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Comparing the economic development in the Eastern Cape and Limpopo provinces in South Africa since the advent of democracy

By

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DECLARATION

I declare that ***"Comparing the economic development in the Eastern Cape and Limpopo provinces in South Africa since the advent of democracy"*** 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 as complete references.

Zahra Mfumu

Signature: .

Date: 20 October 2023

ABSTRACT

There have been many studies investigating multi-dimensional poverty in South Africa since the descent of apartheid. Segregation created during the apartheid era left specific provinces vulnerable to multi-dimensional poverty. This study investigates the changes in multi-dimensional poverty, with a focus on the two disadvantaged provinces: Eastern Cape and Limpopo. Households in these two provinces were severely constrained during the apartheid era. Given this fact, this study examined the economic development in the Eastern Cape and Limpopo to measure changes between 2005 and 2021. This research could enable the drafting and implementation of policies that are appropriate to the realities faced by households in these provinces.

This study used the 2005, 2013, and 2021 General Household Survey (GHS) data to investigate the relationship of the non-income welfare index within Eastern Cape and Limpopo. The indicators include dwelling type, energy for cooking, water access, refuse removal frequency; sanitation facility; wall material of dwelling; access to telephone and internet; ownership to motor vehicle, computer, fridge, satellite dish/decoder, and or television. In determination to derive a multidimensional non-income welfare index, the study uses the Principal Component Analysis approach as a method.

The descriptive statistics show an increasing proportion of poor households that experience better service delivery in Eastern Cape and Limpopo. However, as much as there is less deprivation in service delivery and access to assets in these provinces, the statistics highlight these provinces as the poorest among other provinces in multi-dimensional poverty. In an attempt to examine the change in patterns of non-income welfare poverty, the cumulative distribution function is used. Furthermore, the study investigates the impact of monthly expenditure on the quality of non-income welfare. Which results show that the higher the expenditure spent, the higher the proportion of households that enjoyed good non-income welfare of the indicators under study.

Keywords: Economic Development, Eastern Cape, Limpopo, Non-income Welfare, Multi-dimensional Poverty Index, Multi-dimensional Poverty, Poverty

JEL codes: O1, J30, J32, D31

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LIST OF ABBREVIATIONS

ASGISA	Accelerated Share and Growth Initiative of South Africa
EC	Eastern Cape
FGT	Foster-Greer-Thorbecke
GDP	Gross Domestic Product
GEAR	Growth, Employment, and Redistribution Strategy
GHS	General Household Survey
HSRC	Human Sciences Research Council
LIM	Limpopo
MCA	Multiple Correspondence Analysis
NDP	National Development Plan
NGP	New Growth Path
RDP	Reconstruction and Development Program
StatsSA	Statistics South Africa
UNDP	United Nations Development Programme

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CHAPTER ONE: INTRODUCTION

1.1 Background and Problem Statement

Inequality, unemployment, and poverty have been prominent challenges in South Africa for many decades. The era of apartheid amplified these challenges due to the economy at that period being structured on a system of racial division in almost every aspect of living. The National Party government further worsened segregation and discrimination by introducing the following policies: the Group Areas Act No. 41 of 1950, Population Registration Act No. 30 of 1950, Bantu Authorities Act No. 68 of 1951, Reservation of Separate Amenities Act No. 49 of 1953 and Natives Taxation and Development Act No. 38 of 1958, to name a few. Since the democratic transition in 1994, the new government focused on eradicating these challenges through means that are inclusive and strategized. The Reconstruction and Development Program (RDP), Growth, Employment, and Redistribution Strategy (GEAR), Accelerated and Shared Growth Initiative of South Africa (ASGISA), New Growth Path (NGP), and the National Development Plan (NDP) were policies and programmes implemented to develop and grow the South African economy.

Despite the policies and programmes put in place to promote inclusivity, and employment, and reduce poverty, disparities persist. It is important to acknowledge that while political liberation was achieved in 1994, economic liberation has not been fully realized. Unfortunately, many who were historically marginalized remain so, while a minority still holds significant economic power. Also, the divisions based on race, income, gender, and location created before are still experienced but in the most subtle manner. Populations in primarily rural provinces continue to face these challenges and the Eastern Cape and Limpopo remain prominent in the struggle for economic development. These provinces, therefore, would be the focus of this study. Past empirical findings in these provinces were prominent in highlighting stagnant growth due to the continuous bad service delivery while the population increases. According to StatsSA (2015), the two provinces that showed the overall poorest levels of service delivery were Limpopo and Eastern Cape. These two provinces have been overlooked during the era of apartheid, even though the new government focuses on improving the lives of individuals living in these provinces. There has been an improvement, but still a very long way to go regarding having the rural areas in these two provinces

experience quality in aspects such as employment, housing, education, health, as well as water and sanitation.

The research question of this study is as follows: What progress has been made in terms of economic development in the Eastern Cape and Limpopo provinces since the dawn of democracy?

1.2 Research objectives

The main research objective of this study is to understand the economic development in the two provinces after the advent of democracy concerning how service delivery and poverty alleviation do not show obvious signs of drastic improvement in certain areas of South Africa. The specific research objectives are as follows:

- To examine the economic development in Eastern Cape and Limpopo, with a specific focus on non-income welfare estimates such as asset ownership and service delivery.
- To consider an extensive range of indicators and adopt the Principal Components Analysis method to derive a multi-dimensional non-income welfare index.
- To conduct multivariate econometric analysis to determine the impact of various personal and household characteristics on the likelihood of being deprived.

1.3 Significance of the study

It is crucial to research whether or not the two disadvantaged provinces have shown signs of improvement over time. Moreover, the research intends to pinpoint the measures the government can take to aid these provinces in flourishing and advancing in other key sectors. The significance of this study in South Africa is to draw attention to the discrepancies between the provinces and how it affects economic growth.

1.4 Structure of the study

This thesis consists of five chapters which are structured accordingly as follows: Chapter One provides an overall overview of the topic. The chapter identifies and explains the importance of the study and concludes with a brief overview of the objectives of the study. Chapter Two first discusses the economic profile of the two provinces, followed by explaining the contextual and theoretical frameworks. A detailed review of the past and present policies on welfare during

apartheid and since the advent of democracy is also provided, followed by an evaluation of past empirical studies on provincial non-income welfare, with a specific focus on what was found in the two provinces under study. Chapter Three explains the methodology (Principal Components Analysis) and data (General Household Survey conducted by Statistics South Africa (StatsSA)). Chapter Four presents and discusses the empirical findings and compares these findings with those derived from past empirical studies. Lastly, Chapter Five solidifies the study into a summary of findings and conclusive remarks about the subject of the study, before policy recommendations are presented.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This is a comprehensive literature review chapter. Section 2.1 is the introduction of this chapter. The second section (section 2.2) will present the general profile of the Eastern Cape and Limpopo provinces. This section provides context into the reasons the provinces were chosen for this study and gives a detailed background of poverty and the contribution or lack thereof in these provinces. The general profile is then followed by the conceptual framework in section 2.3, which is the foundation of the study by discussing the definitions of poverty and the different approaches to poverty. The theoretical framework in section 2.4 articulates various poverty theories. Section 2.5 reviews the South African legislations and policies for welfare during apartheid and since the advent of democracy. This section reviews how the legislation and policies impact poverty at the wholesome level of the country and the impact in the provinces. Section 2.6 and section 2.7, present an examination of past empirical studies and conclusions respectively.

2.2 General Profile of Eastern Cape and Limpopo

The Eastern Cape and Limpopo provinces in South Africa have been facing significant challenges in recent years. These provinces have been dealing with deep-rooted structural poverty, resulting in major backlogs in service delivery. According to a report by Statistics South Africa (StatsSA), the barriers that these provinces face in alleviating poverty include high unemployment rates, illiteracy, low income, poor intervention by municipalities, and limited accessibility to basic and social services.

Despite being known as the "talent factories" of South Africa, the Eastern Cape and Limpopo provinces are unable to cultivate their talents due to a lack of economic opportunities (Phillip, 2022). This has led to a significant migration of people to other provinces, primarily to the Western Cape and Gauteng, in search of work and better opportunities. The push factors for this migration include poor economic activities and a lack of job opportunities. Unfortunately, this has resulted in these provinces being unable to contribute as much to the national GDP as expected.

The lack of economic growth in these provinces is mainly due to the limited opportunities for trade, services, and infrastructure. The mining industry is the primary industry in Limpopo, which helps with job creation. However, the lack of growth in other industries has made it challenging for this province to grow the annualized GDP growth rate and GDP per capita. The Eastern Cape, on the other hand, has limited economic activities, leading to a lack of growth in its economy and increased poverty.

According to the Provincial Gross Domestic Product discussion document by StatsSA (2022), South Africa is driven by eight industries, including personal services, finance, trade, mining, government, manufacturing, transport, and agriculture, which are the determinants of growth in the individual economies. Gauteng has remained the largest economy, responsible for R33.1 of every R100 produced by the country's economy. The top three provincial economies in 2022 were Gauteng, KwaZulu-Natal, and Western Cape with GDPs of 33.1%, 15.9%, and 13.9% respectively, which are significantly higher than Eastern Cape and Limpopo with GDPs of 7.6%, and 7.7% respectively. This is largely due to the finance industry being the primary industry in these provinces, which provides greater opportunities for trade, government, and services, and higher chances of employment.

Persistent unemployment and characteristics of rural poverty have led to monetary and non-monetary inequality among households and individuals in these provinces. The GDP per capita of these provinces is one of the lowest in South Africa, with Eastern Cape at R 365 917 and Limpopo at R326 393. These provinces have consistently performed worse than others, leading to a generational backlog that has made households heavily dependent on the government, with high percentages of the population receiving social grants. However, access to piped water remains low in these provinces, despite improvements in households in formal dwellings and electricity for cooking, as highlighted in Table 1.

To alleviate poverty in these provinces, there is a need for the government to invest in infrastructure, trade, and services. The government can also support the development of other industries, such as manufacturing and agriculture, which can create more job opportunities. The education system in these provinces also needs to be improved to ensure that people have the

necessary skills to participate in the labour market. By addressing these issues, these provinces can achieve economic growth and reduce poverty.

Table 1: Key socio-economic indicators in Eastern Cape and Limpopo

	Eastern Cape	Limpopo
Population size (2022)	7.2 million	6.5 million
Provincial GDP per person (2022)	R365 917	R326 393
Provincial GDP as % of national GDP	7.6%	7.7%
Human Development Index (2021)	0.675	0.712
Poverty rate	43.3%	42.3%
Gini coefficient	0.68	0.60
% of the population with electricity for cooking	65.0%	49.3%
% of households living in formal dwellings	83.6%	94.7%
% of households that have access to piped water	49.5%	31.4%
% of the population receives social grants	62.3%	61.6%

Sources: United Nations Development Programme (2019). Census (2022), General Household Survey (2022) & Provincial Gross Domestic Product: Experimental estimates Discussion document 2013- 2022

2.3 Conceptual Framework

2.3.1 Defining Poverty

Poverty is a term that has been researched and defined for many years. What one may consider as poverty, may however not be considered as poverty to the next person. The general definition of poverty is not having sufficient resources to enable access to the necessary goods and services to live a minimum socially acceptable par (Yang, 2017). To understand poverty, two basic questions need to be answered. The first step is acknowledging the meaning of poverty by identifying the poor; secondly, making use of the information from the poor to create measures of poverty for the poor (Yang, 2017).

Poverty can be linked to everything and anything that affects the welfare and security of human beings. As Woolard (2002) states "poverty is multifaceted and can be linked with hunger, unemployment, exploitation, and lack of access to clean water, sanitation, healthcare or schools". The nature of multi-dimensional poverty has been defined as individuals or households who lack the key capabilities and therefore experience inadequacy in the dimensions of poverty (Haughton & Khandler, 2009). The dimensions of poverty in regards to this definition of poverty include poor access to health and education, vulnerability, absence of rights such as the inability to be free in speech, sense of powerlessness, or low confidence. (World Bank, 2001). Multi-dimensional poverty therefore indicates that poverty is not only determined by the amount of income; however, the experience of life one lives can automatically define one's status in poverty.

Absolute and relative poverty are terms that are also used in defining poverty. The absolute definition of poverty is correlated with the 19th-century social British reformers Booth and Rowntree (Rowntree, 1902). The early definition of absolute poverty by Rowntree (1902), namely 'primary poverty', categorized families as poor when total earnings are inadequate to obtain the minimum necessities for the maintenance of their physical efficiency. The absolute meaning of poverty is an objective manner of defining poverty. This concept does not consider the fact that poverty can change as the standard of living of society changes over time, or the needs differ across various groups in society. The basic needs are solely dependent on the observations of those who establish the minimum requirements of basic needs at the definition stage. For example, by the time Rowntree made his study in 1936, being able to read newspapers daily and owning a radio were necessities that determined whether one lived in poverty (Spicker, 1993).

Poverty in relative terms is explicitly defined in terms of poverty relating to a particular reference group. Defining poverty by relating it to the national distribution of income or expenditure (May 1998), to the parameters of a concept of relative poverty ranging from families making ends meet (Goedhart et al., 1997) or living in a socially acceptable minimum standard (May 1998) to living in an average way for society (Galbraith, 1958; Townsend, 1979), as well as having the society's full participation. Relative poverty is a multi-dimensional aspect of defining who is poor and what poverty is. Poverty in this definition does not only consider poverty as the deficiency of basic human needs such as education, water, information, shelter, and income but also the accessibility

to social services according to the United Nations (1995). This type of poverty accommodates the fact that poverty changes over time as society changes.

The definitions of poverty about absolute and relative poverty are not far apart due to both definitions being based on the interpretations of the social construction of need. Both views emphasize poverty as the lack of something; however, the source and foundation of the needs are different (Spicker, 1993). According to Spicker (1993), some of the needs that are highlighted in societal standards are not equivalent to poverty and there are several interpretations of what a need is.

Poverty can also be political. Meth (2006) argues that poverty is related to the allocation or distribution of resources and reflects the impacts of past and present policy choices. This will be evident later in this chapter which discusses the impact of past and present policies regarding the quality and experience in service delivery. Poverty in rural areas of South Africa more especially due to the lack of financial support, lack of infrastructure, and the inadequate level of municipality management which therefore led to the slow development in these areas.

2.3.2 Poverty lines

Thresholds are put into place to determine and characterize poor individuals, compared with others who are not poor. The thresholds are known as 'poverty lines' and are used as a tool for statistical reporting of poverty levels and patterns, monitoring, planning, and evaluation of poverty reduction and policies (StatsSA, 2019). These thresholds were established in 2007 by StatsSA to standardize the money-metric measurement of poverty in South Africa (StatsSA, 2019). StatsSA developed these lines based on a cost-of-basic approach which has the objective of linking the consumption of goods and services to the welfare of the people.

StatsSA (2019) states that the 'cost-of-basic needs approach' can be applied in three steps. Step one involves determining the food basket by selecting the food components of welfare. The second step aims to create a standard that households can meet regarding a normative nutritional value by computing the cost of the food basket to derive the food poverty line. The normative nutritional standard is set as 2 100 calories per person. The last step of the application involves adding the

cost of the consumption of non-food necessities that would help determine the lower- and upper-bound poverty lines. The non-food necessities consist of clothing, shelter, transportation, education, and all that is needed for one to live (StatsSA, 2020).[1]

2.3.3 Multi-dimensional Poverty Index

As explained in the definition section above, poverty is a complex issue that goes beyond just having a low income. To measure a household's overall well-being, it's As explained in the definition section above, poverty is a complex issue that goes beyond just having a low income. To measure a household's overall well-being, it's necessary to consider multiple factors. One way to do this is by tallying the number of assets a household owns and giving each asset equal weight. However, this approach relies on personal and subjective choices and lacks a systematic framework to support it (Bhorat et al., 2014).

