

**DETERMINING THE CHANGES IN THE SUSTAINABLE LIVELIHOODS OF
INFORMAL SETTLEMENTS IN THE CITY OF CAPE TOWN METROPOLITAN FROM
2001 AND 2011**

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AUTHOR'S DECLARATION

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

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ABSTRACT

The essence of human dignity is constitutionally stipulated as having rights to adequate housing, service delivery and an opportunity to participate in the country's economy, to mention but a few generational rights as per the constitution of the Republic of South Africa. The fulfilment of the Bill of Rights, Chapter 2 of the Constitution and or lack of, determines the standard of livelihoods for South Africans. The rural-urban migration and urbanisation as well as natural growth, have challenged the notion of adequate housing through perpetual development of informal settlements in an unsustainable manner in informal settlements of Cape Town Metropolitan. The dwellers are exposed to different vulnerabilities which include but are not limited to: lack of security of tenure; lack of access to potable water, energy source for cooking, inadequate sanitation, abandoned waste and food insecurity that is linked to the socio-economic urban poly-crises. The government in collaboration with other stakeholders, NGO's, PPP, CBO's, and general community members must acknowledge the complex existence of informal settlements and come up with context defined transdisciplinary solutions that will promote sustainable development and urban resilience. The intention of this study is to determine the spatial distributional changes in sustainable livelihood patterns of informal settlements in Cape Town from 2001 to 2011. Census 2001 and 2011 was utilised to calculate the Analysis of Variances (ANOVA) for service delivery indices of water, energy sources for cooking, sanitation (toilet), refuse removal and economic conditions of income and employment from 2001 to 2011-in order to determine if statistically significant changes have occurred in the sustainable livelihood of informal settlements in Cape Town. Thereafter, the thematic maps were created to display the spatial representation of population density and average percentage for the variables of water, energy sources for cooking, sanitation (toilet), refuse removal and economic conditions of income and employment from 2001 to 2011- to determine where have the sustainable livelihoods occurred and why. The results show that the spatial distribution of population densities in most areas recorded in data analysis show that there is an increase in sustainable livelihood of informal settlements in Cape Town between 2001 and 2011. Some areas have shown significant increase while others have not improved since 2001, such as the Southern part of Bellville with a reflection of 21% to 40% of poor services. Southern Bellville displayed poor sustainable livelihood for both 2001 and 2011 due to poor management, and infrastructural limitations. While other parts such as the eastern- south of Khayelitsha show more than 80% excellent services which contributes positively to sustainable livelihood. The results also indicate that there has been an overall increase in terms of service delivery with an indication of $p < 0.01$ in informal settlements of Cape Town from 2001 to 2011, with an exception of refuse removal index that shows no significant changes with an

indication of $p=0.56$ larger than 0.5. With all indices combined, excluding refuse removal, they show that there was an increase in sustainable livelihood patterns of informal settlements in Cape Town from 2001 to 2011. Therefore, the study rejects the notion that change has not occurred in informal settlements of Cape Town Metropolitan from 2001 to 2011.

Keywords and phrases: Cape Town; Informal settlements; Urbanisation; Sustainability; Urban sustainability; Sustainable development; Sustainable livelihood; Adequate housing; Service delivery; Socio-economic; Spatial distribution of informal settlements in Cape Town.

OPSOMMING

Die kruks van menswaardigheid word grondwetlik gestipuleer as die reg tot voldoende behuising, dienslewering en die geleentheid om deel te neem aan die land se ekonomie, net om 'n paar menseregte te noem soos voorgeskryf deur die Grondwet van Suid-Afrika. Die toepassing van die Handves van Menseregte, Hoofstuk 2 van die Grondwet en of gebrek daaraan, bepaal die standaard van lewensbestaan vir Suid Afrikaners. Die landelik-stedelike migrasie en verstedeliking sowel as nuutlike groei, het die neiging van voldoende behuising bemoeilik deur die ewige ontwikkeling van informele nedersettings in 'n onvolhoubare manier in die informele nedersetting van Cape Town Metropolitan. Die inwoners word blootgestel aan verskeie kwesbaarhede wat, onder andere, die gebrek aan sekuriteit van verblyfreg; gebrek aan toegang tot vervoerbare water, energiebronne vir kook, onvoldoende sanitasie, afval en gebrek aan voedsel insluit wat verbind is aan die sosio-ekonomiese stedelike poli-krisis. Die regering in samewerking met ander aandeelhouers, NGO's, PPP, CBO's, en die algemene gemeenskap moet die komplekse bestaan van informele nedersettings erken en dink aan 'n konteks-gebaseerde uitwegte wat die volhoubare ontwikkeling en die stedelike veerkragtigheid sal bevorder. Die doel van die studie is om die ruimtelike verspreidings-veranderinge in volhoubare lewensbestaan patrone van die informele nedersettings in Kaapstad van 2001 tot 2011 te bepaal. Sensus 2001 en 2011 is gebruik om die "Analysis of Variances" (ANOVA) vir dienslewing van water, energiebronne vir kook, sanitasie, afval verwydering en ekonomiese omstandighede van inkomste en indiensneming van 2001 tot 2011 om sodoende te bepaal of daar beduidende statistiese veranderinge plaasgevind het. Daarna, is die tematiese kaarte gemaak om die verspreidings verteenwoordiging van die bevolkingsdigtheid en die gemiddelde persentasie vir die veranderlikes van water, enrgiebronne, sanitasie, afval verwydering en ekonomiese omstandighede van inkomste en indiensneming van 2001 tot 2011 pm te bepaal waar die volhoubare lewensbestaan plaasgevind het en hoekom. Die resultate toon dat die ruimtelike verspreiding van die bevolkingsdigtheid in die meeste areas in die data-analise toon 'n toename in volhoubare lewensbestaan van informele nedersettings in Kaapstad tussen 2001 en 2011. Sommige areas het 'n beduidende toename getoon terwyl ander geen verbetering ondergaan het vanaf 2001 nie soos die Suidelike deel van Belville met 'n weerspieeling van 21 tot 40% van slegte dienslewering. Suidelike Belville het swak volhoubare lewensbestaan getoon vir beide 2001 en 2011 as gevolg van swak bestuur en gebrek aan infrastruktuur. Terwyl ander dele soos die Oostelike-Suide van Khayelitsha meer as 80% uitstekende dienslewering getoon het wat 'n positiewe bydrae lewer tot volhoubare lewensbestaan. Die resultate dui aan dat daar 'n algehele styging was in verband met dienslewring met 'n indikatie van $p < 0.01$ in informele nedersettings in Kaapstad vanaf 2001 tot 2011, met die

uitsondering van afvalverwydering indeks wat geen beduidende veranderinge toon nie met 'n indikatie van $p=0.56$ groter as 0.5. Met al die gekombineerd, uitsluitend die afvalverwydering, is daar 'n beduidende toename in volhoubare lewensbestaan patrone in informele nedersettings in Kaapstad vanaf 2001 tot 2011. Dus verwerp die studie die idee dat geen verandering plaasgevind het in informele nedersettings vanaf 2001 tot 2011 in die informele nedersettings van Kaapstad Metropolitan.

Trefwoorde en frases:

Sleutelwoord en frases: Kaapstad; Informele Nedersettings; Verstedeliking; Volhoubaarheid; Stedelike volhoubaarheid; Volhoubare ontwikkelin; Voldoende behuising; Dienslewering; Sosio-ekonomies; Ruimtelike verspreiding van informele nedersettings in Kaapstad

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ABBREVIATIONS AND ACRONYMS

United Nations- Habitat (UN-Habitat)
United Nations (UN)
Non-Governmental Organization (NGO)
Community Based Organization (CBO)
Human Development Agency (HDA)
Sustainable Energy Africa (SEA)
Africa Renewable Energy Access Program (AFREA)
United Nations Development Programme (UNDP)
Spatial Planning and Land Use Management Act (SPLUMA)
National Development Plan (NDP)
Integrated Development Plan (IDP)
Integrated Urban Development Framework (IUDF)
Sustainable Development Goals (SDGs)
City of Cape Town (CoCT)
Reconstruction Development Framework (RDP)
Public Private Partnership (PPP)
Sustainable Development Goals (SDGs)

CHAPTER 1: SETTING THE SCENE

1. INTRODUCTION

At least 25% of the global population resides in informal settlements and poor residential neighbourhoods contributing to the perpetual challenge of urban informality in the aspects of distribution of spatial patterns and population density, service delivery as well as the economy (Avis 2016; Chaoia at al 2009; UN-Habitat 2013b). Informal settlements are defined by the statistics of South Africa as “Informal settlements or ‘squatter camps’ occur on land which has not been surveyed or proclaimed as residential, and the structures are usually informal. They are usually found on the outskirts of towns or in pockets of ‘infill’ inside towns, or along railways and roads. Some informal areas are also found in tribal areas (e.g. in Mpumalanga) and in townships. Although informal settlements occur within rural areas all EAs of this type were classified as urban informal in 2001”. On one hand, while the causes of the perpetual nature of informal settlements are poorly understood, however, their creation results into shortage of adequate housing and recreation of unsustainable settlements, lack of service delivery and depressive economic growth causing an increase in poverty and high rates of unemployment (Huchzermeyer 2008). On the other hand, cities’ economic growth fuel economies of scale productivity and public investment, posing both a global challenge and opportunity because of rapid urbanisation, this attracts the perpetuation of informal settlements (Avis 2016; Chaoia at al 2009; Huchzermeyer 2008). Urban places are perceived as melting pots of innovation, drivers of socio-economic transformation of the 21st century and because of that, there are unending influxes from rural-urban migration (Avis, 2016; Chaoia at al 2009). However, cities are struck by cycles of socio-ecological and environmental deterioration which in turn recreates unliveable and unsustainable catastrophe manifested through climate change, overcrowded spaces, repressive economy and unstable political dynamics (Huchzemeryer 2008; Kovacic et al 2016; Musango 2017; Swilling Anneck 2012). In addition, environmental degradation and poverty manifest in the experiences of uneven spatial characteristics, infrastructural deficit and physical living conditions in informal settlements showing that dwellers are failing to adapt in the city (Kovacic et al 2016; Musango 2017).

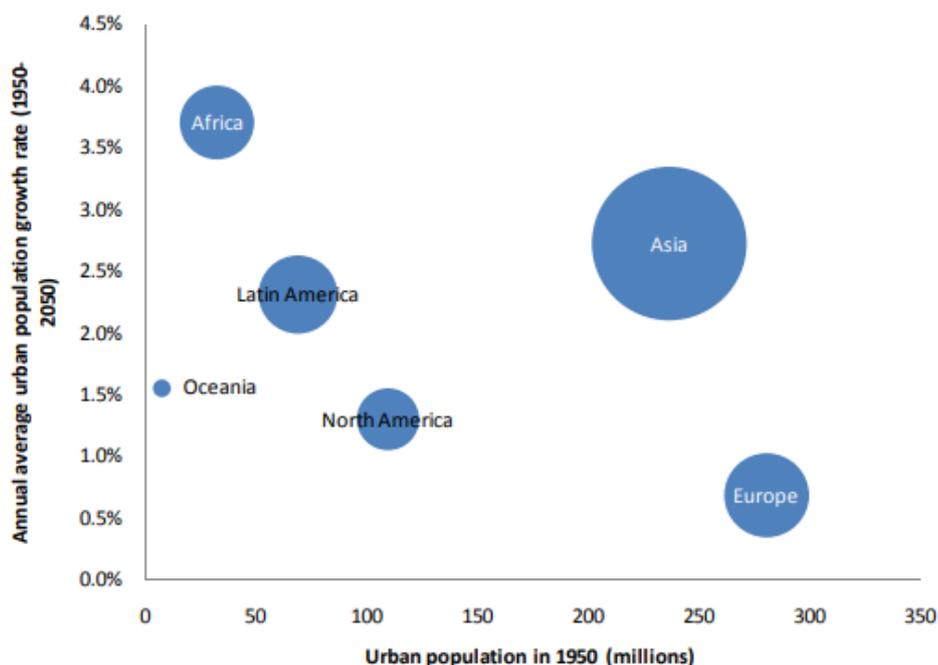


Figure 3.1 Trends in Urbanisation by Continent by urban population and growth (1950-2050)

Source: Chaoia at al (2009:23)

Because 54% of the world's population live in urban areas that occupy about 0.5% of the world's land which is already 70% pressurised by economic activities, 60% of energy consumption and 70% of global waste as well as gas emissions (Avis 2016). This shows the drastic rate at which development occurs that it exceeds the carrying capacity which causes a strain to the environment and its ability to support its population. However, the increase of inadequate and informal housing as an alternative means of liveability is a direct response from the dwellers whose intention is to be nearer the urban centres and opportunities at a close proximity (Avis 2016). The unsustainable development of informal housing creates an environment where crime thrives and street violence persists (Avis, 2016). Due to adaptive urban planning strategies, lack of security of tenure has become a norm and people are non-compliant to building and infrastructural regulations (Huchzemeyer 2006; UN-Habitat 2009). As a result, this raises critical questions concerning urban vulnerability, adaptability and sustainability in relation to the nature of emerging informal urban housing including the informal settlements (Abbott, 2002). The informal settlements dwellers' survival actions display social exclusion and lack of integration but also weaken urban and housing governance technocratic order (Huchzermeyer 2006). In order to be relevant and contextual given the informal settlements unique circumstances, this calls for continuously updated approaches from urban planning and housing development (Huchzermeyer 2006; UN-Habitat 2009). For example the spread of illegal invasion and electrification which is associated with technical constraints and political repressions accumulates to what Rittel and Webber (1973) have named as 'wicked' in the context of planning.

Problems are referred to as wicked when they repel against the proposed solutions (Kovacic et al 2016).

African urban influxes characterised by low densities, peripheral sprawls and informal economic activities are as twice higher than Latin American's and Asia (Global Report on Human Settlements 2003; UN 2009). This is a difficult urban planning situation facing African cities, thus new socio-economic and political order that does not undermine intersectional and pragmatic approaches to informal settlements must be incorporated (Global Report on Human Settlements 2003; Huchzermeyer 2011). In 2003, about 23 % of the world's urban population lived in informal housing, majority in low developing countries which already had a shortage of resources in socio-economic terms and were highly pressured on environmental sustainability (Global Report on Human Settlements 2003). The African annual average urban growth is about 4%, approximately 37% of African population dwell in cities and this is expected to increase to 53% by 2030 (Zimbabwe 2005). This illustrates that it is essential to address informal settlements' living conditions from the current deteriorated and unsustainable phase towards resilient, integrated and prosperous livelihoods (Elsayed & Nassar 2017; Koch & Sticzay 2015).

There have been attempts and policies to combat the perpetual spread of informal settlements at a global and local level, some plans include but are not limited to, 'slum upgrading' an initiative endorsed by the World Health Organization towards striving for sustainable development goals: 1,3,6,8,11 and 17 (Peeters & Osman 2005; Sticzay & Koch 2015; World Health Organization 2018). Informal settlements' living conditions are characterised by informal economy (unregulated, not taxed, unregistered operations), social exclusion, and poor service delivery accompanied by poor well-being as well as low education rates (Sticzay & Koch 2015). Thus coordinated and pragmatic approaches that acknowledge the already existing socio-economic and spatial complexities of informal settlements are crucial (Peeters & Osman 2005). Context defined approaches should be adopted and effectively implemented without eliminating the concept of the 'informal' from the equation (Peeters & Osman 2005).

Table 1.1: Contextual reference of Kenyan and Tanzanian informal settlements and urban planning experiences

African context informal housing crisis, Case study

According to Majani & Magigi (2006) housing is an essential basic amenity of humanity, within it are psychological, economic, social measurement and satisfaction. When one is provided with adequate housing, for example, children have access to a healthy early childhood and development, and family is likely to be functional in different aspects of life due to availability of personal space (Majani & Magigi 2006). However, lack of access to adequate housing benefits' exposes one to land vulnerability and infringes on one's right to community belonging. Lack of access to service delivery and participation in inclusive economy results into unsustainable alternatives, this undermines social order and environmental sustainability, and poses limitations to the agenda of sustainable housing (Majani & Magigi 2006). Majani & Magigi (2006) states that informal settlements' dwellers must be given an equal opportunity to engage the processes and decision making surrounding land management and development, given the direct influence that land distribution has on their living conditions (Habitat 2003).

As an illustration, since the Tanzania's commencement of her independence, there have been pragmatic efforts to provide housing. Alternatively, her government reached consensus that the citizens will play a role in building their own houses from personal savings as an alternative. Tanzanians have done this instead of waiting on government that takes longer and to an extent lacks coordination and efficient functionality. However, despite the willingness to provide adequate housing and slum clearance for the increasing population and urbanised Mwanza, the second largest city after Da Es Salaam in Tanzania, the results depicted that more than 65 percent of the informal settlement dwellers are land insecure. Land insecurity perpetuates urban poverty and vulnerability. Of about 70 percent of the 35 percent that have legal title deeds have had access to financial loans, causing income poverty and conflict for the rest of the informed informal settlement dwellers (Majani & Magigi 2006).

Reflections are that more than 34 percent of Kenyan population that reside in urban areas, more than 71 percent of those are informal settlement dwellers. This number increases each year and requires a multi-dimensional approach, collaborative community efforts, national and international intervention. Similarly, Nairobi the largest city in Kenya, the experiences of informal settlement dwellers are devastating in a sense that approximately 1.5 million people living in Nairobi informal settlements lack access to: adequate sanitation, clean water, clean energy, solid waste management, hospitals, schools and housing and have a low economic status. The informal settlements, are constantly waiting on leadership and better governance, some never get to witness the promise of betterment from politicians. Though, the Kenyan government has also invested in drafting policies that focus on improving the living conditions of slum dwellers, yet those policies are without clear indication in terms of security of tenure. This in turn does not address the issue of secure tenure for the dwellers (Mutisya & Yarime 2011).

1.1 South African policy context of urban and housing planning in relation to informal settlements

To provide context, prior-1994, South African urban planning was based on colonial and apartheid policies, modernist planning models and market driven development (Muller 2016). These models promoted the current fragmented and unsustainable cities witnessed through the spread of informal settlements (sprawl, high travel costs, subsidies, traffic jams, and spatial / social exclusion of the poor & landless) in the post-democratic South Africa (Muller 2016). Black Communities Development Act 4 of 1984, Group Areas Act of 1950, Less Formal Township Establishment Act (LeFTEA) 113 of 1991 and Squatter Act 51 of 1952, sought to categorise infrastructure and resources according to racial hierarchy (Muller 2016). Through the endowment of these Acts, planning practices and its implementation were commenced and deepened socio-economic as well as spatial injustices (Muller 2016). In response to addressing the oppressive past, section (26) of the constitution of the Republic of South Africa stipulates that (1) everyone has the right to have access to adequate housing; (2) The state must take reasonable legislative and other measures, within its available resources, to achieve the progressive realisation of this right (South Africa 1996).

The South African post-apartheid government has inherited a gigantic problem from the colonial and apartheid legacy of spatial injustices and social stratification (Mistro & Hensher 2009). Amongst its memories are migrant's inadequate housing interventions such as 'hostels' that fostered gender and family fabrications with little or no sustainable maintenance (Mistro & Hensher 2009). Apartheid legacy was categorized by poor service delivery for the marginalised and socio-economic inequalities, as well as housing deficiency resulting into spatially disintegrated layout, poor service delivery and congested unplanned settlements (Hatkin 2004; Gilbert 2002). Regardless of policies and legislations as well as frameworks of development that are in place, it is more complex to provide basic service delivery in an effective and transparent manner in the post-apartheid era than it was (Mathonsi & Sithole no date; Mistro & Hensher 2009; Muller 2016; Ngubane 2005). This is because new legislations of urban planning and housing are being underpinned by fragmented and historically racially based legislation (Mathonsi & Sithole no date; Mistro & Hensher 2009; Muller 2016; Ngubane 2005). Moreover, the demographic population that must be catered as per the constitution of the Republic of South Africa, Bill of Rights Chapter 2 is now an inclusive, non-racial and non-sexist society which calls for a transparent, accountable, dignifying, participatory and integrated process of service delivery (South Africa 1996).

Since the inception of South Africa's democratic freedom in 1994, there has been progress to develop housing policies that aim at eradicating the predicament of informal settlements and their consequences with the hope to establish spatial reconciliation and justice (Department of Human Settlements 2004; Graham 2006). The Department of Human Settlements (DHS) adopts its fundamental mandate from section 26 of the Constitution of the Republic of South Africa and section 3 of the Housing Act of 1997, which is read in agreement with approved policies and chapter 8 of the National Development Plan (Gov.za 2019; South Africa 1998). Incremental housing is becoming a familiar trend for upgrading informal settlements, though South African governance in housing does not necessarily acknowledge this process as legitimate because of its unconventional nature (Graham 2006). The perpetual challenge of informal housing continuously increases despite the government's intervention of low-cost housing provision reflected through the Reconstruction and Development Program of 1994 (RDP) (RDP, 1994). The RDP policy framework was designed to eradicate any form of socio-economic inequalities generated by apartheid policies and repressive labour practices towards building a democratic South Africa that is inclusive in all aspects of its existence (RDP 1994). The RDP sought to link the social development and economic growth in order to combat poverty (Bowen & Jay 2011; Mistro & Hensher 2009). Section 152 of the South African Constitution outlines the provisions to achieve social and economic development through programmes such as the RDP at a local government level (South Africa 1996). The sustainable element of economic development is to be financially efficient, environmentally friendly and socially just (Bowen & Jay 2011).

Nevertheless, in response to increasing low cost housing demands and growing population, the 'breaking new ground', a 2004 housing strategy that is motivated by the national Department of Human Settlements was also developed to encourage the delivery of sustainable human settlement including addressing informal settlements for the low socio-economic class (Department of Human Settlements 2004; Graham 2006). The idea that it is only through governmental structures of conventional methods that the issue of adequate housing can be solved is contested on the basis of constitutional rights to adequate housing, in favour of incremental informal settlements upgrading (Graham 2005; Hutchzemeyer 2006; Mistro & Hensher 2009). The South African most pressing issue of lack of housing for the poor shows failures to acknowledge the current existence of informal settlements as part of urban metabolism (Graham 2005; Musango 2017). The issue of housing requires a collaborative effort from the national, provincial and local spheres of government in order to cohesively facilitate the democratic transitional responses to spatial distribution of population densities, service delivery and economic conditions facing informal settlements (Graham 2005; Musango 2017).

Housing is a basic human right that corresponds with the need to ensure security, safety, sense of belonging and love (Fraser 2011; Magasela 2005). The reflections of access to or lack of housing encompasses the socio-economic as well as political concerns that directly speaks to informal settlements, and its consequences such as poverty, crime and gender violence (Fraser 2011; Magasela 2005). Lack of access and affordability to adequate housing represents a poly-crises manifestations (poly crises' definition includes but is not limited to the amalgamation of multifaceted global issues such as urban poverty, political unrest, crime, violence, poor infrastructure and failures of service delivery and democracy in relation to how all these issues together affect the mandate of overall development. The European Union has used this term to also describe the situation after a shaky euro-area economy, the election of president Trump and the impacts that these events would have on migration pressures, and foreign-policy drifts) of intertwined poverty, injustices and political failures (Grajewski 2017; Magasela 2005). In order to be able to generate more houses, there has to be enough financial resources, yet economic development demands for an advancement in the quality of life of citizens and is set apart from economic growth, which depicts an increase in outputs (Bowen & Jay 2011).

