3894 | 0.4370 | 0.1230 | 0.4153 | 0.6001 | 0.3416 |
| Refuse | 0.0764 | 0.5190 | 0.2184 | 0.3061 | 0.4131 | 0.5086 | 0.0992 | 0.4918 | 0.7101 | 0.3520 |
| Telephone | 0.3697 | 0.7105 | 0.5874 | 0.6493 | 0.6117 | 0.6558 | 0.4397 | 0.6183 | 0.7176 | 0.5764 |
| Education | 0.4673 | 0.6500 | 0.6174 | 0.6062 | 0.6234 | 0.6289 | 0.4655 | 0.6564 | 0.6914 | 0.5819 |
| **Community Survey 2007** | | | | | | | | | | |
| | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** | **RSA** |
| Dwelling | 0.1685 | 0.2730 | 0.1806 | 0.2782 | 0.2618 | 0.3026 | 0.3061 | 0.2256 | 0.1213 | 0.2498 |
| Energy | 0.0450 | 0.4199 | 0.1190 | 0.1404 | 0.2936 | 0.2311 | 0.0962 | 0.2998 | 0.5519 | 0.2425 |
| Water | 0.1212 | 0.5705 | 0.2412 | 0.2804 | 0.4425 | 0.4449 | 0.1905 | 0.3869 | 0.5894 | 0.3582 |
| Sanitation | 0.0673 | 0.5282 | 0.2049 | 0.3106 | 0.4320 | 0.4379 | 0.1152 | 0.4363 | 0.6449 | 0.3360 |
| Refuse | 0.0466 | 0.5136 | 0.1561 | 0.1933 | 0.3879 | 0.4054 | 0.0924 | 0.4341 | 0.6875 | 0.3117 |
| Telephone | 0.1582 | 0.3562 | 0.3188 | 0.2833 | 0.2325 | 0.2647 | 0.1572 | 0.1996 | 0.2858 | 0.2322 |
| Education | 0.4968 | 0.6557 | 0.6195 | 0.6133 | 0.6275 | 0.6528 | 0.4858 | 0.6417 | 0.6864 | 0.5896 |

Table A.6: Continued

| Census 2011 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** | **RSA** |
| Dwelling | 0.2034 | 0.2284 | 0.1681 | 0.1877 | 0.1891 | 0.2445 | 0.2293 | 0.1452 | 0.0868 | 0.1964 |
| Energy | 0.0476 | 0.2750 | 0.1375 | 0.0854 | 0.2392 | 0.1668 | 0.0733 | 0.2333 | 0.4612 | 0.1819 |
| Water | 0.1660 | 0.5420 | 0.3537 | 0.3209 | 0.4472 | 0.4714 | 0.2299 | 0.4398 | 0.5929 | 0.3739 |
| Sanitation | 0.0853 | 0.4483 | 0.2794 | 0.2573 | 0.3759 | 0.4191 | 0.1063 | 0.4312 | 0.5999 | 0.2989 |
| Refuse | 0.0592 | 0.4792 | 0.2799 | 0.2196 | 0.3905 | 0.4134 | 0.0765 | 0.4669 | 0.6586 | 0.2999 |
| Telephone | 0.0909 | 0.1724 | 0.1784 | 0.1157 | 0.1119 | 0.1258 | 0.0526 | 0.0872 | 0.1124 | 0.1014 |
| Education | 0.5005 | 0.6365 | 0.6371 | 0.5947 | 0.6060 | 0.6324 | 0.4698 | 0.6192 | 0.6563 | 0.5686 |
| **Community Survey 2016** | | | | | | | | | | |
| | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** | **RSA** |
| Dwelling | 0.1879 | 0.2400 | 0.1825 | 0.1875 | 0.2172 | 0.2515 | 0.2395 | 0.1731 | 0.1218 | 0.2107 |
| Energy | 0.0297 | 0.1621 | 0.0970 | 0.0506 | 0.1455 | 0.1075 | 0.0575 | 0.1588 | 0.3375 | 0.1179 |
| Water | 0.1554 | 0.5319 | 0.3743 | 0.3701 | 0.4546 | 0.5382 | 0.2472 | 0.4827 | 0.6509 | 0.3875 |
| Sanitation | 0.0486 | 0.3974 | 0.2618 | 0.2168 | 0.3220 | 0.4241 | 0.1025 | 0.4217 | 0.6150 | 0.2690 |
| Refuse | 0.0497 | 0.4688 | 0.2879 | 0.2107 | 0.4023 | 0.3474 | 0.0885 | 0.4751 | 0.6524 | 0.2880 |
| Telephone | 0.0572 | 0.0828 | 0.1198 | 0.0678 | 0.0520 | 0.0682 | 0.0376 | 0.0491 | 0.0544 | 0.0551 |
| Education | 0.5403 | 0.6446 | 0.6437 | 0.6092 | 0.5996 | 0.6388 | 0.5183 | 0.6199 | 0.6525 | 0.5846 |

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Table A.7: Comparability of district councils across censuses and community surveys, 1996 - 2016

| Census 1996 | | Census 2001 | | CS 2007 | | Census 2011 | | CS 2016 | |
|---|---|---|---|---|---|---|---|---|---|
| **Western Cape** | | | | | | | | | |
| **Code** | **Name** | **Code** | **Name** | **Code** | **Name** | **Code** | **Name** | **Code** | **Name** |
| 1001 | Breede River | 1 | West Coast | 1 | West Coast | 101 | West Coast | 1 | West Coast |
| 1002 | Klein Karoo | 2 | Boland | 2 | Boland | 102 | Cape Winelands | 2 | Cape Winelands [(a)] |
| 1003 | Cape Metro | 3 | Overberg | 3 | Overberg | 103 | Overberg | 3 | Overberg |
| 1004 | Overberg | 4 | Eden | 4 | Eden | 104 | Eden | 4 | Eden |
| 1005 | Sentrale Karoo | 5 | Central Karoo | 5 | Central Karoo | 105 | Central Karoo | 5 | Central Karoo |
| 1006 | South Cape | 171 | City of Cape Town | 171 | City of Cape Town | 199 | City of Cape Town | CPT | City of Cape Town |
| 1007 | West Coast | | | | | | | | |
| 1008 | Winelands | | | | | | | | |
| **Eastern Cape** | | | | | | | | | |
| 2001 | Amatola | 10 | Cacadu | 10 | Cacadu | 210 | Cacadu | 10 | Cacadu |
| 2002 | Drakensberg | 12 | Amatole | 12 | Amatole | 212 | Amathole | 12 | Amathole |
| 2003 | Wild Coast | 13 | Chris Hani | 13 | Chris Hani | 213 | Chris Hani | 13 | Chris Hani |
| 2004 | Stromber | 14 | Ukhahlamba | 14 | Ukhahlamba | 214 | Ukhahlamba | 14 | Joe Gqabi [(b)] |
| 2005 | Western Region | 15 | O.R. Tambo | 15 | O.R. Tambo | 215 | O.R. Tambo | 15 | O.R. Tambo |
| 2006 | Kei | 44 | Alfred Nzo | 44 | Alfred Nzo | 244 | Alfred Nzo | 44 | Alfred Nzo |
| | | 275 | Port Elizabeth | 275 | Port Elizabeth | 260 | Buffalo City [(c)] | BUF | Buffalo City [(c)] |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 299 | Nelson Mandela Bay [d] | NMA | Nelson Mandela Bay [d] |

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Note:

a) Formerly known as Boland
b) Formerly known as Ukhahlamba
c) Buffalo City was separated from Amathole district since 2011.
d) Formerly known as Port Elizabeth.