Multi-dimensional poverty analysis can be approached using common and complex methods such as principal components analysis (PCA), factor analysis (FA), and multiple correspondence analysis (MCA). In this study, we will adopt the principal components analysis (PCA) approach, which was explained by Filmer and Pritchett (2001:116) as "a linear index of all variables that capture the largest amount of information common to all variables.".

The fundamental principle underlying this approach involves isolating commonalities among a group of interdependent variables, similar to the objectives of regression analysis in minimizing residual discrepancies (Bhorat et al., 2014). PCA is a statistical method that is used to measure the significance of assets distributed across different households. Assets that are more unevenly distributed are given higher weightage, while those that are either not owned by anyone or are ubiquitously owned are not considered during the computation of the index. This is because they do not account for variation across households.

The PCA approach is an attractive method for deriving the multi-dimensional non-income welfare index and is mostly used in South African and international studies. On the other hand, FA is a

[1] This literature proposed three different poverty lines, namely food poverty line, the lower-bound poverty line, and the upper-bound poverty line.

multivariate technique that has been used to explain the relationships between different variables under study (known as the observable variables) and factors (these variables are smaller in comparison to the observable variables) (Alkarkhi & Alqaraghuli, 2019). MCA is described as the approach that explores, summarises, describes, and contains a visual analysis of information that has been contained with a given data table of individuals (*N*) described by categorical variables by Husson & Josse (2014). The main objective of MCA is to study the similarities in the relationship between the variables and the categories from a multi-dimensional perspective. This study will adopt the PCA approach which will be explained in greater detail in Chapter Three.

2.3.4 FGT Poverty Indices

One of the best-known measures of poverty is the Foster-Greer-Thorbecke (FGT) which includes the poverty headcount Index (H_0), the poverty gap index (H_1), and the squared poverty gap index (H_2) (Rohwerder, 2016). The poverty headcount index is the easiest way to measure and understand poverty. According to Rohwerder (2016), this index measures the proportion of the population that is poor. The headcount poverty index can also be defined as the share of households that fall below the poverty line and is therefore sensitive to any corrections that may occur due to non-positive incomes (Foster et al., 2010). The only disadvantage of this index is that it does not indicate the extent of poverty the poor experience (Houghton & Khandler, 2009). Mathematically the Headcount poverty is defined as follows (Foster et al., 1984):

$$H_0 = \frac{1}{N}\sum_{j=1}^{q}\left(\frac{z - y_i}{z}\right)^{\propto}$$

$$= \frac{1}{N}\sum_{j=1}^{q}\left(\frac{z-y_i}{z}\right)^{0}$$

$$= \frac{1}{N}\sum_{j=1}^{q}(1)$$

Therefore; $$H_0 = \frac{q}{n}$$

N represents the number of individual households in the population, while *z* is the poverty line and *q* is the number of individuals/household's per capita income below the poverty line obtained from *N*. Next, *y* represents the income of poor people, while *n* is the random sample selected from the

number of individual households in the population (N) and q is the number of poor in the sample, resulting in the poverty headcount index being estimated by given: $H_0 = \frac{q}{n}$. The equation, therefore, adheres to the definition of the poverty headcount index which is the share of the households who fall below the poverty line (Foster et al., 1984).

The poverty gap index is the measure that reflects the depth of poverty by considering how far the average poor person's income is from the poverty line according to Foster et al. (1984). For example, if the poverty line is R5 000 but in country A we have one out of five people earning below the poverty line and this poor person earns R3 000, $H_0 = \frac{1}{5} = 20\%$. In another country B, using the same poverty line and there is also one out of five people earning below the poverty line, but this poor individual earns a much lower R1 000. Nonetheless, H_0 in country B is still the same as that of country A, that is, $\frac{1}{5} = 20\%$. However, we expect the H_1 to be greater in country B because the income earned by the poor person is R4 000 less than the poverty line, whereas in country A the income earned by the poor individual is 'only' R2 000 below the poverty line (and this is the advantage of H_1 – it can estimate the depth of poverty better than H_0).

The poverty gap index is a fraction between zero and one where zero indicates that no one in the population is below the poverty line and one (100%) indicates that everyone in the population is below the poverty line. The poverty gap index (H_1) is as well defined as the measure to describe the extent to which individuals or households fall below the poverty line hence the name poverty gaps (Houghton & Khandler, 2009). The total sum of these poverty gaps equates to the minimum cost of eliminating poverty. According to Sen (1976), the poverty gap index is an expansion from the poverty headcount index which simply counts all those living under the poverty line and considers them equally poor (Sen, 1976).

The disadvantage of this measure is that it does not give special weight to those deemed as the poorest among the poor. Mathematically, the poverty gap index is calculated as follows (Foster et al., 1984):

$$P_1 = \frac{1}{N} \sum_{j=1}^{q} \left(\frac{z - y_i}{z} \right)^{\propto}$$

$$= \frac{1}{N} \sum_{j=1}^{N} \left(\frac{z-y_j}{z}\right)^1 . I(y_i \leq z$$

$$= \frac{1}{N} \sum_{j=1}^{q} (1) - \frac{1}{N_z} \sum_{j=1}^{q} y_i$$

By letting $\sum_{j=1}^{q} y_i = q\,\mu_{poor}$ where μ_{poor} is the mean expenditure of the poor in the population so that the poverty gap index $= \frac{q}{N} - \frac{q\,\mu_{poor}}{N_z}$

$$= P\left(1 - \frac{\mu_{poor}}{z}\right)$$

Therefore, the poverty gap index will be estimated by: $P_1 = \frac{q}{n} - \frac{m\bar{y}_{poor}}{nz}$

$$P_1 = P\left(1 - \frac{\bar{y}_{poor}}{z}\right)$$

The squared poverty gap index reflects the severity of poverty by being the mean of the squared proportionate poverty gap (Foster et al., 1984). According to Sen (2006), the aggregate squared poverty gap is the proportionate sum of the squared gaps between the poverty line threshold and the actual income of the poor persons respectively. In comparison to the poverty gap index, the squared poverty gap allows for variation in the weight being placed majorly on the income (or expenditure) level of the poorest members of society (Houghton & Khandler, 2009). The disadvantages of the squared poverty gap index are that greater weight is given to extreme poverty than less poverty and the measure is not easy to interpret (Houghton & Khandler, 2009). It, therefore, allows. Mathematically, the squared poverty gap index is derived as follows:

$$P_2 = \frac{1}{N} \sum_{j=1}^{q} \left(\frac{z - y_i}{z}\right)^{\propto}$$

$$= \frac{1}{N} \sum_{j=1}^{N} \left(\frac{z-y_j}{z}\right)^2 . I(y_i \leq z)$$

$$= \frac{1}{N} \sum_{j=1}^{q} (1 - 2\frac{y_i}{z} + \frac{y_i^2}{z^2})$$

But $\sum_1^q y^2$ = Q ($\sigma_{poor}^2 + \mu_{poor}^2$), where σ_{poor}^2 is the variance of the expenditure of the poor so that the squared poverty gap is as follows: $P_2 = P(1 - \frac{2\mu_{poor}}{z} + \frac{(\sigma_{poor}^2 + \mu_{poor}^2)}{z^2})$ which estimates the square poverty gap index to be $\frac{1}{n} \sum_{j=1}^{q}(1 - 2\ \frac{y_i}{z} + \frac{y_i^2}{z^2})$. By $\sum_1^q y^2$ = Q ($s_{poor}^2 + \bar{y}_{poor}^2$), where they $\bar{y}_{poor}\ and\ s_{poor}^2$ are the mean and variance of the expenditure of the poor individuals in the sample. Therefore, the squared poverty gap index would be (Foster et al., 1984):

$$P_2 = P(1 - \frac{2\hat{y}_{poor}}{z} + \frac{(\sigma_{poor}^2 + \hat{y}_{poor}^2)}{z^2}$$

2.4 Theoretical Framework

2.4.1 Introduction

This section will articulate the theories of what poverty is, the history of the mindset of understanding poverty, as well as how poverty and inequality interlude with each other. The poverty theories that are highlighted in this section will be from the classical theories based on history to new models or theories that have developed over centuries.

2.4.2 Classical Theory

The classical theory of poverty is based on the traditional way of viewing poverty considering one's decisions and actions. The theory highlights the assumption that individuals are responsible for their destiny and responsible for their actions that lead to poverty. The theory includes beliefs that the markets self-regulate; it also highlights that if the market forces are left on their own, equilibrium would be quickly restored (Greenwald and Stiglitz, 1987). There are two main approaches within this theory, namely individual factors, and sub-culture of poverty.

Individual factors

The approach of individual factors includes decision-making regarding choice and behaviour. The notion that poverty is fuelled by individual factors such as individual attitude, human capital, and welfare participation is under-taken by everyone (Gans, 1995). This theory pushes the agenda that people should be held responsible for the decisions they make; if a bad decision is made, it would lead to one suffering poverty. Lastly, the theory also emphasizes the reality of hard work, education, as well as taking advantage of every opportunity presented.

Sub-culture of poverty

Poverty may not only be based on the capabilities that one has but the mindset of everyone. A poverty mentality is groomed by the environment, beliefs, family, and friends. It is argued that few individuals become poor due to upbringing or learning of certain psychological behaviours linked to poverty (Davis & Sanchez-Martinez, 2014). The term 'sub-culture' was created on the understanding that there are differences in values and beliefs due to the disparities between being poor and rich. This theory was created by Oscar Lewis in 1961 and 1966 which marks the concept of influence in the way people make decisions based on what they are taught and surrounded with each day.

2.4.3 Neoclassical Theory

The theory that the market is open and free to a certain degree waves the belief that everyone can compete for positions that are dependent on the individual's abilities, effort, and training. According to Davis and Sanchez (2014), the Neoclassical theory is a market-based competitive theory that emphasizes the significance of unequal beginning endowments of talents, skills, and capital in generating poverty.

Human Capital Theory

The spread of human capital theory was based on understanding the importance of the set of skills acquired by workers and its direct effect on human capital development (Davis & Sanchez-Martinez, 2014). Becker (1962) defined human capital as the skills, education, health, and training of individuals. The investment in education, skills, health, and training proved to be of great value regarding the increase of productivity and reduction of poverty. Davis & Sanchez-Martinez (2014)

state that the human capital-oriented view on poverty is that the increase of individual incomes may not be as equal as desired due to the backlog and structural inequality. Therefore, increasing spending on education of the poor would help increase the level of skills and abilities which in turn increases the opportunity to achieve a higher level of earnings.

2.4.4 Sen's Capability Approach

The capability approach contains the embodiment of a multi-purpose framework rather than a straightforward theory of well-being (Comim et al., 2008; Robeyns 2005, 94-96; Sen 1992; 2006). The definition of the approach is founded on the existence of freedom for the liberty to participate in politics or being able to receive basic education or health care are among the basic components of development (Sen, 1999). The approach is a derived concept that represents the many functions a person might perform and the individual's choice to choose between different ways of living. The concept is inherently multi-dimensional (Conconi & Viollaz, 2017).

The approach highlights the fact that income is not the only determinant of poverty and the lack of, or excess capabilities of individuals can restrict or benefit from doing something. Sen (1999) states that the value of wealth is based on the things that allow people to do with significant freedom, resulting in them being able to achieve. According to Conconi & Viollaz (2017), poverty is therefore defined as a failure of capability which refers to people's inability to experience essential beings and activities that are fundamental to life.

The capability approach focuses on people's beings and doings as well as opportunities to realize those beings and doings. Instead of examining what people's access to resources, the capability approach rather focused on what or how people use resources they have access to, to achieve a life that has value. Therefore, the concept of capabilities is represented by the many functions an individual might perform and is inclusive of the choice of selecting between the different ways of living (Conconi & Viollaz, 2017).

2.5 Brief Review of SA legislations and policies to welfare during apartheid and since the advent of democracy

2.5.1 Legislation before and since 1994

The Group Areas Act No 41 of 1950 was extended and improved to achieve the primary aim of residential segregation being compulsory (Nonyongo, 2011). This Act ensured that there were legal provisions that guided the specific areas where different population groups could own property, reside, or even work. The Population Registration Act No. 30 of 1950 was created to classify South Africans racially into three groups, namely Black, Coloured (including Indians[2]), and White. The classification was used to qualify and determine different groups based on appearance, social acceptance, and descent. The Reservation of Separate Amenities Act No. 49 of 1953 was created by the National Party government to develop the concept of unequal allocation of resources such as infrastructure, education, and jobs. The act focused on separating amenities such as toilets, parks, and beaches, while the quality of the facilities was not the same for the different racial groups (Nonyongo, 2011).

The Natives Taxation and Development Act, Act No 38 of 1958, on the other hand, was an act or system created for further hardship and inequalities based on four aspects, which included (Nonyongo, 2011):

a) African men with a lower income were forced to pay a greater percentage of their earnings in taxation compared to men in other racial groups, regardless of their marital status.
b) Africans were liable to start paying from the age of 18 years, while other racial groups were only expected to pay personal taxes from the age of 21 years.
c) Africans had no right to consider the taxes they had to pay specifically. They had to pay the following taxes: educational levies, dripping fees, glazing fees, dog tax, as well as pass and compound fees.
d) Africans were imprisoned for non-payment of taxes while other races were not imprisoned for the failure to pay taxes.

[2] Eventually Indians/Asians are distinguished as a separate fourth ethnic category since the advent of democracy, while the term 'Blacks' include Africans, Coloureds, and Indians/Asians.

The introduction of the Bantu Authorities Act, according to Nonyongo (2011), was based on the objective of permanently keeping the Blacks away from the urban areas of South Africa. This is well-known for being one of the predominant Acts of segregation among South African citizens based on race and ethnicity. Blacks were pushed away from the world of the Whites (urban areas) and mandated to stay in rural areas which were formerly known as the "Homelands". This led to segregation in education, health, welfare, transportation, and employment which deeply entrenched economic inefficiency and inequality in the country.

2.5.2 Economic policies since 1990

Partly due to the implementation of this past legislation, poverty persisted amongst some population groups and areas/provinces, and hence the post-apartheid government introduced new legislation and development policies such as the fiscal policy to achieve the goal of successful and equal development in South Africa. An example of the macroeconomic policies introduced by the African National Congress since the year 1994 includes the following (Mosala et al., 2017): The Reconstruction and Development Program (RDP), the Growth, Employment, and Redistribution (GEAR) strategy, the Accelerated and Shared Growth Initiative-South Africa (NDP). These macroeconomic policies were adopted to include the private sector in policymaking to extend the process of economic liberalization (Mosala et al., 2017).