The protection, fulfilment and promotion of human rights should be the point of departure for any dignifying development in South Africa in order to redress the past conditions and redistribute the resources that will create an enabling environment for the marginalised to thrive (Leibenberg 2005; Leibenberg 2008). The importance of the fulfilment of human rights is to fulfil human dignity and restore humanity especially for the previously disadvantaged population in South Africa (Leibenberg 2005). Informal settlements are by the virtue of existence unsustainable until their building structures, physical conditions reflects resilience against natural and man-made shocks (The World Bank 2012).

However, given the current housing backlog and lack of integrative housing strategies, the manifestation of perpetual informal settlements as a result of both migration and socio-economic inequality has by far jeopardised the fundamental right to 'adequate housing' which challenges the slogan of 'cities without slum' that was endorsed by Millennium Development Goals: a vision to have improved the informal living conditions by 2020 (Cities Alliance 2002; Huchzermeyer 2011; Pillay 2008). The department of Human Settlements in South Africa has compelled to eradicate all informal settlements by 2004, in accordance with the initiative of the 'slums without cites' slogan (Cities Alliance 2002; Huchzermeyer 2011). In the post- apartheid South African society, the National Development Plan (NDP) 2030 vision chapter 8, has specifically designated to transform human settlements and address spatial inequalities through development of infrastructure (NDP 2012). This

will place people closer to their working and living environment while creating economically viable environment (NDP 2012).

The NDP's objectives are to adequately address the dysfunctional nature of human settlements which has pushed and swept people away from the places from which they can live, participate in the economy and work in close proximity (NDP 2012). The NDP aims to achieve its objectives at least by 2030 towards 2050 where South Africa will have zero poverty, workers in the peripheries will not be isolated, rural and townships will have activated space economy, and inner cities will not be controlled by informal settlements lords, to mention a but a few (NDP 2012). Instead the country will have functional and productive citizens who have access to adequate service delivery including housing, sustainable energies, maintained infrastructure, productive farms as well as well- managed socio-economic conditions (NDP 2012).

Nevertheless, the Integrated Urban Development Framework (IUDF) is a response to a continuous increase of population in South African cities and is a directive of the National Development Plan Chapter 8 (IUDF 2016). The overall achievement for the IUDF is to witness spatial transformation in all South African cities by setting a policy framework to direct inclusive, resilient and liveable urban settlements (IUDF 2016). According to the intentions of the IUDF, South Africans must have access to social and economic opportunities, improved urban spaces for inclusive and sustainable economic growth (IUDF 2016). Furthermore, the IUDF is committed to work towards a constructive and democratic governance, reinforce new spatial patterns that encourage spatial cohesion, efficient and safe transportation (IUDF 2016). In this way, South African can also become globally competitive citizens (IUDF 2016).

The Inter-Agency and Expert Group on SDGs (IAEG-SDGs) indicators reports that, the United Nations 2030 agenda for sustainable development has led to the adoption of 17 ambitious goals that are sensitive to income, sex, age, race, ethnicity, migratory status, disability, geographic location and other traits (IAEG-SDGs 2016). These goals have their targets and indicators for sake of accountability and practicality (IAEG-SDGs 2016). The South African government have also committed itself towards the realization and achievement of the SDGs on various government platforms and spheres- and must align the SDGs with the NDP, specifically Chapter 8 of the NDP with Goal 11 of SDGs in terms of addressing informal settlements (The Conversation 2018). In relation to sustainable development goals, the informal settlements are addressed under Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable (IAEG-SDGs 2016).

Sustainable development goal 11 have 10 targets and 15 indicators that will ensure its fulfilment (IAEG-SDGs 2016).

1.2 Cape Town and informal settlements' experiences

Huchzemeyer (2008) outlines that the extent to which informal settlements are spread out, it is almost impractical to imagine African cities without the informal settlement's existence, despite numerous governmental and international interventions. Informal settlements in Cape Town present unique challenges to the city's governance which include but are not limited to the so called illegal invasions of land that lead to insecurity of tenure and in worst cases resulting into evictions (Huchzemeyer 2008). These informal settlements lack access to basic municipal services such as piped potable water, energy for cooking, adequate sanitation and waste removal (Huchzemeyer 2011; Nassar & Elsayed 2017; Watson 2009). Similar to the global community, Cape Town's informal settlements are characterised by challenges such as but are not limited to, overcrowded spaces, illegal electrification, and uneven distribution of spatial layout as well as depressive economic growth with low employment opportunities (Huchzermeyer 2011).

According to the City of Cape Town (CoCT) policy document on informal settlements there are about 204 informal settlements in Cape Town of various sizes and densities that accommodate approximately 145 000 households (CoCT 2013). Most of these informal settlement are located on the land owned by the city and lesser on private land (CoCT 2013). Though the city is in continuous attempts into addressing the gap in informal settlements in Cape Town through programs such as the Urban Settlements Development Grant and Upgrading of Informal Settlement Programme (Muller 2016). However, due to the volatile and organic nature of informal settlements, these settlements are prone to disasters such as flooding (those located on steep slopes), for example disposal of grey water in south east of Khayelitsha, unplanned landfills sites which results in loss of lives, possessions and difficulty in municipal responses (Govender et al 2011). Due to compactness of Cape Town's informal settlements, services such as toilets and water taps are placed on the outskirts of settlements, which also creates problems of mobility for the disabled people, accessibility and safety especially for women and children (Govender et al 2011).

Integrating the spatially fragmented and economically 'dysfunctional' informal settlements into the rest of the city is one the problems facing Cape Town's urban planning (Huchzemeyer 2008). Cape Town was one of the first to apply for the adoption for Upgrading of informal settlements program

that was initiated by the Department of Human Settlements in order to create sustainable housing (DoHS 2004; DHS 2009; Fieuw 2011). The 2004 Informal Settlement Upgrading Programme have a specific subsidy method that forms part of the National Housing Policy in terms of ‘Breaking New Ground’, a plan for Development of Sustainable Human Settlements (Department of Human Settlements 2004). The Breaking New Ground policy document is flexible, participatory and situational in its nature with an acknowledgement of the challenges of the informal settlements, this creates an opportunity for informal settlements’ transformation (NUSP 2013).

However, in order to adequately address the engraved occurrence of informal settlements in Cape Town, the BNG demands a paradigm shift in relation to approaching informal settlements (Huchzemeyer 2008). The City of Cape Town is experiencing an in-migration pressure rate of 16 000 households per annum which reflects a majority of at most R3500 income per month as reported by the Western Cape Provincial Parliament (WCPP) (WCPP 2018). Thus, the BNG should acknowledges the income differences and go beyond the normal in order to ensure that the programme is indeed pro-poor, inclusive and challenges the status quo that exist in housing ownership (Huchzemeyer 2008). The amount of R850 million is set aside for the Upgrading of Informal Settlements Programme, this reflects the commitment from the Western Cape government to redress the housing living conditions in informal settlements (WCPP 2018).

In Cape Town, and other South African municipalities, the Integrated Development Plan (IDP) is a five year strategy plan that aims to guide the process of service delivery in relation to also the Spatial Development Framework plan, in monetary terms as well as in physical implementation of designated development within the municipal area of jurisdictions and operation (Pan et al 2014). However, when it comes to informal settlements the reality of the IDP in fulfilling the promises of number of toilets provided, water and other basic service delivery amenities along with the indicators used to capture the elements of sustainability and equity are exceptionally lacking or absent (CoCT 2013a; Pan et al 2014). The IDP of Cape Town states that it is committed into providing basic municipal services for residents, including those in informal settlements (CoCT IDP 2017). Given the phrase used by the City of Cape Town IDP (2017:19) “provide residents, including those in informal settlements”, one may presume that those in ‘informal settlements’ are not the priority when it comes to service delivery because some settlements are said to be existing outside the national norms and service standards (CoCT IDP 2017).

1.3 Problem statement

With an increasing population of about 57, 363,925 million in South Africa (Worldometers.info 2018) about 36, 505,690 people lived in urban areas in 2016 as compared to an urban population of 8,110,012 in 1960 (Indexmundi 2018). In 2014, 23% of urban population lived in informal settlement (Indexmundi 2018). Of about 4 004 793 population of Cape Town captured in approximately 1 224 849 households it is said that only 18.9 % have access to potable water (CoCT 2016). About 22, 2% have access to sanitation. There has been a 3, 2% GDP growth since 2005 to 2015 and 2, 1% labour in terms of employment growth (CoCT 2016). In 2011 about 837 532 people had access to formal housing accompanied by 1 032 497 (CoCT 2016). About 81, 6% of Cape Town's population resides in formal housing while 10.0 % lives in informal housing and the rest lives in other types of dwellings (CoCT 2016). These reflections show the extent and the depth of the challenges in informal settlements of Cape Town. These projections and observations contradict the constitutional mandate of the South African government which states that, everyone has the right to adequate housing, human dignity, equality, education, clean environment as well as safety and security, and thus the current observations must be brought into scrutiny (Huchzermeyer 2008; Watson 2009; South Africa 1996).

Because of inadequate planning and perpetual urbanisation, Cape Town's informal settlements have increased to 204 clusters with 193 000 households (Dreams to Reality 2018). In addition to illegal as well as unplanned spread of informal settlements, lack of access to waste removal, and high youth employment contributes unliveable conditions (Dreams to Reality 2018). The compactness of informal settlements in Cape Town results into fires and health hazards (Pharoah 2008). The observed unliveable conditions poses a threat to informal settlements residents and government's expenditure (Pharoah 2008). As an illustration, it is reported that the government have to allocate at least R521 million for water and sanitation provisioning and an estimate of R292 million for electricity in order to create liveable environment in Cape Town's informal settlements (Dreams to Reality 2018).

The rural to urban migration by hundreds of millions which is caused by both pull and push factors that include but not limited to lack of access to basic amenities such as service delivery, redundant economic growth in search for a better life results in unsustainable urban living conditions such as houses made of unregulated and fragile materials that put pressure on the urban ecosystems' functionality (Nassar & Elsayed 2017; Pharoah 2008). Also the dwellers are exposed to poor drainage as well as poor sanitation that cause contagious diseases making them vulnerable to infectious diseases (Cities Alliance 2002; Pharoah 2008).

Moreover, South African cities are faced with an issue of spatially disintegrated housing plans and housing backlog (Tainter 2006; Watson 2009). Informal settlements perpetuity are part of the

response to urban issues from the unemployed, poor and marginalised groups (African Centre for Cities 2018). People living in informal settlements, in the context of Cape Town, are confronted with day to day challenges of lack of piped and potable water, energy for cooking, adequate sanitation and removal of waste as well as high rates of unemployment and overall limitation to participate towards an inclusive economy (Ismaps.org.za 2018; Pieterse 2014; Watson 2009). The problems experienced by people living in informal settlements are perhaps a call for renewed approaches to be employed when addressing informal settlements challenges with regards to spatial distribution of population densities, service delivery indicators and socio-economic conditions. This call must be practically and relevantly considered in order to contribute towards sustainable livelihood that will not promote development at the expense of the environment and overexploitation of scarce resources (Pieterse 2014; Watson 2009).

Informal settlements' dwellers are faced with the problems of forced evictions, lack of security of tenure, resettlement and replacement as well as lack of public goods and services (commission on human rights resolution 1993). The international human rights conference expressed its concerns about the violation of basic human rights including the right to adequate housing and right to healthy food (commission on human rights resolution 1993; Muller 2006). Informal settlements resembles deficiencies in terms of urban service provision such as sustainable infrastructure and functional spatial form, as well as inclusive economic growth. People living in informal settlements experience harsh conditions that must be transformed through integrative mechanisms of development in order to improve quality of life and contributes towards their sustainable livelihoods (Pieterse 2014).

In defiance of the government's post- apartheid Reconstruction Development Framework (RDP) a policy framework that sought to eradicate poverty and inequality, South Africa remains the most unequal society in the world (The Independent 2018; World Bank 2018). Land ownership, housing backlogs, unstable socio-economic conditions are manifested through high unemployment rates, poverty and income inequality (Mistro & Hensher 2009). Though poverty has reduced between 1994 and 2011, it is estimated that at least 2.5 million more South Africans have fallen victims of poverty since 2011 (The Independent 2018). Cape Town's informal settlements are known by illegally erected building structures, low economic status and lack of security of tenure (Watson 2009). It is usually the poor of the poorest that find refuge in informal settlements, illustrating the extent of South Africa's enduring legacy of apartheid as stated by The Independent (2018).

The material structures used for informal settlement's building erections are unsustainable in a sense that they are not resilient to natural and man-made shocks or hazards; spaces are unregulated in terms

of proximity of human interactions as per the ET Hall's perspective (World Bank 2012). The structures used as building materials lack guiding principles of resilient urban cities of today's context of complexity and uncertainty (World Bank 2012). The sense of unregulated and unplanned informal urban spaces result in unsafe environments, vulnerability to water diseases, uncleanliness, and lack of waste management that create unliveable spaces (Meth 2017). Women and children are exposed to gender-based violence when they have to travel longer distances to reach toilets at night (Massey 2013). Dwellers are infected and affected by tuberculosis as a result of unclean environments and the lack of educational awareness about diseases accelerates the situation (Massey 2013; Meth 2017).

1.4 Research questions

There are three identified research questions:

- a. What changes have occurred in the spatial distribution of population densities of the informal settlements in Cape Town from 2001 to 2011?
- b. What changes have occurred in basic service delivery (water, energy sources for cooking, sanitation and refuse removal, and a Basic Service Index) of informal settlements in Cape Town from 2001 to 2011?
- c. What changes have occurred in economic conditions (income and employment) of informal settlements in Cape Town from 2001 to 2011?

1.5 Aim and objectives

The aim of the study is to determine the spatial distributional changes in sustainable livelihood patterns of informal settlements in Cape Town from 2001 to 2011. Sustainable livelihoods will be understood from the perspective of population densities, service delivery and economic conditions.

In order to achieve this aim the following objectives will be explored:

- A. To perform a literature review
- B. To determine the changes in the spatial distribution of population densities in informal settlements in Cape Town from 2001 to 2011.
- C. To calculate and determine the changes in the spatial distribution of a water, energy sources for cooking, sanitation and refuse removal (and a Basic Service Index) for the informal settlements in Cape Town from 2001 to 2011.

- D. To calculate and determine the changes in the spatial distribution of the economic conditions (income and employment status) of the informal settlements in Cape Town from 2001 to 2011.
- E. To make recommendations based on these findings in terms of how various policies involved in informal settlements' livelihoods can be improved.

CHAPTER 2: DETERMINING THE CHANGES IN THE SUSTAINABLE LIVELIHOODS OF INFORMAL SETTLEMENTS OF SPATIAL DISTRIBUTION OF POPULATION DENSITIES, SERVICE DELIVERY AND ECONOMIC CONDITIONS

2. INTRODUCTION

This chapter covers the literature review of this study.

2.1 Theoretical component of sustainability

In relation to sustainable livelihoods, it is challenging to give a one-size-fit all definition of sustainability in the context of balancing between economic development and environmental sustainability (Muller 2016). Sustainable development is interdependent, it deals with cross-cutting wicked problems, and is an intergenerational current '*buzzword*' which assimilates a relationship between different dimensions of development including politics, economics, environment, ecology and culture (Bowen & Jay 2011; Hattingh 2002; Muller 2006; Tainter 2006). According to the Brundthland Report (1987) sustainability is understood as an ability to use today's resources without jeopardising the future generation to fulfil its own needs, the definition has remained unchanged.

In 1987, the Brundtland Commission instigated the conversation and engagement around issues that concern the utility of the available resources without compromising the ability of the future generation to fulfil their own needs (WCED, 1987). Upon research and world-wide meetings including the Rio de Janeiro Earth Summit in 1992 and the Johannesburg World Summit in 2002- the Brundtland report provided a strategic foundation to reconcile the green movements of environmental preservation arising from the global north and the need to alleviate poverty in the global south, that is now free from colonial power (Hattingh 2002; Swilling & Annecke 2012). Urbanisation has been identified as one of the major contributors to the world's environmental challenges and has been a driver of the cities' over consumption of resources for economic growth (Avis 2016; Musango et al 2017)

Potentially, it is observed that urbanisation could be a socio-economic and spatial investment opportunity if focus is directed into its long term impact through sustainably responsive rather than reactive mechanisms (Avis 2016; Musango et al 2017; Pieterse 2014). Most third world cities have exceeded their carrying capacity far beyond the scope of their development (Smith 1995). However, very little research is invested into addressing the questions and challenges of sustainable urban development, especially in the context of informal settlements' living conditions (Smith 1995).

Urban sustainable development considers the observed relationship that exist between the substantial pressures on land development, economic prosperity, urban size and environmental problems with the planet at the centre, especially in the third world countries (Karsada & Parnell 1993; Keiner 2004; Smith 1995). The diversity of views that exist between the economists, sociologists and environmentalists, amongst others, reflects the complexity and the extent of ‘urban challenges’ (Keiner 2004; Smith 1995; Simon 1992). And if addressed accordingly will provide an experiment for transitions towards sustainable urban development (Keiner 2004; Smith 1995; Simon 1992).

As stated by the Brundlandt Commission Report (1987) and Barrow (1995) sustainable development is based on the principles of inter and intra-generational equity, and inter-species equity. Sustainable development is about the integration of environmental, social, political, cultural and economic dimensions into planning implementations and the involvement of those planning strategies into decision making in order to serve the present and future generational needs (Planning Profession Act no 36 of 2002; Muller 2016). Sustainable development complements the synergistic perspective of Maslow’s hierarchy of access to basic and physiological needs (food, shelter, health, safety, and security, affection and belonging, esteem and status and cognitive self-actualisation) (Muller 2016). Synergistic satisfaction, in a sense that when a given need is satisfied, other needs are stimulated and simultaneously satisfied, this contributes towards the development of human being and their surrounding (Max-Neef 1989). Needs must be holistically understood for example, a need for housing is a satisfier for security and safety while a need for education satisfies a desire for understanding, knowledge and creation of identity (Max-Neef 1989).

Hence, in terms of informal settlements, housing conditions must reflect a sense of safety, security, protection, cognitive self-actualisation in a way that captures the essence of human dignity in order to promote sustainable livelihoods (Musango et al 2018). It is important to note that sustainability has indicators that measure its policies based on inputs, outputs, longer term impacts, cross-cutting indicators that measure both tangible (water, cooking energy, sanitation and water removal) and non-tangible personalised (health, self-actualisation) as well as non-tangible ideal services (advice, coordination and collaboration) (Creating Housing in Sustainable Communities 2011). The Integrated Development Plan, Spatial Development Framework and the Spatial Land Use Management Act of 2013 and other urban planning tools, should consider the nature of socio-economic rights and service delivery when addressing planning accompanied with housing issues. This should be done in order to reconstruct cities from the apartheid spatial form towards sustainable development through co-operative governance (Muller 2016).

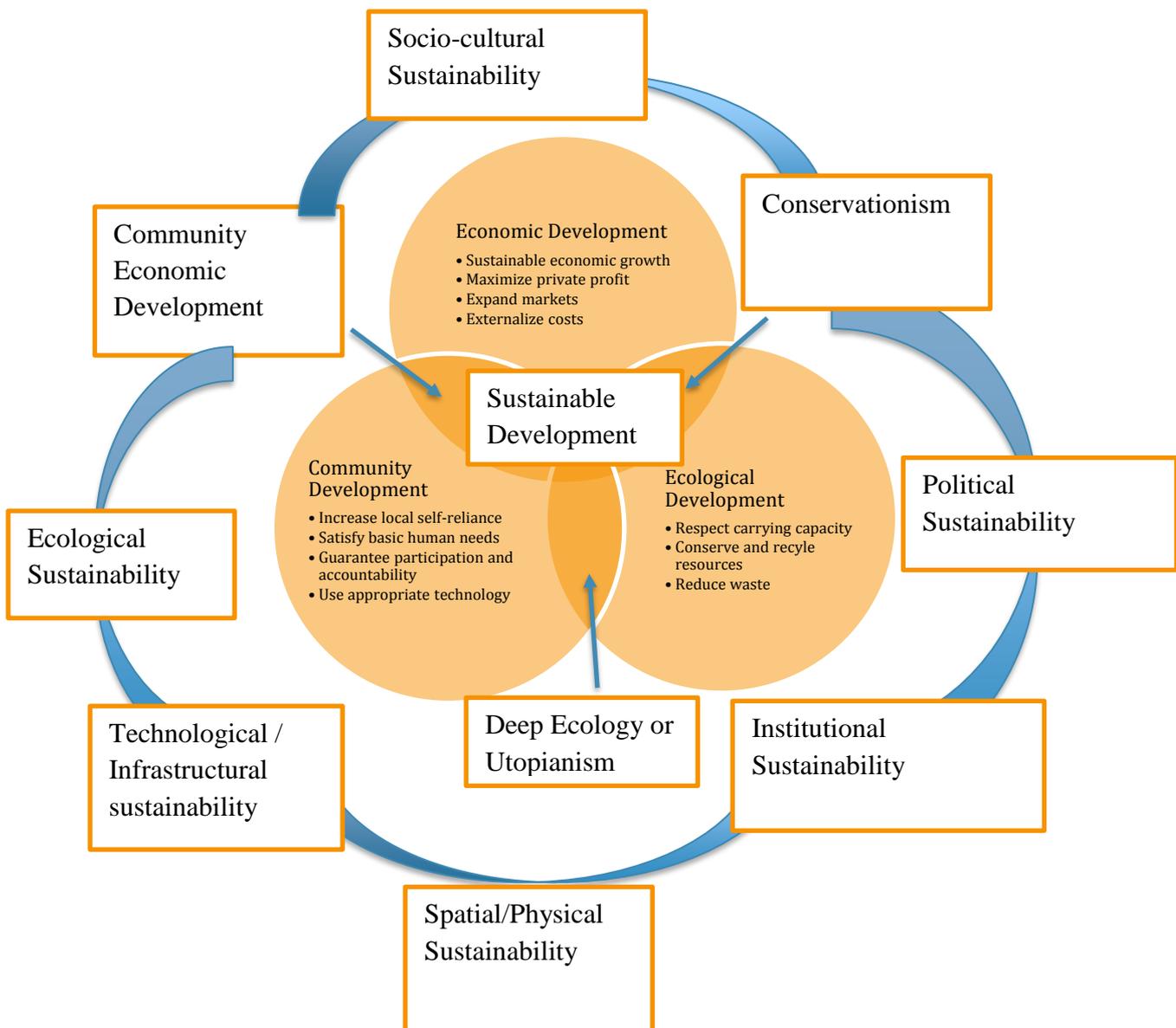


Figure 4.1: Showing the interdependent nature of sustainable development

Source: Muller (2016:7)