Table A.8: Mean deprivation by district council for WC, 1996 - 2007

| Western Cape | | |
|---|---|---|
| **Code** | **District Council name** | **Census 1996** |
| 1001 | Breede River | 0.2181 |
| 1002 | Klein Karoo | 0.2821 |
| 1003 | Cape Metro | 0.1577 |
| 1004 | Overberg | 0.2309 |
| 1005 | Sentrale Karoo | 0.2835 |
| 1006 | South Cape | 0.2409 |
| 1007 | West Coast | 0.2122 |
| 1008 | Winelands | 0.1928 |
| | | |
| **Code** | **District Council name** | **Census 2001** |
| 1 | West Coast | 0.1991 |
| 2 | Boland | 0.2042 |
| 3 | Overberg | 0.2043 |
| 4 | Eden | 0.2290 |
| 5 | Central Karoo | 0.2271 |
| 171 | City of Cape Town | 0.1628 |
| | | |
| **Code** | **District Council name** | **CS 2007** |
| 1 | West Coast | 0.1185 |
| 2 | Boland | 0.1482 |
| 3 | Overberg | 0.1270 |
| 4 | Eden | 0.1714 |
| 5 | Central Karoo | 0.1581 |
| 171 | City of Cape Town | 0.1126 |

Source: Own calculations using Census 1996, Census 2001, and CS 2007 data.

Table A.9: Mean deprivation by district council for EC, 1996 - 2007

| Eastern Cape | | |
|---|---|---|
| **Code** | **District Council name** | **Census 1996** |
| 2001 | Amatole | 0.5897 |
| 2002 | Drakensberg | 0.6396 |
| 2003 | Wild Coast | 0.7799 |
| 2004 | Stormberg | 0.6003 |
| 2005 | Western Region | 0.2619 |
| 2006 | Kei | 0.7879 |
| | | |
| **Code** | **District Council name** | **Census 2001** |
| 10 | Cacadu | 0.3550 |
| 12 | Amatole | 0.5376 |
| 13 | Chris Hani | 0.6023 |
| 14 | Ukhahlamba | 0.6143 |
| 15 | O.R. Tambo | 0.7409 |
| 44 | Alfred Nzo | 0.7188 |
| 275 | Port Elizabeth | 0.2275 |
| | | |
| **Code** | **District Council name** | **CS 2007** |
| 10 | Cacadu | 0.2143 |
| 12 | Amatole | 0.4435 |
| 13 | Chris Hani | 0.4913 |
| 14 | Ukhahlamba | 0.5156 |
| 15 | O.R. Tambo | 0.6424 |
| 44 | Alfred Nzo | 0.6161 |
| 275 | Port Elizabeth | 0.1567 |

Source: Own calculations based on Census 1996, Census 2001, and CS 2007 data.

Table A.10: Mean deprivation by municipality for WC, Census 2001

| Western Cape | | |
|---|---|---|
| **Code** | **Municipality name** | **Census 2001** |
| 101 | Matzikama | 0.2295 |
| 102 | Cederberg | 0.2476 |
| 103 | Bergrivier | 0.2109 |
| 104 | Saldanha Bay | 0.1367 |
| 105 | Swartland | 0.1981 |
| 106 | Witzenberg | 0.2235 |
| 107 | Drakenstein | 0.1921 |
| 108 | Stellenbosch | 0.1919 |
| 109 | Breede Valley | 0.1958 |
| 110 | Breede River/Winelands | 0.2330 |
| 111 | Theewaterskloof | 0.2337 |
| 112 | Overstrand | 0.1685 |
| 113 | Cape Agulhas | 0.1626 |
| 114 | Swellendam | 0.2209 |
| 115 | Kannaland | 0.2924 |
| 116 | Langeberg | 0.2174 |
| 117 | Mossel Bay | 0.1778 |
| 118 | George | 0.2066 |
| 119 | Oudtshoorn | 0.2435 |
| 120 | Plettenberg Bay | 0.2334 |
| 121 | Knysna | 0.2673 |
| 122 | Laingsburg | 0.2855 |
| 123 | Prince Albert | 0.2544 |
| 124 | Beaufort West | 0.1908 |
| 171 | City of Cape Town | 0.1628 |
| 191 | West Coast | 0.3244 |
| 192 | Breede River | 0.3544 |
| 194 | South Cape | 0.3816 |
| 195 | Central Karoo | 0.3282 |

Source: Own calculations using Census 2001 data.

Table A.11: Mean deprivation by municipality for EC, Census 2001

| Eastern Cape | | |
|---|---|---|
| **Code** | **Municipality name** | **Census 2001** |
| 201 | Camdeboo | 0.2552 |
| 202 | Blue Crane Route | 0.3718 |
| 203 | Ikwezi | 0.3735 |
| 204 | Makana | 0.3613 |
| 205 | Ndlambe | 0.3990 |
| 206 | Sunday's River Valley | 0.4729 |
| 207 | Baviaans | 0.3679 |
| 208 | Kouga | 0.3046 |
| 209 | Kou-Kamma | 0.3036 |
| 210 | Mbhashe | 0.7976 |
| 211 | Mnquma | 0.6937 |
| 212 | Great Kei | 0.6544 |
| 213 | Amahlathi | 0.6070 |
| 214 | Buffalo City | 0.3452 |
| 215 | Ngqushwa | 0.6400 |
| 216 | Nkonkobe | 0.5590 |
| 217 | Nxuba | 0.4153 |
| 218 | Inxuba Yethemba | 0.2518 |
| 219 | Tsolwana | 0.5636 |
| 220 | Inkwanca | 0.3703 |
| 221 | Lukanji | 0.3967 |
| 222 | Itsika Yethu | 0.7601 |
| 223 | Emalahleni | 0.6849 |
| 224 | Engcobo | 0.7843 |
| 225 | Sakhisizwe | 0.5656 |
| 226 | Elundini | 0.7182 |
| 227 | Senqu | 0.6153 |
| 228 | Maletswai | 0.4205 |
| 229 | Gariep | 0.3816 |

Table A.11: Continued

| Eastern Cape | | |
|---|---|---|
| **Code** | **Municipality name** | **Census 2001** |
| 230 | Mbizana | 0.7505 |
| 231 | Ntabankulu | 0.8011 |
| 232 | Qaukeni | 0.7578 |
| 233 | Port St Johns | 0.8081 |
| 234 | Nyandeni | 0.7733 |
| 235 | Mhlontlo | 0.7542 |
| 236 | King Sabata Dalindyebo | 0.6522 |
| 237 | Umzimkhulu | 0.7169 |
| 238 | Umzimvubu | 0.7197 |
| 275 | Nelson Mandela | 0.2275 |
| 291 | Aberdeen Plain | 0.4913 |

Source: Own calculations using Census 2001 data.