The South African government of the new era and democracy liaised in creating the 1993 Reconstruction and Development Program (RDP). The program is formed based on reducing poverty and inequality by ensuring that basic needs are met, increasing the development of human resources, building the economy, as well as democratizing the state and society. The central objective of the RDP has to do with the improvement of the quality of life of South African citizens, especially the poor and marginalized sections of communities. Even though the initiative was abandoned after two years due to the inability of economic growth to finance it. The RDP was given a budget of R2.5 billion to ensure that this program achieve its objectives, yet it was not enough to alleviate the backlog in providing an equal opportunity regarding infrastructure and services to the poor (Luiz, 2007).

According to Cling (2001), the RDP was successful only in improving social security through the establishment of an extensive welfare system. Through this system, the government was able to build a free health care system for pregnant women and children, as well as provide free meals to between three and a half million and five million school children. The system built 500 new clinics to ensure more people were close to medical services. The last way the system helped the people live better is by providing more than two million additional homes with a connection to the electricity network. This resulted in approximately 63% of the population having access to electricity (Cling, 2011).

Growth, Employment and Redistribution Strategy, also known as GEAR, was created, and introduced by then Minister of Finance Trevor Manuel in June 1996. This strategy was introduced at a time when the country experienced volatile depreciation in its national currency (Abedian and Ajam 2009). The primary aim of this strategy was to rebuild and reshape the economy through increased economic growth. The Department of Finance (1996) associated economic growth with employment creation to improve the standard of living and create an equal distribution of income. The Department of Finance (1996) noted employment creation as a powerful tool for redistribution, supported by government housing, water and sanitation, health, education, welfare, and social security services provision. The strategy had a target of creating 400,000 jobs per annum by the year 2000 and ensuring that the annual real GDP growth rate was at 6% (Makino, 2013).

The implementation of this strategy first was a success, as it had an impact on the strengthening of South Africa's financial situation, lowered its interest rates, and handled the inflation crisis (Habib, 2013). Furthermore, the GEAR strategy decreased the import tariffs below the anticipated 7.6% of the value of imports, and investments by State-Owned Companies grew by 13.6% per annum. However, the fiscal gains as stated above took place at the cost of social security which resulted in poverty and inequality increasing dramatically during the years when this strategy was implemented (Habib, 2013). The second failure was the fact that the country's growth rate never reached the target of 6% per annum and was always below 5% per annum. Unemployment on the other hand was above 30% instead of decreasing as the main aim of the GEAR strategy (Gevisser, 2009).

GEAR was replaced by the new strategy which was launched in the year 2006 and named Accelerated and Shared Growth Initiative of South Africa (ASGISA). The strategy included step-by-step plans that sought to improve South Africa's economic growth and the country's capacity to create jobs. The government aimed at achieving the goal of economic growth being at least 4.5% between the years 2005 to 2009 and by 2014 be at the target of 6% as the GEAR strategy outlined to be at a point of increasing the chances standard of living becoming better, especially for the poor. However, the lifespan of this strategy was disturbed by the sudden removal of former President Thabo Mbeki. According to Mbola (2009), even though its success cannot be measured, success was achieved regarding the infrastructure, The programme included public sector spending which resulted in a 3% increase in real GDP between the years 2006/07 to 2009/10. However, there was no change in unemployment and poverty whether positive or negative.

Unemployment, poverty, and inequality continued to worsen which became the main objectives of the third strategy of elevating South Africa's economy (Morris, 2013). This strategy was introduced in the year 2010 by then-President Jacob Zuma and is known as the New Growth Path (NGP). According to Gumede (2012), the NGP aimed to create more than five million jobs by the year 2020 simultaneously reducing unemployment by 10 percentage points, as well as ensuring that economic inequalities in the country are reduced (Habib, 2013). The NGP only lasted for two years and the effectiveness of the implementation of this policy was hard to access due to its short lifespan. However, the NGP explicitly identified the areas in which employment could be created and who were the job drivers which were identified as the infrastructure and service industries, the green economy, public services, and rural development (Patel, 2011).

The NGP set the foundation of the National Development Plan (NDP) which was introduced in 2012. The NDP sought a route of establishing a sustainable and long-term vision from 2012 to 2030. The plan emphasized economic growth to deal with the challenges of unemployment, inequality, and redistribution. The few targets included in this plan included the estimated creation of 11 million jobs by the year 2030, which in the case of the world experiencing a pandemic created a huge backlog in employment. The target may slow down and not be as realistic as expected. The remainder of the targets the plan included focused on eliminating income-induced poverty and reducing inequality. To ensure that these targets are met, the Gini coefficient should have fallen to

0.60 by 2030 (Mosala et al., 2017). The plan also seeks a society that is corruption-free and has a strong adherence to ethical conduct throughout the society and seeks to have a government that is accountable to the people of South Africa (Mosala et al., 2017).

Another way the government has ensured that there is the eradication of poverty is through fiscal policy. StatsSA (2018) highlights measures such as reducing the cost of living to improve the lives of those living in poverty. The redistributive mechanism used is known as the 'social wage' by the government's budget to purposely improve the lives of poor people. How social wage comes into reality is through the reduction in the cost of living which consists of providing free primary health care, no fee-paying schools, old age and children child support grants, housing, and free basic services (water, electricity, and poor sanitation) to poor households. With all being equal there has been a notable improvement in the country compared to 1994; however, due to the country's socio-economic challenges being deep, structural, and long-term, the rural communities are yet bearing the brunt of poverty.

2.6 Review of Past Empirical Studies

2.6.1 Studies on Provincial Income Poverty

As this study focuses primarily on provincial multi-dimensional non-income poverty, only the well-known studies on provincial income poverty will be briefly reviewed in this subsection. First, Leibbrandt et al. (2006) used the 1996 and 2001 census data and focused specifically on the two richest provinces (Western Cape and Gauteng) and the two poorest provinces (Eastern Cape and Limpopo). The evidence of the study shows that there has been a continual increase in poverty in all four provinces. The lower poverty line was used (R250 per capita per annum in 1996 prices) and the results showed that 20% of the poor in South Africa live in Eastern Cape and 17% of those who are poor live in Limpopo which is the highest proportion of individuals living in poverty in these two provinces respectively. Further evidence from this study indicated that the poor lack the means to access this service due to the lack of income or infrastructure. The Eastern Cape had struggled in improving service delivery in the rural parts of the province, while in Limpopo there had been a slight improvement in the poor accessing most of the basic services except for the service of sanitation and water.

The study by Bhorat & Van Der Westhuizen (2012) used data from the 2005/2006 Income and Expenditure Survey (Statistics South Africa, 2008), The study included findings that the location of the citizens plays a significant role in determining poverty. The authors measured the standard of living and distribution of services using the Free Basic Services (FBS) poverty line. The poverty threshold is R1 500 per month, which indicates that household poverty was higher in Limpopo with more than half of the households living below the poverty line (slightly over 50.0%) and the Eastern Cape (47.0%).

Finn et al. (2013) made calculations using the weighted 1993 Project for Statistics on Living Standards and Development (PSLSD) (1993) and National Income Dynamics Study (NIDS) waves 2 (2010-2011) data. The study determined the money-metric poverty line by using the multi-dimensional headcount in 1993 of 37% and finding the poverty line below which 37% of the population falls in the same year (Finn et al., 2013). The measurement is equivalent to R292 in 2010 Rands, this amount is kept consistent with the real terms to analyze the difference in poverty if there were any differences. According to the study, the national money-metric poverty headcount rate had a modest fall from 37% to 28% in 1993 and in 2010 the fall was from 47% to 34% considering the real 2010 poverty line of R292 per capita per month (Finn et al., 2013).

Given the calculations and considering the above the poorest provinces according to the money-metric poverty headcount in 1993 were Limpopo and Eastern Cape, with 61% of the population classified as money-metric poor and 57% of the population classified as money-metric poor respectively (Finn et al., 2013). In the year 2010, Limpopo remained the poorest at 42%, followed by the Free State and Eastern Cape with 39% and 38% of the population classified as money-metric poor respectively. All through the years 1993 to 2010 the provinces Western Cape and Gauteng remained the lowest money-metric poverty rates.

2.6.2 Studies on provincial non-income welfare poverty

The Human Sciences Research Council (HSRC) reported the fact that households living in poverty had sunk deeper to which the gap between the rich and poor grew wider. The HSRC study showed that the provinces of Eastern Cape and Limpopo had the highest proportion of their population with 77% and 72% respectively living in poverty. Moreover, seven out of 10 of the municipalities

in the Eastern Cape such as the municipality of Ntabankulu being the poorest live below the poverty line and lack basic service delivery. In Limpopo, however, only two of the province's municipalities with many of its residents live below the poverty line (HSRC, 2004).

The study by Burger et al. (2016) utilized the data from Censuses of 1996, 2001, and 2011 and the Community Survey of 2007 (CS 2007) conducted by StatsSA to analyze the racial and geographical impact on poverty, by adopting the Fuzzy Sets approach to derive a multi-dimensional non-money-metric welfare index. The study unpacks the deprivation levels across all provinces in the country and discovered that there was a notable divide in average deprivation levels in the Western Cape, Gauteng, and the Northern Cape (between 0.2 and 0.3) compared to Limpopo and the Eastern Cape (in-between 0.6) in the year 1996 (Burger et al., 2016).[3] The evidence presented by this study proves that the era of Apartheid played a significant role in the differences among these provinces. According to the authors, at the time of apartheid, there were only three provinces (known as the Western Cape, Gauteng, and the Northern Cape) that had few parts of their land categorized as the "homelands", which were settlements that had inadequate service delivery and little economic activity or opportunities for employment during these times.

The study calculated the average deprivation by province in 1996-2011. The results highlight the fact that the Eastern Cape and Limpopo remained the poorest provinces in South Africa. The fact that these provinces have deep remote rural areas, placed a limit on the improvements that could be achieved (Burger et al., 2016). Nevertheless, the level of deprivation between the years 1996 and 2001 has experienced a sharp fall which highlights the effectiveness of the post-apartheid policies in addressing poverty and equality of service delivery throughout South African provinces. The fall in deprivation in these provinces is well supported by the improvements in deprivation across the board. This is evident with Eastern Cape and Limpopo's average deprivation being 0.610 and 0.620 in 1996 respectively but dropped to 0.408 and 0.440 in 2011 respectively. Whilst these two provinces have been catching up with the other seven provinces during the period under study, they remained the two provinces with the highest average deprivation index or worst non-money-metric poverty.

[3] According to the Fuzzy Sets approach, the higher the index value (as found in provinces such as Eastern Cape and Limpopo), the more serious the extent of non-money-metric deprivation.

According to the 'Poverty Trends in South Africa 2006 and 2015' report released by StatsSA (2017), the most vulnerable to poverty in South Africa included children (aged 17 years or younger), people living in rural areas, females, black Africans, and the older generation who live on social grants for survival. The focus of the study is on those living in Eastern Cape and Limpopo due to being the poorest provinces since the year 2001. The report shows there has been an improvement in poverty in these provinces. The improvement in poverty in these two provinces is derived by measuring poverty in terms of it being multi-dimensional. The result of this measurement concluded that the Eastern Cape had experienced a drop in multi-dimensional poverty by 17.5 percentage points since the year 2001. However, the province is still classified to be one of the poorest provinces regarding multi-dimensional poverty. On the other hand, the province of Limpopo was noted to be the second highest province with 11.5% of individuals or households living in multi-dimensional poverty. These results are true since most of its land is rural. In which the occupants of these rural areas have little to no form of education and the lack of infrastructure and financial capabilities are the added factors to these two provinces remaining the poorest provinces in South Africa.

The study by Fransman & Yu (2019) examined the multi-dimensional poverty in South Africa in 2001-2016 with the MPI (multi-dimensional poverty index) approach. The study also illustrated findings using a table that focused on the proportion of population deprived in each indicator which calculations were made using the Census 2001, CS 2007, Census 2011, and CS 2016. The findings revealed that the Western Cape and Gauteng were the least deprived compared to the other provinces. While the Eastern Cape, Limpopo, and the Northwest were the most deprived, however, there had been a greater decline between the years 2001 and 2016 of deprivation proportions for African, females, rural residents, and those living in these three provinces. In summary, the study acknowledges the decline in deprivation, however, there are still provinces that are still deprived of access to proper sanitation, education, health, and infrastructure.

In motivation to the previous paragraphs StatsSA (2020) highlighted the fact that Limpopo and Eastern Cape are the poorest provinces regarding gaining access to basic services. StatsSA (2020) using the General Household Survey data, noted that water inside the dwellings, off-site or on-site

was most common among households in the richest provinces such as Western Cape and Gauteng, and the least common in Limpopo (71.3%) and Eastern Cape (72.1%). While most households in the Western Cape (93.9%) and Eastern Cape (92.7%) had access to improved sanitation, access was most limited in Limpopo (58.7%) and Mpumalanga (64.4%). In the Eastern Cape, households' access to improved sanitation facilities increased by 59.3 percentage points between 2002 and 2020, growing from 33.4% to 92.7%. The largest percentage of pit toilets with ventilation pipes were observed in Eastern Cape (44.9%) and Limpopo (34.5%), due to the absence of flush toilets.

Lastly, the study by Hajdu et al. (2020) focused on the living standards of rural provinces. The fact that the rural areas endured the past apartheid period created an impoverished and unemployed rural population. The state, therefore, created the solution of alleviating poverty through the expansion of social protection that has been unequal in the rural provinces. The expansion of social protection including public housing, education, and health provisioning, and the expansion of cash pensions and welfare grants which are paid to a third of the population, which is the majority of the impoverished elderly, caregivers of children, and the disabled. The dependents are mostly from the rural areas of the Eastern Cape and Limpopo.

2.7 Conclusion

This chapter addressed the changes that took place regarding multi-dimensional poverty in the provinces of the Eastern Cape and Limpopo from the time of apartheid to the year 2020. It also showed the persistent decline in the MPI at the national level in these specific provinces. From the literature review above, there is a lack of comprehensive studies that specifically examined and compared provincial non-income poverty in the Eastern Cape and Limpopo. It was either one who could find studies of the Eastern Cape and not the same studies regarding Limpopo that would assist in the comparison of the two provinces to evaluate the changes that occurred these past years about multi-dimensional poverty.

Most of the past empirical studies highlighted the fact these two provinces are the least amongst the other provinces due to the backlog and history of these provinces but would then focus more on the successful provinces which are Gauteng and Limpopo. Information regarding how MPI affects the economy of these provinces and specific actions and disasters that occur that affect the

advancement of the province and its people due to multi-dimensional poverty. Lastly, the chapter highlighted the impact of policies implemented on the future of a province regarding resources, infrastructure, and poverty (both income and non-income).

CHAPTER THREE: METHODS AND DATA

3.1 Introduction

In this chapter, we will discuss the methodology and data used in the empirical analysis. The chapter starts with an introduction of what this chapter entails in section 3.1. Section 3.2 will describe the methods that will be used in this study and the rationale behind the application of these techniques. In section 3.3, we will explain the data more clearly, utilizing the General Household Survey (GHS) conducted by Stats SA. The survey comprises three waves in 2005, 2013, and 2021. Finally, section 3.4 will conclude this chapter.

3.2 Methods

This research involves the creation of a multi-dimensional non-income welfare index through the use of Principal Component Analysis (PCA), a well-established multivariate technique that has been utilized for over a century in analyzing complex data sets. As described by De Leeuw (2013), PCA is a classical method that is particularly effective in analyzing data sets that contain inter-correlated quantitative dependent variables. The primary aim of this multivariate technique, as outlined by Abdi & Williams (2010), is to explore and analyze complex data tables with inter-correlated quantitative dependent variables.