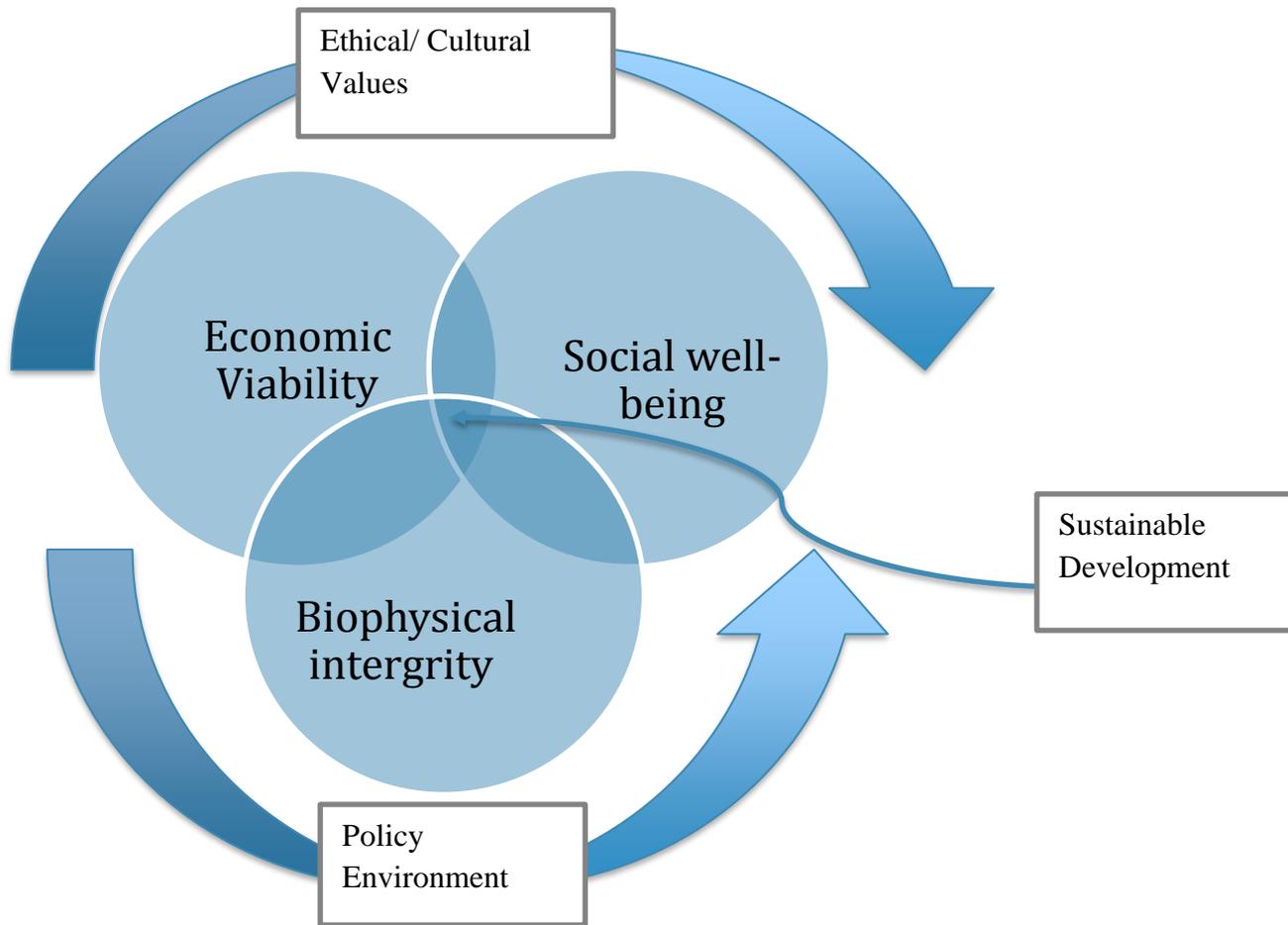


Figure2.2: Local pathway to sustainable development in South Africa

Source: Muller (2016:8)

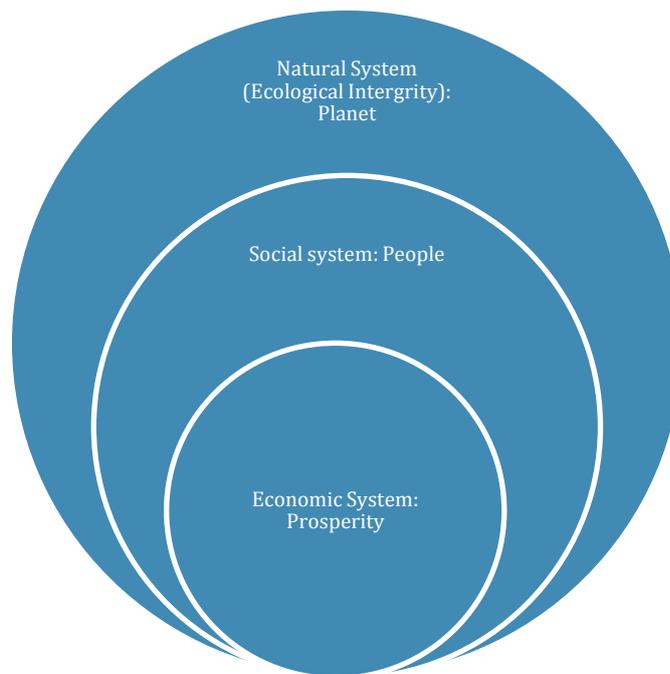


Figure 2.3: Nested approach to sustainable development

Source: (WSSD, 2001)

2.2 The aspect of spatial distribution of densities of people residing in informal settlements

Migration has an influence on the spatial patterns and structure of cities (Sykora & Cermak 1998). The population is unevenly distributed across the earth based on different unique environmental settings, and only a few part of the earth are habitable (StudyMode 2018). The influx of highly mobile unemployed and younger population from the Eastern Cape into Cape Town in search for improved standards of living, is being witnessed in Cape Town's informal settlements (Ebrahim et al 2015). The objective of any human settlement planning should be to provide equitable and affordable housing in order to promote liveability and facilitate integrated as well as sustainable livelihoods (World Planning Conference 2017). The City of Cape Town is yet set to facilitate its urban planning tools towards spatial justice by focusing on physical infrastructure (Kesson et al 2018). The City of Cape has various mechanisms to re-block and reconfigure the spatial distribution of the informal settlements in order to create safer and open spaces (Kesson et al 2018).

Cape Town as a global city in the global South is characterised by its dominance in global affairs in relation to its population size, economic growth, tourism and social infrastructure that influences the domestic spatial distribution and population densities (Lemanski 2006). To an extent, the City of Cape Towns' compliances to the international standards, contributes to splintered urbanism and social

exclusion of the residents involved in for example informal economy and those who reside in informal settlements as they are not equipped to participate in the competitive global market and its standards (Lemanski 2006; Pieterse 2014).

As an illustration, in 2010, during the preparations for the FIFA World Cup, the City of Cape Town was committed into sweeping some informal settlements' dwellers away from the stadium and tourist's busiest areas (Raghavan 2010). This shows the degree of pressure that Cape Town encounters in order to fit into the 'normal western ways' while affecting the spatial distribution of its poor citizens. This pressure also manifests through the technocratic order of planning tools that is reinforced in informal settlements which require a different perspective given their unique nature (Huchzermeyer 2008).

Cape Town's population's distribution is not different from that of, for example the Indian informal settlements where urbanised informal settlements are concentrated in pockets and co-exist with industrial urban centres and agricultural activities (Srivastava & Singh 2007). The decision making that surrounds the physical make up of informal settlements dwellers is influenced by availability of resources and close proximity to access, which in turn shapes their spatial pattern (Sherbinin et al 2007; Srivastava & Singh 2007). The geography of the city of Cape Town reveals the deepened spatial inequalities and the injustices displayed by the housing market which displays the hierarchy of physical location on affordability (Turok 2001). The poor are pushed outside from the affluent urban core towards urban sprawls, posing a physical mobility challenge for people living in for example, Khayelitsha, who have to travel longer in order to get to work (Turok 2001). The informal settlements' dwellers are less resilient to coping with disasters in physical aspects as they are pushed towards urban edges, in the most wetland that are prone to the risk of natural disasters (Dixon 2013).

2.3 Gender dynamics, the vulnerability of urban poor women in informal settlements

South Africa, from which Cape Town is no exception, has in the midst of its transformation agenda since 1994 struggled to prioritise the issues of women and children (Kehler 2001). Women in South Africa are primary victims of poverty, domestic and sexual violence, regardless of their geographical location, as it is the case in Cape Town's informal settlements (Kehler 2001). Women's experiences in Cape Town's informal settlements are shaped by their race and class which serve as determinants of access to resources and opportunities (Fuma 2016; Kehler 2001; Mabilo 2018).

Urban poverty and exposure to informal settlements' harsh living conditions affect women and men differently based on survival and adapting strategies employed by both (Dixon 2013). The aspects of

gender that affect women living in informal settlements include but are not limited to: vulnerability to climate change, gender and mobility, sexual violence, subjection to primary care taking and being breadwinners as well as family heads in the absence of male figures (Dixon 2013; Mabilo 2018). In a study conducted by (Dixon 2013) it is observed that the urban poor in Cape Town's informal settlements are exposed to climate change vulnerability and the most to suffer are the illiterate and unemployed women (Dixon 2013). Women are reported as the primary users of household energy and also shoulder most of the household responsibilities to fulfil for example, energy requirement and management (Fuma 2016). However, the Free Basic Alternative Energy Policy of 2007 failed to acknowledge the financial implications encountered by women (Fumi 2016).

The expectation from gender cultural norms influences the division of labour and women's freedom of mobility and responsibility for reproductive labour (Dixon 2013). The safety of women and children in informal settlements in Cape Town deserves attention and feedback in terms of women's limitations to public spaces utility, freedom of 'being' without the fear of rape, murder or being discriminated against, which reinforce a social hierarchy of toxic masculinity in a South African society that has a history of gendered violence (Dixon 2013; Mabilo 2018; Massey 2013).

The reproduction of social hierarchy is reinforced through gender stratifications in households, working places and in terms of access to the country's economic growth. Lack of access to opportunities is the main difference that separates the struggles of women of different races, and informal settlements of Cape Town are predominantly inhabited by Black women who lack adequate education and have no voice in the society (Fumi 2016; Mabilo 2018; Massey 2013). Lack of education results into joblessness or low paying labour which exposes women to various subordinations, for example some enter into abusive relationships for shelter, clothing and food while others may become victims of human trafficking. Hence, Kehler argues that because the relations of class, race and gender determines a woman's survival given the indicators of well-being such as health status, consumption expenditure, income levels, and housing standards. Then, there is a feminisation of poverty for especially women of color in informal settlements who barely have access to the mentioned measurements (Kehler 2001).

Nonetheless, Amayunzu-Nyamongo (et al 2007) shares the health experiences of Kenyan women who live in informal settlements in terms poverty and gender particularly women living with human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS). Most of the women who participated in a study conducted by Amayunzu-Nyamongo (Amayunzu-Nyamongo et al 2007) were aged between 31 and 40 years and few of them were single. A high proportion did not

acquire primary school education which shows the biggest educational gap for women living in informal settlements. Furthermore, about 62,6% women went for HIV testing which also shows the lack of educational awareness and reluctance about health in informal settlements, and a few educated knew about their status (Amayunzu-Nyamongo et al 2007). In terms of financial freedom and dependency, most women are engaged in informal economic activities and some depend on their spouses and family members for income (Amayunzu-Nyamongo's study et al 2007).

2.4 The aspect of service delivery to the sustainable livelihoods of people residing in informal settlements

Due to the observation that some over 1.5 million households in South Africa are within the informal settlement existence, where access to basic service delivery is underdeveloped or non-existent (Clark et al 2016). This makes it difficult to keep record for improvement and maintenance. Service delivery is not only about infrastructural availability but also how it organises the behavioural patterns of the society (Turok 2001). According to McDonald and Pape (2002) the cost and crises of service delivery across South African municipalities contributes to the theoretical and practical review of the paradigm shift from a welfare municipalism to a market driven vision of financial constraints (Miraftab 2004). The cost for recovery from the service delivery crises is possible but depends on balanced budgets and the implications of affordability and privatisation of essential amenities such as water, energy and sanitation (McDonald and Pape 2002; Miraftab 2004).

However, the more privatisation because of the increased cost, is the more these essential amenities are commodified resulting in them being no longer a 'right to have' rather a 'privilege' (McDonald and Pape 2002). This poses a danger of recreating an exclusionary system especially for those who cannot yet afford to take the privatisation responsibility (McDonald and Pape 2002; Miraftab 2004). It is also difficult for the municipalities to provide for informal settlements that take place outside the operations of municipal urban planning policies (Clark et al 2016; Miraftab 2004). Therefore, there is a responsibility for both the informal settlements' dwellers and the government with regards to ensuring that each party fulfils their roles (Clark at al 2016). The government should create an enabling environment for education to take place at an accelerated pace, and the informal settlement's dwellers should engage in responsive manners by utilising available facilities for long term solutions (Clark at al 2016).



Figure 2.4: Image of informal settlements in Cape Town

Source: (Goodman 2018)

Essentially, the standard of any ‘governmentality’ is judged according to the well-being of its citizens (Lemke 2000). Availability of resources and how they are distributed demands a paradigm shift that will determine the transformative nature of development which is sustainable, and human centred (Ambole 2016; Abbott 2001). The rate at which urbanisation and in-migration occurs from other provinces and across the neighbouring countries threatens the distribution of service delivery in local municipalities, throughout South Africa, and Cape Town is no exception (Lagardien & Cousins 2004). Topographic limitations and locationality of informal settlements on wetlands are causing the service delivery to lag behind in Cape Town’s informal settlements (Mels et al 2008).

The demand exceeds the supply while the inability to merge the population growth and urbanisation rate, results in a service delivery crises in many urban centres that accommodate a number of unplanned settlements in Cape Town (Lagardien & Cousins 2004). In the City of Cape’s informal settlements, the Department of Water Services is directly responsible for the provisioning of water and sanitation (Mels et al 2008). According to the City of Cape Town and Western Cape Government report (2016) in terms of basic service delivery, 18.9% have access to water; 10.2 % to refuse removal; 23.1 % to electricity and 22.2 % to sanitation given the population of 4 004 793 million

distributed across 1 264 849 households (CoCT 2016). This reflects the level to which evaluation assessment for service delivery must be employed as well as strict measures that will ensure efficiency and effectiveness at a given time. Within 2008 and 2010, the City of Cape Town has purposed to achieve access to potable water and adequate sanitation for all in informal settlements (CoCT 2016). The interrelatedness of dimensions such as socio-economic conditions and environmental constraints, and the gap that exist between them has an influence with respects to difficulties in service delivery provisioning in informal settlements of Cape Town (Mels et al 2008). One of the most common causes of political unrest and protest has been because of the lack of service delivery (Alexander 2010). Protests in South Africa, including Cape Town range from peaceful to extremely dangerous events based on the intensity of the situation (Alexander 2010). Most of these protests occur because there is a demand from local politicians and provincial government to provide essential amenities including but not limited to adequate housing; clean water; electricity and clean energy; sanitation and waste removal (Alexander 2010).

Due to lack of consensus in terms of water services and related units within local municipalities; there has been a delay in provisioning of sanitation and water in informal settlements in Cape Town. Though the prescribed measures of enabling legislations and policy frameworks are in place, the lack of effective implementation has been also a direct service delivery constraint. The Community Water Supply and Sanitation Unit at Pensinsula Technikon has been entrusted with the mandate to formulate a planning and implementation framework as a response to regional stakeholders' request in order to address the basic sanitation needs in the City of Cape Town's informal settlements (Lagardien & Cousins 2004).

2.5 The challenge of sanitation in informal settlements

Internationally and also in a South African context, sustainable sanitation is understood as one of the main crucial elements of achieving sustainable livelihood and equity in creating liveable spaces (Pan et al 2014; WHO & UNICEF 2013). However, given the technical and institutional processes for implementing sustainable sanitation there is a gap between policies in place and the implementation (WHO & UNICEF 2013). The spatial and physical environment in informal settlements poses a threat on the practical implementation of sanitation structures, which requires reconfiguration in many aspects in order to provide equitable and sustainable sanitation (DWAF 2008). According to (Pan et al 2014; Schroeder 2018) sustainable sanitation is characterised equivalently to the definition used by the Sustainable Sanitation Alliance (SuSanA), i.e., "a sanitation system that is 'economically viable, socially acceptable, and technically and institutionally appropriate'; it should protect the environment

and natural resources” (SuSanA, 2014). The intersectionality of sanitation addresses the issues of safety, environmental cleanliness and social justice holistically while giving economic empowerment trade-offs (Pan et al 2014).

Given the conditions of informal settlements’ dwellers, sanitation is an essential part of sustainability and equity (Pan et al 2014). Sustainability, as already mentioned, is a multifaceted concept. However, in the context of sanitation it is associated with environmental health and spatial conditions which determine placement and locationality of facilities (Pan et al 2014). Also, equity is a world-wide *buzzword* that directly speaks to issues of social justice and human dignity (Muller 2016; Pan et al 2014; Scott et al 2012). In informal settlement in relation to sanitation, equity is about the distribution of sanitation services in comparison between the formal and the informal settlements (Pan et al 2014). According to Pan et al (2014) the lack of proper and dignified sanitation provisioning in informal settlements in Cape Town, is a manifestation of disintegrated criterion that undermines ‘the uniqueness of context’ within the policy making, political and socio-economic environment.

The gaps between planning, implementation and monitoring delegitimize the sustainability and equity elements pertaining to sanitation. Thus, there must be a clear guideline describing and monitoring the meaning of sustainability and equality for providing equitable and adequate sanitation in Cape Town’s informal settlement. As opposed to unsustainable solutions and short term alternatives of for example, a bucket system, which in turn poses challenges for the elderly, disabled, women and children- and serves as a contributory factor of contagious diseases. There are technical and infrastructural limitations threatening the progress of sanitation provisioning in informal settlement of Cape Town. The interrelated factors contributing to failures of adequate sanitation in informal settlements include lack of water and bulk services to connect, drainage constraints, locationality and whether there should be a relocation or upgrading before the implementations, especially with the drought situation in the Western Cape, (Pan et al 2014).

In 2014, a five year old Michael Komape was robbed of his dignity and deprived a right to life when he fell into a toilet pit, at Mahlodumela Primary School in Chebeng a village just outside Limpopo province (News24 2017). Michael’s experience reflects a million more cries by South African citizens who are, but without access to dignity and transparent government, in urban informal settlements and also in rural areas (SAHRC 2014; News24 2017). Therefore, it is paramount that that City of Cape Town, proposes research that will consider incorporating the assessment processes of sustainability and equity in terms of sanitation delivery in informal settlements (Pan et al, 2014).

2.6 Energy aspect in informal settlements

Approximately 43% of South Africans are considered energy poor (no access to adequately reliable safe energy) because energy access is not just about access but also affordability which is determined by income level and socio-economic status which in turn has an impact on the level of education received by the household's children. As a response to South African inherent inequalities in terms of resource distribution and accessibility, the South African government has achieved immeasurable progress by ensuring that from the wealthiest to the poorest, at least by 2025, 97% all households would have access to grid energy and 3% to solar home system (Household energy access report no date).

South African cities, including Cape Town, are stricken by distorted urban layout with the marginalised poor communities living on the peripheries of cities. The marginalised have limited access to the promised life privileges offered by the city such as access to clean energy (Household energy access report no date). Sustainable development from a gender and energy perspective ensures that women's struggles are not romanticised, it is observed that in most households the primary users of energy are women. Hence, it is important to not only highlight the gender struggles that come with 'energy poverty' in informal settlements, and the broader Africa but also to ensure that women empowerment is well rounded as stated by the Sustainable Energy Africa (SEA) (SEA 2016; Habtezion 2012).

In terms of the National Development Plan vision 2030, the privileges of the minorities are now to become the rights of everyone since the endorsement of democracy in 1994 in all aspects of development including safe, efficient and clean energy for all South African citizens in order to ensure economic prosperity and competitive industries (NDP 2012). About 93.5% of electricity in South Africa is produced primarily from coal-fired power plants, this accumulates to high carbon emissions and contributes to global warming (Dobson 2015). Since 1994, household electrification increased from 36% to 87% and 6.8 million of houses are connected to grid and over 120 000 are connected to use the solar home system (Household energy access report no date). This shows the level of commitment and investment from the energy sector into improving the South African living conditions (Household energy access report no date). Approximately 94% of Cape Town's households had access to electricity by 2015, this doesn't guarantee that the standard of living has improved seeing that fires have also increased, creating an imbalanced development trajectory (Francioli 2018).

An increase in supply of electricity in Cape Town's informal settlements has enhanced the living conditions of the dwellers such as efficiency in cooking and warming water. It has also played a positive role in the safety of women as well as improved education for children as they can study longer hours at night. Since informal settlements continuously spread out at an unpredictable rate, urban growth and migration puts pressure on cities supplying energy for households (Household energy access report no date). In Cape Town, the Joe Slovo housing project through the Breaking New Ground housing programme was the first of its kind to prioritize sustainability and clean energy. For this project, the BNG housing plan acknowledges climate change through implementation and promotes collaboration between the spheres of government, businesses and different stakeholders for the provisioning of solar energy (Household energy access report no date).

There are several issues that serve as constraints in terms of availability and accessibility of energy in cities such as Cape Town. These are health and safety, alignment policies spheres, ownership, housing design and illegal connections. Women are the primary users of energy in many households, thus, they must be incorporated in ongoing energy operations within Africa as reported by Africa Renewable Energy Access program (AFREA) (AFREA 2011). The illegal connections make the networks collapse and must be monitored closely (SEA 2016). Cities' processes are not strong and adequate enough to enable the lower income group who are in-fluxing the cities (SEA 2016). The inability to plan ahead creates more difficulty in terms of dealing with energy requirement projections (SEA 2016). The government must put contingencies in place to deal with urbanisation for both a short and long term (Household energy access report no date). Plans and decisions will shape communities, thus the energy sector should take a micro- level approach to ensure innovation and change (AFREA 2011; SEA 2016).

Conventional technologies and infrastructure can be substituted with alternative green technology that offers a pragmatic and incremental approach which could help avoid fires and combat violence against women and children (Household energy access report no date; SEA 2016). Some people end up using coal, candles and paraffin to supplement for electricity or to opt for other households needs such as grocery (SEA 2016). Development, energy and gender are interwoven and must be treated as such (SEA 2016).

Recommendation on combating energy poverty:

- Benchmarking from other countries
- Gender sensitive sustainable energy solutions
- Integrate gender into ongoing and new energy operations within the African region

2.7 Water conditions in informal settlements

Every aspect of life is connected to water access and availability, from economic prosperity, to health, and general wellbeing of every individual (Muzondi 2014; SAHRC 2014; Water.org 2018). Water is 'life' on the basis of its availability, potability and accessibility (Water.org 2018). Without water, and safe water to use for that matter, industries will not operate from primary to tertiary service providers- water is thus an integral part of humanity and its total functionality in a space (Muzondi 2014; Water.org 2018). It is a human right to have access to water (SAHRC 2014; UNDP no date; Water.org 2018). Access to potable water improves the living conditions of women and children in socio-economic terms, and unlocks their potential to take ownership of their development (Water.org 2018).

As it stands, 1 in 9 people is deprived of access to safe water, and 1 in 3 persons do not have access to a toilet (Water.org 2018). Currently, 844 million people are living without access to safe water, while 2.3 billion are without access to improved sanitation (Water.org 2018). The shortcomings on water accessibility serve as stumbling blocks towards the achievement of socio-economic progress of women and children -and their time utility on programs that are fundamental for their development in a long term of their existence (Water.org 2018). Time spent by women collecting water causes them to slack in other areas of their lives such as personal empowerment, education and pursuit of their skills (Water.org 2018). About 200 million of hours are spent by women and girls collecting water (Water.org 2018). At least every 2 minutes a child dies of water related disease, and 1 million people are killed by water, sanitation and hygiene- related disease each year causing a detrimental health crisis and compromised 'right to life' (Water.org 2018).

SDG 6 emphasises on access to clean water and sanitation (UNDP no date). In terms of international obligation on water and sanitation, the International Covenant on Economic, Social and Cultural Rights recognises the fundamental significance of a right to adequate food, clothing, and housing, including a right to clean water and sanitation, the list is not intended to be exhaustive (SAHRC 2014). Children are exposed to contaminated water that make them vulnerable to mortality rates, for example in Nairobi in informal settlements, children's mortality rate is double higher than the average national rate (Avis 2016).

