

University of KwaZulu-Natal

**Understanding the Complexities of Spontaneous
Settlements Emerging in Close Proximity to Landfill Sites:
A Case Study of Kennedy Road settlement, EThekweni
Municipality**

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2014

**Understanding the Complexities of Spontaneous Settlements Emerging in Close Proximity to
Landfill Sites: A Case Study of Kennedy Road settlement, EThekweni Municipality**

By

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**A short dissertation submitted in partial fulfillment of the academic requirements for the degree
of Master of Town and Regional Planning in the school of Built Environment and Development
Studies, University of KwaZulu-Natal**

DURBAN

2014

Declaration

This thesis is a presentation of my original research work. Wherever contributions of others are involved, every effort is made to indicate this clearly, with due reference to the literature, and acknowledgement of collaborative research and discussions

This work was done under the supervision of Mrs Ojo-Aromokudu. This work was submitted in partial fulfilment of the academic requirements for the degree of Master of Town and Regional Planning in the school of Built Environment and Development Studies, University of KwaZulu-Natal.

Student Name and Surname

Date

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I would also like to thank those whose names are not mentioned here; I have not forgotten your assistance.

TO GOD BE THE GLORY

Dedication

I dedicate this dissertation to my beautiful mother, Mahlodi Mogano who raised me to be the woman I am today. Her love and support brought me to this level. I am truly grateful and I thank the Almighty God for blessing me with her.

Ke re “ke leboga lerato le thekgo ya gago wena phejane ya Maseakwala, tema ya gao o ye kgathile bophelong bjaka. Ke tla dula ke le motlotlo ka goba le motswadi wa go swana le wena. Modimo a go etelle pele matsatsing a gago a bophelo”

Abstract

This study adopted both the qualitative and quantitative research approaches to understand the complexities of spontaneous settlements emerging in the proximity of landfill sites using the Kennedy Road settlement as a case study because of its proximity to the Bisasar Road Landfill site; both the settlement and the landfill site are located within the EThekweni municipality. Spontaneous settlements are a common phenomenon in South Africa and have become part of the urban landscape. The dynamics influencing the location of spontaneous settlements to risky areas like landfill sites have not been adequately examined in literature; therefore, this study aimed to investigate the realities of the Kennedy Road settlement with a broader view of bringing insights for a progressive planning approach that accommodates urban home seekers. The study found that, while Kennedy Road, in common with other spontaneous settlements in South Africa, lacks basic services and infrastructure, the settlement is also highly exposed to the harmful effects of the landfill including, amongst many other factors, dust, bad odours and noise. The study also found that the main factor that influences the emergence and continuous growth of spontaneous settlements in South Africa is convenient and easy access to urban environments that offer many opportunities such as employment and housing on urban landscapes at very low costs.

Keywords: Spontaneous Settlement, Landfill Site, Buffer Zone, Solid Waste

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List of Acronyms

(EPA) - Energy Information Administration

(GAIA) - Global Alliance for Incinerator Alternatives

(GAMA) - Greater Accra Metropolitan Area

CRU – Community Residential Unit

IDP – Integrated Development Plan

KZN – KwaZulu-Natal

MSW – Municipal Solid Waste

NEMWA - National Environmental Management: Waste Act

SDF – Spatial Development Framework

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1. INTRODUCTION AND RESEARCH METHODOLOGY

1.1. Introduction

This research study aimed to understand the complexities of spontaneous settlements emerging in close proximity to landfill sites. Landfill sites are the most prevalent method of disposing of and managing waste not only in South Africa but in many other nations across the world. While these sites differ in terms of the potential threat they pose to the environment or human health; they also differ in size and type (Moilola, 2007). In many cases, spontaneous settlements are developed on land that is vacant. In the case of this research study, a spontaneous settlement developed on a piece of land that is in very close proximity to a landfill site.

This introductory chapter presents the background to the research, the research topic, the study's aims and objectives, questions and hypothesis, and its significance and limitations. The research methodology adopted for this study is also presented. The chapter concludes with an outline of the structure of the dissertation.

1.2. Background

South Africa is a developing country that is characterised by the rapid growth of spontaneous settlements. There are a number of definitions of spontaneous settlements. Saane (2005) defines spontaneous settlements as settlements which are not surveyed, do not have proper boundaries and are illegally developed with no legal documentation of the relationship between individuals and the property they occupy. The conditions in spontaneous settlements are below acceptable living standards with evidence of severe social problems such as a lack of basic services including fresh and clean water, sanitation and education (Saane, 2005).