This text seeks to provide a comprehensive overview of the Principal Component Analysis (PCA) technique as a data analysis tool. The main goal of PCA is to reduce the complexity of a given data set while retaining its essential features. To achieve this, PCA has four primary objectives: (1) to extract and identify the most important information from a data table, (2) to reduce the size of the data set, (3) to simplify the description of the selected data set, and (4) to analyze the structure of the observations and variables (Abdi & Williams, 2010).

PCA is a mathematical technique that creates new variables, known as principal components, from the original variables of the data set. These principal components are linear combinations of the original variables and capture the maximum amount of variance The first principal component (PC_1 or V_1)) has the largest possible variance and aims to extract the largest part of the data table that remains unchanged. The second principal component is computed under the constraint of

being orthogonal (i.e., perpendicular) to the first component and captures the remaining variance in the data (Abdi & Williams, 2010: 434).

One of the strengths of PCA is its ability to reduce data requirements by combining homogeneous variables into one (Hoque, 2014). However, there are certain limitations to this approach, such as information loss and data standardization. If the principal components that explain enough variation in the dataset are not accurately captured, it can lead to the exclusion of the simplest invariance, resulting in information loss (Karamizadeh et al., 2013). Therefore, it is crucial to assess the covariance matrix before computing the principal components. This task can be complex since the variance of each variable is measured on its unique scale. It is also essential to confirm that all variables have a mean of 0 and a standard deviation of 1. If not, variables with higher scales could overpower the PCA, leading to unreliable outcomes (Karamizadeh et al., 2013).

An alternative to PCA for poverty analysis is fuzzy sets. Fuzzy sets are based on set theory and produce either a value of 1 or 0 for the outcomes of households, whereas PCA creates components from linear combinations of variables. Fuzzy sets are sensitive to the cut-offs for variables to be included in the set or not (Hoque, 2014). However, fuzzy sets have their limitations, and for the reasons outlined above, PCA was chosen over fuzzy sets.

In conclusion, Principal Component Analysis is a valuable technique for data analysis with several strengths and limitations. Its ability to reduce data requirements, extract essential features, and simplify data descriptions makes it a useful tool. Nonetheless, it is essential to exercise caution in the assessment of the covariance matrix and the standardization of data to ensure accurate results.

To determine the principal components, two methods are employed. Tharwat (2016) outlines the first method, which involves calculating the covariance matrix in two main steps: (a) determining the covariance matrix of the data, denoted as (X), and (b) calculating the eigenvalues and eigenvectors of the covariance matrix. To calculate the variance, the first step is to measure the deviation of the variable from its mean value, as defined by Tharwat (2016); $\sigma^2(x) = \Sigma((x - \mu^2))$, where μ represents the mean of the variable x while the σ^2 represents the variance and the E(x) represents the expected value of x .

The covariance matrix is therefore used when there is more than one variable and can be defined as Σ_{ij}=E $(x_i; x_j)$-E (x_i) E (x_j) = E [$(x_i - \mu_i)(x_j - \mu_j)$]. Once the mean of each variable in the data matrix is calculated, then the mean-centering data are calculated, which is samples as $D = \{d_1; d_2; \ldots.; d_n\} = \{x_1 - \mu, x_2 - \mu, \ldots. , x_N - \mu\}$ which therefore lead the covariance matrix to be represented by the following equation: $\Sigma = DD^T$. The above does reduce the dimension of the original data which the PCA space would be projected as follows: $Y = W^{\Pi}D = \Sigma_{i=1}^{N} W^T(x_i - \mu)$ - this equation represented by Y is the original data after the mean has been subtracted from the PCA space.

To proceed with the proposed methodology, we will need to obtain comprehensive data on the assets and services utilized by households residing in the provinces of Eastern Cape and Limpopo. The data can be sourced from the General Household Survey, which has been conducted by Stats SA for the years 2005, 2013, and 2021. The survey data sets contain a set of common variables across all three survey waves, including dwelling type, primary cooking energy source, water and sanitation access, wall material, refuse removal, communication and internet access, motor vehicle ownership, and computer ownership. It is important to note that to prevent multicollinearity, we have utilized the variable 'cooking' to represent energy, rather than including all three energy variables. Additionally, Table 2 outlines the poverty variables and their respective categories, which will help us to better understand the socio-economic status of the households in these two provinces.

Table 2: The various variables captured for Eastern Cape and Limpopo in the three waves of GHS data

Dimension	Description	Rank	Category
Dwelling	Type of Dwelling	1	Formal dwelling
		2	Informal dwelling
Energy	Energy for Cooking	1	Electricity or solar energy
		2	Gas
		3	Paraffin or Coal
		4	Wood or Animal dung
Water	Type of water access	1	Tap in dwelling
		2	Tap on the premises
		3	Public tap or tanker
		4	Dam, river, or other
Refuse	Refuse Removal	1	At least once a week (by municipality or community)
		2	less than once a week (by municipality or community)
		3	Communal refuse dump
		4	Own refuse dump
		5	None
Sanitation	Toilet Facilities	1	Flush or Chemical
		2	Bucket latrine
		3	Pit latrine
		4	Other/None

Table 2: Continued

Main material used	Wall material of dwelling	1	Brick
		2	Corrugated
		3	Plastic
		4	Mixture
		5	Tile or mud
		6	Thatching grass
Access to Communication	Access to a landline or mobile phone	1	With landline and mobile phone
		2	With either one of the two
		3	None of both
Internet access	Access to Internet at dwelling and outside dwelling	1	Own
		2	Does not own but have access
		3	Neither own nor have access nor have access
Transportation	Motor Vehicle	1	Yes
		2	No
Household asset	Computer	1	Yes
		2	No
Household asset	Fridge / Refrigerator	1	Yes
		2	No
Household asset	Satellite dish/ decoder	1	Yes
		2	No
Household asset	Television	1	Yes
		2	No

Sources: General Household Surveys 2005, 2013 and 2021.

The effective identification of the multi-dimensional non-income poor population in Eastern Cape and Limpopo is of utmost importance to address poverty in these regions. To achieve this goal, we will be utilizing the relative poverty line approach, which has been proven successful in identifying the most vulnerable populations. This approach involves setting a poverty threshold of 40%, established by the national population in GHS 2015.

However, it is important to note that this approach can be challenging to comprehend, as highlighted by Statistics Portugal (2015). Additionally, one of the flaws of this approach is its failure to consider non-income factors that influence one's standard of living, and thus, it does not provide an accurate representation of poverty. This categorization of anyone below the poverty threshold as poor, regardless of their well-being, can result in inaccurate assessments of the poverty situation.

Despite its imperfections, this approach is being utilized in this study as it reflects the current state of society at the time of analysis. The primary reason for its use is that it expands the definition of poverty, allowing us to identify those who may not have been identified using traditional income-based approaches. By doing so, we can gain a more comprehensive understanding of poverty in Eastern Cape and Limpopo and design targeted interventions to address it effectively.

The primary data sources for this study will be the General Household Survey (GHS) conducted in 2005, 2013, and 2021. These datasets are available on StatsSA and provide an extensive unit of analysis at the household level across all nine provinces. The GHS is an annual survey launched in 2002 to assess the living conditions of South African households. It contains a wide range of topics, including education, health, social development, housing, household access to services and facilities, ownership of assets, food security, and agriculture. The survey aims to provide critical information on the socio-economic status of households in the country, and it is a valuable resource for researchers and policymakers.

The GHS survey is representative of the entire South African population, and it covers both urban and rural areas. The survey is conducted using a multi-stage cluster sampling design, and the sample is stratified by province, district, and locality type. In each sampled household, the survey

collects information on the household members, their demographic characteristics, and their socio-economic status. The survey also collects information on the dwelling unit, including its type, size, and ownership.

One of the strengths of the GHS survey is its extensive questions on asset ownership and access to services and facilities. This information is particularly relevant to this study, which seeks to examine the relationship between household asset ownership, access to services and facilities, and household welfare. The GHS survey also has a high response rate, which ensures that the data collected is representative of the population. Overall, the GHS is an ideal data source for this study, given its comprehensive coverage and the quality of data collected.

3.3 Data

The 2005, 2013, and 2021 General Household Survey (GHS) will be the primary data sources for this study. The dataset is accessible on StatsSA with a unit of analysis being on a household level across all nine provinces. This is an annual household survey that was launched in 2002 to measure the living circumstances of South African households. All the non-income welfare questions were 'transferred' from the Labour Force Survey to the GHS. The survey collects data on education, health, social development, housing, household access to services and facilities, ownership of assets, food security, and agriculture. A wide range of questions on asset ownership and access to services/ facilities are asked in this survey, hence the GHS being chosen for this study.

3.4 Conclusion

In this chapter, we explored the application of the Principal Component Analysis (PCA) method to develop a comprehensive welfare index that goes beyond income for the nine provinces. To analyze the relationship between the non-income welfare index and these provinces, we utilized data from the General Household Surveys (GHS) conducted in 2005, 2013, and 2021. We wrap up the chapter by identifying the data sources that will be utilized to achieve the study's objectives.

CHAPTER FOUR: EMPIRICAL FINDINGS

4.1 Introduction

This chapter presents and discusses the empirical findings obtained through the adoption of the PCA method, as explained in the previous chapter. In section 4.2, the chapter interprets the demographic characteristics of households, such as gender, race, and area type. It also discusses the descriptive statistics on the non-income welfare of households. Furthermore, the chapter presents the results of the principal component analysis and examines the non-income welfare of households by household expenditure category. Section 4.3 concludes the chapter.

4.2 Empirical Findings

Table 3 presents a comprehensive overview of the demographic profiles of two provinces, Limpopo, and the Eastern Cape, across three GHS surveys. The table provides crucial information about the population size, gender, and race of household heads, as well as the area type.

The data presents some noteworthy changes that occurred in both provinces over the past. For instance, the percentage of female-headed households in the Eastern Cape increased from 47.6% in 2005 to 50.6% in 2021. In contrast, the percentage of female-headed households in Limpopo decreased from 50.05% to 45.6% during the same period. However, despite these changes, the percentage of female-headed households in both provinces remained higher than the national average of approximately 40% in all three survey years.

Additionally, the data reveals that both provinces have a high percentage of African-headed households, with 98.2% in Limpopo and 84.6% in the Eastern Cape. This finding highlights the need for policies that address the unique needs and challenges faced by African-headed households in these provinces. The data also indicates that Limpopo has a higher percentage of households residing in rural areas, with 80.3% of households living in these areas, compared to the Eastern Cape, where the percentage of households living in rural areas decreased from 61.7% in 2005 to 46.1% in 2021. The number of households living in urban areas in the Eastern Cape has steadily increased to 53.9% by 2021. Furthermore, the majority of households in both provinces have three

to four members, with 25.0% in the Eastern Cape and 29.2% in Limpopo. The average size of a household in the Eastern Cape was 3.84, while in Limpopo, it was 3.64.

In conclusion, the data provides valuable insights into changes that have occurred in these two provinces over the past 16 years. Although there have been some improvements in household dynamics in these areas, the data suggests that more work needs to be done to match the rest of the country. The information presented in Table 3 is important for policymakers and researchers to design and implement targeted interventions that address the unique needs of households in these provinces.

Table 3: Demographic profile of the households (%, unless stated otherwise)

	Eastern Cape			Limpopo			South Africa		
	2005	2013	2021	2005	2013	2021	2005	2013	2021
Number of households									
Number (million)	1.58	1.66	1.72	1.18	1.43	1.68	12.06	15.09	17.94
Gender									
Male	52.4	50.0	49.4	50.0	48.5	54.4	62.5	58.8	58.0
Female	47.6	50.0	50.6	50.0	51.5	45.6	37.5	41.2	42.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Race									
African	84.0	86.6	84.6	95.3	96.7	98.2	75.4	79.7	82.0
Coloured	7.1	6.5	8.0	0.1	0.5	0.1	8.2	7.3	6.9
Indian	0.2	0.3	0.9	0.6	0.4	0.3	2.6	2.3	2.4
White	8.7	6.7	6.5	4.0	2.5	1.5	13.8	10.7	8.7
Other/Unspecified	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Area type									
Urban		49.2	53.9		16.7	19.7		68.6	69.3
Rural	N/A	50.8	46.1	N/A	83.3	80.3	N/A	31.4	20.7
		100.0	100.0		100.0	100.0		100.0	100.0
Household size									
One person	20.6	22.6	25.5	21.7	22.3	21.5	23.4	22.9	23.3
Two persons	17.4	18.2	16.6	12.6	15.7	13.6	18.1	19.4	18.6
Three persons	14.3	15.4	18.3	14.1	15.0	17.2	15.3	16.2	17.3
Four to five persons	25.7	25.5	25.0	26.5	27.7	29.2	25.5	25.7	26.9
More than five	22.0	18.3	14.6	25.1	19.3	18.5	17.7	15.8	13.9
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Mean household size	*3.86*	*4.04*	*3.84*	*3.73*	*3.88*	*3.64*	*3.55*	*3.85*	*3.66*

Note: The urban/rural area type variable is not available in GHS 2005.

Sources: General Household Survey 2005, General Household Survey 2013 & General Household Survey 2021.

In Table 4, a comparative analysis of non-income welfare indicators of two South African provinces, Eastern Cape, and Limpopo, across three General Household Surveys (GHSs) has been presented. The table reveals an overall improvement in the percentage of households that have access to better services. However, this progress is not uniform across all indicators. The Eastern Cape and Limpopo provinces saw significant increases in households living in formal dwellings, with an increase of 17 percentage points and 11 percentage points, respectively, between 2005 and 2021. Both provinces also witnessed an increase in the percentage of households with electricity, with 79.1% in Eastern Cape and 65.1% in Limpopo at the time of GHS 2021.

However, the table also highlights the presence of some households that still lack proper access to water, refuse removal, and sanitation facilities even in 2021. The inadequate management of the delivery of these services in these two provinces has led to inconsistent water distribution and an increase in illegal connections to water supply systems. Poverty is also a significant cause of poor sanitation, as most households in these provinces cannot afford to buy salt or bleach for water treatment, exposing them to a higher risk of infection and illnesses. The lack of communication between communities in these provinces regarding their needs and municipalities supplying reliable and consistent services has created continuous stagnation in the provision of these services (Murei et al., 2022). In Limpopo, the majority of households still rely on dams and rivers (32.8%) to access water, while in the Eastern Cape, the percentage of households with taps within dwellings increased by 11.1 percentage points since 2013. These results correlate with the fact that Limpopo is a highly ruralized province. By 2021, only 20.8% of households in Limpopo had refuse removed at least once a week, while in Eastern Cape, 40.1% of households had this service. These results highlight the lack of development in this regard compared to other parts of the country.

Moreover, both provinces still have a significant proportion of households (44.3% in Eastern Cape and 74.3% in Limpopo) using pit latrines as sanitation facilities. The Eastern Cape had a steady increase in households with flush/chemical toilets, but there were still more households using pit latrines in 2021. The increase in the usage of pit latrines and poor sanitation in these provinces are also because most communities were not provided with the necessary resources from the beginning.