In a South African context, water availability and accessibility is influenced by different factors including locationality, topography, infrastructure and socio-economic status, this comes down to political will and decision making as reported by Human Development Agency (HDA 2012; Muzondi 2014; SAHRC 2014). Politicians offer to lead people into a promise land of a South Africa that is

free from oppression of all kinds, through mere tokenism with little or no practical plans of action to solidify their campaigns once elected (Muzondi 2014). This causes conflicting intentions in governance (Muzondi 2014; Watson 2003). Unplanned urban growth puts pressure on water related infrastructural development (Avis 2016).

The lack of urban infrastructure to cater for potable water provision creates unliveable conditions, unhealthy environments and waterborne diseases, as well as water pollution that contribute negatively to health-wellbeing of informal settlement's dwellers (Avis 2016; Water.org 2018). Water pollution exposes children to transferable diseases, cholera and tuberculosis (Avis 2016; Water.org 2018). The informal settlement dwellers are deprived of opportunities to participate in processes and decision making that affects their daily lived experiences, consequently, resulting in their voices being buried under enraged oppression and pain (Avis 2016). Providing water and sewerage in low-density layouts that are grounded on unplanned development is costly, difficult and requires extensive reconfigurations (Avis 2016).

In Cape Town, due to the drought crisis, focus is placed on water availability in relation to quality, "The number of households in the City increased by 196 276 between 2011 and 2016 whilst an additional 200 521 households were provided with access to piped water and access to water services subsequently increased from 99.3 per cent in 2011 to 99.8 per cent in 2016" (CoCT 2017:17). The increased demand on water provision reinforces pressure on the City's attempts to provide water service within its limited means in terms of infrastructural and economic constraints, also dictated by fears surrounding the drought crisis (CoCT 2017; HDA 2012).

2.8 Refuse removal conditions in Cape Town's informal settlements

With South Africa adopting into the international mandate of waste management, and commitment to sustainable development, the waste sector has mandated itself as guided by the National Environmental Management: Waste Act No. 59 of 2008, into balancing between the consumption of resources (DEA no date). Furthermore, there is a continuous searching for the most socio-economically efficient manner in order to respond to the inception and final disposal of waste (DEA no date). It is reported that the city of Cape Town has committed itself into addressing waste removal related issues, cleaning the environment in informal settlements by increasing its allocated budget by 112% towards waste management since 2006/2007 (Infrastructurenew.s 2018). The limitation concerning the waste management plan and community collaboration is data availability and community consciousness about environmental cleanliness (News24 2017). Access to waste removal

contributes to fighting against hygiene related diseases, and promotes a peaceful and freshening environment (Turok 2008). The number of households with access to waste removal in Cape Town has decreased between 2011 and 2016 due to unregulated urbanisation (CoCT 2017).

The South African plan around waste management is holistic in nature, and is grounded upon the principles of collaboration from all spheres of government and other sectors (DEA no date). The shift of focus in terms of redirecting waste towards the socio-economic, environmental and biophysical return investment is reflected through the elements including avoidance and reduction; reuse; recycle; recovery; treatment and disposal; legal consideration according to NEMA articulations and expectations of equitable access and justice (DEA no date). The practices of these habits, then redirect investments towards job creation; municipal revenues; capital investment in the waste sector resulting in strengthened institutional capacities (DEA no date).

2.9 The aspect of economic conditions to the sustainable livelihoods of people residing in informal settlements

At the heart of any country's well-being is economic prosperity from which every other aspect such as social well-being, service and physical infrastructure draws its success (Tainter 2006; Spinks 2001). The majority of population in informal settlements depends on the informal economy, ranging from street vendors, to illegal practices such as drug dealing and prostitution (Lemanski 2007; Meth 2017). It is important to address the nexus between the unregulated nature of urbanisation and urban poverty in a way that demonstrates the impact they have on urban sustainable livelihoods in African cities (Mutisya & Yarime 2011; Meth 2017). Most of the research has focused on mitigating urban poverty yet without proper guidance on how to ensure the implications on informal settlements' urban sustainable livelihoods (Mutisya & Yarime 2011).

As an illustration, in Kenya the unprecedented increase of urbanisation is intertwined to migration, poverty, and natural growth which pose a challenge on the effective implementation of economic policies in Kenyan urban centres (Mutisya & Yarime 2011). In Cape Town city, the need to create more job opportunities for socio-economic empowerment remains a persistent challenge for the uneducated population and informal labour market (Lemanski 2007). Luthango et al (2016) reports that because of socio-economic challenges, informal settlements' dwellers in Cape Town experience exclusive economic growth that is informal and less supported by government. Constraining infrastructural conditions slows the process of creating an enabling environment for inclusive economy (Lemanski 2007). Basic infrastructural provisions have been proposed as a response to

address socio-economic conditions in order to create an enabling environment for economic improvement, and better sustainable living conditions that will solidify constitutional freedom of right to economic freedom, safety, security, adequate housing and hopefully a right to 'life' as well as to a healthy environment (Luthango et al 2016).

It is the government's intention to improve the current unsustainable living conditions of Cape Town's informal settlements' dwellers. However, given the complexities surrounding informal settlements there are uncertainties with regards to what are the programs or approaches that are suitable prior-application and what would be their influence in creating better livelihoods (Luthango et al 2016). Research has illustrated that improved physical and basic infrastructural conditions are crucial for creating a safe environment and can potentially reduce vulnerabilities of informal settlements which will boost the capital investment and economic activities of the dwellers (Luthango et al 2016). Structural and systematic intervention are deemed as a long term goal achievement for life circumstances of high unemployment rate, in the context of informal settlements in Cape Town (Luthango et al 2016). Thus, any upgrading programs aimed at helping ease the drastic conditions experienced by informal settlements' dwellers must be aided with intense sustainable objectives that will foster focus on small businesses at both structural and systematic level (Luthango et al 2016).

2.10 Employment status in Cape Town's informal settlements

The scope of the informal economy is observed to contribute at least between 45% (North and Middle-Africa) and 82% (South-Asia) of non-agricultural employment, availability of data about this information is harder to convey at city level (Herrera et al 2012; Skinner 2014). However, it is estimated that at least 80% of populations in developing countries are informal economies' workers (Herrera et al 2012; Skinner 2014). There is a direct relationship between the informal settlement's state of livelihood of informality and the engagement in informal economy (Skinner, 2014; Sustainable Livelihood Foundation 2015). Informal economies activities, in South Africa, contribute significantly into the growth of the Gross Domestic Product, yet, those contributions are without proper acknowledgement (Skinner 2014). Informal economies are the main income generators at household level of informal settlements' dwellers (Skinner, 2014; United Nations 2009). According to Skinner (2014) the Western Cape and Cape Town in particular has less recorded informal economies of about 33% in terms of proportional employment and 18% of enterprises that are not registered for VAT purposes. This is a low record in comparison to Tanzania's informal economies sector which is about 52% in terms of employment size (Skinner 2014). The most common economic activities and the spatial distribution of business in informal settlements range from child care;

hairdressing; street vending; recycling which plays a role in mitigating climate change and construction, to mention but a few (Charman & Petersen 2014; Skinner 2014).

2.11 Income conditions

In Cape Town informal settlements, by just passing through the N2 road to the airport, one can almost feel the tangible atmosphere of hopelessness, noises of dusty streets, deeply wounded clustered crowds of the young and old gazing at the coming out and setting off of the sun, day in and day out (Amin & Cirolia 2018; Harber 2011). This reality is the lifetime experience of the many abandoned and almost chained souls and potential left without fulfilment of informal settlements' dwellers, who are everyday wondering with the hopes of regaining some sense of dignity and achievement of the promised socio-economic liberation that is hopefully yet to be testified (Amin & Cirolia 2018; Harber 2011). Informal settlements are internationally and nationally viewed as a manifestation of the intersections between rural-urban migrations through urbanisation (Amin & Cirolia 2018).

Because of these intersections the determining feature of survival and liveability of urbanisation in the informal settlements becomes the informal economy, which comprises the disproportionate number of women, the disabled bodies and children (Avis 2016; Mabilo 2018; Massey 2013). With regards to employment, women are vulnerable to low wages, low-skilled and practice home based activities (Fumi 2016). Jobs in the informal economy include for example, street vendor's hairdressing and are unregulated thus facing challenges of inadequate social security, child labour and lack of representation amongst many other pressing informal sectors' predicaments (Avis 2016). On estimation, in South and East Asia (other than China with about 33% of non-agricultural informal employment in informal economy) about 60% of non-agricultural activities feeds on non-agricultural employment in informal economy (Avis 2016; Vanek et al 2014). Similar estimations and observations relate to sub-Saharan Africa, with informal employment of about 33% in South Africa, to 82% in Mali, with 74% to 61% of women involvement (Avis 2016). Women represent a greater labour force in the informal economy, this shows again the reproduction of social hierarchy in terms of involvement in whether the formal and/ or informal economy based on gender (Avis 2016; Mabila 2018).

Table 2.1: Illustration of the structure of employment: employment population ratios, agricultural and non- agricultural employment 2004/2010

Source: (Vanek et al, 2014)

	Employment population ratio			Agricultural employment as a % of total employment			Informal employment as a % of non-agricultural employment		
	Women	Men	Total	Women	Men	Total	Women	Men	Total
Latin America and the Caribbean	48	75	61	11	22	18	54	48	51
Sub-Saharan Africa	55	74	65	59	55	57	74	61	66
Middle East and North Africa	22	67	45	37	22	26	35	47	45
Eastern Europe and Central Asia	49	61	55	16	18	17	7	13	10
South Asia	34	78	57	72	47	54	83	82	82
East and Southeast Asia	53	78	65	40	42	41	64	65	65
China*	67	75	71	36	30	33

According to the World Bank (2018) the global economy has remained strong by expanding by 3% in the third quarter of 2017, and the labour market conditions have shown growth in January 2018, such as in the United States. China has displayed resilience with 6.3% in the last quarter of 2017 while Japan's growth decreased to 0.5% in 2017 but revived due to strengthened exports and private consumption (World Bank 2018). South African economy is recovering from the 2015 to 2017 crises that was fuelled by the severe drought (World Bank 2018). South Africa's GDP is expected to increase from 1.3% in 2017 to 1.4% in 2018. This increase is expected to shift to 1.8% in 2019 and to 1.9% in 2020 (World Bank 2018). In return, the increase will boost the market, nationally and globally, seeing that South Africa is an African economic hub with contributions of 24% to the continent's GDP, and is a leading member of SADC in economic terms and industrial infrastructure (Show-Me 2018; World Bank 2018). Hence, South Africa needs to strengthen its comparative advantages in order to attract foreign trade investments especially in industrial skilled economy (World Bank 2018). This will happen promptly when domestic inequalities are intentionally addressed which have trapped the country's growth under inequality for decades, and also the reinstated equilibrium of slow growth and inequality that reproduces the cycle of high taxation, crime as well as corruption on limited resources (World Bank 2018).

Cape Town has suffered from the hydrological changes that drained the whole country's strategic fiscal planning and market flows which also caused a decline on one of the income generators 'the tourism industry' (Show-Me 2018). The City of Cape Town reports that Cape Town has intensified the Western Cape GDP by 71.8% in 2016 (CoCT 2017). However, the City's unemployment is reflexively higher than the entire province of the Western Cape (CoCT 2017). According to HDA (2013) unemployment and labour participation are visibly higher in informal settlements than in formal residential due to access being according to education status, ethnicity, gender and race as underpinned by historical injustices.

2.12 Literature review recommendations and conclusion

Most of the dramatic manifestations of human activities and their impact on the environment on earth's surface are experienced by cities (Yigitcanlar & Kamruzzaman 2015). The consequences of human actions as results of unmonitored migration and urbanisation have drastically disturbed the natural habitats, hydrological cycles and have created unliveable conditions including the informal settlements' growth that lack adequate housing, security of tenure, service delivery and economic empowerment (Yigitcanlar & Kamruzzaman 2015). It is observed that the current poly-crises of lack

of potable water, sanitation, gender equity and employment opportunities as well as unequal income distribution, South African informal settlements households, including Cape Town, is a phenomenon that has occurred as a result of unmonitored urbanisation and migration (Enumeration Report 2017). Stakeholders from different sectors, private partnerships, NGOs and Community Based Organisation as well as the international community must continue to co-operate in terms of policy making and implementation in response to the unique circumstances facing the urban environment, such as urban poverty, housing informality, energy poverty and socio-economic as well as environmental injustices facing the cities today (Yigitcanlar & Kamruzzaman 2015).

Strategies that are adopted by the city of Cape Town in addressing the informal settlements could be a pilot and illustration for the rest of South Africa's prime and smaller cities (Huchzemeyer 2008). There are legal and financial limitations that are ought to be addressed in order to enhance the efficiency and practical implementation of spatial distribution of population densities, service delivery, and economic empowerment (Watson 2009). Inclusive initiatives such as the 'Upgrading of Informal settlements programme' should be incrementally aligned and integrated with the core of spatial planning frameworks between government spheres and key stakeholders (Huchzemeyer 2008; Muller 2016). Transitions towards a sustainable infrastructure, inclusive economy, just spatial form and democratic governance will improve informal settlements liveability from splintered urbanism to integrated and functional settlements (Pieterse 2009). It is essential that the National Plans for urban planning coherently align with the provincial and local plans. It is essential that the plans adopt strict measurements of monitoring and evaluation (Huchzemeyer 2008; Muller 2016). Integration is important in order to guide the progress, to determine what is viable and not without squandering financial resources on strategies that are not applicable (Watson 2003).

Nevertheless, more critical and rigorous engagement needs to occur in order to address the unliveable conditions of informal settlements' dwellers in relation to health, potable water provisioning and activating capital investments that will redirect the shift of investment towards the provisioning of basic essential amenities that will satisfy the fulfilment of psychological needs and other satisfiers. According to Miraftab, 2009: "Perhaps the deep informality of third world cities is not their failure but a triumphant sign of their success in resisting Western models of planning and urban development" now, the challenge is to ensure the adequate and sustainable functionality of the 'third world informality'. Inclusive governance beyond symbolic representation in democracy must be reinforced in order to ensure that there is an interface between government policy and economic empowerment (Miraftab 2016). One of the tendencies that contribute to complex problems is the treating of development dimensions as separate entities (Miraftab 2016). Government should also

avoid eliminating people from decision making that directly affect their liveability (Miraftab 2016). A very clear and solution based approach will include the policy makers at all spheres to fundamentally rethink the interface between economic policy making and institution building by prioritising programmes such as the land reform in most sustainable and equitable manner as well as accelerating service delivery (Ngwanya 2010).

CHAPTER 3: METHODOLOGY

3. INTRODUCTION

This study is motivated by the observations of informal settlements in Cape Town. It is holistic in nature and has adopted a positivist approach both quantitatively and qualitatively.

3.1 Study area

The main aim of this study is to calculate and determine changes in the spatial distribution of service delivery and economic conditions between 2001 and 2011 in Cape Town informal settlements. The following will be used as methods in order to conduct the proposed study. Cape Town is chosen as the study area, there are around 146,000 households in 437 informal settlement pockets in Cape Town (Ismaps.org.za, 2018). Informal settlement pocket is a cluster or grouping of shack housing which can vary in size from a few shacks to a few thousand (Ismaps.org.za, 2018).

3.2 Data sources

Data with the following variables was received and extracted from StatsSA Census 2001 and 2011.

3.3 Variables of spatial distribution of population densities, service delivery and economic conditions aspects

The variables used in the study are indicated in Figure 3.1

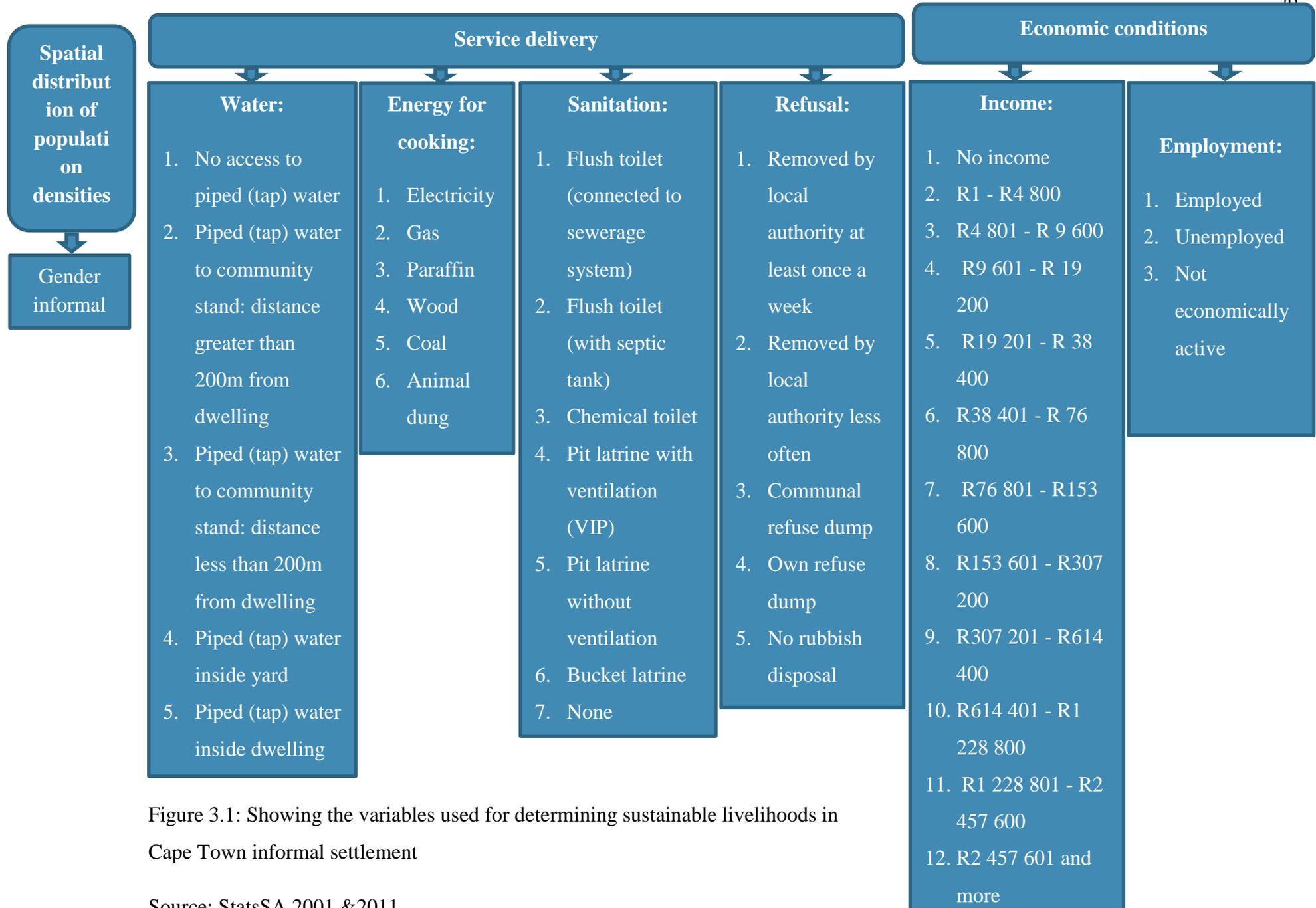


Figure 3.1: Showing the variables used for determining sustainable livelihoods in Cape Town informal settlement

Source: StatsSA 2001 & 2011

3.4 Data processing and analysis

The following narrates the steps that were taken to explore the study of calculating and determining the changes of sustainable livelihood of informal settlements in Cape Town between 2001 and 2011.

The raw StatsSA data received was cleaned by removing the columns that were not necessary for the continuation of data processes such as 'not applicable', 'other' and 'unspecified' from both the 2001 and 2011 excel files containing variables which include cooking (2001 &2011); employment (2001 &2011); Gender informal (2001 &2011); income (2001 &2011); piped water (2001 &2011); refuse removal 2001 &2011) and toilet facility (2001 &2011). These variables are categorised according to the aspects of (i) spatial distribution of population densities (ii) service delivery and (iii) economic conditions as depicted in (Figure 3.1).

The percentages from the raw values were then calculated. Thereafter, the percentages calculated were joined into shape files for both 2001 and 2011, respectively. The next step was to score the variables as to whether they positively or negatively contribute to the overall sustainable livelihood of people living in informal settlements in Cape Town (according to the literature) (Table 3.1). Some variables inform the interpretation of whether they positively or negatively contribute to household's overall sustainable livelihoods and how so.

Table 3.1: Overall score of variables and their contribution to overall sustainable livelihoods of informal settlements

Variables	Positive or negative contribution to sustainable livelihoods
Water	
No access to piped (tap) water	negative
Piped (tap) water to community stand: distance greater than 200m from dwelling	Negative
Piped (tap) water to community stand: distance less than 200m from dwelling	negative
Piped (tap) water inside yard	Positive
Piped (tap) water inside dwelling	Positive
Energy sources for cooking	
Electricity	Positive
Gas	Positive
Paraffin	Negative
Wood	Negative
Coal	Negative
Animal_dung	Negative
Solar	Positive
Sanitation	
Flush toilet (connected to sewerage system)	Positive
Flush toilet (with septic tank)	Positive
Chemical toilet	Positive
Pit latrine with ventilation (VIP)	Negative
Pit latrine without ventilation	Negative
Bucket latrine	Negative
None	Negative
Refuse removal	
Removed by local authority at least once a week	Positive
Removed by local authority less often	Positive
Communal refuse dump	Negative
Own refuse dump	Negative
No rubbish disposal	Negative
Income	
No income	Negative
R1 - R4 800	Negative
R4 801 - R 9 600	Negative
R9 601 - R 19 200	Negative
R19 201 - R 38 400	Negative
R38 401 - R 76 800	Negative
R76 801 - R153 600	Negative
R153 601 - R307 200	Negative
R307 201 - R614 400	Positive
R614 401 - R1 228 800	Positive
R1 228 801 - R2 457 600	Positive
R2 457 601 and more	Positive
Employment status	
Employed	Positive
Unemployed	Negative
Not economically active	Negative

Furthermore, the average percentages for these variables were calculated accordingly: for cooking (2001 & 2011); employment (2001 & 2011); Gender informal (2001 & 2011); income (2001 & 2011); piped water (2001 & 2011); refuse removal (2001 & 2011) and toilet facility (2001 & 2011) taking cognisance of whether the variables positively or negatively contribute to the overall sustainable livelihoods of people living in informal settlements. Then, the average percentages for variables were calculated for the purpose of creating thematic maps for spatial representation of population densities and variables via ArcMap.

In order to perform the Basic Service Index and Anova, the average percentages for all of these variables was a requirement for both 2001 and 2011 in different spread sheets. The overall Basic Service Delivery containing average percentages for 2001 and 2011 was calculated based on the two spreadsheets created.

Then, an ANOVA analysis was calculated in order to determine if statistically significant changes have occurred in the average percentages for cooking (2001 & 2011); employment (2001 & 2011); gender informal (2001 & 2011); income (2001 & 2011); piped water (2001 & 2011); refuse removal (2001 & 2011) and toilet facility (2001 & 2011) and Overall Basic Service Delivery Index from 2001 to 2011.

Then, the thematic maps for each of the variables were created for: cooking (2001 & 2011); employment (2001 & 2011); gender informal (2001 & 2011); income (2001 & 2011); piped water (2001 & 2011); refuse removal 2001 & 2011) and toilet facility (2001 & 2011) representing the informal settlements in Cape Town. Moreover, thematic maps for each of the variables are created with specified symbology according to their ranges:

- 0-20% Very poor water services
- 21-40% Poor water services
- 41-60% Average water services
- 61-80% Good water services
- 81-100% Excellent water services

Then, there is a report based on the comparison according to the spatial distributional changes that have occurred according to the percentage calculations indicated above. Eventually, gender files from StatsSA for both 2001 & 2011 were used to do the following:

- To add a column to each and call it “Area01” and “Area11”.