Table A.12: Mean deprivation by municipality for WC, CS 2007

| Code | CS 2007 |
|---|---|
| 101 | 0.1448 |
| 102 | 0.1671 |
| 103 | 0.1249 |
| 104 | 0.0719 |
| 105 | 0.1134 |
| 106 | 0.1982 |
| 107 | 0.1591 |
| 108 | 0.1058 |
| 109 | 0.1422 |
| 110 | 0.1476 |
| 111 | 0.1510 |
| 112 | 0.1026 |
| 113 | 0.1170 |
| 114 | 0.1272 |
| 115 | 0.2351 |
| 116 | 0.1313 |
| 117 | 0.1225 |
| 118 | 0.1699 |
| 119 | 0.1818 |
| 120 | 0.1852 |
| 121 | 0.2136 |
| 122 | 0.2059 |
| 123 | 0.1907 |
| 124 | 0.1309 |
| 171 | 0.1126 |
| 191 | 0.2194 |
| 192 | 0.2923 |
| 193 | 0.0303 |
| 194 | 0.2460 |
| 195 | 0.2212 |

Source: Own calculations using CS 2007 data.

Table A.13: Mean deprivation by municipality for EC, CS 2007

| Code | CS 2007 |
|---|---|
| 201 | 0.1357 |
| 202 | 0.2585 |
| 203 | 0.2536 |
| 204 | 0.2113 |
| 205 | 0.2463 |
| 206 | 0.2698 |
| 207 | 0.2221 |
| 208 | 0.1475 |
| 209 | 0.2621 |
| 210 | 0.7132 |
| 211 | 0.5566 |
| 212 | 0.4963 |
| 213 | 0.4937 |
| 214 | 0.2729 |
| 215 | 0.5284 |
| 216 | 0.4715 |
| 217 | 0.2881 |
| 218 | 0.1775 |
| 219 | 0.4553 |
| 220 | 0.2314 |
| 221 | 0.2622 |
| 222 | 0.6406 |
| 223 | 0.5792 |
| 224 | 0.6771 |
| 225 | 0.4867 |
| 226 | 0.6395 |
| 227 | 0.5274 |
| 228 | 0.2549 |
| 229 | 0.2444 |
| 230 | 0.6832 |

Table A.13: Continued

| Code | CS 2007 |
|---|---|
| 231 | 0.7027 |
| 232 | 0.6925 |
| 233 | 0.7027 |
| 234 | 0.6597 |
| 235 | 0.6577 |
| 236 | 0.5217 |
| 237 | 0.6293 |
| 238 | 0.6094 |
| 275 | 0.1567 |
| 291 | 0.3313 |

Source: Own calculations using CS 2007 data.

Table A.14: p-values and t-values of OLS regression for Census 1996

| Census 1996 | | | |
|---|---|---|---|
| | | **Prob > F** | 0.0000 |
| **Variable** | **Coefficient** | **t** | **P > \| t \|** |
| Gender: Female | 0.0150 | 30.58 | 0.000 |
| Race: Black | 0.2357 | 267.64 | 0.000 |
| Race: Coloured | 0.0047 | 3.91 | 0.000 |
| Race: Indian | -0.1341 | -83.44 | 0.000 |
| Province: Eastern Cape | 0.2017 | 185.50 | 0.000 |
| Province: Northern Cape | 0.0404 | 23.01 | 0.000 |
| Province: Free State | 0.0237 | 18.50 | 0.000 |
| Province: KwaZulu-Natal | 0.1496 | 138.94 | 0.000 |
| Province: North West | 0.0802 | 65.20 | 0.000 |
| Province: Gauteng | -0.0715 | -68.12 | 0.000 |
| Province: Mpumalanga | 0.0651 | 50.90 | 0.000 |
| Province: Limpopo | 0.1782 | 152.73 | 0.000 |
| Education spline: Incomplete primary | -0.0161 | -132.73 | 0.000 |
| Education spline: Incomplete secondary | -0.0277 | -137.13 | 0.000 |
| Education: Matric | -0.0529 | -53.37 | 0.000 |
| Education: Matric + Cert/Dip | -0.0371 | -49.87 | 0.000 |
| Education: Degree | 0.0187 | 16.00 | 0.000 |
| Household Size | -0.0023 | -29.32 | 0.000 |
| Constant | 0.3081 | 242.31 | 0.000 |
| | | | |
| R-squared | 0.5553 | | |
| Adjusted R-squared | 0.5553 | | |
| Number of observations | 802181 | | |

Source: Own calculations using Census 1996 data.

Table A.15: p-values and t-values of OLS regression for Census 2001

| Census 2001 | | | |
|---|---|---|---|
| | | **Prob > F** | 0.0000 |
| **Variable** | **Coefficient** | **t** | **P > \| t \|** |
| Gender: Female | 0.0080 | 18.24 | 0.000 |
| Race: Black | 0.2012 | 232.69 | 0.000 |
| Race: Coloured | -0.0014 | -1.18 | 0.236 |
| Race: Indian | -0.1059 | -68.87 | 0.000 |
| Province: Eastern Cape | 0.1838 | 183.55 | 0.000 |
| Province: Northern Cape | 0.0322 | 18.85 | 0.000 |
| Province: Free State | 0.0371 | 30.92 | 0.000 |
| Province: KwaZulu-Natal | 0.1220 | 123.18 | 0.000 |
| Province: North West | 0.0824 | 72.60 | 0.000 |
| Province: Gauteng | -0.0489 | -51.22 | 0.000 |
| Province: Mpumalanga | 0.0720 | 60.70 | 0.000 |
| Province: Limpopo | 0.1776 | 164.66 | 0.000 |
| Education spline: Incomplete primary | -0.0187 | -160.86 | 0.000 |
| Education spline: Incomplete secondary | -0.0223 | -117.68 | 0.000 |
| Education: Matric | -0.0675 | -78.60 | 0.000 |
| Education: Matric + Cert/Dip | -0.0395 | -64.05 | 0.000 |
| Education: Degree | 0.0075 | 10.36 | 0.000 |
| Household Size | -0.0026 | -35.28 | 0.000 |
| Constant | 0.3236 | 262.43 | 0.000 |
| | | | |
| R-squared | 0.5232 | | |
| Adjusted R-squared | 0.5232 | | |
| Number of observations | 905619 | | |

Source: Own calculations using Census 2001 data.