Over the 16 years, the Eastern Cape had a significant increase from 52.5% to 72.3% of its households using bricks as the wall material of their dwelling, while Limpopo had an increase from 83.4% to 96.3%. There was also a rapid growth of households in these provinces that own either a landline or mobile phone. By 2021, the results accounted for 94.5% and 91.8% in the Eastern Cape and Limpopo, respectively. Access to the internet in these provinces had greatly increased from 2.9% to 61.8% in the Eastern Cape and from 1.1% to 62.4% in Limpopo, indicating a significant improvement in the digital divide.

Table 4: Descriptive statistics on non-income welfare of households

	Eastern Cape			Limpopo			South Africa		
	2005	2013	2021	2005	2013	2021	2005	2013	2021
Dwelling type									
Formal	55.2	59.0	72.4	85.4	92.8	96.3	70.8	77.7	83.6
Informal dwelling	44.8	41.0	27.6	15.6	7.2	3.7	29.2	22.3	16.4
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Energy for cooking									
Electricity or solar energy	39.0	71.5	79.1	36.4	53.5	65.1	62.8	78.4	83.5
Gas	3.3	4.0	6.7	1.1	1.2	0.6	1.9	3.2	4.8
Paraffin or coal	31.3	10.7	4.0	11.3	3.6	1.3	18.9	7.2	3.9
Wood or animal dung	26.4	13.8	10.2	51.3	41.7	33.0	16.4	11.2	7.7
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Water Access									
Tap in dwelling	26.6	30.8	37.7	12.8	16.4	11.3	40.4	45.3	45.2
Tap in premises	17.5	14.2	10.3	25.4	30.0	32.7	29.4	26.8	29.4
Public tap or tanker	24.0	35.0	23.5	35.8	25.3	23.2	16.8	16.7	13.9
Dam, river, or other	31.9	20.0	28.6	26.0	28.3	32.8	13.4	11.2	11.4
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Refuse removal frequency									
Removed once a week	41.6	34.7	40.1	18.4	20.0	20.8	60.7	62.6	60.2
Removed less than once a week	1.8	7.5	2.1	0.5	1.3	3.1	1.3	2.5	2.6
Communal refuse dump	0.5	0.3	4.5	5.6	0.9	7.5	3.4	1.6	6.6

Table 4: Continued

Own refuse dump	52.1	53.8	51.4	72.7	70.4	68.0	30.4	28.8	28.4
Other/ none	4.0	3.61	1.9	2.8	7.4	0.6	4.2	4.6	2.2
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Sanitation facility									
Flush or chemical	40.2	41.9	43.5	23.7	22.1	25.6	60.4	62.9	65.6
Bucket latrine	3.5	0.7	1.5	0.1	0.6	0.0	2.2	1.2	0.8
Pit latrine	33.1	47.6	44.3	64.0	70.3	74.3	29.7	31.5	33.3
Other/none	23.2	9.8	10.7	12.2	7.0	0.1	7.6	4.4	0.2
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Wall Material of dwelling									
Bricks	52.5	57.7	72.3	83.4	92.0	96.3	71.9	77.0	83.8
Corrugated	8.9	7.6	5.6	6.1	4.0	3.0	14.1	13.5	11.8
Plastic	0.1	0.2	0.1	0.3	0.0	0.0	0.3	0.2	0.1
Mixture	4.1	14.1	13.2	0.7	1.5	0.2	1.7	3.1	2.0
Tile/mud	30.4	19.8	8.2	8.1	1.8	0.2	10.2	5.0	1.7
Thatching grass	4.0	0.6	0.6	1.4	0.7	0.2	1.8	1.2	0.4
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Access to telephone									
Both landline and mobile telephone	11.8	7.1	2.9	4.2	3.0	3.5	17.9	12.8	6.5
Either landline or mobile telephone	44.9	82.3	94.5	54.5	92.7	91.8	47.2	82.2	91.2
None	43.3	10.6	2.6	41.3	4.3	4.7	34.9	5.0	2.3
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Internet access									
Owned	2.9	26.9	61.8	1.1	18.5	62.4	6.4	34.4	71.6
Does not own but have access	6.2	3.3	2.9	3.1	3.4	1.3	10.0	6.5	5.9
Not at all	90.9	69.8	35.3	95.8	78.1	36.3	83.7	59.1	22.5
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 4: Continued

Motor vehicle ownership									
Yes	15.0	16.5	17.8	13.1	16.6	17.8	24.7	16.6	29.8
No	85.0	83.5	82.2	86.9	83.4	82.2	75.3	83.4	70.2
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Computer ownership									
Yes	6.6	8.3	14.3	3.8	12.2	17.7	12.3	19.1	27.2
No	93.4	91.7	85.7	96.2	87.8	82.3	87.7	80.9	72.8
Fridge ownership									
Yes	40.3	58.4	80.3	46.7	61.8	88.9	56.5	71.0	87.2
No	59.7	41.6	19.7	53.3	38.2	11.1	43.5	29.0	12.8
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Satellite dish/decoder ownership									
Yes	5.9	17.4	56.7	4.6	28.1	68.9	9.7	30.1	60.8
No	94.1	82.6	43.3	95.4	71.9	31.1	90.3	69.8	39.2
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Television ownership									
Yes	49.3	71.9	82.5	45.6	73.3	88.5	60.5	79.2	87.6
No	50.7	28.1	17.5	54.4	26.7	11.5	39.5	20.8	12.4
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Own calculations using GHS 2005.2013 & 2021 data.

The table provides insightful information regarding the ownership of assets in the Eastern Cape and Limpopo provinces between 2005 and 2021.

According to the table, in the year 2021, a significant percentage of households in both provinces did not own motor vehicles or computers. Specifically, 85.7% of households in the Eastern Cape and 82.3% of households in Limpopo did not own computers. However, it is worth noting that there has been a small increase in the ownership of these assets over the past 16 years.

Interestingly, there has been a significant change in the ownership of refrigerators in both provinces. In 2005, 59.7% of households in the Eastern Cape and 53.3% of households in Limpopo did not own refrigerators. By contrast, in 2021, 80.3% of households in the Eastern Cape and 88.9% of households in Limpopo owned refrigerators. This points to a considerable improvement in the living standards of the people in these provinces.

Furthermore, the table indicates that more households in both provinces had satellite dishes in 2021, with 56.7% of households in the Eastern Cape and 68.9% of households in Limpopo owning them. There has also been a steady increase in households owning televisions in both provinces over the past 16 years. In the Eastern Cape, households with televisions increased from 49.3% in 2005 to 82.5% in 2021, while in Limpopo, households with televisions increased from 45.6% in 2005 to 88.5% in 2021.

It is believed that the improvement in ownership of assets in these provinces is due to the efforts of individuals who migrated to other provinces in search of better opportunities and were able to build their own homes in the rural areas. This has resulted in an increase in the number of households that own assets such as refrigerators, satellite dishes, and televisions. Overall, the table underscores the importance of individual efforts in enhancing the living standards of communities.

Table 5: Principal components analysis table (show the first principal components 'coefficients')

	2005	2013	2021
Dwelling: Formal	0.2407	0.2543	0.2885
Energy for cooking: Electricity or solar energy	0.2653	0.2186	0.1933
Energy for cooling: Gas	-0.0142	0.0156	0.0196
Energy for cooking: Paraffin or coal	-0.1910	-0.1808	-0.1696
Water source: Piped water in dwelling	0.2953	0.3040	0.3138
Water source: Piped water on site	-0.0817	-0.0932	-0.1055
Water source: Other	-0.1567	-0.1451	-0.1438
Refuse removal: Once a week	0.2396	0.2530	0.2672
Refuse removal: Less than once a week	0.0012	-0.0099	0.0028
Refuse removal: Communal refuse dump	-0.0517	-0.0496	-0.1243
Refuse removal: Other/None	-0.0804	-0.1038	-0.0784
Sanitation: Flush or chemical toilet	0.2662	0.2804	0.2855
Sanitation: Bucket latrine	-0.0468	-0.0453	-0.0695
Sanitation: Other/None	-0.1488	-0.1290	-0.0481
Wall material: Bricks	0.2408	0.2574	0.2931
Wall material: Corrugated	-0.1333	-0.1695	-0.2365
Wall material: Plastic	-0.0146	-0.0181	-0.0160
Wall material: Mixture	-0.0676	-0.0985	-0.1081
Wall material: Thatching grass	-0.0401	-0.0405	-0.0431
Telephone: Both landline and mobile	0.2441	0.1856	0.0733
Telephone: None of both	-0.2011	-0.0951	-0.0374
Internet: Owned	0.1954	0.2383	0.1906
Internet: Not at all	-0.2185	-0.2554	-0.2013
Ownership of motor vehicle: Yes	0.2597	0.2500	0.2482
Ownership of computer/laptop: Yes	0.2343	0.2315	0.2426
Ownership of fridge: Yes	0.2585	0.2460	0.2449
Ownership of satellite dish: Yes	0.2033	0.2478	0.2520
Ownership of television: Yes	0.2371	0.2184	0.2347
First eigenvalue	7.0286	6.2580	5.3578
The proportion of variation explained by the first component	25.10%	22.35%	19.15%

Source: Own calculations using GHS 2005.2013 & 2021 data.

Table 5 contains the results of the Principal Components Analysis (PCA) conducted over three years. The analysis shows that the first components had Eigen values ranging between 5.36 and 7.023 and accounted for about 19-25% of the variations. The components included 28 dummy variables derived from the service and asset variables, with piped water in a dwelling (0.3138) being the variable with the highest coefficient in positive values in 2021. Other variables that had high positive coefficients in the same year include wall material: bricks (0.2931), formal dwelling (0.2885), flush/chemical toilets as a sanitation facility (0.2885), refuse removal at least once a week (0.2672), and ownership of satellite dish: Yes (0.2520). On the other hand, wall material: corrugated (-0.2365), internet: not at all (-0.2013), water source: other (-0.1435), and energy for cooking: paraffin or coal (-0.1696) were the dummy variables with the highest negative coefficients in absolute terms.

Table 6 provides a detailed analysis of the proportion of the poor living in the nine provinces. The analysis shows that the poverty headcount ratio dropped from 40% to 8.7%, indicating a significant reduction in poverty in the country. The Eastern Cape had a poverty headcount drop of 40.4 percentage points between 2005 and 2021, but still, had the highest poverty headcount ratio of 18.3% in 2021. The Limpopo province had the greatest decline in the poverty headcount ratio between 2005 and 2021, dropping from 63.8% to 6.0%, a decline of 57.8 percentage points. It is interesting to note that the Eastern Cape and Limpopo were the two provinces with the highest poverty rates in 2005. However, by 2021, Limpopo had surprisingly dropped to eighth place, indicating significant progress in reducing poverty in these provinces when compared to other provinces in the country.

Table 6: Non-income poverty headcount rates by province (%)

	2005	2013	2021	Difference: 2005 vs. 2021
Western Cape	16.5	9.7	2.7	13.8
Eastern Cape	58.7	38.9	18.3	40.4
Northern Cape	31.5	14.9	9.7	21.8
Free State	39.1	12.2	8.2	30.9
KwaZulu-Natal	45.1	28.4	8.3	36.8
North West	44.4	21.8	14.0	30.4
Gauteng	25.0	11.8	7.8	17.2
Mpumalanga	49.0	18.5	8.6	40.4
Limpopo	63.8	31.0	6.0	57.8
South Africa	40.2	20.6	8.7	31.3

Sources: GHS 2005.2013 & 2021.

The study presented in Tables A2 and A3 examines the non-income poverty and squared poverty headcount gap ratios by province over 16 years. The results reveal that the Eastern Cape and Limpopo provinces experienced the highest non-income poverty and non-income squared poverty headcount gap ratios compared to the other provinces.

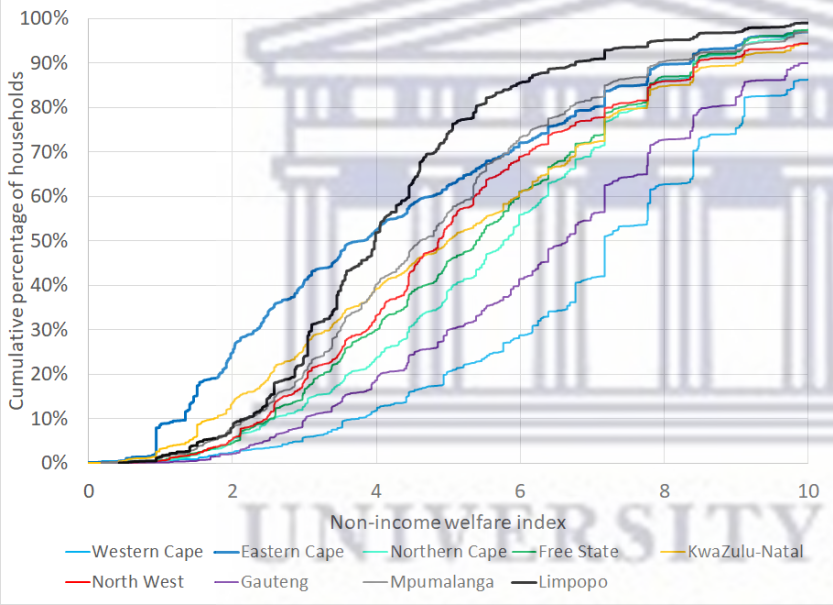
The study also revealed that the Eastern Cape experienced the highest decline in the non-income poverty headcount gap between 2005 and 2021. However, despite the decline, the province still had the highest non-income poverty headcount ratio of 0.0472 among the nine provinces in 2021. On the other hand, Limpopo experienced a significant decline in the non-income poverty headcount gap from 19.42% in 2005 to 1.34% in 2021. Both provinces observed a substantial decrease in the non-income squared poverty headcount gap ratio by 2021.

To gain a deeper understanding of the changing pattern of non-income welfare poverty, cumulative distribution functions (CDFs) were graphed. The CDFs allowed for a comparison of the changes in non-income poverty between all nine provinces in 2005 and 2021, and between three time periods for Eastern Cape and Limpopo, respectively. The CDFs showed that as the non-income

index value rose, the corresponding cumulative proportion of households experiencing non-income poverty also rose.

Figure 1 illustrates the CDFs for all provinces in South Africa in 2005. The graph highlights that households in the Western Cape and Gauteng were better off than those in the rest of the country, while households in the Eastern Cape and Limpopo experienced higher levels of non-income poverty. In particular, the CDF of Eastern Cape was above the other eight provinces' CDFs between the non-income welfare index of zero to four, indicating that households in the province were the poorest in terms of non-income welfare at the time. As the non-income welfare index increased, the percentage of households experiencing this type of poverty also increased.

Figure 1: Cumulative density functions of all nine provinces in 2005



Source: Own calculations using GHS 2005.2013 & 2021 data.