- To calculate the geometry (area size in square km) for the informal settlements in 2001 and 2011 in the columns called Area
- To add another column in 2001 and 2011, called PopDens01, and PopDens11
- To calculate the population densities for 2001 and 2011
- To create thematic maps of the population densities

As a result, the observation and results are outlined based on the elements of:

- Population density maps for 2001 and 2011
- The thematic maps of the average percentages for the variables

Interpretation of the ANOVAS to indicate whether statistically significant changes have occurred to the overall sustainable livelihoods of people living in informal settlements over the years.

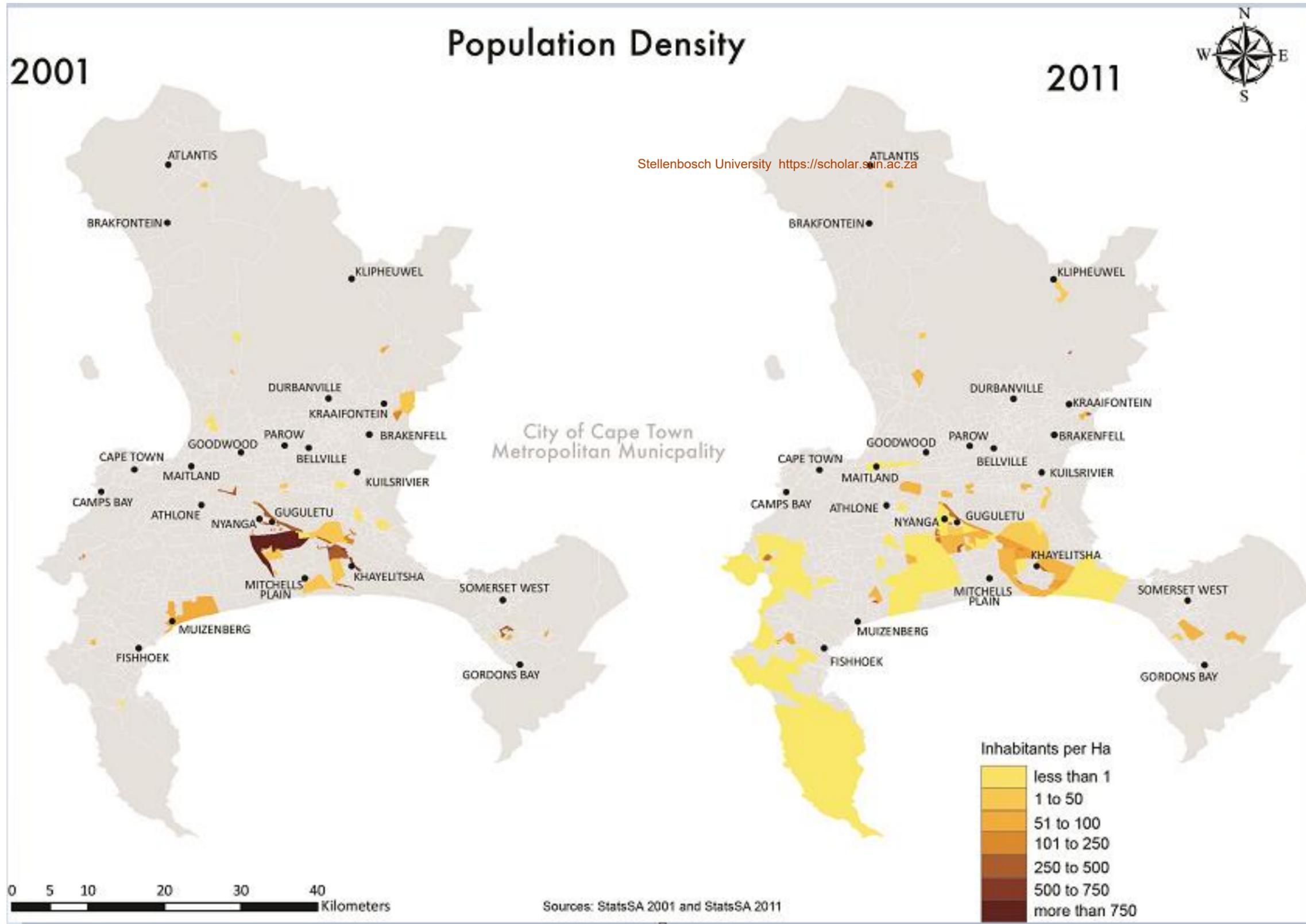
CHAPTER 4: INTERPRETATION OF THE RESULTS

4. INTRODUCTION

4.1 The thematic maps show the spatial distribution of the different variables of informal settlements in Cape Town between 2001 and 2011

Population is unevenly distributed. Locationality differs based on different factors such as the topography, land use size, human capital, politics of geography, to mention but a few. On one hand, in 2001, the Nyanga informal settlements inhabitants possess 500 to 750 inhabitants per hectare (Ha) (Figure 4.1). This reflects high rates of overcrowding of people due to lack of space. Informal settlements are built out of legal and regulation processes that guide municipalities' building plans (Purry 2016). Lack of space and information about planning, may lead to overcrowding to take place out of proportion. Overpopulated environments and lack of proximity rules of human interaction causes a quick spread of diseases within a space (Purry 2016). Overcrowding also increases potential for fires (Pharoah 2008). On another hand, Gugulethu and Khayelitsha as well as Mitchells Plain accommodate 101 to 250 inhabitants per Ha. This is also due to migration and urbanisation and immigration of many rural dwellers in search for job opportunities, affordable housing and to gain the 'city experience' (Huchzemeyer 2008; Purry 2016).

In 2011, Fishhoek informal settlements has a high spread of inhabitants possessing less than 1 per Ha, the same occurs in the north-western side of Mitchells Plain, north of Muizenberg and between Somerset West and Khayelitsha (Figure 4.1). There is a relationship that exist between the level of standard of living surrounding the areas of informal settlements and the liveability of those informal dwellers. Mitchells Plain is an affluent area in comparison to Khayelitsha, therefore informal settlements dwellers from these two places will experience life in a slightly different way due to the environments constrains and or opportunities. Hence, the possibility of one being more occupied and overcrowded than the other.



Note: The blank polygons show that the data was not collected for those areas both for 2001 and 2011 analysis

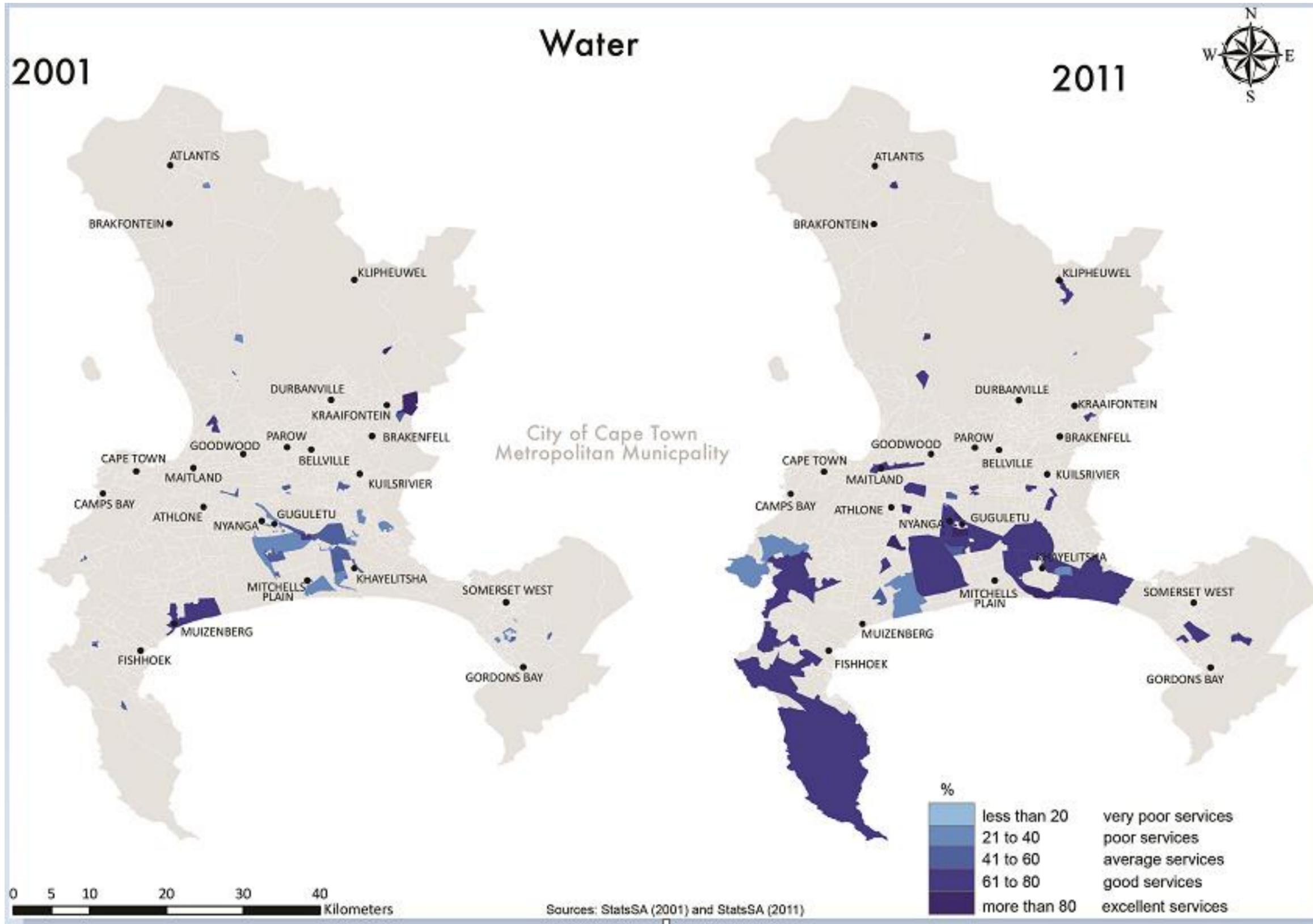
Figure 4.1: Population density from 2001 to 2011 of informal settlements in Cape Town

4.2 Average percentages for water variable

With regards to water, there is a visible shift of good services to excellent service from 2001 to 2011 across Fishoek, Khayelitsha, though at the centre of Khayelitsha's pocket there is an observable less than 20% of poor services. The north-western part of Mitchells Plain, upward to Nyanga and Gugulethu have shown a positive increase of water service delivery from 2001 to 2011 (Figure 4.2). This also contributes positively to, for example, reduced water borne diseases, cholera and tuberculosis in the lives of informal settlements' dwellers, as observed from the literature that these issues are encompassed (Smith & Hanson 2003; Water.org 2018).

Smith & Hanson states that water availability is about accessibility and affordability, and not just locationality alone. Most of informal settlements dwellers do not pay for their water, the government provides the incentives, and hence, there must be a prioritisation of effective policy implementation at the core of basic 'human right' and access to water (Banda 2013). In 2001 the South African national government committed into a Free Basic Services (FBS) policy which focused on providing basic infrastructural needs across the country, including water (Taing et al 2013). Resulting in notable water service improvement in informal settlements since between 2001 and 2011.

However, other areas such Gugulethu, Nyanga and Khayelitsha have shown a positive improvement of being above 60% to more than 80%, within 2001 and 2011, though some parts of these areas are still experiencing poor services of about less than 20% (Figure 4.2). This might be due to the inherent nature of spatial inequalities and topography which influence the extent of infrastructural investment in informal settlements, since most of they are located on land that is prone to wetlands and other disasters (Taing et al 2013).



Note: The blank polygons show that the data was not collected for those areas both for 2001 and 2011 analysis

Figure 4.2: Average percentages for water variable

4.3 Average percentages for energy variable

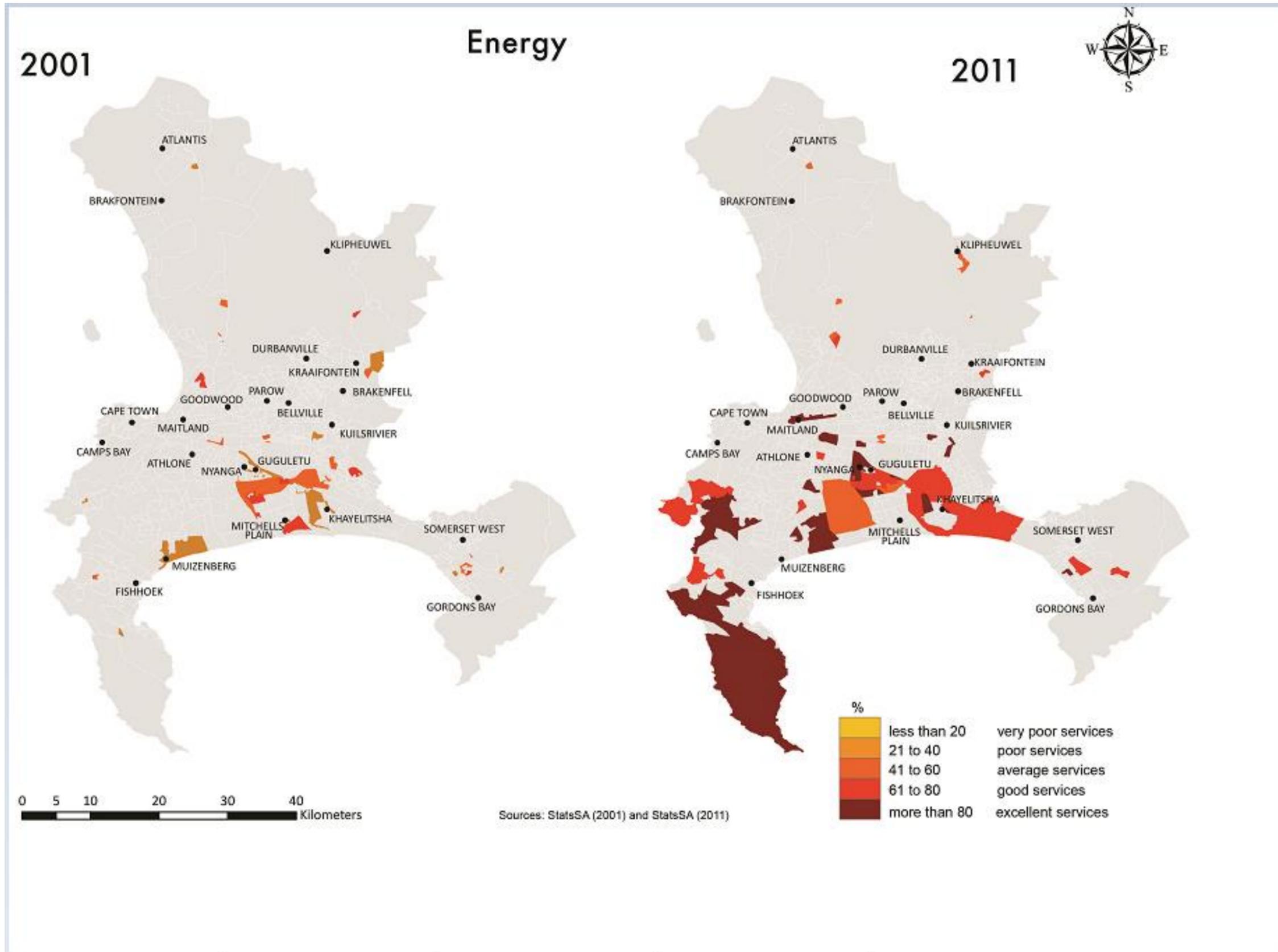
The south-eastern side of Atlantis shows poor access to energy in 2001, of about 21% to 40% reflection of energy (Figure 4.3 and 4.4). This changed towards an average of 41 % to 60% in 2011 (Figure 4.3 and 4.4). In 2001, the Southern parts of Camps Bay in 2001 had 61% to 80% of good services of energy while Fishhoek had more than 80% excellent service. Gugulethu, Nyanga and Khayelitsha are informal settlements that have had poor energy services in 2001, and have improved to good services while some parts of these 3 areas depict excellent energy services in 2001. This is because the city of Cape has well-managed their reliance on Eskom (Western Cape Government 2018). The City of Cape Town is also interested in investing towards independent energy yet is without capital (Western Cape Government 2018). Thus the city focuses more on the distribution side. Furthermore, there has been improved electrification around the metropolitan and informal settlements, and has maintained the infrastructure (Western Cape Government 2018)

Currently, because of the recent drought, the city of Cape Town has not made a lot of money from tariffs and has now introduced an increase of 8.1% fixed charges for electricity, and an amount of R135, 000 000-00 is allocated for electricity (News24 2018). Cape Town also gaining momentum in pioneering investments in alternative energy such as sustainable energy and was first in Africa to adopt an Energy and Climate Change Strategy (2005) (Cape Town Green Map 2018). In addition, the widespread of excellent energy services in Fishhoek and the lack of in other areas such as Klipheuwel demonstrates the perpetuation of inequalities that exist within informal settlements. Klipheuwel is a small pocket while spatial distribution of population densities in Fishhoek is big. This poses a challenge for the future of both settlements, as there is a possibility of Klipheuwel growing in size and more demand of energy services. And Fishhoek deteriorating because of in-migration. In-migrants are attracted to informal settlements that are already well serviced, without being cognisant of the consequences of for example, overcrowding and deficit thereof (Banda 2013). Careless use of different forms of energy may cause fires in informal settlements such as the use of candle without diligence and paraffin, may even results in death as recently witnessed in the city of Cape town informal settlements, leaving thousands homeless (News24 2018).



Figure 4.3: Showing the tragic fires in Cape Town Informal settlements

Source: News24 (2018)



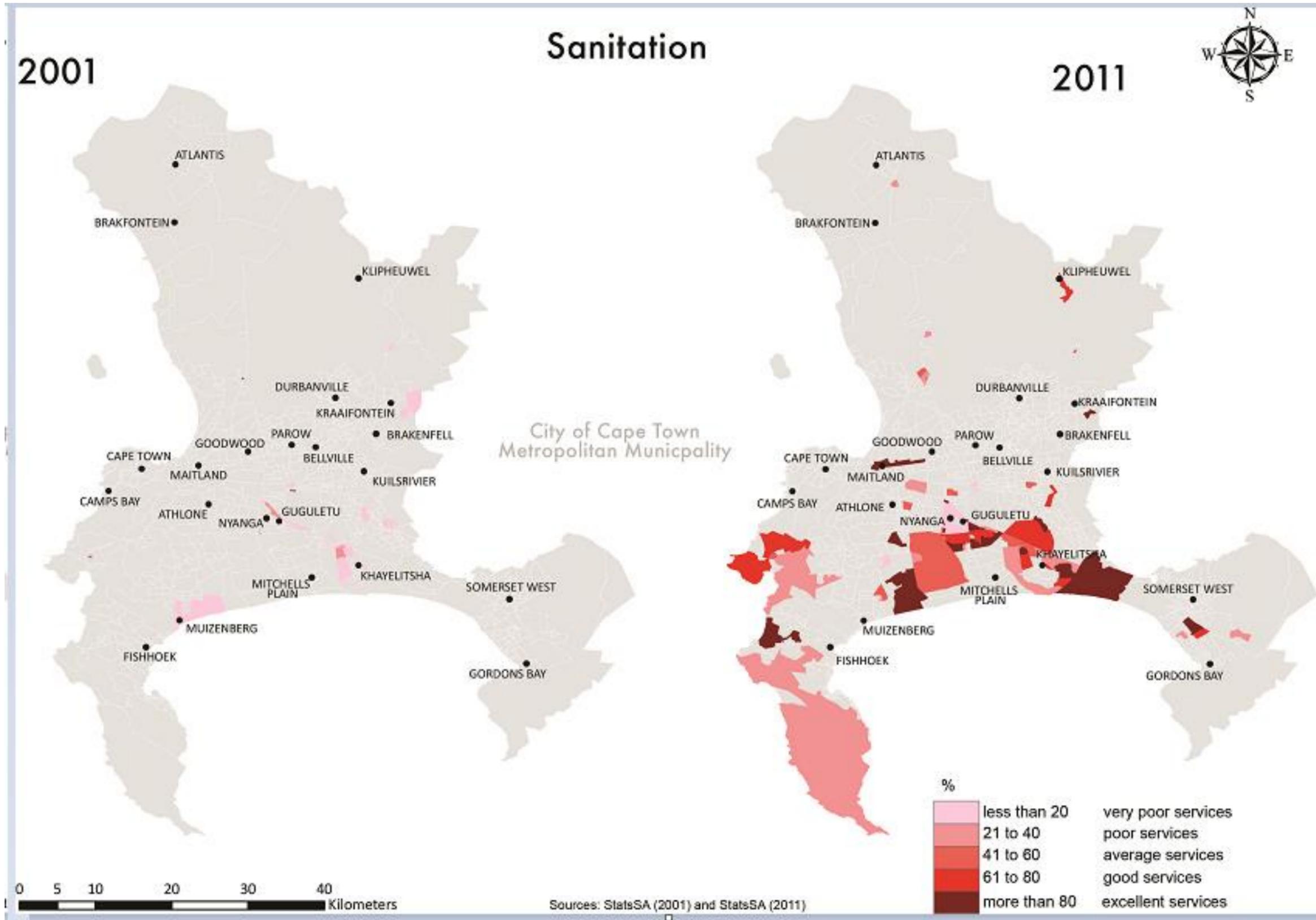
Note: The blank polygons show that the data was not collected for those areas both for 2001 and 2011 analysis

Figure 4.4: Average percentage for energy variable percentages

4.4 Average percentages for the sanitation variable

In 2001, on one hand, Muizenberg south, Khayelitsha south-west, and the north eastern parts of Kraaifontein experienced less than 20% of sanitation which reflects very poor services. On the other hand, the centred small part of Khayelitsha by the north-west part experienced at least 21 to 40% of poor services while the north-western side of Gugulethu indicates 41 to 60% average of access to sanitation (Figure 4.5). Sanitation is an essential element of equity and sustainable livelihood. Conversations around sanitation provisioning are to an extent sensitive in Cape Town, this has been witnessed through various protests in parliament and streets of Cape Town, and South Africa at large. Citizens have been contesting against the use of the bucket system in Cape Town's informal settlements due to the lack of adequate sanitation, and the un-dignifying pit latrine. Sanitation provisioning is not just about infrastructure but also the order of life style that it instils, the order of hygiene, healthy living, and safety (Turok 2001).

However, in 2011, there are drastic increase in the level of sanitation and its quality across the east-south parts of Khayelitsha with about more than 80% access to excellent services. On the other hand, the very wide population distribution of the north-western part of Fishhoek gets to witness at least more than 40% of average sanitation services (Figure 4.5). Khayelitsha seems to be spatially divided and populations are unevenly distributed in terms of service delivery, one finds different ranges of access to service within in a reasonable range of distance. This shows that the rate at which urbanisation occurs does not match with the processes of service delivery. While other people are in-fluxing in informal settlements, others have already settled in and have been acknowledged by the government. The cycle is vicious and will get messy if not carefully monitored. Populations are increasing putting pressure on the environment and sanitation is at high demand, Cape Town reflects the trajectories that have occurred as a result of sanitation demand in relation to population growth in informal settlements of Cape Town.