Table A.16: p-values and t-values of OLS regression for CS 2007

| CS 2007 | | | |
|---|---|---|---|
| | | **Prob > F** | 0.0000 |
| **Variable** | **Coefficient** | **t** | **P > \| t \|** |
| Gender: Female | 0.0027 | 3.19 | 0.001 |
| Race: Black | 0.1426 | 91.00 | 0.000 |
| Race: Coloured | -0.0055 | -2.57 | 0.010 |
| Race: Indian | -0.0859 | -29.67 | 0.000 |
| Province: Eastern Cape | 0.2034 | 111.31 | 0.000 |
| Province: Northern Cape | 0.0488 | 15.26 | 0.000 |
| Province: Free State | 0.0133 | 5.96 | 0.000 |
| Province: KwaZulu-Natal | 0.1347 | 75.67 | 0.000 |
| Province: North West | 0.0876 | 41.66 | 0.000 |
| Province: Gauteng | -0.0154 | -9.04 | 0.000 |
| Province: Mpumalanga | 0.0799 | 37.45 | 0.000 |
| Province: Limpopo | 0.1964 | 99.87 | 0.000 |
| Education spline: Incomplete primary | -0.0184 | -79.15 | 0.000 |
| Education spline: Incomplete secondary | -0.0209 | -67.95 | 0.000 |
| Education: Matric | -0.0571 | -37.85 | 0.000 |
| Education: Matric + Cert/Dip | -0.0325 | -26.92 | 0.000 |
| Education: Degree | 0.0067 | 5.14 | 0.000 |
| Household Size | -0.0044 | -29.67 | 0.000 |
| Constant | 0.2841 | 122.82 | 0.000 |
| | | | |
| R-squared | 0.4541 | | |
| Adjusted R-squared | 0.4540 | | |
| Number of observations | 242027 | | |

Source: Own calculations using CS 2007 data.

Table A.17: p-values and t-values of OLS regression for Census 2011

| Census 2011 | | | |
|---|---|---|---|
| | | **Prob > F** | 0.0000 |
| **Variable** | **Coefficient** | **t** | **P > \| t \|** |
| Gender: Female | 0.0004 | 1.21 | 0.225 |
| Race: Black | 0.1097 | 175.66 | 0.000 |
| Race: Coloured | -0.0027 | -3.22 | 0.001 |
| Race: Indian | -0.0660 | -55.70 | 0.000 |
| Province: Eastern Cape | 0.1361 | 185.50 | 0.000 |
| Province: Northern Cape | 0.0529 | 44.15 | 0.000 |
| Province: Free State | -0.0093 | -10.25 | 0.000 |
| Province: KwaZulu-Natal | 0.0976 | 137.51 | 0.000 |
| Province: North West | 0.0686 | 80.17 | 0.000 |
| Province: Gauteng | -0.0326 | -48.75 | 0.000 |
| Province: Mpumalanga | 0.0682 | 81.30 | 0.000 |
| Province: Limpopo | 0.1618 | 205.80 | 0.000 |
| Education spline: Incomplete primary | -0.0139 | -135.19 | 0.000 |
| Education spline: Incomplete secondary | -0.0133 | -96.85 | 0.000 |
| Education: Matric | -0.0596 | -107.86 | 0.000 |
| Education: Matric + Cert/Dip | -0.0363 | -74.92 | 0.000 |
| Education: Degree | 0.0057 | 10.93 | 0.000 |
| Household Size | -0.0038 | -61.40 | 0.000 |
| Constant | 0.2474 | 267.14 | 0.000 |
| | | | |
| R-squared | 0.3907 | | |
| Adjusted R-squared | 0.3907 | | |
| Number of observations | 1194096 | | |

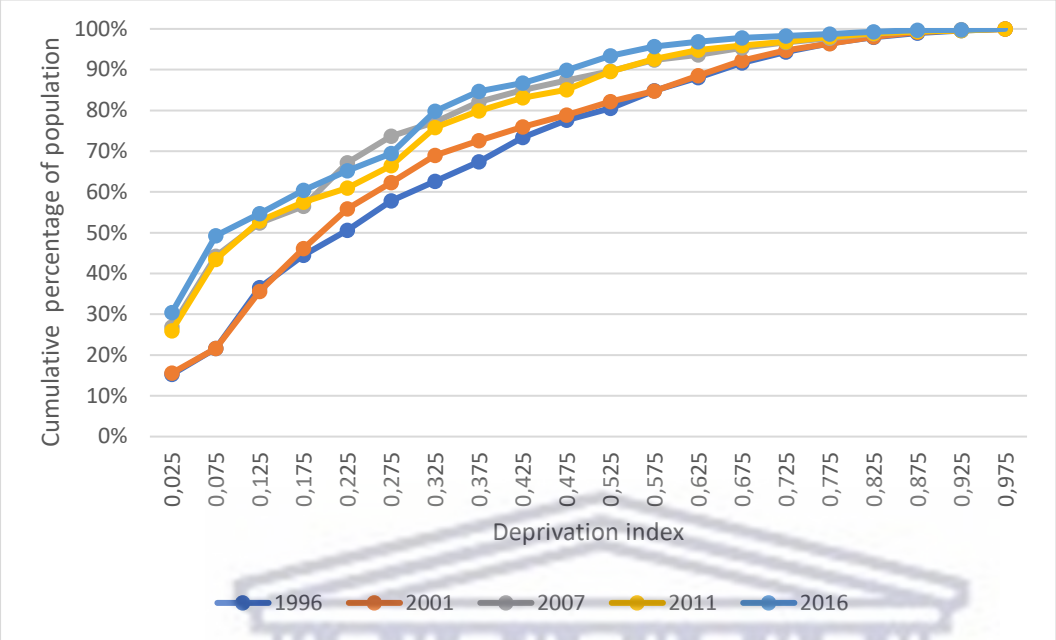
Source: Own calculations using Census 2011 data.

Table A.18: p-values and t-values of OLS regression for CS 2016

| CS 2016 | | | |
|---|---|---|---|
| | | **Prob > F** | 0.0000 |
| **Variable** | **Coefficient** | **t** | **P > \| t \|** |
| Gender: Female | 0.0032 | 9.56 | 0.000 |
| Race: Black | 0.0879 | 129.05 | 0.000 |
| Race: Coloured | -0.0049 | -5.43 | 0.000 |
| Race: Indian | -0.0610 | -46.36 | 0.000 |
| Province: Eastern Cape | 0.1224 | 160.60 | 0.000 |
| Province: Northern Cape | 0.0741 | 61.89 | 0.000 |
| Province: Free State | 0.0121 | 13.20 | 0.000 |
| Province: KwaZulu-Natal | 0.1034 | 144.05 | 0.000 |
| Province: North West | 0.0785 | 92.23 | 0.000 |
| Province: Gauteng | -0.0119 | -18.00 | 0.000 |
| Province: Mpumalanga | 0.0944 | 111.97 | 0.000 |
| Province: Limpopo | 0.1860 | 232.83 | 0.000 |
| Education spline: Incomplete primary | -0.0100 | -88.12 | 0.000 |
| Education spline: Incomplete secondary | -0.0079 | -57.14 | 0.000 |
| Education: Matric | -0.0575 | -112.07 | 0.000 |
| Education: Matric + Cert/Dip | -0.0301 | -63.97 | 0.000 |
| Education: Degree | 0.0042 | 7.75 | 0.000 |
| Household Size | -0.0015 | -23.70 | 0.000 |
| Constant | 0.1777 | 181.76 | 0.000 |
| | | | |
| R-squared | 0.3374 | | |
| Adjusted R-squared | 0.3374 | | |
| Number of observations | 945018 | | |