Ziblim (2013) notes that, the South African government aims to eradicate spontaneous settlements countrywide and replace them with formal housing. However, despite extensive delivery of subsidised housing since the advent of democracy in 1994, the rapid growth of spontaneous settlements continues. It can be argued that the slow pace of delivery of low-cost housing is the primary cause of spontaneous settlements even around hazardous locations such as landfill sites (Tshikotshi, 2009). This underlines the need for proper planning to provide housing as well as basic services and social amenities.

While the South African constitution is renowned throughout the world for its emphasis on human rights, the gap between the rich and the poor persists despite its provisions (Levy et al, 20104). This

study aims to understand the complexities of spontaneous settlements emerging in close to areas that are not ideal for habitation such as those around landfill sites, where residents are exposed to high levels of risk.

Landfill sites are designated pieces of land that are carefully selected and designed for the disposal and management of solid waste. However, they carry high costs, including adverse environmental, social and health effects (Lee and Jones-Lee, 1994). It is therefore crucial that all landfill sites have buffer zones that separate them from adjacent land uses in order to avoid or minimize these site impacts. However, landfill buffer zones are often left inactive and vacant; in the search of land for occupation by the poor urban inhabitants, landfill site buffer zones are then invaded leading to the emergence of spontaneous settlements on these pieces of land; this is a problem because living in close proximity to landfills has adverse effects on the surrounding environments and on human health.

1.3. Problem Statement

The dynamics influencing the location of spontaneous settlements to risky areas like landfill sites have not been adequately examined in literature. The present study is an attempt to investigate the realities of Kennedy Road which is a spontaneous settlement within the EThekweni Municipality with a broader view of bringing insights for a progressive planning approach that accommodates urban home seekers. Unless environmental dangers and plights of people arriving in urban areas in need of housing for occupation is adequately discussed, urban health will continue to be compromised which is not only a long term cost to the households themselves but the city at large. It is then important that factors influencing the emergence of spontaneous settlement in risky areas such as landfill sites be studied to contribute to the existing knowledge and literature.

1.4. Research Question

- a) What are the dynamics that influence the emergence of spontaneous settlements in close proximity to landfill sites?

1.4.1. Research Sub-Questions

- b) What are the costs of living in close proximity to a landfill site?
- c) Is it possible to plan for spontaneous settlements?
- d) What are the biggest challenges in eradicating spontaneous settlements?

1.5. Aims and Objectives

The main aim of this study is to understand the dynamics that influence the emergence of spontaneous settlements in close proximity to landfill sites. The study's objectives are:

- a) To determine the costs of living in close proximity to a landfill site.
- b) To establish whether it is possible to plan for spontaneous settlements.
- c) To gain insight into the major challenges in eradicating spontaneous settlements.

1.6. Hypothesis

The emergence or formation of spontaneous settlements occurs on urban land deemed to be lost or vacant spaces, whether hazardous or not, by the urban poor in their search for affordable land for their housing needs.

1.7. Significance of the Study

This study's significance lies in its contribution to finding effective and efficient ways to manage or control the invasion of landfill buffer zones. It will also inform relevant stakeholders such as the municipality, government departments and the general public on sustainable waste management, particularly landfilling. The rationale for the proper management of landfill sites together with their buffer zones is clear and well presented.

The lessons learnt from this study will suggest effective interventions to control the invasion of buffer zones resulting in the emergence of spontaneous settlements. South Africa needs to demonstrate effective commitment to deal with this crisis. The study will provide policy makers with concrete recommendations to deal with the invasion of landfill site buffer zones and spontaneous settlements. It will also contribute to the debate on environmental management, waste management and housing provision.

1.8. Scope and Limitations of the Study

One of the limitations of this study is that it was conducted in a single area, EThekweni Municipality; its findings may therefore not be applicable to other areas. Time and prevented a broader study.