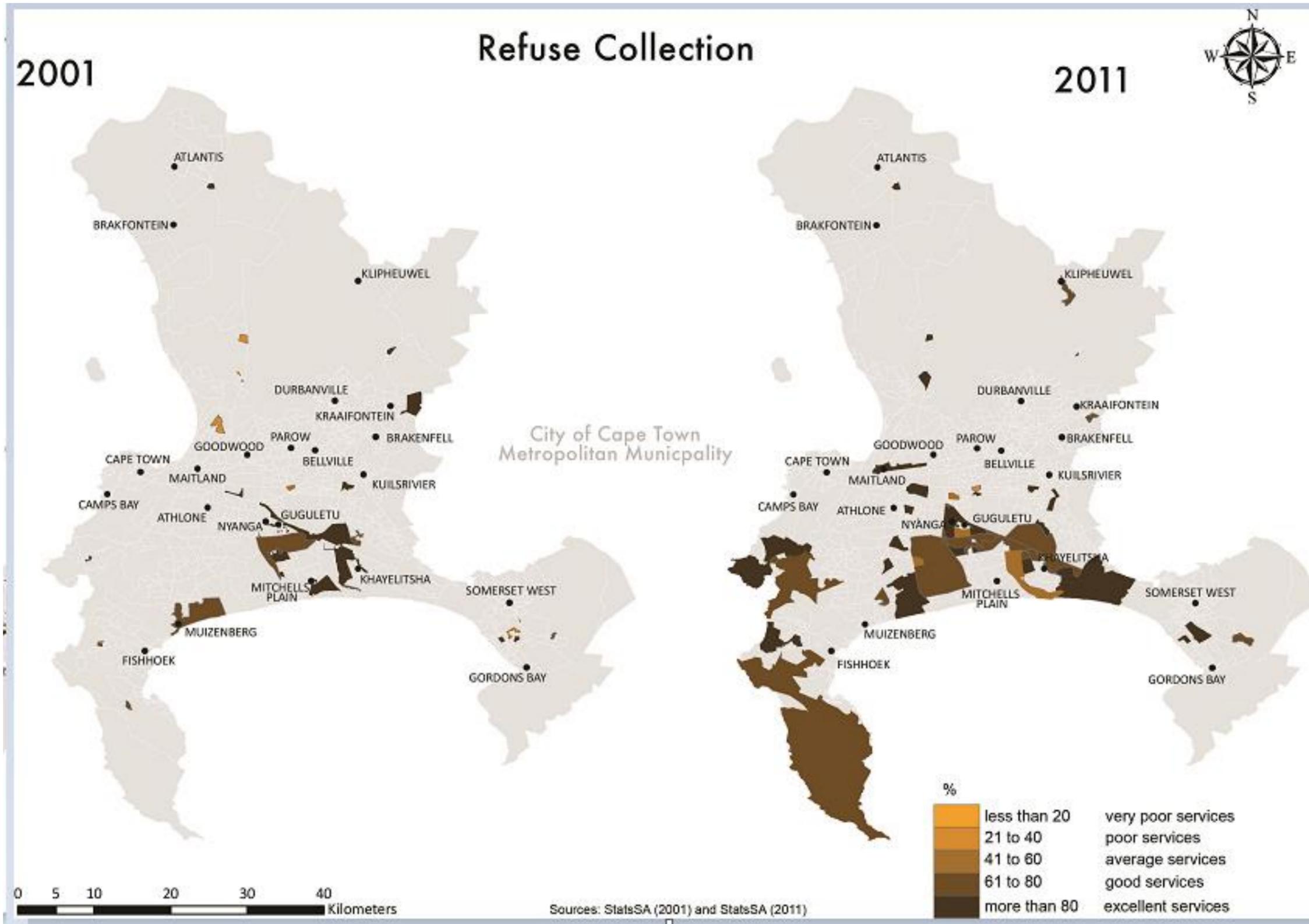
Note: The blank polygons show that the data was not collected for those areas both for 2001 and 2011 analysis

Figure 4.5: Average percentages for sanitation variable

4.5 Average percentages for the refuse removal variable

In terms of 2001 observations, the north-east part of Mitchells Plain, Khayelitsha south-western part and Gugulethu south-east as well as Kraaifontein north-east, depicts more than 80% excellent services of refuse collection over a low spread of population (Figure 4.6). As informal settlements increase in size and so does the demand for refuse removal, which calls for both a provisional element but also a maintenance aspect. In 2011, the south-western side of Fishhoek reflects good services within the range of 61 to 80% of refuse removal (Figure 4.6). Muizenberg north, also shows more than 80% of excellent services, while Mitchells Plain's north of north east shows 41 to 60% average services, and the north-west part indicates good services of 61 to 80% (Figure 4.6).

Waste removal is one of the issues that have both created unclean environment and also job opportunities in Cape Town (Turok 2001). Given the government's reluctance and delays in waste collection, there is a rise in privatisation of the waste removal business (Clark et al 2016; McDonald and Pape 2002). The government works with private companies to accelerate the rate of public waste's collection (McDonald and Pape 2002). Waste should be seen as an opportunity to economic growth such as recycling and upcycling for the local who eat from hand to mouth on daily basis while contributing to climate change reduction. The areas with high rate of lack of refuse removal (refuse collection) include the south-western parts of Khayelitsha, a cluster in between the northern parts of Gugulethu and Nyanga (Figure 4.6). Lack of access to waste removal creates unhealthy and unliveable conditions which causes a cycle of sickness, and deteriorates the environment (Avis 2016).



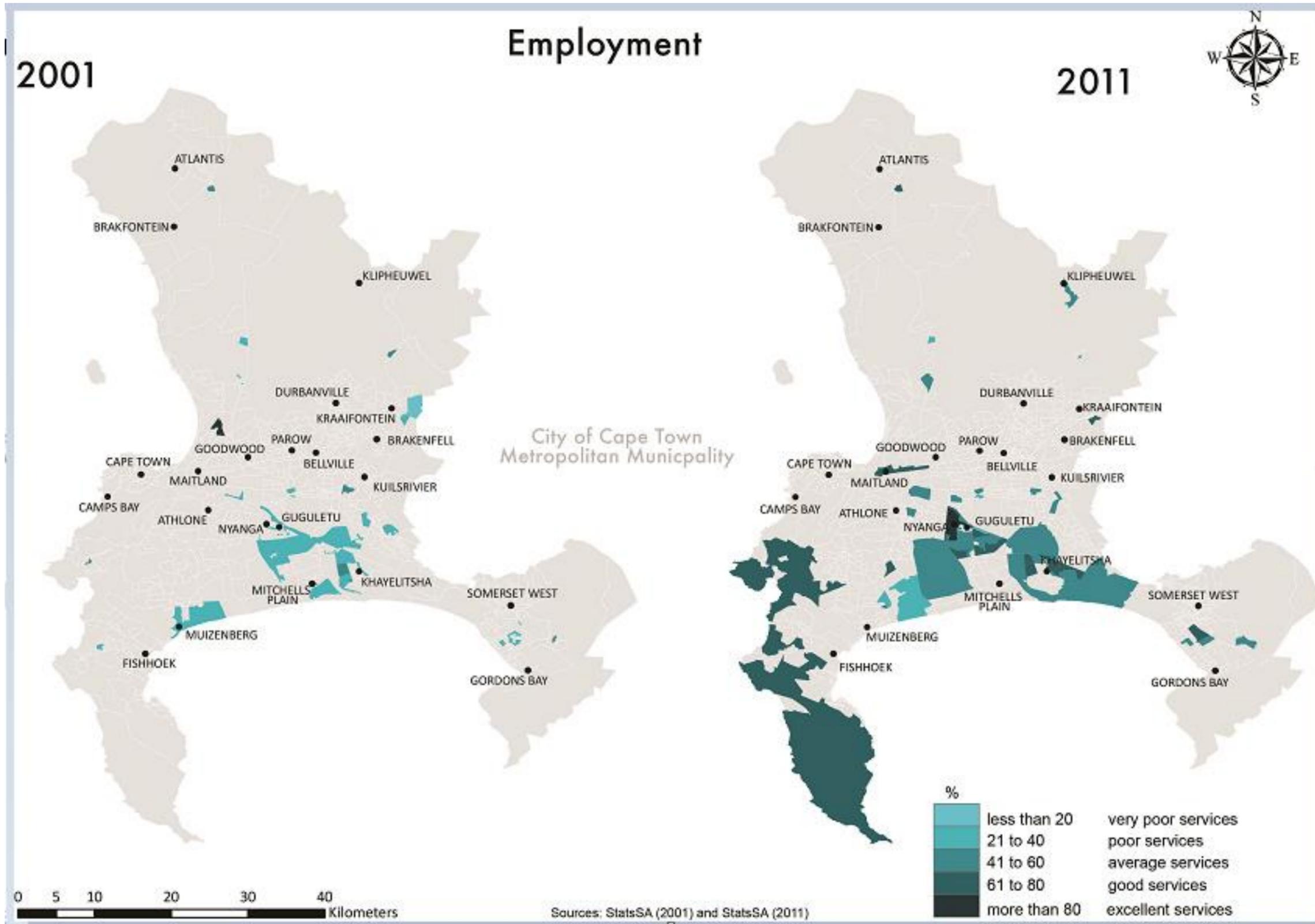
Note: The blank polygons show that the data was not collected for those areas both for 2001 and 2011 analysis

Figure 4.6: Average percentages for the refuse removal variable

4.6 Average Percentages for the employment variable

In terms of population distribution across the north-west part of Muizenberg, Mitchells Plain northern parts, and Kraaifontein north, there is a clear indication of less than 20% access to services which affirms very employment and thus income levels (Figure 4.7). And also the 21 to 40% of poor services for population densities (Figure 4.7). This reveals the lack of affordability of services, which reflects on the obvious racial lines of economic domination, as well as gender dynamics that influence population distribution. People will locate where they can find opportunities and can be able to afford places of placement. For the poor, affordability is the main priority but also the real constraint into entering the inclusive economy participation. Thus informal settlements offer cheap property as an alternative from the neoliberal economy of playing within the rules of the game, as per Friedman's (1970) perspective on global economy. In 2011, there is an increase in population densities, with slight changes along the south-western side of Fishhoek, upward Camps Bay that reflects access to good services (Figure 4.7). Khayelitsha, Gugulethu and Nyanga show the mixture of poor services and average services, and the small centre part of Khayelitsha showing good services. This may mean that since 2001 people may have improved their skills, that has empowered them for a better living or the government have accelerated the pace of providing opportunities by creating an enabling environment for economic growth (Figure 4.7).

In 2001, in Cape Town, the unemployment rate for the Black African was as high as 49.78% and only 227 372 were employed (Cape Town Census 2001). Unemployment rate was 24.52% for coloured and about 453 208 were employed (Cape Town Census 2001). Of 12.15% unemployment rate for Asians, it is reported that 15 114 were employed. Approximately 4.72% of White people were unemployed, and about 242 100 were employed (Cape Town Census 2001). These indications show the racialisation of a labour force in Cape Town (Mabilo 2018). This can be based on a number of factors which include but are not limited to education, racial prejudice and historical context of discrimination in labour force (Muller 2016). However in 2011, some changes occurred in percentages of employment, according to Cape Town's census data, it is reported that in 2011 the unemployment rate for Black African was at least 34.54% (Cape Town Census 2011). Black people are the majority of informal settlements' dwellers, black people's unemployment rate indicate the level at which they can survive or not in informal settlements. About 22.67% of coloured were unemployed in 2001, 9.91% of Asians were unemployed and only 4.71% of white population was unemployed (Cape Town Census 2011). These indications still reveal the degree of imbedded inequalities and the economic liberation journey that awaits for people living in Cape Town, and other parts of South Africa that are stricken by inequalities.



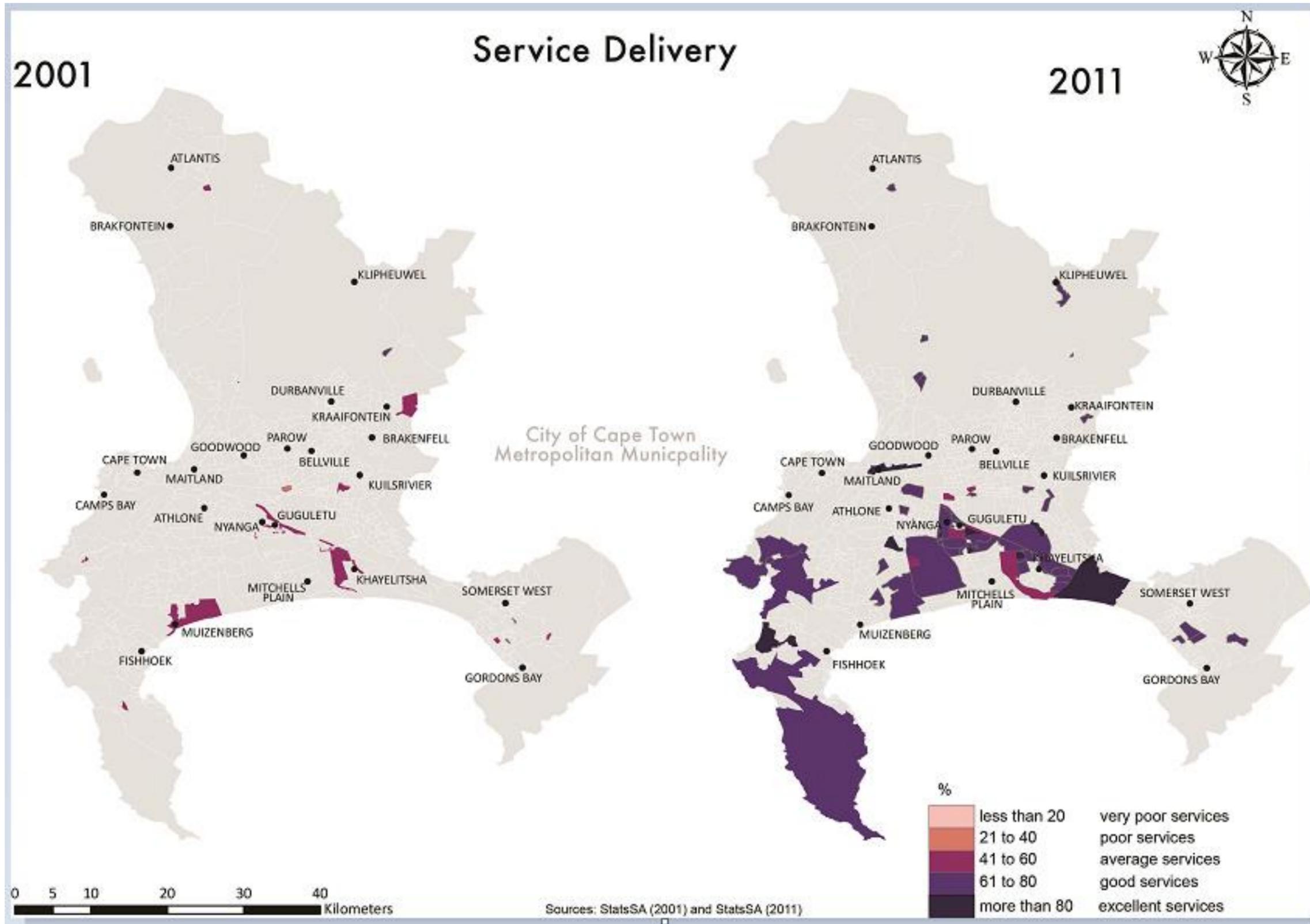
Note: The blank polygons show that the data was not collected for those areas both for 2001 and 2011 analysis

Figure 4.7: Average percentages for the employment variable

4.7 Average for overall service delivery

The results show that there has been an increase in the spatial distribution of population densities with regards to service delivery within 2001 to 2011 (Figure 4.8). In 2001, in Muizenberg the service delivery was within 61 to 80%, while in Gugulethu north the service delivery across population density was poor services reflecting 21 to 40% (Figure 4.8). There has been a continuous spatial inequality that influences the distribution of services across the informal settlements in Cape Town, which is also deepened by the historical context of South African spatial planning. However, in 2011, there is a wide spread of population densities across Fishhoek with good services (Figure 4.8). Mitchells Plain's large population density and service delivery services are good reflections, except for the small pocket at the centre of north-west side by Nyanga, which shows average services but different from poor services displayed in 2001.

Khayelitsha has improved from average service in 2001 to good services in most part of its spatial distributions. In the north of north-west side of Fishhoek, the reflections are more than 80% of excellent services. By the northern side of Maitland in between Goodwood, there are excellent services. Equally important, the north-western part of Somerset West shows more than 80% of excellent services which shows that despite lagging on various aspects of development, there has been improvements in the service delivery of informal settlements in Cape Town from 2001 to 2011. Hypothetically speaking, it would be naive to give correlation = causation, because one will need factors that could influence the changes that has occurred in the 7 years since 2011 to 2018.



Note: The blank polygons show that the data was not collected for those areas both for 2001 and 2011 analysis

Figure 4.8: Average percentages for overall service delivery

In 2001, there was a high concentration of population densities of informal settlements pockets in and around Khayelitsha (Figure 4.9). Regardless of an increased population from 2001, it seems that service delivery came along with the high population of about 29.3% since 2001 (Census Cape Town 2001). This again, challenges the observation from the literature that, urbanisation and high population densities in formal settlements perpetuates poor service delivery. And shows the potential of urbanisation in contributing to cities' overall well-being (Avis 2016). This might be a reflection of dedicated urban planning in mitigating the issues of in-migration and rapid urbanisation. In 2001, Fishhoek shows a poor service delivery in its southern parts, and the spatial distribution of population is low. However, in 2011, Fishhoek indicates an increase of 61 to 80% of good services in high population distribution. This shows there is high population and clustering of people in Fishhoek. Hence, the high levels of spatial distribution of population densities improved sustainable livelihoods.

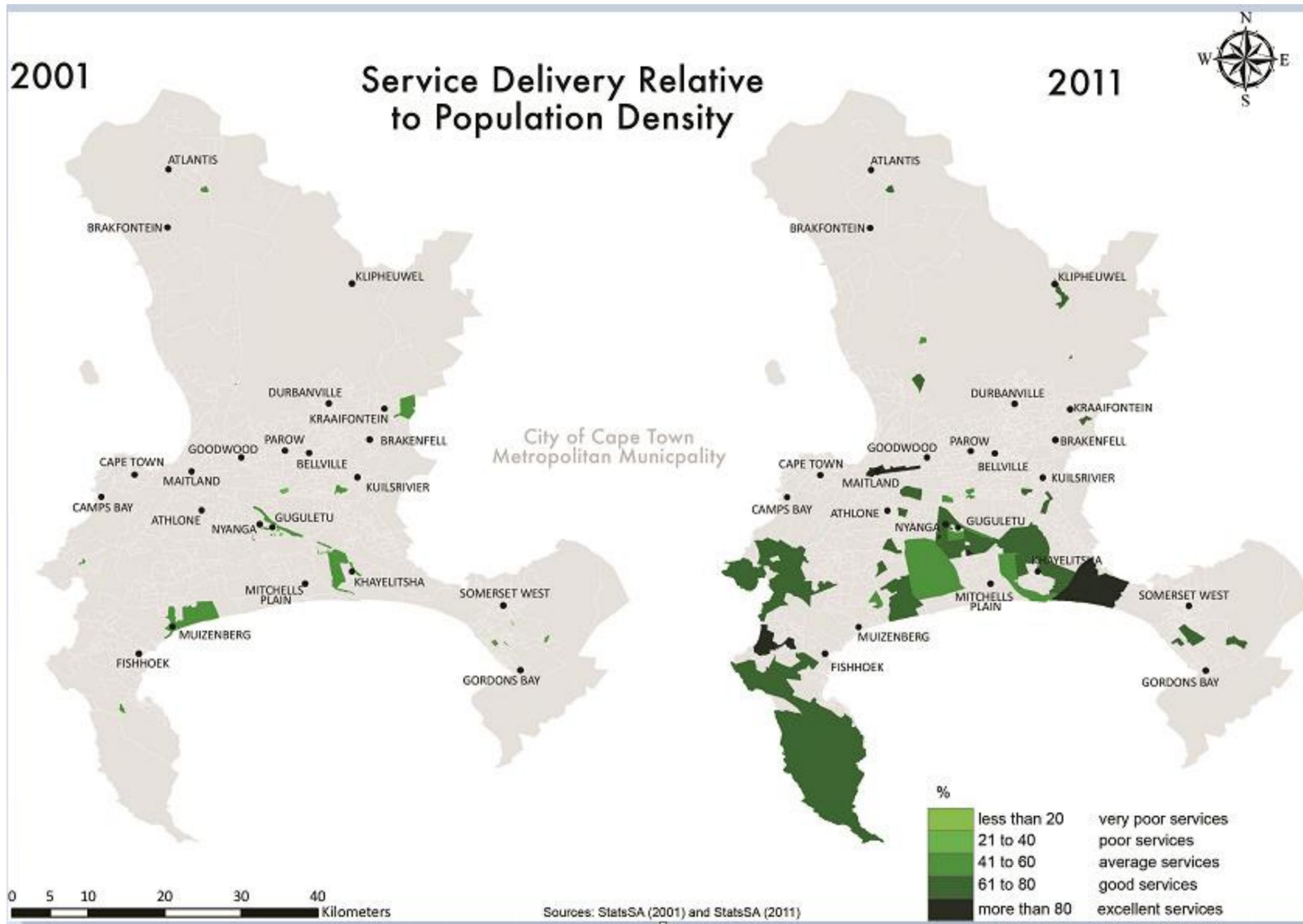
In 2011, between Camps Bay and Fishhoek, there is an area that indicates 80% of excellent services which is different from the 2001 observation, where of fewer population densities that were present were of poor quality of services. This is because the City of Cape has committed towards adopting informal settlements upgrading initiatives that will improve the quality of life and ultimately improve the sustainable livelihoods of the informal settlement dwellers. The initiatives promoted the practicality of self-responsibility through upgrading: providing formal houses, re-blocking and improving public space as well as providing for social services. Over 493 households benefited since 2001 to 2009 and about 140 households in between 2010 to 2012 (Luthango et al 2016).

In 2001, Kraaifontein reflects rather a medium distributional population densities in comparison to Muizenberg and Khayelitsha (Figure 4.9). Moreover, in 2001, Muizenberg also reflects high population densities with poor services (Figure 4.9). However, in 2011, the spatial distribution of population densities slightly decreased in Kraaifontein (Figure 4.9). This reflects an increase in sustainable livelihoods from 2001 to 2011, where there is a shift from high population with poor services towards low population with good services. This might be that, people improved in their livelihoods in terms of education and employment and then moved into other bitterly survived areas, while the remaining got an opportunity to be well provided. It is essential that the people take responsibility in collaboration with the government in terms of managing and monitoring urbanisation in a manner that benefits livelihoods as opposed to regressive urban influxes, as explored in the literature. On the other hand, in 2001, between the western parts of Bellville and Kuilsrivier there was a small distribution of population densities in informal settlements, also with poor services (Figure 4.9). And a very small reflection of informal settlements' population distribution in Fishhoek as well as along in between the eastern parts of Somerset west and Gordons Bay, which all displayed

poor services (Figure 4.9). There was a fewer population distribution in the Northern part of Atlantis and the western part of Camps Bay, which both reflect poor services (Figure 8.4). In 2001, most of these distributional population densities display the range between very poor services to poor services (Figure 4.9).

Similar to 2001 and 2011, the spatial distribution of population was low in Bellville west, services indicates poor conditions between 21 to 40% from 2001 to 2011 (Figure 4.9). In relation to influxes, there is a clear indication that people are not interested in in-fluxing the Bellville west side due to its slow growth and poor service delivery within 2001 and 2011, respectively (Figure 4.9). This observations might prove the infrastructural and locationality constraints that are faced by the government when dealing with informal settlements (Clark et al 2016). Furthermore, this might be indicate that the Bellville government proves to be reluctant of the living conditions of informal settlements dwellers, thus pushing them away from further occupying the space. However, in 2011, between the north-western part of Somerset West and eastern-south of Khayelitsha, there are highly clustered population densities with more than 80% excellent services (Figure 4.9). This shift is dramatic from 2001 north-western side of Somerset West which reflects almost no population densities in its north-western side (Figure 4.9).