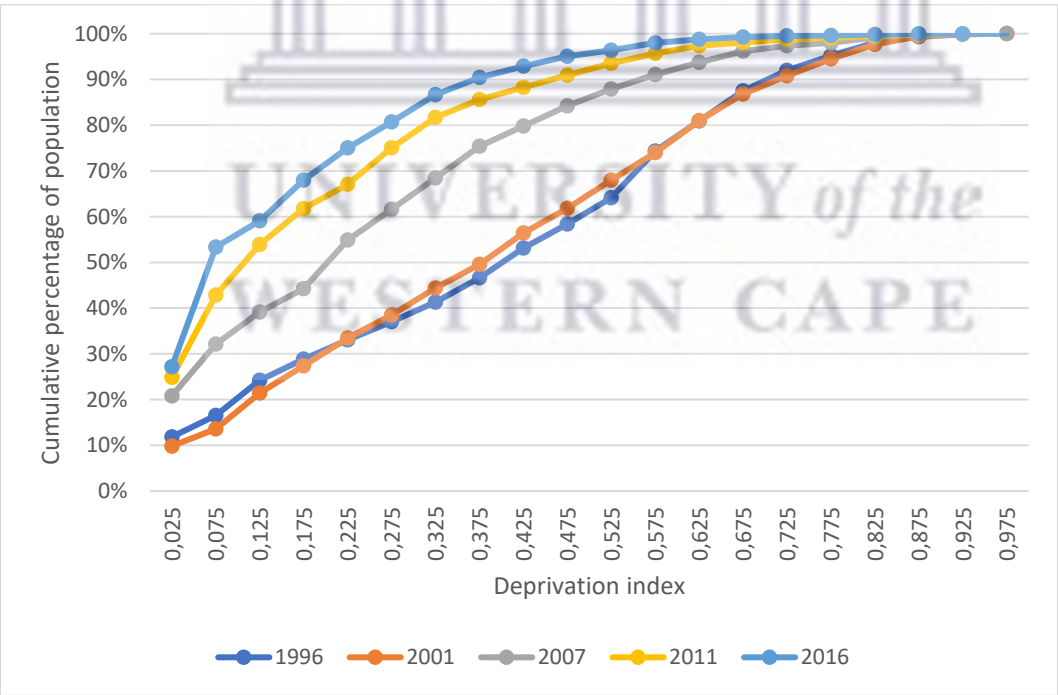
Source: Own calculations using CS 2016 data.

Figure A.1: Cumulative distributive functions in Northern Cape, 1996 - 2016



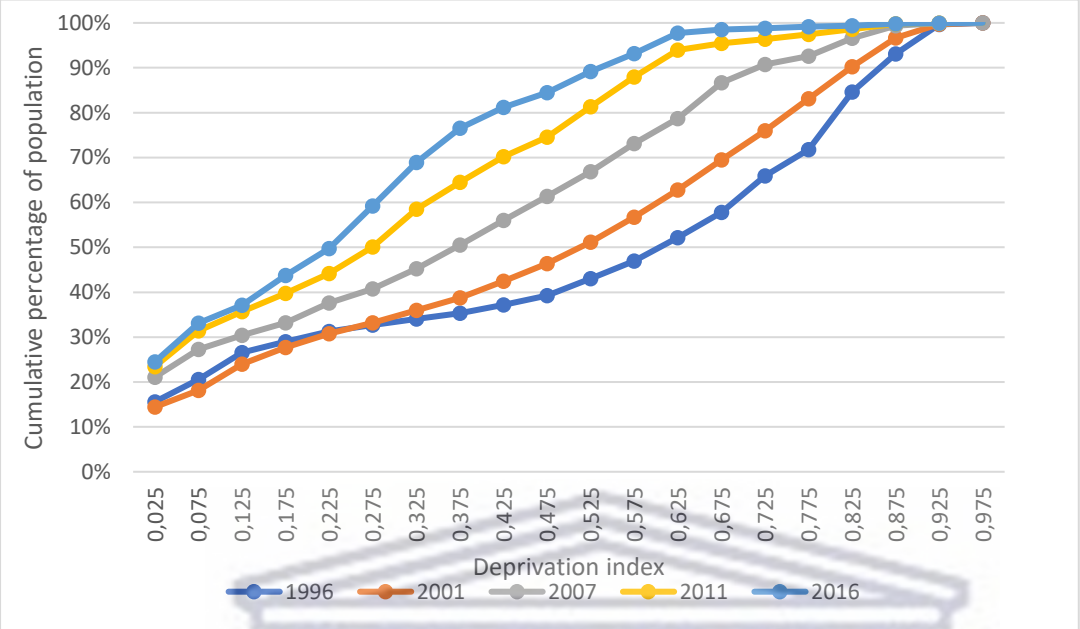

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Figure A.2: Cumulative distributive functions in Free State, 1996 - 2016



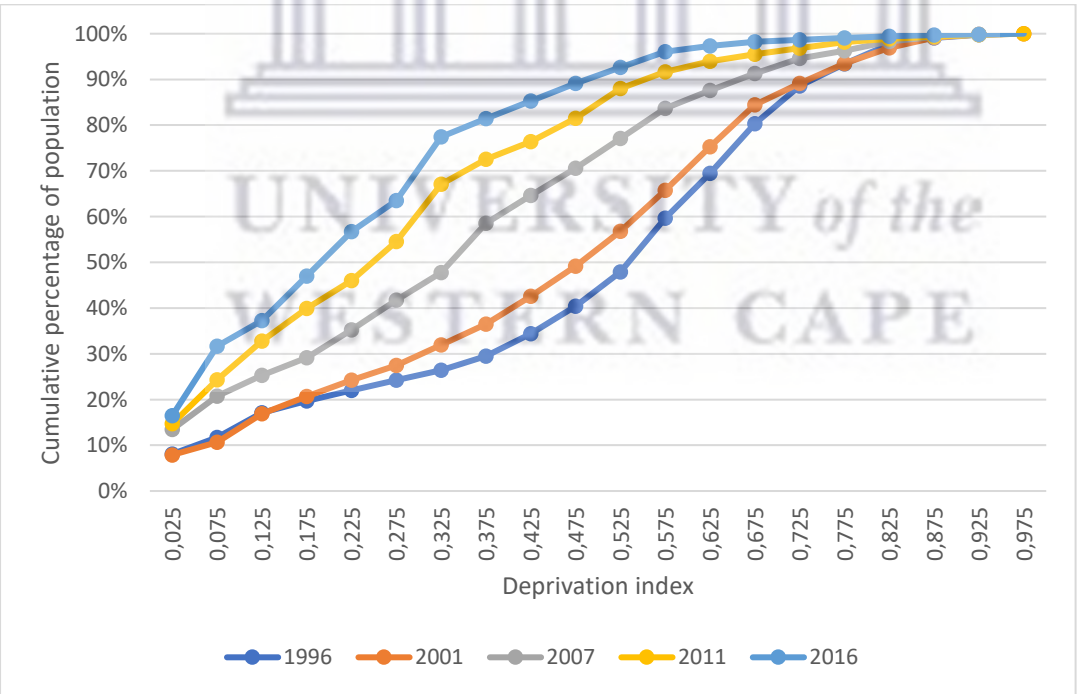

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Figure A.3: Cumulative distributive functions in KwaZulu-Natal, 1996 - 2016