1.9. RESEARCH METHODOLOGY

1.9.1. Introduction

This section describes the research methods that were used to collect data in order to achieve the study's objectives. The main aim of this study is to understand the dynamics that influence the emergence of spontaneous settlements in close proximity to landfill sites using the Kennedy Road settlement in EThekweni Municipality as a case study. A qualitative research method was used to collect data through interviews. Thematic analysis, which is a method for identifying, analysing, and reporting

patterns within data was used to reach the findings that are presented in chapter 4, the use of thematic analysis enabled the researcher to organise and describe the findings in rich detail, further allowing the interpretation of various aspects of the research topic” (Braun and Clarke, 2006: 82). The geographical location of the case study and its background are described, as well as the research design, sampling and sampling methods, data sources and the ethical considerations that have been taken into account by the researcher.

1.9.2. Research Approach and Design

The research design is important as it influences the reliability of a study’s results and conclusions. This study adopted both qualitative and quantitative research approaches. The qualitative research approach enabled the collection, description and interpretation of data that reflect different individual conceptions of the phenomenon (Balatyne and Gerber, 1994). A qualitative method aims to answer questions on the ‘what’, ‘how’ or ‘why’ of a phenomenon rather than ‘how many’ or ‘how much’, which are answered by quantitative methods. The quantitative research approach emphasized objective measurements and the statistical, mathematical and numerical analysis of data collected through surveys, allowing the gathering of numerical data which gave the researcher the ability generalise across groups of people and to be able to explain the research phenomenon (Babbie, 2010). Both research approaches allowed the researcher to obtain information from relevant stakeholders including officials from EThekweni Municipality and the KwaZulu-Natal (KZN) Department of Human Settlements and the residents of Kennedy Road settlement together with a representative from the Community Development Committee.

In-depth interviews were used in this study because they are a useful technique to collect qualitative data. The researcher included open-ended questions that enable the collection of detailed information from relatively few people (Guion et al, 2001). The interviews were self-administered by the researcher.

1.9.3. Research Setting

THE KENNEDY ROAD SETTLEMENT CASE STUDY

Background

The Kennedy Road settlement is located in EThekweni Municipality in KZN. It developed in the late 1970s and the early 1980s, attracting migrants from the countryside that were fleeing political violence during the apartheid period. The settlement is located on a steep hill and it is adjacent to a municipal landfill site called the Bisasar Road Landfill. It is also situated in one of EThekweni’s industrial areas (Ruben and Roysten, 2008).

Map 1: Base Map for Kennedy Road Case Study

Ruben and Roysten's (2008) note that the Kennedy Road settlement was a vacant piece of land before the first dwellers settled in. The residents built shacks, but there was no provision of services or any form of infrastructure. The authors add that, while the settlement is overcrowded and densely inhabited, this did not stop the community from maintaining communal spaces for activities such as sports and for community meetings to discuss issues that concern the community at large. Other community spaces have been set aside for religious purposes. Ruben and Roysten (2008) note, that, Kennedy Road's location has attracted large numbers of people, resulting in expansion of the settlement.

Plates: Photographs of the settlement and the landfill providing a visual impression of both sites.

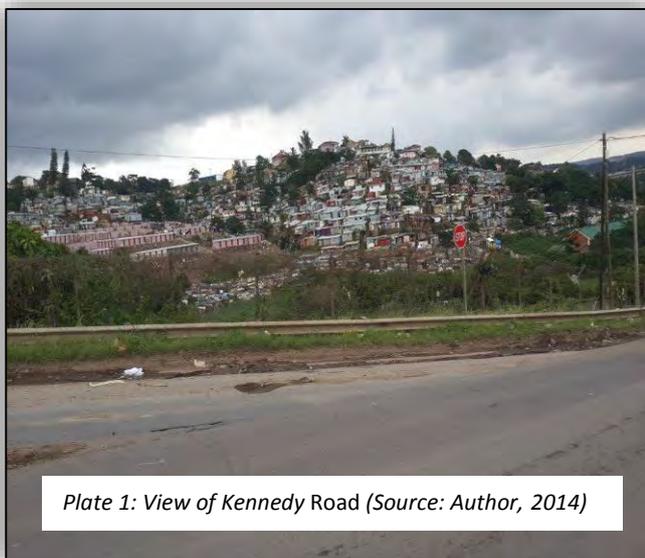


Plate 1: View of Kennedy Road (Source: Author, 2014)