Atlantis, has in both 2001 and 2011 remained with low population densities (Figure 4.9). While, Camps Bay has increased in population densities from 2001 to 2011 and reflects good services (Figure 4.9). The results show that changes in spatial distribution of population densities of informal settlements in Cape Town from 2001 to 2011 does not merge with the rate at which service delivery is provided (Figure 4.9).



Note: The blank polygons show that the data was not collected for those areas both for 2001 and 2011 analysis.

Figure 4.9: Service delivery in relative to population density informal settlements in Cape Town from 2001 to 2011

4.8 Comparing the changes in the sustainable livelihood of informal settlements in Cape Town from 2001 to 2011 through ANOVA analyses

The ANOVA, a phrase that comes from ‘Analysis of Variance’, is a statistical method used to test differences between two or more group means in a sample. For the purpose of this study ANOVA was used to determine if statistically significant changes have occurred for the average percentage of indices of water (2001 to 2011), energy sources for cooking (2001 to 2011), sanitation (toilet) (2001 to 2011), and refuse removal (2001 to 2011), in income (2001 to 2011), and employment (2001 to 2011). A t-test was also used, it is a hypothesis test that is used to compare the means of two populations. A t-test hypotheses of >0.05 rejects that there was no significant changes in the sustainable livelihood of informal settlements in Cape Town, because changes in service delivery did occur within 2001 and 2011. However, for the refuse removal index, there was no significant change. This may be because of the urbanisation and immigration which has posed a backlog on sanitation provisioning in informal settlements in Cape Town (Chaoia at al 2009; Huchzermeyer 2008).

Based on the sustainable livelihood index calculated through an ANOVA analyses, there was an increase in the sustainable livelihood from 2001 to 2011. Sustainable livelihood increased from 0.47 in 2001 to 0.68 in 2011. This contradict some of the reports from the literature, that the informal settlements of Cape Town have worsened and the City of Cape Town is failing to provide essential amenities for the informal settlements dwellers. For example, Levy (2018) has reported about the City of Cape Town’s failures to invest in informal settlements by stating that, “*Committee Chairperson Ms Nocawe Mafu told the delegation to return in one week with a comprehensive report explaining why Cape Town ranks lowest out of the eight metros considered in a report on spending of USDG allocations. The committee was told by the department’s Director-General that the city has spent only 25% of the allocated grant*”. To further substantiate the allegations and observations that are contrary to the observed results, that the City of Cape Town has not been doing well in supporting its informal settlements, Payne (2018), reported “*The National Department of Human Settlements admitted in Parliament this week that it has largely failed the residents of Cape Town’s informal settlements, especially when it comes to service delivery. The Portfolio Committee also heard that R100 million set aside for upgrading basic services in these areas had not been spent. The main problem according to Director-General Mbulelo Tshangana was a breakdown in cooperation between the national and provincial human settlement departments and the local metros and municipalities*”.

On the other hand, the Western Cape government claims to have been on the lead when it comes to service delivery. This is because the government of Cape Town in comparison to cities from other

provinces, have invested itself into being politically stable, developed clear planning frameworks in order to address the needs of its residents continuously and to be fiscally sustainable (Western Cape Government 2018). The City of Cape Town has been reportedly standing up against corruption of all norms because the people who suffer the most from the stolen and misused resources are children, women and the disabled (Western Cape Government 2018). However, Goodman (2018) has reported that the end of apartheid was supposed to be the beginning, yet liberation is costing the informal settlements' dwellers their health given the observed state of service delivery. Though, the results show that the living conditions have improved since 2001 to 2011. This also shows that due to the unforeseen circumstances, there is still a wide scope that is yet to be covered in terms of sustainable livelihood in informal settlements (Goodman 2018).

4.9 Water Index 2001 to 2011

There was an increase in water service provisioning in informal settlements of Cape Town within 2001 to 2011 (Figure 4.10 and Table 4.1). According to the City of Cape Town (CoCT) (2001), it is reported that water supplied to all communities including the informal settlements is deemed potable and accessible in the forms of piped water system inside the dwelling, inside the yard and outside from the access point (CoCT 2001). It is also reported that the household of 98.7% had access to piped water inside and outside the yard (CoCT 2001).

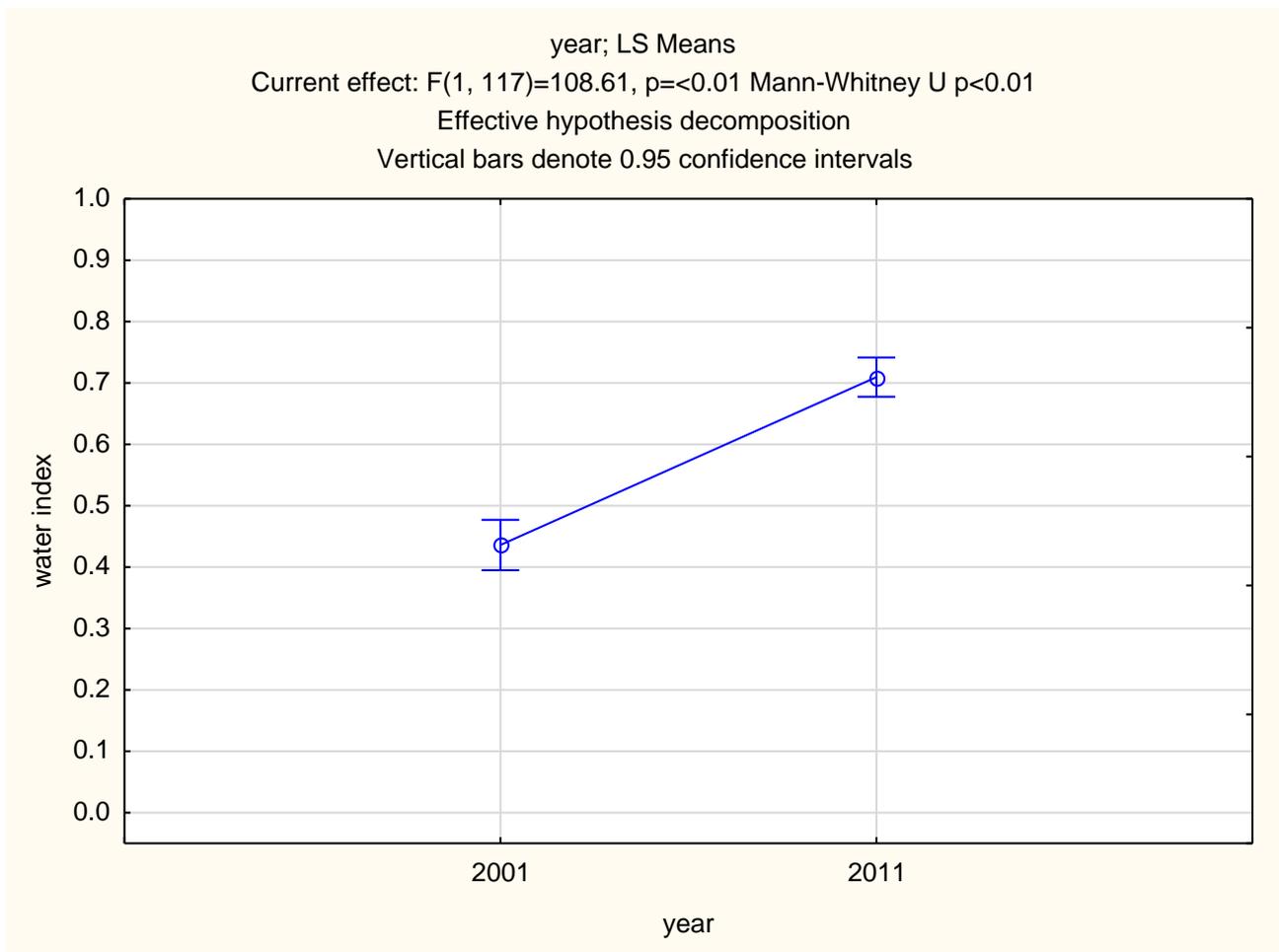


Figure 4.10: Water index from 2001 to 2011

Table 4.1: Descriptive Statistics of water index from 2001 to 2011

Effect	Descriptive Statistics (combined in service delivery.stw)			
	Level of Factor	N	water index Mean	water index Std.Dev.
Total		119	0.61	0.19
year	2001	45	0.44	0.16
year	2011	74	0.71	0.12

Note: This table represents the means as shown on the graph with standard deviation

4.10 Energy index from 2001 to 2011

There is an increase in the energy provisioning of informal settlements in Cape Town from 2001 to 2011 (Figure 4.11 and Table 4.2). This may be credited to the City of Cape Town's commitment to ensure that its residents have access to ESKOM electricity without perpetuating illegal electrification.

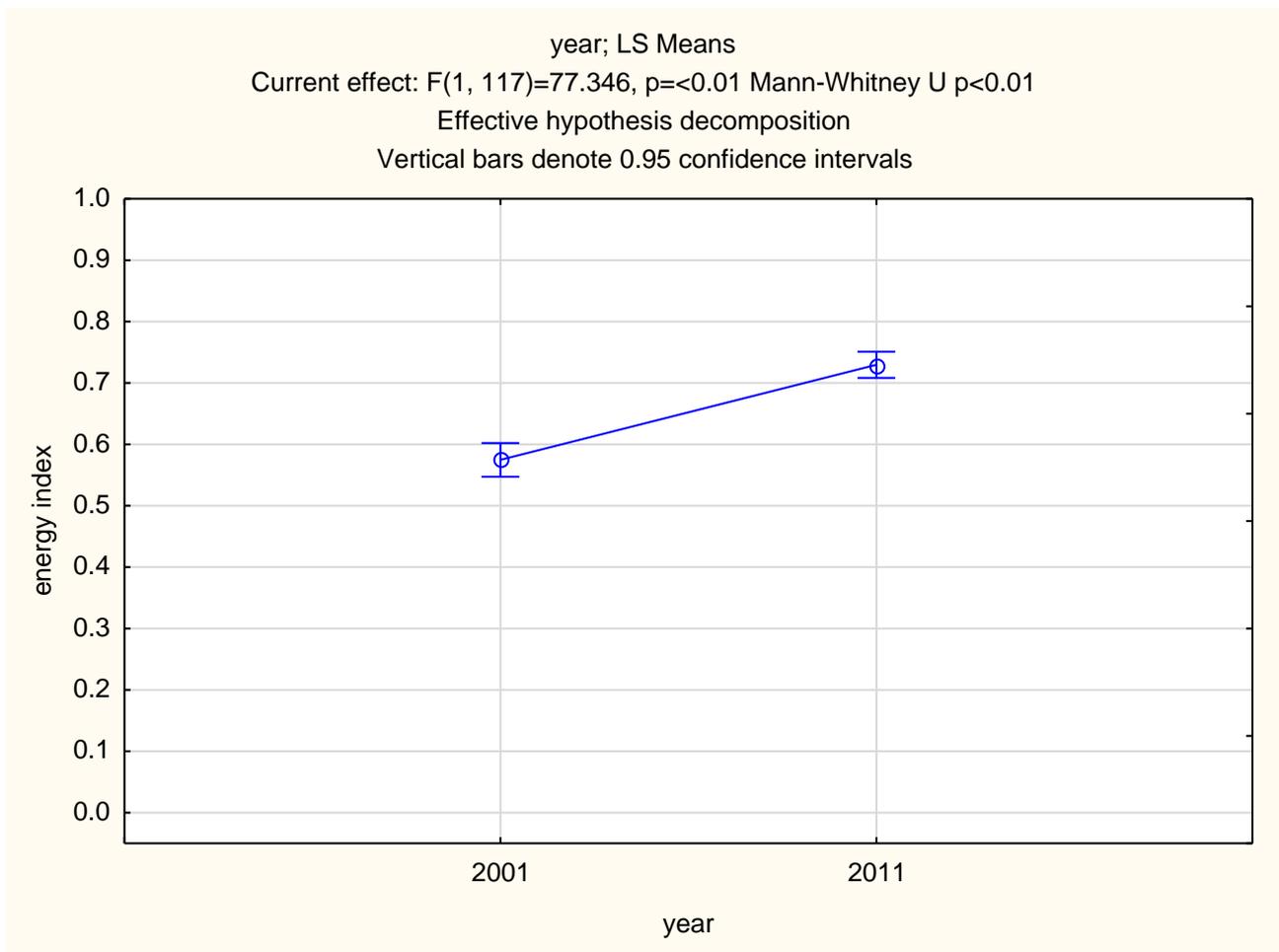


Figure 4.11: Energy index from 2001 to 2011

Table 2.2: Descriptive statistics of energy index from 2001 to 2011

Effect	Descriptive Statistics (combined in service delivery.stw)			
	Level of Factor	N	energy index Mean	energy index Std.Dev.
Total		119	0.67	0.12
year	2001	45	0.57	0.07
year	2011	74	0.73	0.1

Note: This table represent the means as shown on the graphs with standard deviation

4.11 Sanitation index from 2001 to 2011

There is an increase in sanitation between 2001 and 2011 (Figure 4.12 and Table 4.3). There is a dramatic increase this may be due to having adopted the Basic service policy since 2001, in order to ensure that all spheres of South African government abide with the rights to basic amenities in all municipalities. Also, before Cape Town experienced the dramatic drought, water availability enabled the provision for sanitation where location and topography were not limitations.

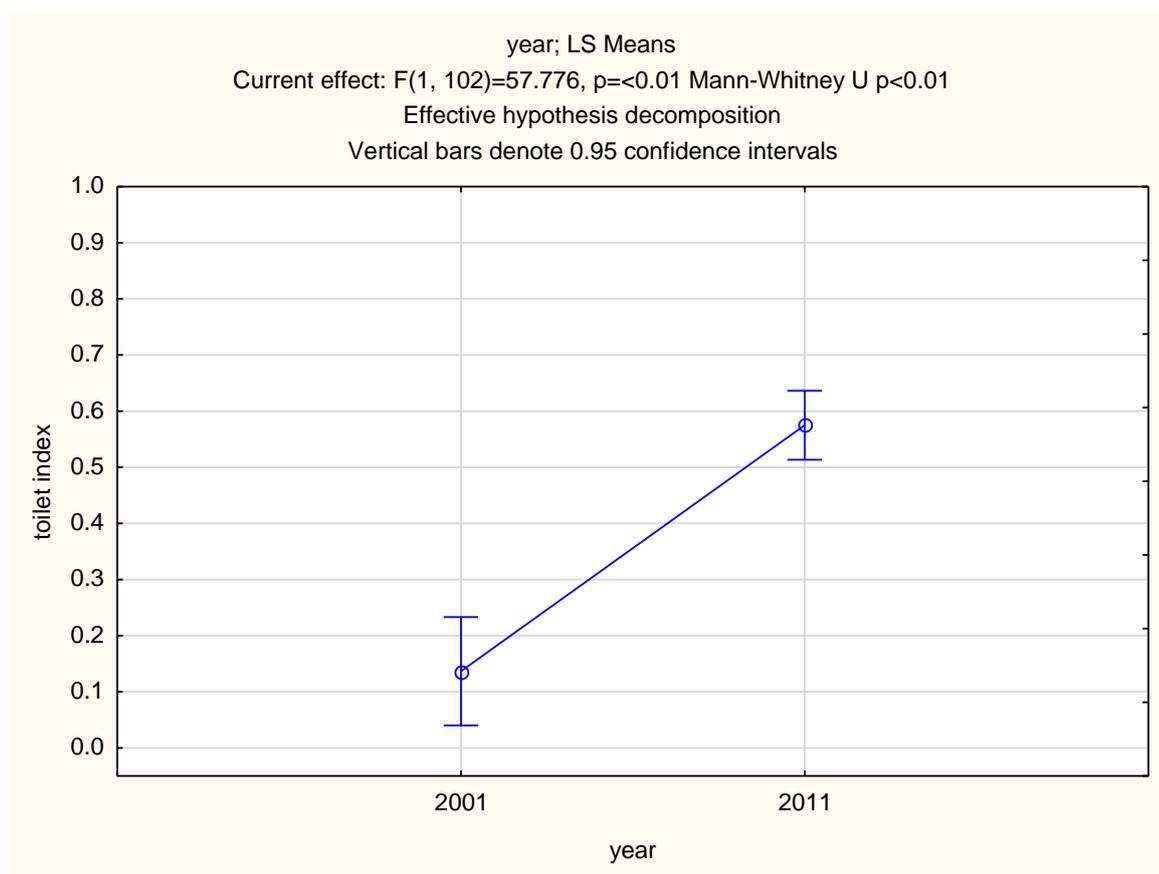


Figure 4.12: Sanitation (toilet) index from 2001 to 2011

Table 4.3: Descriptive statistics for sanitation index from 2001 to 2011

Effect	Descriptive Statistics (combined in service delivery.stw)			
	Level of Factor	N	toilet index Mean	toilet index Std.Dev.
Total		104	0.45	0.33
year	2001	30	0.14	0.1
year	2011	74	0.57	0.31

Note: This table represent the means as shown on the graphs with standard deviation

4.12 Refuse removal index from 2001 to 2011

There was no significant increase in refuse removal between 2001 and 2011 (Figure 4.13 and Table 4.4). As observed from the literature in chapter 2, that the city of Cape Town has committed itself into addressing waste removal related issues, cleaning the environment in informal settlements, by increasing its allocated budget by 112% towards waste management since 2006/2007. However, the observation is that there has been no significant change in the refuse removal index of informal settlements in Cape Town within 2001 and 2011.

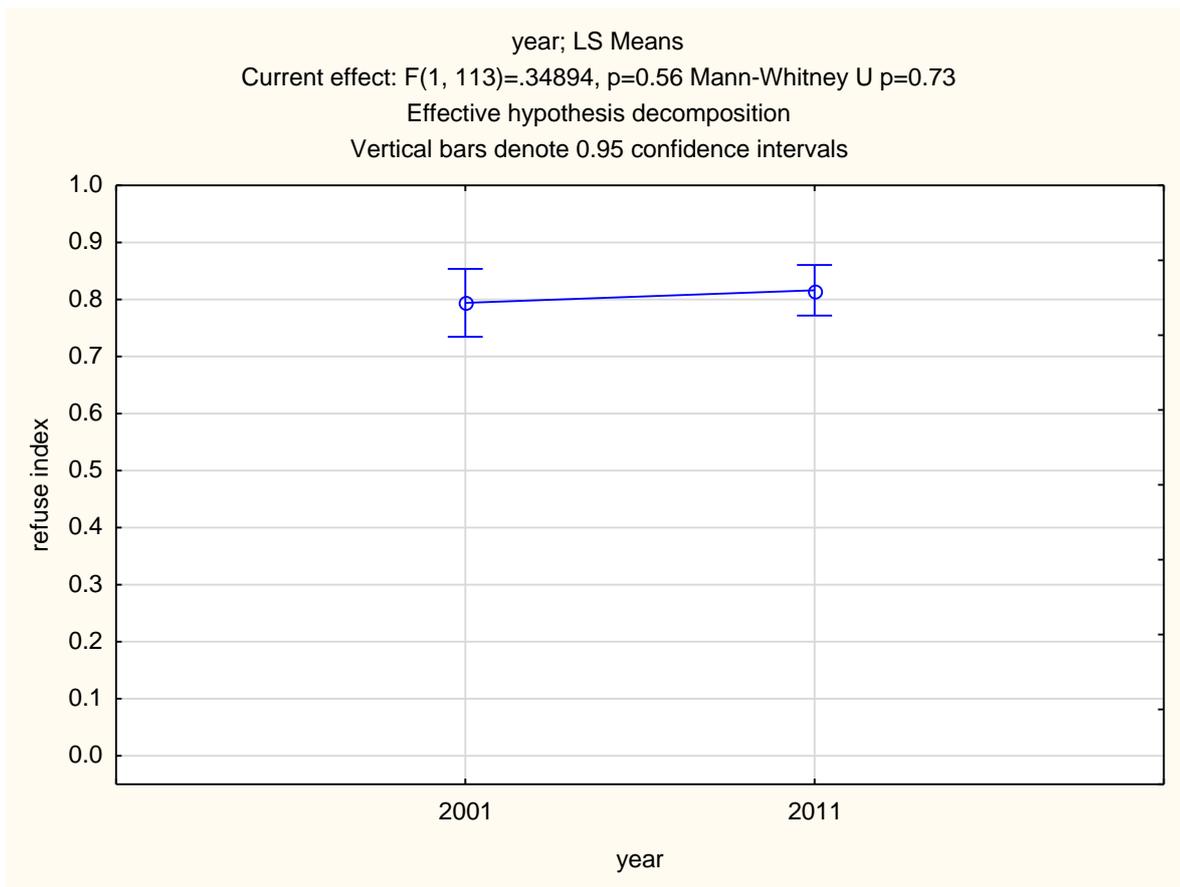


Figure 4.13: Refuse removal index from 2001 to 2011

Table 4.4: Descriptive statistics of refuse removal index from 2001 to 2011

Effect	Descriptive Statistics (combined in service delivery.stw)			
	Level of Factor	N	refuse index Mean	refuse index Std.Dev.
Total		115	0.81	0.19
year	2001	41	0.79	0.24
year	2011	74	0.82	0.16

Note: This table represent the means as shown on the graphs with standard deviation

4.13 Employment Index from 2001 to 2011

According to the display of Figure 4.14 and Table 4.5 it shows that there is an increase of employment from 2001 to 2011. This might have been caused by an increase in education levels which affected decision making about life choices with positive return investment of life betterment. The government of Cape Town has shown an interest in youth development programs for job creation through self-responsibility initiatives.