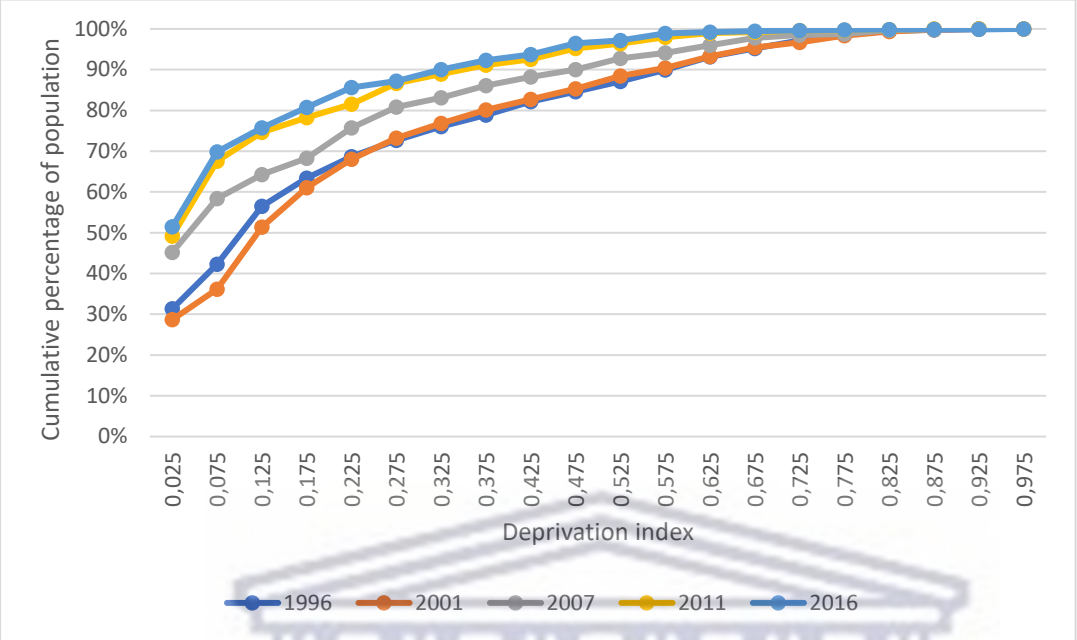

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Figure A.4: Cumulative distributive functions in North West, 1996 - 2016



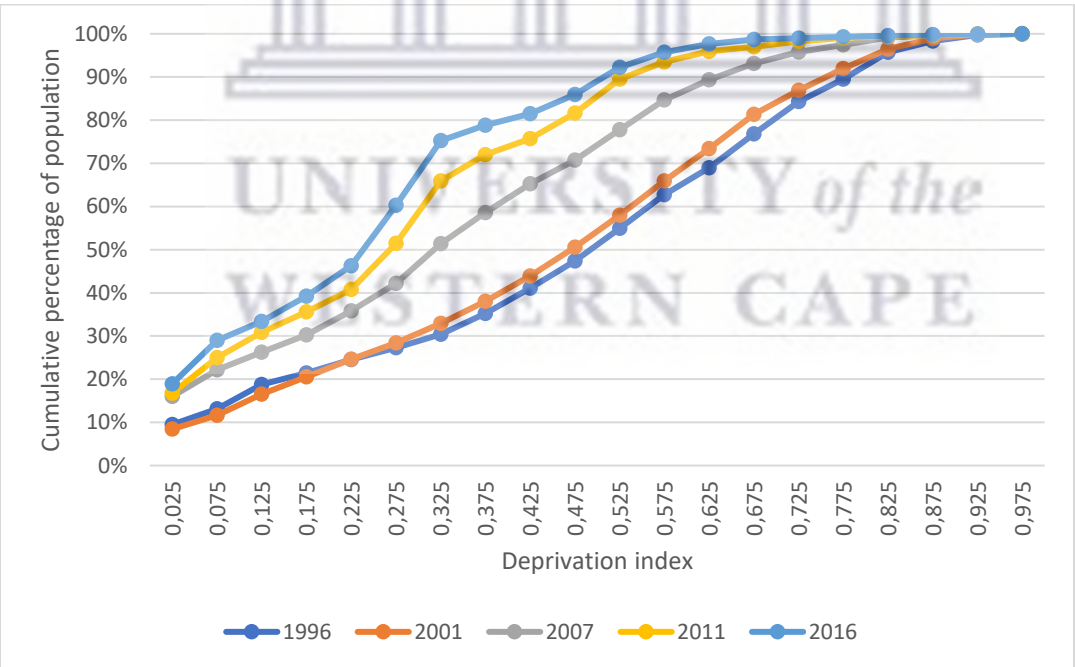

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Figure A.5: Cumulative distributive functions in Gauteng, 1996 – 2016



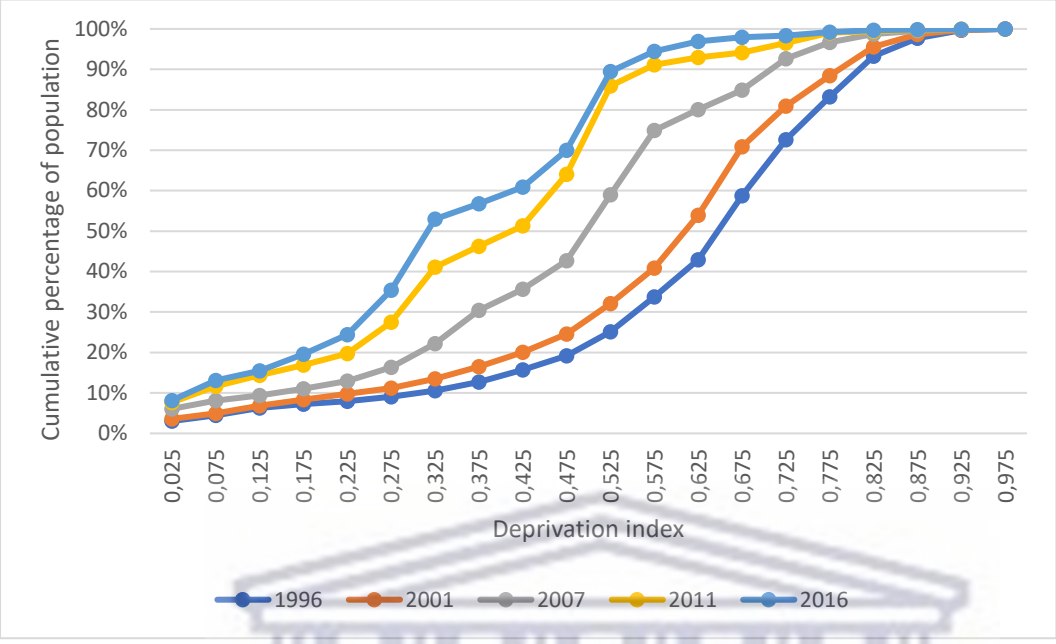

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Figure A.6: Cumulative distributive functions in Mpumalanga, 1996 - 2016