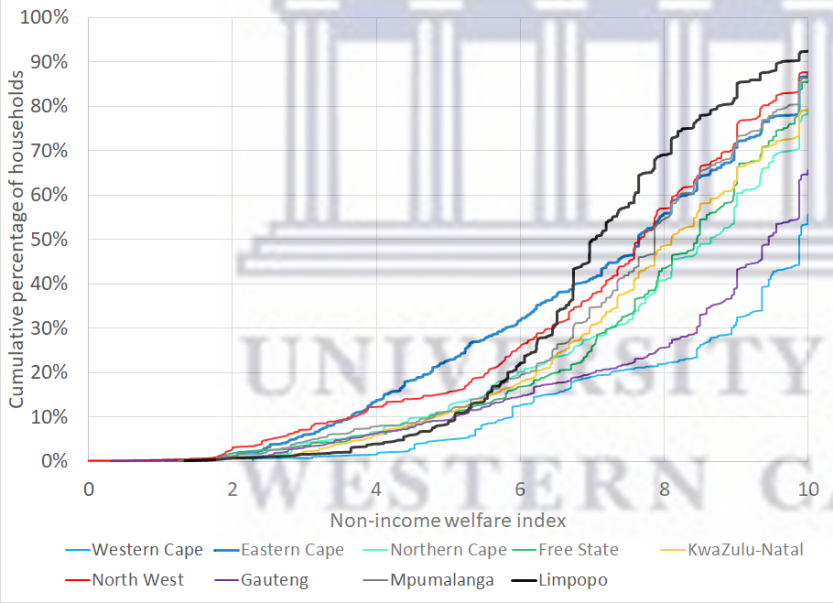
According to the CDF graph, the non-income welfare index in Limpopo province has increased significantly. This has resulted in households in Limpopo and the Eastern Cape being the poorest among all provinces, with a non-income welfare index of four, indicating an equal level of poverty. However, as the index increased, the gap between Limpopo and other provinces continued to widen, making households in Limpopo the poorest of all. In contrast, the CDF graph of the Eastern Cape showed a decrease in the proportion of households living in non-income welfare poverty as

the non-income welfare index increased. This implies that, in the Eastern Cape, households improved their living conditions as the non-income welfare index increased.

Figure 2 displays the CDFs for all provinces in South Africa in 2021. The CDFs of the Eastern Cape and North West provinces were higher than those of other provinces, except for the very bottom. This indicates that households in the Eastern Cape remained the poorest until there was a rapid increase in the proportion of households living in non-income welfare poverty in Limpopo at higher non-income welfare index values.

The significant increase in the proportion of households living in non-income welfare poverty in Limpopo was reflected in the wide gap between Limpopo's CDF and the rest of the provinces. This shows that Limpopo has a bigger problem to solve than other provinces in terms of households living in non-income welfare poverty.

Figure 2: Cumulative density functions of all nine provinces in 2021



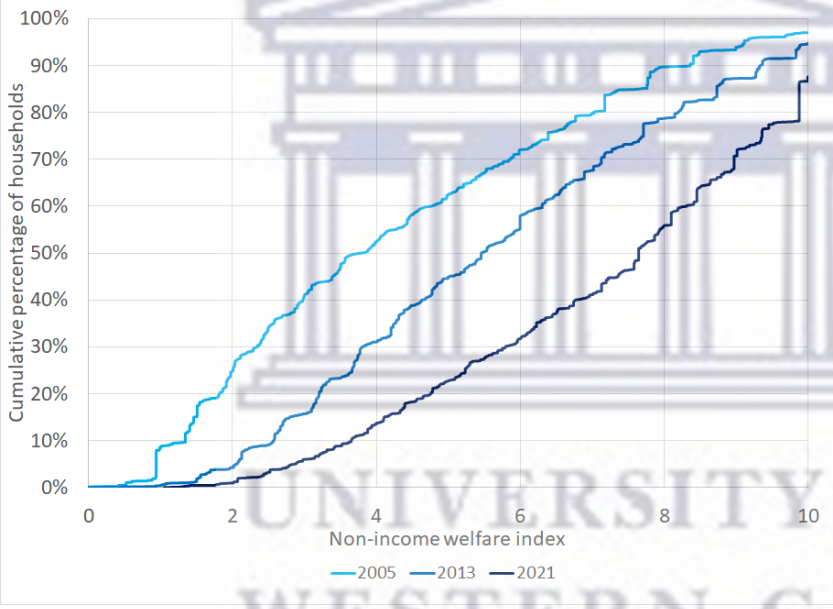
Source: Own calculations using GHS 2005.2013 & 2021 data.

To conclude, the findings from both Figures 1 and 2 correspond with the findings of Table 6, that is, Eastern Cape and Limpopo were the most deprived provinces in 2005. In 2021, however, households in the Eastern Cape and North West suffered greater in non-income welfare poverty

compared to the other provinces at lower non-income welfare index values, but at higher index values the Limpopo CDF became much steeper.

Figure 3 shows the CDF graphs for Eastern Cape households for the periods 2005, 2013, and 2021. The graph illustrated that the 2013 CDF graph lies below the 2005 CDF graph, while the 2021 CDF graph lies below the 2013 CDF graph. These results confirm that non-income poverty declined continuously between 2005 and 2021 in the Eastern Cape. In addition, Figure 3 shows that the gap between the 2005 CDF graph and the 2013 CDF graph was wider than that between the 2013 and 2021 CDF graphs at first. This, however, changed as the percentage of households increased the wider the gap of non-income welfare poverty between 2013 and 2021 compared to 2005 and 2013.

Figure 3: Cumulative density functions of Eastern Cape only (2005, 2013, and 2021

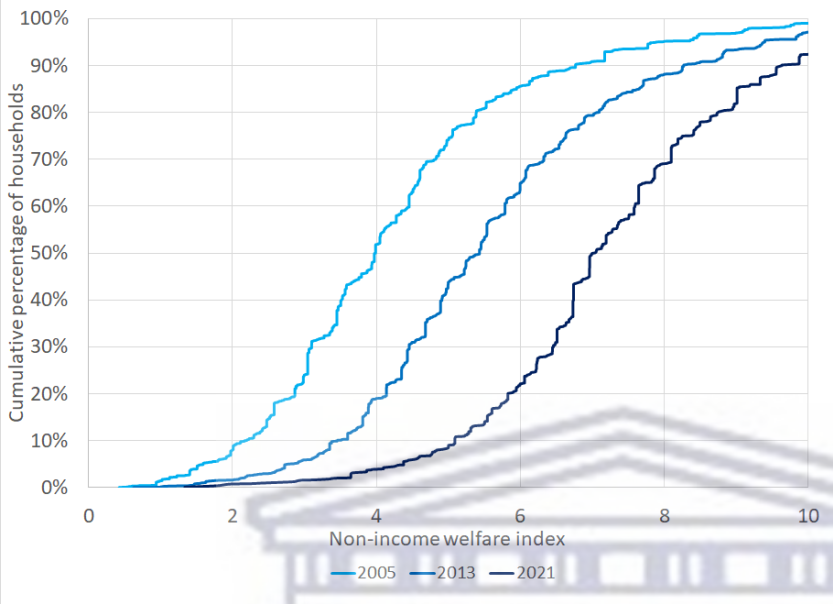


Source: Own calculations using GHS 2005.2013 & 2021 data.

Figure 4 shows the CDF graphs for Limpopo households for the three years under study. In the case of Limpopo except for the very bottom, the 2021 CDF lies below the 2013 and 2005 CDFs. This finding illustrates the fact (as discussed earlier) that non-income welfare poverty in Limpopo declined continuously post-apartheid period. There was a relatively faster decline in non-income poverty between 2005 and 2013 but at the top, the decline was slow between the 90th and 100th

percentile. The 2021 CDF graph had an even wider gap between itself and 2013. This illustrated the rapid pace of change in non-income poverty in the year 2021, for households in Limpopo.

Figure 4: Cumulative density functions of Limpopo only (2005, 2013, and 2021)



Source: Own calculations using GHS 2005.2013 & 2021 data.

The evidence provided by the CDFs is clear - non-income poverty has significantly declined in the Eastern Cape and Limpopo regions. However, while these provinces have seen progress, they still lag behind other regions in terms of poverty reduction. The graphs indicate that the reduction in non-income poverty between 2013 and 2021 occurred at a moderately faster pace than the previous period from 2005 to 2013.

Table 7 reveals insightful information about the demographic profile of poor households in both provinces during the three GHSs. The table provides a detailed breakdown of population size, gender composition, race of household heads, area type, and household size. The data shows that the number of impoverished households has consistently declined in both provinces over the years. However, female-headed households remain the majority of poor households, accounting for over 50% of the total. It is concerning that in Limpopo, the percentage of female-headed households that remained in poverty between 2005 and 2013 was particularly high. Moreover, there was a significant increase in male-headed households in poverty, which rose from 44.4% in 2013 to 70.5% in 2021.

The data also shows that both provinces have a high percentage of African-headed households that are poor, with 99.6% in the Eastern Cape and 99.8% in Limpopo. Poor households in both regions are primarily located in rural areas, accounting for 79.0% and 84.6% of households in the Eastern Cape and Limpopo, respectively. The Eastern Cape had the highest rate of households with one person living in poverty throughout the 16 years. In contrast, in Limpopo, households with four to five persons were deemed poor between 2005 and 2013, but in 2021, 57.6% of households with one person were poor.

In conclusion, Table 7 provides an in-depth analysis of the demographic profile of poverty in the Eastern Cape and Limpopo regions. The data highlights the need for specific interventions to address the high percentage of female-headed households in poverty, the rising number of male-headed households in poverty, and the high percentage of African-headed households in poverty. The fact that poor households in both regions are primarily located in rural areas further underscores the need for targeted interventions to address rural poverty. The data is clear - we need to take action to address poverty in these regions.

Table 7: Profile of the poor households in each province (%, unless stated otherwise)

	Eastern Cape			Limpopo			South Africa		
	2005	2013	2021	2005	2013	2021	2005	2013	2021
Number of households									
Number (million)	0.93	0.65	0.32	0.75	0.44	0.10	4.85	3.10	1.57
Gender									
Male	48.8	45.8	46.4	44.3	44.4	70.5	46.8	45.3	52.2
Female	51.2	54.2	53.6	55.7	55.6	29.5	53.2	54.7	47.8
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Race									
African	97.9	97.6	99.6	99.9	99.8	100	98.8	98.5	99.7
Coloured	2.1	2.3	0.4	0.1	0.1	0.0	1.2	1.4	0.3
Indian	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
White	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0
Other/Unspecified	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Area type									
Urban		17.5	21.0		2.6	15.4		11.4	19.7
Rural	N/A	82.5	79.0	N/A	97.4	84.6	N/A	88.6	80.4
		100.0	100.0		100.0	100.0		100.0	100.0
Household size									
One person	23.4	23.8	30.5	17.5	22.5	57.6	20.7	23.3	37.1
Two persons	14.5	16.1	13.4	11.7	15.6	20.5	13.2	15.9	15.1
Three persons	13.5	14.2	12.4	14.1	14.7	9.3	13.8	14.4	11.6
Four to five persons	23.6	23.2	26.4	28.5	25.1	11.2	25.8	24.0	22.7
More than five	25.0	22.7	17.3	28.2	22.1	1.4	26.5	22.4	13.5
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: The urban/rural area type variable is not available in GHS 2005.

Source: Own calculations using GHS 2005.2013 & 2021 data.

Table 8: Descriptive statistics on non-income welfare of poor households

	Eastern Cape			Limpopo			South Africa		
	2005	2013	2021	2005	2013	2021	2005	2013	2021
Dwelling type									
Formal	24.8	14.9	8.1	77.8	80.3	55.9	35.6	29.7	13.7
Informal dwelling	75.2	85.1	91.9	22.2	19.7	44.1	64.4	70.3	86.3
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Energy for cooking									
Electricity or solar energy	9.3	41.1	43.6	9.1	10.6	18.0	21.3	30.5	31.2
Gas	3.1	4.1	5.1	1.0	0.5	0.0	2.2	3.0	2.2
Paraffin or coal	43.0	21.8	11.6	13.5	6.4	19.5	37.2	26.5	37.2
Wood or animal dung	44.6	33.0	39.7	76.5	82.5	62.5	39.4	40.0	30.4
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Water Access									
Tap in dwelling	0.7	0.4	0.0	0.2	0.9	0.0	1.0	1.3	0.6
Tap in premises	11.3	6.7	3.5	22.0	22.0	17.9	35.3	22.2	22.9
Public tap or tanker	36.6	50.3	41.1	45.2	35.2	23.5	34.8	44.6	46.2
Dam, river or other	51.4	42.6	55.4	32.6	41.9	58.6	28.9	31.9	30.3
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Refuse removal frequency									
Removed once a week	13.2	5.2	2.9	2.8	4.3	7.1	25.7	16.3	13.7
Removed less than once a week	0.5	1.1	0.0	0.1	0.5	4.5	1.0	2.2	1.2
Communal refuse dump	0.6	0.5	5.8	4.0	0.8	12.9	6.0	4.9	23.7
Own refuse dump	79.5	86.2	87.6	89.4	80.4	72.0	58.4	62.3	51.4
Other/ none	6.2	7.0	3.7	3.7	14.0	3.5	8.9	14.4	10.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 8 Continued

Sanitation facility									
Flush or chemical	7.7	4.9	10.8	4.1	1.5	3.5	20.2	11.4	14.6
Bucket latrine	5.2	1.2	1.2	0.2	0.1	0.0	4.6	3.3	5.3
Pit latrine	47.8	71.5	87.7	76.8	81.2	94.6	56.5	67.4	77.9
Other/none	39.3	22.4	0.4	18.9	17.2	1.9	18.7	17.9	2.2
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Wall material of dwelling									
Bricks	20.6	11.2	5.6	75.8	79.2	53.2	37.0	27.2	12.2
Corrugated	14.7	14.5	19.6	8.7	9.2	39.2	30.5	37.0	58.6
Plastic	0.1	0.1	0.4	0.1	0.0	0.0	0.6	0.6	0.3
Mixture	7.0	30.6	43.7	1.0	4.5	2.5	4.2	12.1	14.5
Tile/mud	51.4	42.6	29.0	12.7	5.8	3.2	24.4	19.7	12.0
Thatching grass	6.2	1.0	1.6	1.7	1.3	1.9	3.4	3.4	2.5
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Access to landline or mobile phone									
Both landline and mobile phone	0.4	0.4	0.9	0.1	0.3	0.0	0.3	0.7	2.2
Either landline or mobile phone	39.7	81.8	94.6	44.9	88.8	90.7	40.2	85.4	92.3
None	60.0	17.8	4.5	55.0	10.9	9.3	59.5	13.9	5.5
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Internet access									
Owned	0.0	4.2	23.2	0.0	1.4	14.5	0.0	3.6	33.6
Does not own but have access	1.5	0.2	2.4	0.8	0.2	0.0	1.6	1.2	6.8
Not at all	98.5	95.6	74.4	99.2	98.4	85.5	98.4	95.2	59.6
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 8 Continued

Motor vehicle ownership									
Yes	1.3	1.2	0.0	2.2	1.7	3.5	1.7	2.0	1.0
No	98.7	98.8	100.0	97.8	98.3	96.5	98.3	98.0	99.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Computer ownership									
Yes	0.0	0.2	0.2	0.1	0.2	0.0	0.1	0.3	0.1
No	100	99.8	99.8	99.9	99.8	100	99.9	99.7	99.9
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Fridge ownership									
Yes	12.2	22.4	39.1	31.4	26.5	28.4	19.5	21.5	26.9
No	87.8	77.6	60.9	68.6	73.5	71.6	80.5	78.5	73.1
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Satellite dish/decoder									
Yes	0.3	1.6	12.2	0.5	2.5	5.4	0.2	1.3	4.1
No	99.7	98.4	87.8	99.5	97.5	94.6	99.8	98.7	95.9
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Television ownership									
Yes	23.9	42.6	42.2	30.2	44.2	16.0	26.7	37.0	28.5
No	76.1	57.4	57.8	69.8	55.8	84.0	73.3	63.0	71.5
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Own calculations using GHS 2005.2013 & 2021 data.