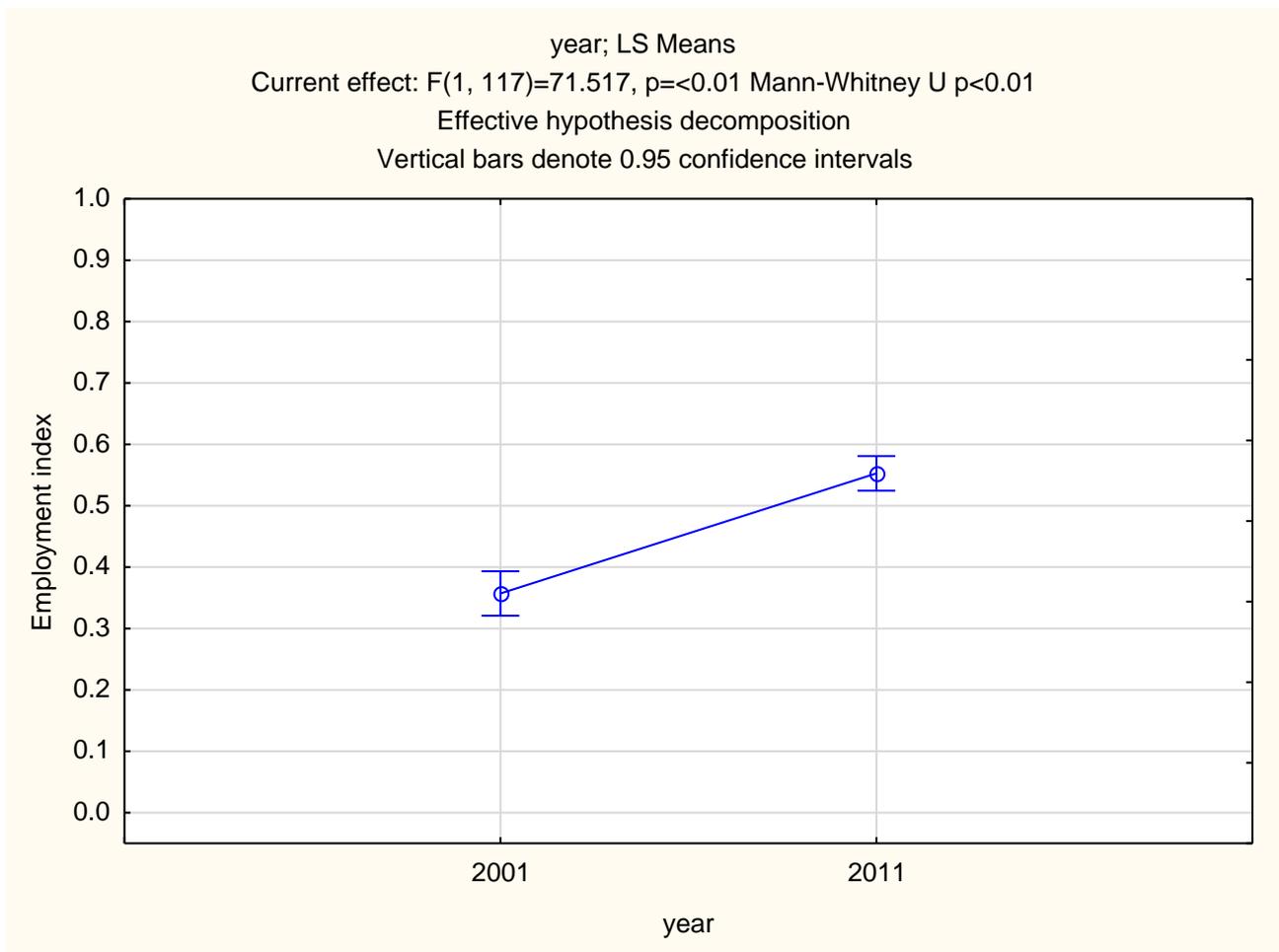


Figure 4.14: Employment index from 2001 to 2011

Table 4.5: Descriptive statistics of the employment index from 2001 to 2011

Effect	Descriptive Statistics (combined in service delivery.stw)			
	Level of Factor	N	Employment index Mean	Employment index Std.Dev.
Total		119	0.48	0.15
year	2001	45	0.36	0.13
year	2011	74	0.55	0.12

Note: This table represent the means as shown on the graphs with standard deviation

4.14 Sustainable livelihood index from 2001 to 2011

There is an increase in the sustainable livelihood of informal settlements in Cape Town (Figure 4.15 and Table 4.6). This indicates that the aspects of spatial distributional patterns of population densities, service delivery and economic conditions have shown a positive response in terms of livelihood of informal settlements in Cape Town from 2001 to 2011.

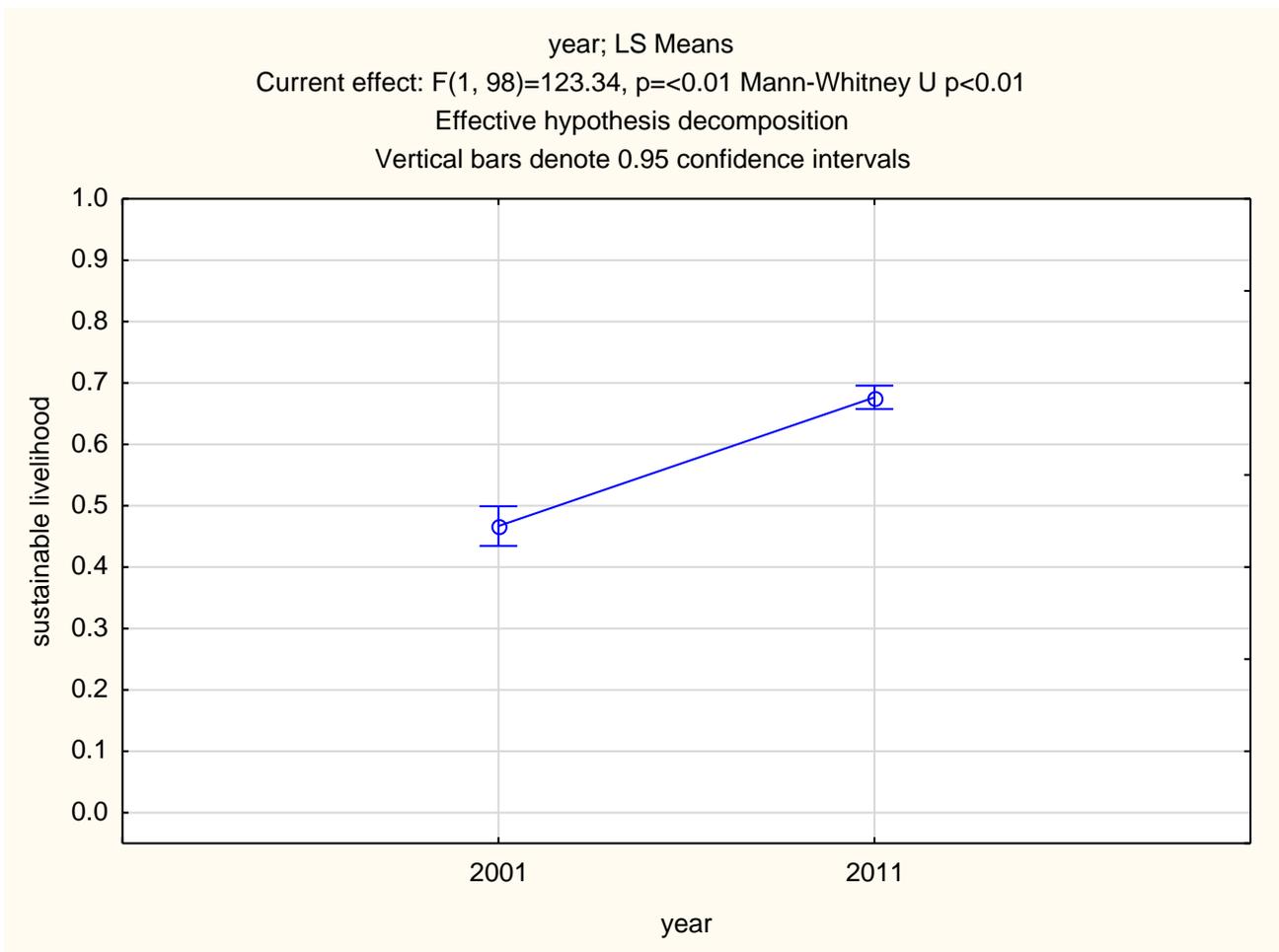


Figure 4.15: Sustainable livelihood index from 2001 to 2011

Table 4.6: Descriptive statistics of the sustainable livelihood index from 2001 to 2011

Effect	Descriptive Statistics (combined in service delivery.stw)			
	Level of Factor	N	sustainable livelihood Mean	sustainable livelihood Std.Dev.
Total		100	0.62	0.12
year	2001	26	0.47	0.08
year	2011	74	0.68	0.09

Note: This table represent the means as shown on the graphs with standard deviation

4.15 Overall Basic Service index from 2001 to 2011

The service delivery aspect comprises the variables of water, energy sources for cooking, sanitation (toilet) and waste removal from 2001 to 2011 (Figure 4.16 and Table 4.7). Statistically significant changes were determined in terms of all the service delivery variables ($p < 0.01$) with an exception of refuse removal where ($p = 0.56$) is larger than 0.5. This indicates that the refuse removal did not increase, it might have been already good by 2001 or might have been affected by factors of increased

population. However, there an overall indication of the increase of service delivery of informal settlements in Cape Town from 2001 to 2011.

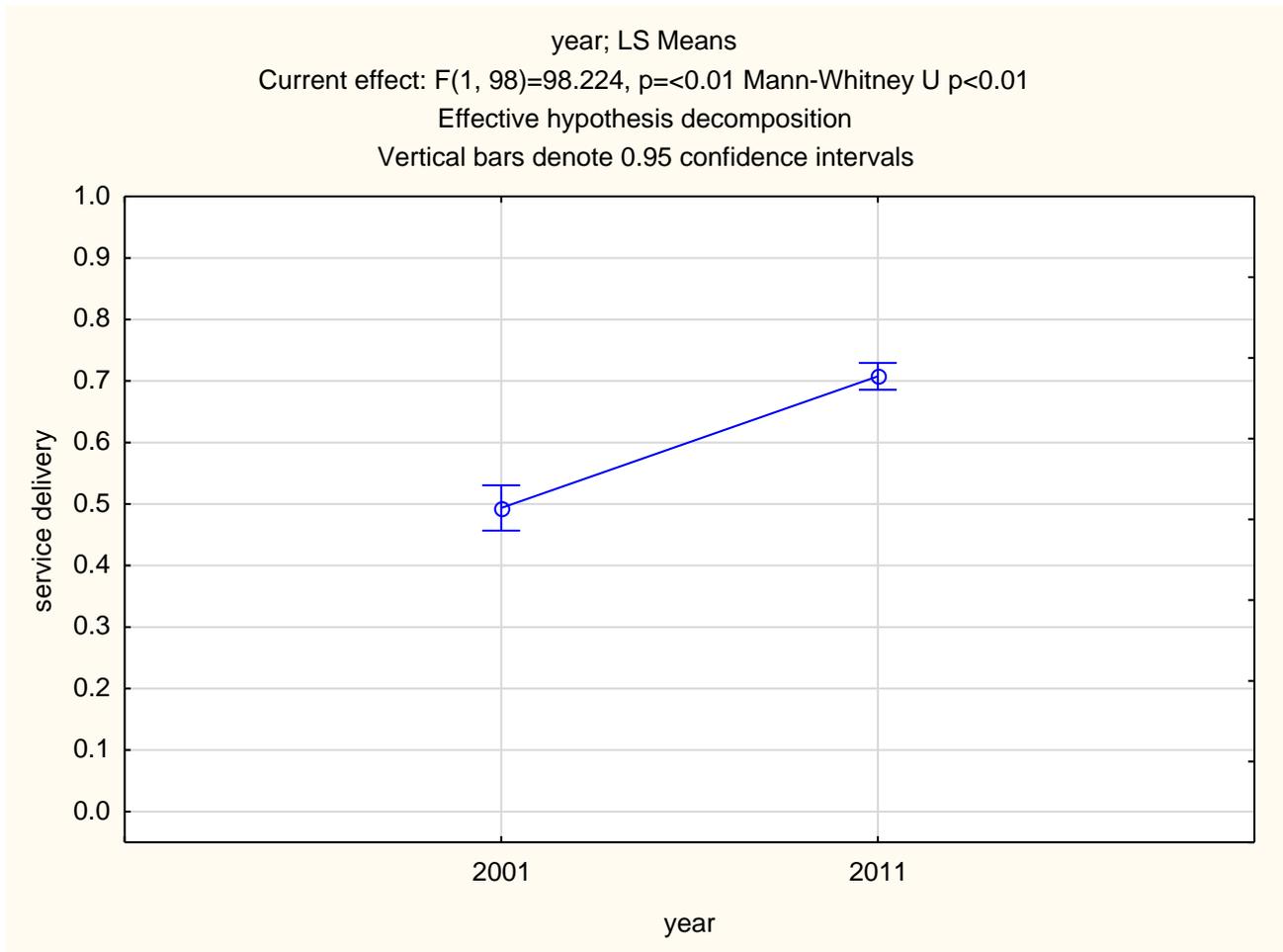


Figure 4.16: Overall Basic Service delivery variable index from 2001 to 2011

Table 4.7: Descriptive statistics for overall Basic Service delivery index from 2001 to 2011

Effect	Descriptive Statistics (combined in service delivery.stw)			
	Level of Factor	N	service delivery Mean	service delivery Std.Dev.
Total		100	0.65	0.13
year	2001	26	0.49	0.09
year	2011	74	0.71	0.1

Note: This table represent the means as shown on the graphs with standard deviation

CHAPTER 5: CONCLUSIONS AND POLICY IMPLICATIONS

5. CONCLUSIONS

Since the apartheid transitions from an exclusive planning and spatially unjust system of development, policies have been then designed to reflect an inclusive and integrated urban environment (Musvoto et al, 2016). Attempts to redress spatial injustices in order to include the informal settlement into a spatially cohesive urban space includes the commencement of a White Paper: A New Housing Policy and Strategy for South Africa in 1994 (White Paper, 1994). Historically, the White Paper was the first policy document that includes all its citizens in its planning and processes for housing delivery as well as in initiatives towards inclusive economy generation (White Paper, 1994). It has envisioned to create an enabling environment for economic growth that would steer up social order in terms of housing provision so to restore the dignity of the South African citizens especially the previously disadvantaged. However, the White Paper Housing Policy and Strategy for South African development did not incorporate the elements of sustainable livelihoods as an integral part or point of departure for housing planning and delivery (Ramashamole, no date). Therefore a White must adopt Goal 11 of the SDGs and ensure to collaborate with the vision of the National Development Plan Chapter 8, in order to coherently address issues of urban housing and informal settlements in South Africa.

Unregulated population growth and lack of future planning predictions, as well as lack of infrastructural investment for incremental urban growth puts weight on government in terms of dealing with informal housing. Whether South Africa can reimagine beyond the current state of informal settlements towards a sustainable infrastructure, inclusive economy, democratic governance and just spatial form is also depended on the implementation of the available policies based on critical assessment of their viability and political will. Thus, the available instruments for urban planning in relation to informal settlements such as the informal settlements' upgrading programme must be effectively implemented in wider scope of all informal areas in Cape Town. In places where this initiative have been implemented, remarkable changes have been observed. Therefore, it must be manifested in all other informal settlements areas such as in Bellville South informal settlements which have witnessed poor services between 2001 and 2011 in service delivery and economic improvement.

Watson (2009) states that the manner in which urban planning has been approaching the urban poor who are characterised by lack of access to adequate housing, impoverished service delivery and

governed by weak institutions, must be reviewed in order to explore the possibilities of an inclusive and just spatial planning. Urban planning is identified as a key role player by the UN-Habitat and responsive rather than reactive mechanisms must be employed (UN-Habitat 2006). Agents of urban transformative change all around the globe and in South Africa, Cape Town, suggest that the 'local communities' or 'market' must look past the mentality that conventional methods will serve as corrective mechanisms to solving unequal distribution of spatial densities, poor service and regressive economic growth (Watson 2009; UN-Habitat 2006). Urban planning has a fundamental role in redressing the major urban issues of poverty and urbanisation without sweeping or hiding the poor away, as also part of a response to environmental sustainability (Watson 2009; UN-Habitat 2006). In terms of addressing rapid urbanisation it is essential to activate regional economies, invest infrastructure that will allow for economic opportunities and prosperity within sub-regions and rural areas (Huchzemeyer 2008).

As observed that South Africa is known by her good policies yet without effective implementation (Muller 2016). It is not enough to draft policies, rather more focus should be emphasised on the practicalities of solutions for the informal settlements' dwellers by holistically and constructively addressing the issues of security of tenure; and availability of land as well and enhancing education as well as socio-economic stability (Piertese 2009). Good and democratic governance with effective monitoring and evaluation processes must become a norm at every sector and sphere of government in order to ensure transparency and accountability (Piertese 2009). Thus there is a sense of urgency in terms of moving from policy to action, planning with people for the people (Muller 2006; Piertese 2009).

Monitoring changes in demographic trajectories with regards to urbanisation as one of the main contributors to unregulated urban informal settlement growth, is paramount in order to align planning policies with the context and time (Ruhiiga 2014; Watson 2009). The inter and intra urban and rural dynamics must be considered when measures for urban planning practices in informal settlements are employed, in order to create an interface and mend urbanisation rates through infrastructure that will encourage people to dwell in their places of origin (Ruhiiga 2014).

Based on the reality that the informal settlements' dwellers depend on the informal economy, potentially, the fulfilment of informal settlements' dwellers needs is reliant on the functionality of proper roads and subsistence agricultural activities, to mention but a few (Demographics and socio-economic status 2017). In order to adequately address these needs, the availability of detailed data is crucial so that population's income and spatial planning can be provided based on informed context

(Demographics and socio-economic status 2017). In terms of land policies, all spheres of government should implement an integrated housing, transport, economic and social municipalities' amenities plan as a proactive response to urban influxes especially in metropolitan areas. With regards to densification and corridor infill development, more vacant land should be occupied with property next to roads for easy access for the low income population (Demographics and socio-economic status 2017). The government in collaboration with the private and non-government organisations should invest in rural development, accelerate sustainable infrastructure in order to activate sustainable economies (Demographics and socio-economic status 2017). The role of local government should be revisited by for instance, directly transferring housing subsidies to them, identifying need for operational funding to match capital grant portion of housing subsidy requiring them to invest in community infrastructure and facilities for long term development of rates base & capacity to sustain free basic services (Muller 2016).

5.1 Interventions

South Africa is governed by the supreme law of the land- the Constitution of the Republic of South Africa 1996 (South Africa 1996). This means that there is no valid operations that takes place outside the constitution. The constitution must promote, fulfil and protect the three sets of generational rights that are stipulated. It is essential that all other mechanisms and form of interventions in informal settlements and urban housing are those that abide with the (i) the protection of (ii) fulfilment and, (iii) promotion of the republic's generational rights, to for example, chapter 2 of the Bill of rights (Muller 2016). Citizens must take charge of their right to participation in decision making (Huchzemeyer 2008; Muller 2016).

It is proposed that the National Development Plan (NDP 2012) aligns its objectives and practical tools with those of the United Nations Agenda for 2030 of sustainable development goals. Especially the urban housing sustainable development goal 11 must be directly aligned with chapter 8 of the NDP 2030 vision in order to collaborate with practical global solutions without being imperialised. South African systems of planning must adopt flexibility in order to accommodate its current volatile urban planning environment. It must change from being technocratic into being responsive and self-defined.

The UIDF has nine levers of development at the national level to serve as a directive to the NDP 2030. The South African national government of urban planning have constructed a policy framework known as the Spatial Planning and Land Use Management Act of 2013 (SPLUMA). SPLUMA has five principles of (i) spatial justice (ii) spatial sustainability (iii) good administration (iv) efficiency

(v) spatial resilience. These principles provide for a flexible environment for urban planning at provincial and local level. There must be a compiled document that aligns all the objectives, tools, mechanisms and plan of actions accordingly.

The Breaking New Ground intended to provide guidance for housing development over the next five years since 2004 to 2009 by accelerating housing delivery as a key directive for combating poverty. Some of the objectives and intentions of the BNG included: to create job opportunities through housing provisioning; increase access for property rights to maintain wealth and empowerment across different socio-economic status; promote the upgrading of informal settlements and facilitate affordability of social housing market. The BNG has faced constraints during its course of existence which provide a gap for monitoring and evaluation and re-implementation. The constraints within the housing system are inadequate resources for urban and housing development; lack of integration with other long term housing plans; knowledge gap from the grass roots and access to appropriate housing credit.

At local level, the local government must revise their zoning schemes towards addressing issues of splintered and informal urbanism. There is a requirement for co-operation through integrated developmental policies that enhance capacity for appropriate housing delivery. Furthermore, there must be an enablement of land availability for the development of long terms housing and human settlement plans based on effective policies and processes. It is paramount to redirect capital investment into urban and housing development in order to overcome the legacy of spatial exclusion and support sustainable livelihood by bridging the gap market. In terms of inclusionary housing: policy required in SPLUMA Sect 21(i): Municipality must identify designated areas for inclusionary housing in their SDF; Schedule 1 (h): Provincial legislation must provide measures regarding the approval of a development application which requires the use of land for inclusionary residential and economic purposes, subject to any national policy. All spheres of government must ensure the incorporation and implementation of SPLUMA (2013).

Development should be interdependent in a sense that energy provision should also complement the service delivery of other aspects such as healthy water, consistent removal of water and adequate sanitation. Hence, adequate housing is a good place to start off with, instead of treating the symptoms, rather diagnose the issues of land availability, locationality and topography through collaborative governance that acknowledges the multifaceted nature of rationalities involved in planning and implementation of service delivery (Taing 2015; Watson 2003).

5.2 Upgrading of informal as a current alternative

The Upgrading of Informal Settlement program aims to also increase the efficiency and effectiveness of land utility, increase urban densities and decreases segregation while the modernist traditional urban planning expertise overlooks these factors when sweeping the poor away from the so called ‘informal settlements’ (Huchzermeyer 2006). As stated by (Herrle & Fokdal 2011) that what if the informality of the global south is not a failure of but a resistance against the western modernised ways of planning and the issue at hand is to find more sustainable mechanisms to make the ‘informality’ adequate and liveable. Currently, the responses to informality in the aspects of housing and even the economy do not effectively capture the complexity and connectivity of different sectors and has not received compassionate attention from legal practitioners, urban planners as well as the government in charge of national, provincial and local development (Herrle & Fokdal 2011).

On-site upgrading of informal settlements ensures that people are maintained within the places in which they can work in close proximity, preserves social cohesion as well as the improvement of service delivery such as clean energy for cooking, potable water, refuse removal, toilet facilities. During the process of upgrading job opportunities are created which in turn influences the employment rate, income per houses and gender roles as some woman are now prioritised in building and construction. Attempts to rationalise the logical set up, sizes must be made because many informal houses are built without proper plans. Therefore, aided self-help and short course education is essential (McCarthy 1988).

Evidently, informal settlements serve a contested perception in cities-physically, legally and socio-economically. Government officials are trapped between responding to real human needs (Maslow 1943, hierarchy of human needs such as psychological needs, and security and universal rights such as community and access to livelihood) and serving the agenda of global competitiveness as per instructions from the top technocratic orders. Mostly, the perpetual nature of informal settlements through land invasion is influenced by human needs rather than market processes that is controlled by the formal urban development agenda. The government must leave a room for mind-set and reskilling as well as capacity building needed by those dealing with informal settlements on ground level (Huchzermeyer 2006).

A lesson learnt from cases of informal settlement upgrading from Gauteng are that the terminology such as 'life threatening epidemics' or 'zero tolerance' used to define the informal settlements has a potential to determine how they are treated by the government. The technocratic and formalised ways of dealing with informal settlements deepen the spatial inequality and re-embed the repressive apartheid planning system that segregates the poor. The Upgrading of Informal Settlement Program is not necessarily an advocate for promoting informal settlements rather a positive and dignifying response to the given circumstances of informal perpetual nature in unique contexts.

More research needs to be conducted with regards to the impact that the nexus between rapid urbanisation and spatial distribution of population densities, service delivery, and socio-economic condition has in relation to the increase in informal settlements in Africa, South Africa and particularly in Cape Town (Huchzermeyer 2006). It is essential to merge research of poverty increase with the detriment that it has on urban sustainability in terms of determining sustainable livelihoods and also be used to review the historical transitions of informal settlements (Mutisya 2011).

5.3 Data limitations and recommendations for future research

The blank polygons below each thematic map show that, the data was not collected for those areas for both the 2001 and 2011 analysis. There was a limitation in terms of accessing all the required data for those areas that are not captured under the thematic maps, though the current is enough to provide for interpretations. It is recommended that one gathers all their sources from which they will extract their data as soon as they realise their passion of research. This will avoid wasting time, money and energy. It is recommended that the study is continued in order to find out what has happened in the sustainable livelihood of informal settlements in Cape Town since 2012, upwards and incorporate elements of for examples, addressing splintered urbanism and how it should be approached.

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