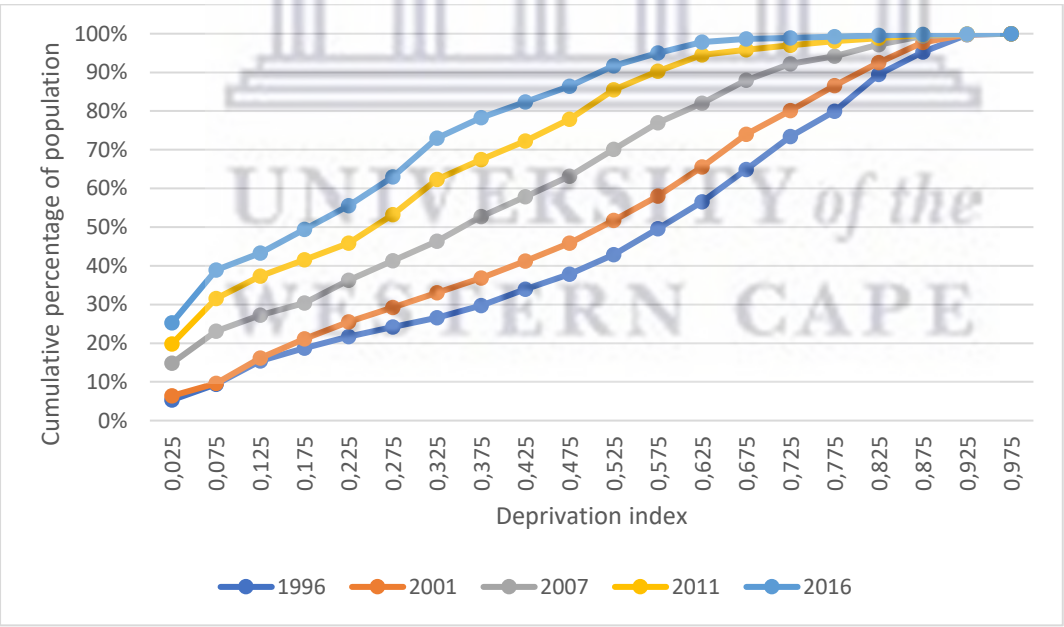

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Figure A.7: Cumulative distributive functions in Limpopo, 1996 - 2016



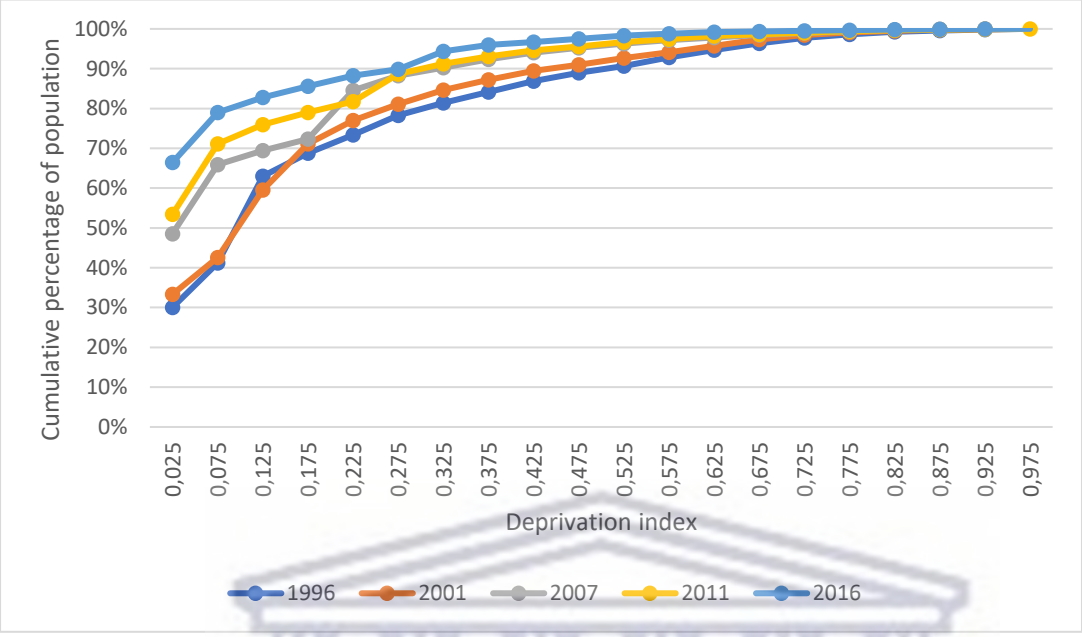

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Figure A.8: Cumulative distributive functions of Blacks, 1996 - 2016



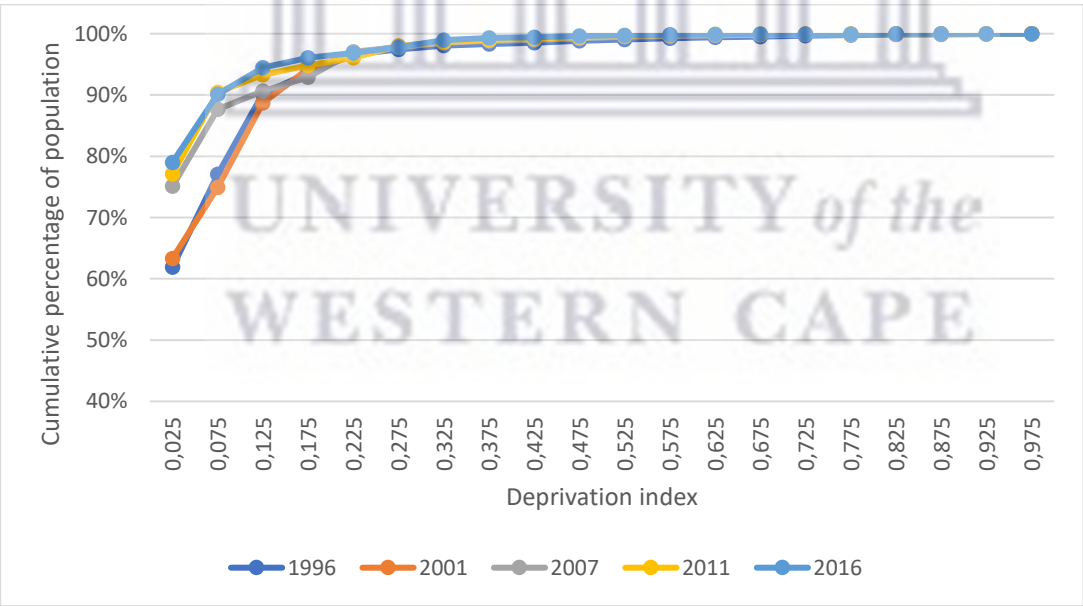

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Figure A.9: Cumulative distributive functions of Coloureds, 1996 – 2016