Table 8 provides a comprehensive analysis of the non-income welfare of poor households in two provinces of South Africa over 16 years, based on data from three General Household Surveys (GHSs). The table reveals that the percentage of poor households living in informal dwellings in the Eastern Cape remained exceedingly high, consistently rising from 75.2% in 2005 to 91.9% in 2021, whereas Limpopo had a higher proportion of poor households living in formal dwellings. The data also shows that the use of wood or animal dung as a source of energy by poor households in the Eastern Cape declined significantly between 2005 and 2021, while in Limpopo, it remained high. Additionally, the table highlights the continuous increase in pit latrines by poor households in both provinces over the years, and the high percentage of households with no access to a landline mobile phone or the internet.

Moreover, Table 9 provides an in-depth analysis of the proportion of households defined as non-income poor by the monthly household expenditure category. The data reveals that the percentage of non-income poor households in Eastern Cape decreased continuously from 81.8% in 2005 to 53.4% in 2021, even though the R0-R300 expenditure category still had the highest proportion of non-income poor households. In Limpopo, there was a drastic decline in the proportion of non-income poor households over the years. The table shows that the proportion of households with a monthly expenditure of R1199 or less was high in 2005, ranging between 62.8% to 84.0%, but declined significantly to 16.7% in an unspecified expenditure category by 2021.

In conclusion, the data presented in both tables highlight the need for continuous efforts to alleviate poverty and improve the standard of living of poor households in South Africa, especially in terms of access to basic services and resources.

Table 9: Percentage of households defined as non-income poor, by household expenditure category.

	WC	EC	NC	FS	KZN	NW	GAU	MPU	LIM	RSA
					GHS 2005					
R0-R399	63.8	81.8	63.4	65.6	70.7	68.8	55.9	74.1	84.0	71.8
R400-R799	40.6	71.9	43.9	51.2	67.5	53.0	44.2	67.2	69.8	59.8
R800-R1199	23.7	51.9	24.5	33.9	41.0	50.7	32.3	46.7	62.8	40.3
R1200-R1799	12.1	30.3	12.9	33.3	27.1	31.8	18.7	28.2	36.8	23.9
R1800-R2499	5.1	13.8	2.0	17.4	16.0	23.5	9.3	11.5	25.5	12.6
R2500-R4999	0.4	6.1	0.7	4.7	2.9	4.6	1.7	5.8	12.0	3.0
R5000-R9999	0.0	3.2	0.0	0.9	0.8	1.2	0.0	2.0	5.8	0.7
R10000+	0.0	1.5	0.0	0.0	0.4	0.7	0.0	0.0	0.0	0.2
Not specified	16.8	29.0	5.4	9.9	34.6	13.2	14.6	44.5	76.4	22.2
All	16.5	58.7	31.5	39.1	45.1	44.4	25.0	49.0	63.8	40.2
					GHS 2013					
R0-R399	37.2	61.4	36.7	29.6	59.2	46.7	37.0	52.7	50.7	48.2
R400-R799	34.9	63.4	22.4	25.2	50.2	35.3	31.9	37.4	46.6	42.7
R800-R1199	23.8	51.1	32.0	16.5	45.7	29.7	27.4	25.8	38.2	35.1
R1200-R1799	20.9	48.6	21.6	11.1	36.5	26.6	20.9	20.4	28.8	29.2
R1800-R2499	16.4	38.9	9.3	4.9	25.4	23.3	13.9	13.6	23.5	20.2
R2500-R4999	5.8	20.5	7.5	8.3	13.1	13.9	8.6	13.4	14.1	11.1
R5000-R9999	2.2	5.9	0.3	1.0	1.8	6.6	1.2	4.1	3.5	2.4
R10000+	0.0	1.8	0.0	0.0	0.3	0.7	0.0	0.0	0.0	0.2
Not specified	16.9	38.8	24.3	29.3	35.6	24.7	12.0	19.6	35.9	21.4
All	9.7	38.9	14.9	12.2	28.4	21.8	11.8	18.5	31.0	20.6
					GHS 2021					
R0-R399	14.3	53.4	36.1	29.3	27.6	46.5	15.8	22.7	10.2	29.0
R400-R799	9.4	27.3	12.6	22.0	34.1	12.0	35.0	21.7	11.6	23.5
R800-R1199	13.8	24.8	10.6	9.8	23.3	24.6	16.6	23.6	7.9	17.1
R1200-R1799	13.2	33.7	15.8	17.7	14.7	22.4	7.1	12.5	6.4	14.8
R1800-R2499	1.9	23.3	17.7	11.5	11.4	9.4	11.2	4.9	5.1	11.0
R2500-R4999	3.7	14.5	12.2	3.0	5.3	6.5	9.2	6.5	6.2	7.5
R5000-R9999	0.5	7.5	1.0	0.0	0.5	2.0	3.9	1.0	0.0	2.4
R10000+	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02
Not specified	0.0	0.0	42.6	3.0	4.2	31.6	5.4	0.0	16.7	6.5
All	2.7	18.3	97.3	8.2	8.3	14.0	7.8	8.6	6.0	8.7

Source: Own calculations using GHS 2005.2013 & 2021 data.

The General Household Survey (GHS) conducted in 2005 and 2021 provides valuable insights into the non-income welfare category of households in the Eastern Cape and Limpopo provinces in South Africa. Tables 10 and 11 examine the percentage of households that have the best non-income welfare category for each indicator based on their monthly household expenditure.

Table 10 shows that households in the Eastern Cape with formal dwellings, access to electricity/solar energy, tap-in dwellings, frequent refuse removal, flushed or chemical toilets, and whose dwellings were made of bricks had monthly household expenditures between R1800 to R10000+ in 2005. However, in 2021, households with a monthly expenditure of R0 to R399 also had access to these services, indicating better living standards.

Interestingly, only 33% of households had access to the Internet in 2005, and they had a monthly expenditure of R10000+. However, in 2021, the percentage of households owning this service increased significantly, and it was available even at a monthly expenditure of R400.

Furthermore, in 2005, households with higher monthly expenditure categories had access to mobile phones or landlines. However, by 2021, this was no longer the case, and households with lower monthly expenditure categories also had access to these services, indicating the increasing affordability of technology. Throughout the 16 years of this study, households that owned assets such as motor vehicles, computers, fridges, satellite dishes/decoders, and television had a higher monthly expenditure bracket. This indicates that while access to basic services has improved for households in lower expenditure categories, owning assets remains a luxury available only to those with higher monthly expenditure categories.

In conclusion, Table 11 confirms the findings of Table 10, indicating that households in higher expenditure categories had a higher percentage of good non-income welfare for the indicators under study. The findings of this study provide valuable insights into the changing living standards and affordability of basic services and assets for households in the Eastern Cape and Limpopo provinces over the past 16 years. Tables 10 and 11 examine the percentage of households in the Eastern Cape and Limpopo that have the best non-income welfare category for each indicator,

based on their monthly household expenditure. The data is from the General Household Survey (GHS) conducted in 2005 and 2021. standards and affordability of basic services and assets for households in the Eastern Cape and Limpopo provinces over the past 16 years.

4.3 Conclusion

The descriptive statistics revealed that Limpopo improved a lot compared to Eastern Cape. There were, however, significant changes in the accessibility to services and ownership of assets but also highlighted the lack of change during the periods 2005, 2013, and 2021.

Table 10: Percentage of Eastern Cape households with the best non-income welfare category in each variable per monthly household expenditure category.

	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	[L]	[M]
						GHS 2005							
R0-R399	40.7	16.9	10.5	26.8	21.5	37.1	1.0	0.1	1.2	0.3	13.2	23.0	23.0
R400-R799	42.0	27.4	13.3	28.5	26.4	38.9	1.8	0.0	2.9	0.2	30.2	41.8	41.8
R800-R1199	61.4	42.4	25.4	46.7	47.6	59.6	6.4	0.8	12.9	2.5	49.2	62.1	62.1
R1200-R1799	71.6	62.9	39.2	56.8	58.2	71.1	18.5	0.7	20.3	3.7	69.1	79.3	79.3
R1800-R2499	93.8	78.9	65.5	72.5	78.1	91.4	37.3	11.6	43.3	18.5	88.3	87.8	87.8
R2500-R4999	94.8	90.8	80.1	84.4	88.5	94.5	53.2	14.9	63.3	33.4	92.5	93.8	93.8
R5000-R9999	96.7	95.8	78.6	85.9	90.4	94.2	57.6	16.8	78.1	42.0	94.5	95.4	95.4
R10000+	100.0	95.0	96.2	97.1	98.5	100	60.9	33.2	70.1	64.9	94.8	95.5	95.5
Not specified	79.2	70.8	50.8	76.0	75.7	78.7	34.5	10.0	45.2	26.7	61.7	66.8	66.8
All	55.2	39.0	26.6	41.6	40.2	52.5	11.8	2.9	15.0	6.6	40.3	49.3	49.3
						GHS 2021							
R0-R399	46.6	74.6	16.4	21.4	33.0	48.1	0.0	19.0	0.0	0.0	22.9	0.0	30.4
R400-R799	60.3	80.8	27.7	23.7	40.8	60.3	1.3	43.1	6.1	3.3	64.8	15.0	67.2
R800-R1199	59.0	74.8	19.9	29.8	32.5	60.0	1.2	61.9	0.0	0.0	68.3	31.7	70.2
R1200-R1799	54.2	68.3	18.3	21.1	26.3	55.5	1.6	40.7	2.0	2.6	67.9	42.0	66.6
R1800-R2499	68.0	81.2	27.9	32.0	35.4	65.7	1.0	55.0	3.0	3.5	76.7	47.8	81.1
R2500-R4999	76.4	81.0	35.8	39.5	48.2	76.5	1.5	65.8	7.0	7.0	85.7	62.3	89.6
R5000-R9999	84.1	84.0	56.0	53.3	67.4	83.9	7.2	75.2	36.0	24.6	95.4	83.7	96.1
R10000+	98.5	78.2	72.7	73.3	80.1	99.3	5.1	87.2	84.3	65.6	96.9	95.6	96.3
Not specified	82.2	86.1	77.9	81.0	83.0	82.2	13.4	91.0	48.7	48.7	94.0	59.0	91.7
All	72.4	79.1	37.7	40.1	48.0	72.3	2.9	61.8	17.8	14.3	80.3	56.7	82.5

[A]: Dwelling type – formal
[B]: Energy for cooking – electricity or solar energy
[C]: Water access – tap in dwelling
[D]: Refuse removal frequency – once a week
[E]: Sanitation facility – flush or chemical
[F]: Wall material of dwelling – bricks
[G]: Access to landline or mobile phone – both
[H]: Internet access – owned
[I]: Motor vehicle ownership – yes
[J]: Computer ownership – yes
[K]: Fridge ownership – yes
[L]: Satellite dish/decoder ownership – yes
[M]: Television ownership – yes

Source: Own calculations using GHS 2005.2013 & 2021 data.

Table 11: Percentage of Limpopo households with the best non-income welfare category in each variable per monthly household expenditure category.

	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	[L]	[M]
GHS 2005													
R0-R399	77.0	19.3	3.4	10.3	11.7	74.6	0.3	0.0	2.3	0.3	26.0	1.3	26.0
R400-R799	86.3	31.2	6.6	13.9	17.8	85.3	0.7	0.1	5.1	0.6	45.4	0.9	43.1
R800-R1199	87.1	32.9	6.9	14.7	17.3	85.6	2.6	0.0	13.7	0.8	55.7	3.0	56.7
R1200-R1799	91.3	60.8	23.9	24.7	39.7	87.5	6.9	0.7	19.5	4.3	61.1	4.0	60.2
R1800-R2499	98.0	71.7	30.8	37.2	52.3	98.4	13.7	0.8	36.2	12.7	69.6	15.0	63.3
R2500-R4999	96.2	86.0	60.4	58.3	71.6	91.3	24.3	10.0	58.8	25.4	83.9	27.8	87.5
R5000-R9999	99.0	88.6	74.2	65.1	79.9	94.8	41.5	18.1	85.5	46.5	95.0	36.3	86.2
R10000+	100.0	92.1	79.0	48.7	79.0	93.9	29.7	10.9	93.2	22.8	93.9	47.0	82.0
Not specified	82.0	29.4	10.4	0.0	23.6	71.2	0.0	0.0	24.0	13.2	29.8	0.0	34.4
All	85.4	36.4	12.8	18.4	23.7	83.5	4.2	1.1	13.1	3.8	46.7	4.6	45.6
GHS 2021													
R0-R399	100	63.7	11.6	13.9	13.9	100	2.8	33.9	3.0	3.2	63.2	40.7	69.3
R400-R799	94.2	67.0	1.8	12.3	16.9	95.4	1.0	33.4	3.8	3.3	76.7	32.6	77.9
R800-R1199	96.7	60.6	6.4	14.4	15.3	97.2	2.6	49.3	3.0	4.4	82.8	50.2	81.4
R1200-R1799	94.9	63.0	7.1	14.8	16.7	94.6	3.0	58.6	9.7	9.1	88.7	68.1	89.8
R1800-R2499	97.7	53.0	5.5	19.3	20.5	98.0	2.8	64.5	7.6	10.9	92.8	71.4	89.4
R2500-R4999	95.5	60.5	7.5	21.4	23.6	95.2	3.6	68.7	15.5	14.7	90.2	79.6	91.0
R5000-R9999	96.3	86.8	25.1	25.7	42.7	97.0	3.1	80.3	46.3	42.5.	99.4	89.7	97.1
R10000+	99.2	90.7	46.4	51.5	74.1	98.3	12.2	92.7	82.7	79.6	99.4	96.9	99.4
Not specified	100.0	86.3	41.4	53.2	61.4	88.9	0.0	83.3	28.4	28.4	83.3	65.1	83.3
All	96.3	65.0	11.3	20.8	25.6	96.3	3.5	62.4	17.8	17.7	88.9	68.9	55.5

[A]: Dwelling type – formal
[B]: Energy for cooking – electricity or solar energy
[C]: Water access – tap in dwelling
[D]: Refuse removal frequency – once a week
[E]: Sanitation facility – flush or chemical
[F]: Wall material of dwelling – bricks
[G]: Access to landline or mobile phone – both
[H]: Internet access – owned
[I]: Motor vehicle ownership – yes
[J]: Computer ownership – yes
[K]: Fridge ownership – yes
[L]: Satellite dish/decoder ownership – yes
[M]: Television ownership – yes

Source: Own calculations using GHS 2005.2013 & 2021 data.

CHAPTER FIVE: CONCLUSION

5.1 Introduction

This chapter presents an overall overview of the study by reconciling chapters Two to Four. It starts with section 5.2 which presents the summary of key findings of the study. Section 5.3 provides the conclusion and policy recommendations.

5.2 Summary of Key Findings

Chapter Two of this study delves into the complexity of non-money-metric multi-dimensional poverty and provides a comprehensive definition of the various poverty types. It also highlights the focus of the study, which is on non-money-metric multi-dimensional poverty and its impact on the Eastern Cape and Limpopo provinces from the time of apartheid to the year 2020. The chapter examines the history of multi-dimensional poverty in these provinces, analyzing how policies affected poverty levels and discussing the lack of studies that compared the poverty levels of these two provinces. The chapter provides an in-depth analysis of the historical and institutional factors that influenced multi-dimensional poverty in these provinces.