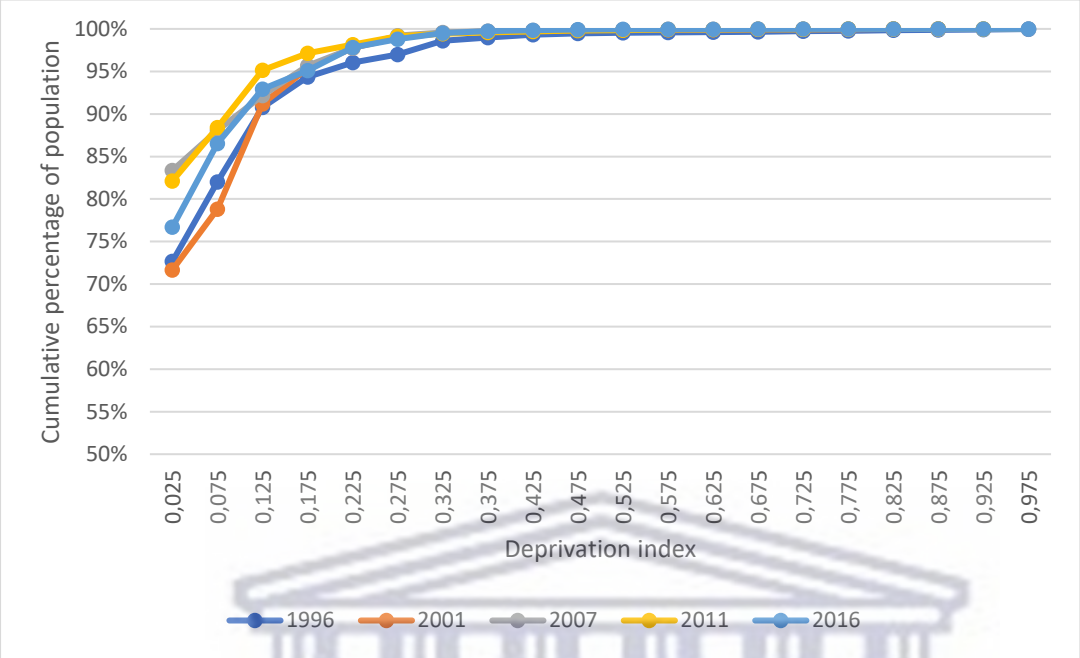

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Figure A.10: Cumulative distributive functions of Indians, 1996 – 2016



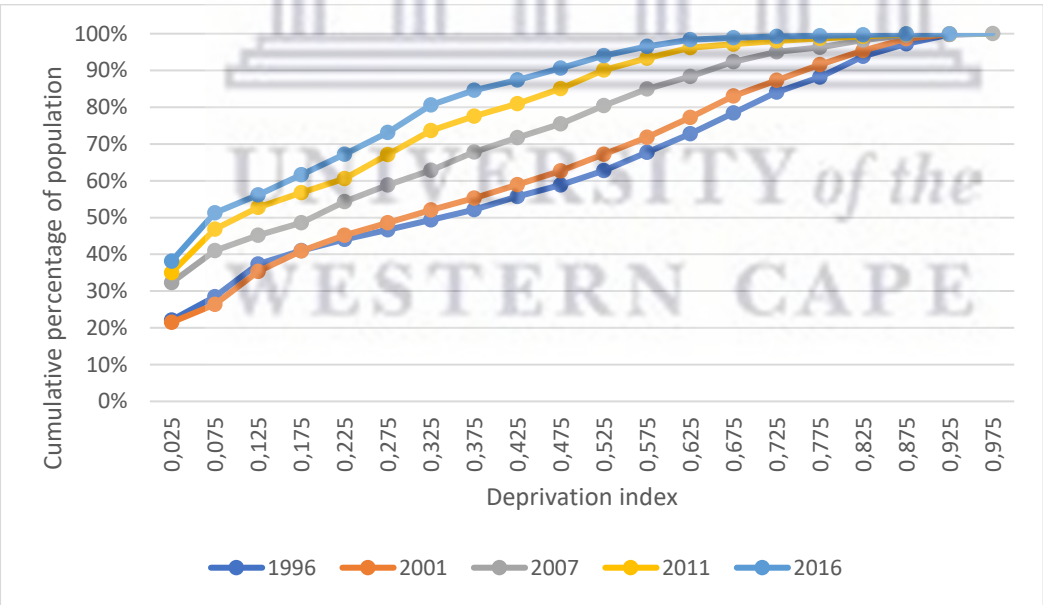

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Figure A.11: Cumulative distributive functions of Whites, 1996 -2016



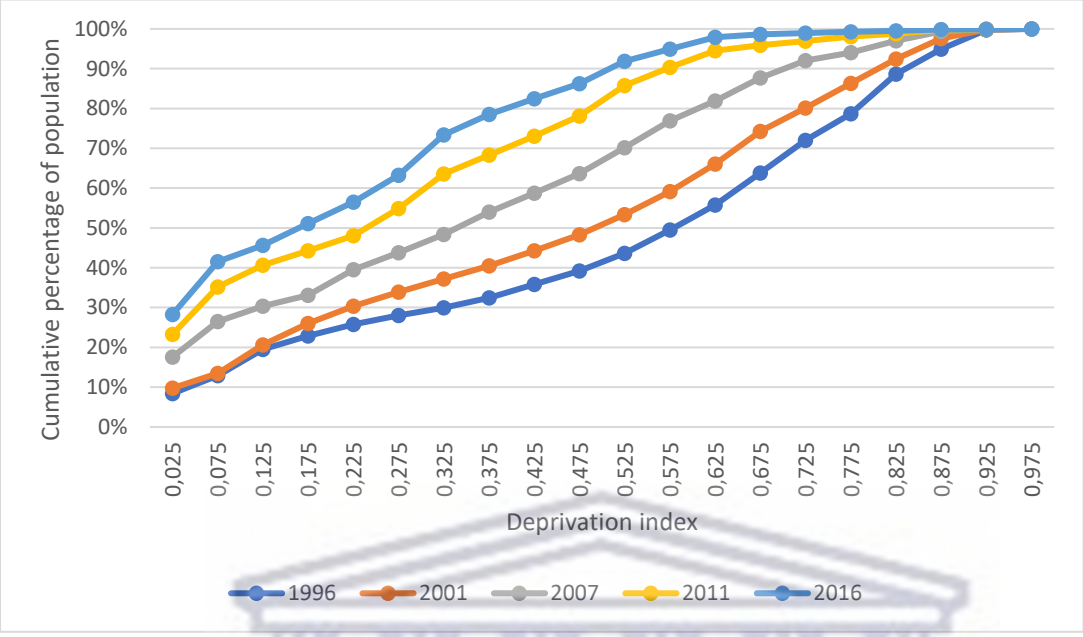

Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Figure A.12: Cumulative distributive functions of Males, 1996 - 2016




Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.

Figure A.13: Cumulative distributive functions of Females, 1996 – 2016




Source: Own calculations using Census 1996, Census 2001, CS 2007, Census 2011, and CS 2016 data.