Chapter Three explains the data and methodology used in the study, outlining the Principal Component Analysis (PCA) method employed to derive a multi-dimensional non-income welfare index for the nine provinces. This method considered 13 service and asset variables, and the study utilized the 2005, 2013 and 2021 General Household Surveys (GHS) data collected by Statistics South Africa.

Chapter Four presents empirical findings based on the methodology used. It provides a detailed analysis of the characteristics of households in Eastern Cape and Limpopo provinces, highlighting the differences in rural and urban dwellings, and the fact that households in both provinces were predominantly headed by African females. The chapter confirms that these two provinces are the poorest in South Africa, and although there have been some improvements in access to services and assets, there is still a backlog from the apartheid era.

The descriptive analysis in Chapter Four provides evidence of poor households in Limpopo experiencing better service delivery by 2021 compared to the Eastern Cape. It also highlights the high percentage of poor households in both provinces lacking access to assets such as the internet, motor vehicles, computers, fridges, satellite dishes/decoders, and television ownership. The chapter employs cumulative distribution functions to examine the change in patterns of non-income welfare poverty. The graphical analysis confirms that the cumulative percentage of households in Eastern Cape and Limpopo increased simultaneously when the non-income welfare index poverty increased, with both provinces indicating a rapid pace of decline in non-income poverty from 2013 to 2021.

Lastly, the chapter highlights that a higher proportion of households that enjoyed good non-income welfare of the indicators under study were in higher expenditure categories. The chapter provides a detailed analysis of the different factors that influence non-income welfare poverty, providing a better understanding of the complexity of poverty in South Africa.

5.3 Conclusion and Recommendations

This research examines the changes in multi-dimensional poverty between 2005 and 2021 in the Eastern Cape and Limpopo provinces, which are known to be the poorest areas of South Africa. However, these provinces still face poverty due to the lack of institutional capacity at the local level. Despite some progress, the legacy of apartheid continues to affect these provinces, resulting in a growing gap between them and others.

The study does not consider the quality of service delivery in these provinces, which is a significant gap in the analysis. According to Burger et al. (2015), improving the quality of services such as sanitation and refuse removal can provide dignity, prevent diseases, and reduce distress and inconvenience. Nonetheless, the data used in the study does not have adequate proxies for measuring the quality of service delivery. Therefore, it is crucial to include quality-of-service delivery indicators in the data provided by Statistics South Africa. Fourie (2006) also suggests that the government should focus not only on the quantity of infrastructure but also on its quality. The study emphasizes that funds that would have been used to create new infrastructure that would require maintenance should be reinvested in maintaining existing infrastructure. The poor quality

of infrastructure and service delivery in these provinces has hindered their economic development. However, constructing new infrastructure is often more practical than improving the quality of existing structures, as stated by Robinson & Torvik (2005).

To improve the standard of living of households in these provinces, the study recommends considering all dimensions of multi-dimensional poverty. Fransman & Yu (2019) suggest that indicators relating to physical and social isolation, as well as feelings of vulnerability, powerlessness, and helplessness, should be included in the SAMPI. This will provide a more realistic and comprehensive picture of multi-dimensional poverty for households in these provinces.

Ntsalaze & Ikhide (2018) emphasize the importance of providing affordable electricity to households in these provinces to reduce the negative effects of using traditional fuels for cooking and the loss of productive time. They also highlight the importance of government intervention in the strengthening of developmental policies, focusing specifically on human settlements. Poor home environments hinder improvements in service delivery and households having access to assets. Therefore, the government should incorporate informal settlements into infrastructure development plans.

Finally, the study suggests that local municipalities should create policies that channel investments into lagging areas to strengthen their potential to contribute to multi-dimensional poverty reduction (Mushongera et al., 2017). Therefore, it is essential to conduct a thorough analysis of the challenges and improvements in Limpopo and Eastern Cape to enhance the effectiveness of evidence-based planning. This will enable the government to customize interventions specifically for these provinces and improve the targeting of policy interventions.

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APPENDIX

Table A1: Classification and categorisation of variables included for the derivation of non-income welfare index

Indicator	Category	2005	2013	2021
Dwelling	Formal dwelling	1: Dwelling / House on a separate stand or yard or on farm 3: Flat or apartment in a block of flats 4: Town/Cluster/Semi-detached house 5: Unit in a retirement village 6: Dwelling/House/Flat/Room in backyard 9: Room/Flatlet on a property or a larger dwelling/ servants' quarters/ granny flat	1: Dwelling/house or brick/concrete block structure on a separate stand or yard or on farm 3: Flat or apartment in a block of flats 4: Cluster house in complex 5: Town house (semi-detached house in complex) 6: Semi-Detached house 7: Dwelling/house/flat/room in backyard 10: Room/flatlet on a property or a larger dwelling / servants' quarters / granny flat	1: Dwelling/House or brick/concrete block structure on a separate stand or yard or on farm 3: Flat or apartment in a block of flats 4: Cluster house in complex 5: Town house (semi-detached house in complex) 6: Semi-Detached house 7: Dwelling/house/flat/room in backyard 10: Room/flatlet on a property or a larger dwelling / servants' quarters / granny flat
	Informal dwelling	2: Traditional dwelling/hut/structure made of traditional materials 7: Informal dwelling/shack in backyard 8: Informal dwelling/shack not in backyard 10: Caravan/Tent 11: Other 99: Unspecified	2: Traditional dwelling/hut/structure made of traditional materials 8: Informal dwelling/shack in backyard 9: Informal dwelling/shack not in backyard 11: Caravan/tent 12: Other (specify) 99: Unspecified	2: Traditional dwelling/hut/structure made of traditional materials 8: Informal dwelling/shack in backyard 9: Informal dwelling/shack not in backyard 11: Caravan/tent 12: Other (specify)
Fuel source for cooking	Electricity or solar energy	1: Electricity from mains 2: Electricity from generator 9: Solar Energy	1: Electricity from mains 2: Electricity from generator 9: Solar Energy	1: Electricity from mains 2: Other source of electricity 9: Solar energy
	Gas	3: Gas	3: Gas	3: Gas
	Paraffin or coal	4: Paraffin 6: Coal	4: Paraffin 6: Coal	4: Paraffin 6: Coal

	Wood or animal dung	5: Wood 8: Animal dung 10: Other 11: None 99: Unspecified	5: Wood 7: Candle 8: Animal dung 10: Other 11: None	5: Wood 8: Animal dung 11: Other
Water source	Tap in dwelling	1: Piped (Tap) water in dwelling	1: Piped (tap) water in dwelling/house	1: Piped water in dwelling/house
	Tap on premises	2: Piped (Tap) water on site or in yard	2: Piped (tap) water in yard	2: Piped (tap) water in yard
	Public tap or tanker	6: Public/Communal tap 7: Water carrier / tanker	6: Public/communal tap 7: Water-carrier/tanker	6: Public/communal tap 7: Water-carrier/tanker
	Dam, river or other	3: Borehole on site 4: Rain water tank on site 5: Neighbour's tap 8: Borehole off site/communal 9: Flowing water/stream/river 10: Stagnant water/dam/pool 11: Well 12: Spring 13: Other 99: Unspecified	3: Borehole in yard 4: Rain-water tank in yard 5: Neighbour's tap 8: Borehole outside yard 9: Flowing water/stream/river 10: Stagnant water/dam/pool 11: Well 12: Spring 13: Other	3: Borehole in yard 4: Rain-water tank in yard 5: Neighbour's tap 8: Water vendor (charge involved) 9: Borehole outside yard 10: Flowing water/stream/river 11: Stagnant water/dam/pool 12: Well 13: Spring 14: Other
Refuse removal frequency	At least once a week	1: Removed by local authority at least once a week 3: Removed by community members at least once a week	1: Removed by local authority/private company at least once a week. 3: Removed by community members, contracted by the municipality at least once a week. 5: Removed by community members at least once a week	1: Removed by local authority/private company at least once a week. 3: Removed by community members, contracted by the municipality at least once a week. 5: Removed by community members at least once a week
	Less than once a week	2: Removed by local authority less often than once a week 4: Removed by community members less often than once a week	2: Removed by local authority/private company less often than once a week. 4: Removed by community members, contracted by the municipality less often than once a week. 6: Removed by community members less often than once a week	2: Removed by local authority/private company less often than once a week 4: Removed by community members, contracted by the municipality less often than once a week 6: Removed by community members less often than once a week

	Communal refuse dump	5: Communal refuse dump/communal container.	7: Communal refuse dump/communal container.	7: Communal refuse dump. 8: Communal container/ central collection point
	Own refuse dump	6: Own refuse dump	8: Own refuse dump	9: Own refuse dump
	None/ Other	7: No rubbish removal 8: Other 9: Unspecified	9: Dump or leave rubbish anywhere. 10: Other 99: Unspecified	10: Dump or leave rubbish anywhere 11: Other 99: Unspecified
Sanitation facility	Flush or chemical	1: Flush toilet with offsite disposal 2: Flush toilet with onsite disposal (specific tank) 3: Chemical toilet	1: Flush toilet connected to a public Sewerage system. 2: Flush toilet connected to a septic tank. 3: Chemical toilet	1: Flush toilet connected to a public Sewerage system/ 2: Flush toilet connected to septic or conservancy tank. 3: Pour bucket-flush toilet connected to a septic tank (or seepage pit). 4: Chemical toilet 8: Portable flush toilet.
	Bucket latrine	6: Bucket toilet	6: Bucket toilet	7: Bucket toilet
	Pit latrine	4: Pit latrine with ventilation pipe. 5: Pit latrine without ventilation pipe	4: Pit latrine with ventilation pipe. 5: Pit latrine without ventilation pipe	5: Pit latrine/toilet with ventilation pipe 6: Pit latrine/toilet without ventilation pipe 9: Composting toilet 10: Urine diversion dry toilet. 11: Open defection
	None/ other	7: None 9: Unspecified	7: None 8: Other 9: Unspecified	12: Other 99: Unspecified
Wall material of dwelling	Bricks	1: Bricks 2: Cement blocks/concrete	1: Bricks 2: Cement blocks/concrete	1: Bricks 2: Cement blocks/concrete
	Corrugated	3: Corrugated iron/zinc 4: Wood	3: Corrugated iron/zinc 4: Wood	3: Corrugated iron/zinc 4: Wood
	Plastic	5: Plastic 6: Cardboard	5: Plastic 6: Cardboard	5: Plastic 6: Cardboard

	Mixture	7: Mixture of mud and cement 8: Wattle and daub	7: Mixture of mud and cement 8: Wattle and daub	7: Mixture of mud and cement 8: Wattle and daub
	Tile or mud	9: Title 10: Mud	9: Title 10: Mud	9: Mud
	Thatching grass	11: Thatching/grass 12: Asbestos 13: Other 99: Unspecified	11: Thatching /grass 12: Asbestos 13: Other 99: Unspecified	10: Thatching /grass 11: Asbestos 12: Other 99: Unspecified
Telecommunication	With landline AND mobile phone	Landline: 1.Yes; Mobile phone: 1. Yes	Landline: 1.Yes; Mobile phone: 1. Yes	Landline: 1.Yes; Mobile phone: 1. Yes
	With EITHER one of the two	Landline: 1. Yes; Mobile phone: 2. No OR Landline: 2: No; Mobile phone: 1. Yes	Landline: 1. Yes; Mobile phone: 2. No OR Landline: 2: No; Mobile phone: 1. Yes	Landline: 1. Yes; Mobile phone: 2. No OR Landline: 2: No; Mobile phone: 1. Yes
	With NONE of both	Landline: 2. No; Mobile phone: 2. No	Landline: 2. No; Mobile phone: 2. No	Landline: 2. No; Mobile phone: 2. No
Internet connection	Own	1: Own	1: Internet connection in the household 7: Any place via a mobile cellular telephone 8: Any place via other mobile access services	1: Fixed internet connection in the household (e.g. Fibre, ADSL) 2: Mobile internet (e.g. mobile broadband such as 3G or 4G on phone, tablet or other device)
	Does not own but have access	2: Does not own but have access	2: Internet in a library/community hall/Thusong centre 3: Internet for students at a school/university/college 4: At place of work 5: Internet Café 2km or less from the household 6: Internet Café more than 2km from the household 9: Other (specify)	3: Public or private WiFi (i.e. Tshwane WiFi, Food outlets etc) 4: Internet for students at a school/university/college 5: Internet at place of work 6: Internet in a library/community hall/Thusong centre 7: Internet Café
	Neither own nor have access	3: Neither own nor have access 9: Unspecified	No to all of the above	No to all of the above

Motor vehicle ownership	Yes	1: Yes	1: Yes	1: Yes
	No	2: Does not own but have access 3: Neither own nor have access 9: Unspecified	2: No 9: Unspecified	2: No 9: Unspecified
Computer ownership	Yes	1: Own	1: Yes	1: Yes
	No	2. Does not own but have access 3. Neither own nor have access 9. Unspecified	2: No 9: Unspecified	2: No 9: Unspecified
Fridge/Refrigerator	Yes	1: Yes	1: Yes	1: Yes
	No	2: Does not own but have access 3: Neither own nor have access 9: Unspecified	2: No 9: Unspecified	2: No 9: Unspecified
Satellite dish/decoder	Yes	1: Yes	1: Yes	1: Yes
	No	2: Does not own but have access 3: Neither own nor have access 9: Unspecified	2: No 9: Unspecified	2: No 9: Unspecified
Television	Yes	1: Yes	1: Yes	1: Yes
	No	2: Does not own but have access 3: Neither own nor have access 9: Unspecified	2: No	2: No 9: Unspecified

Table A2: Non-income poverty headcount gap ratios by province

	2005	2013	2021	Difference: 2005 vs. 2021
Western Cape	0.0463	0.0234	0.0061	0.0402
Eastern Cape	0.2776	0.1223	0.0472	0.2304
Northern Cape	0.0966	0.0544	0.0249	0.0717
Free State	0.1202	0.0350	0.0254	0.0948
KwaZulu-Natal	0.1819	0.0841	0.0200	0.1619
North West	0.1312	0.0683	0.0488	0.0824
Gauteng	0.0692	0.0349	0.0226	0.0467
Mpumalanga	0.1555	0.0507	0.0293	0.1262
Limpopo	0.1942	0.0610	0.0134	0.1809
South Africa	0.1418	0.0582	0.0244	0.1174

Table A3: Non-income squared poverty headcount gap ratios by province

	2005	2013	2021	Difference: 2005 vs. 2021
Western Cape	0.0218	0.0081	0.0022	0.0195
Eastern Cape	0.1659	0.0539	0.0180	0.1480
Northern Cape	0.0445	0.0274	0.0097	0.0349
Free State	0.0538	0.0156	0.0120	0.0463
KwaZulu-Natal	0.0983	0.0368	0.0074	0.0909
North West	0.0583	0.0309	0.0224	0.0359
Gauteng	0.0288	0.0135	0.0091	0.0197
Mpumalanga	0.0712	0.0214	0.0124	0.0588
Limpopo	0.0849	0.0216	0.0052	0.0798
South Africa	0.0716	0.0244	0.0099	0.0617