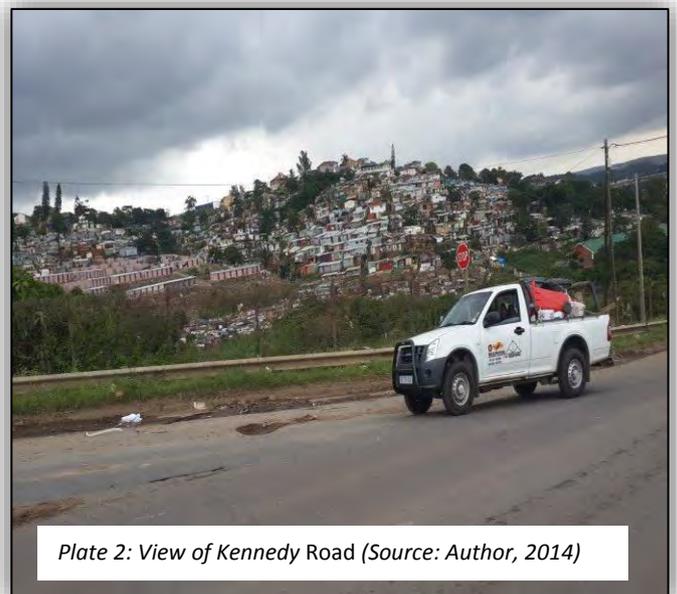


Plate 2: View of Kennedy Road (Source: Author, 2014)

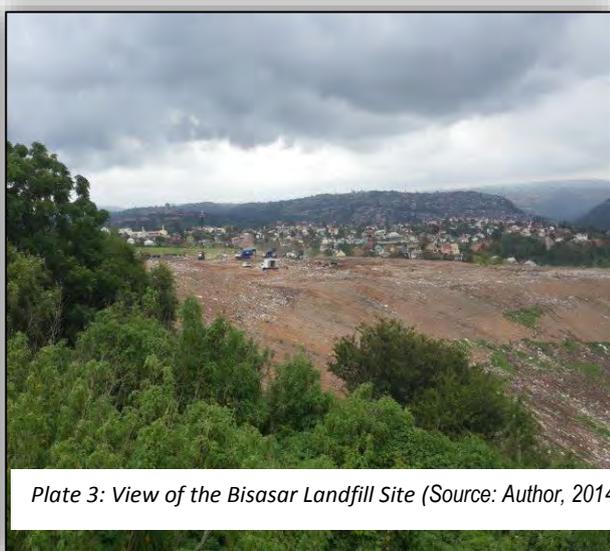


Plate 3: View of the Bisasar Landfill Site (Source: Author, 2014)

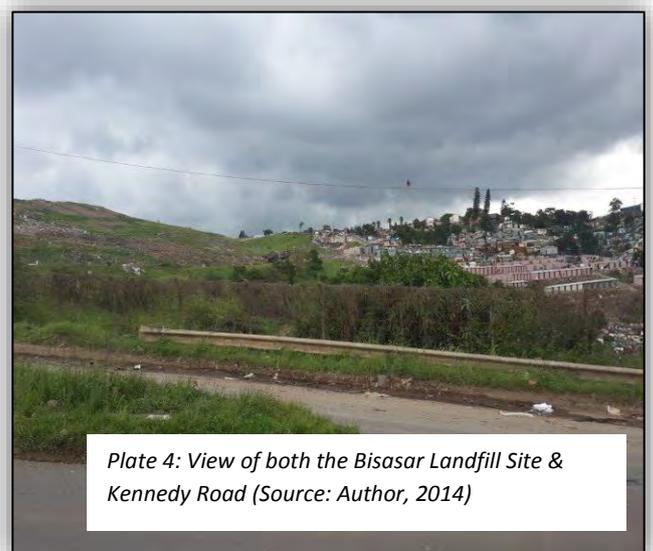


Plate 4: View of both the Bisasar Landfill Site & Kennedy Road (Source: Author, 2014)

1.9.4. Study Population, Sampling and Sampling Methods

Sampling involves taking a representative selection of the population for the purpose of data collection. A population is defined as all the elements (individuals, objects and events) that meet the criteria for inclusion in a study (Burns and Grove, 1993:779). According to Lathan (2007), a sample is defined as the subgroup of a population that is representative of a group; the sample should be representative in the sense that each sample unit represents the characteristics of a known number of units in the population. Non-probability sampling was used for this study. This sampling method does not attempt to select a random sample from the population of interest. Rather, subjective methods are used to decide which elements to include. Non-probability sampling was appropriate for this study as it allows the sampling to be convenient based on accessibility and close proximity to the researcher, is less expensive and it can be implemented more quickly. The non-probability method employed was convenience sampling that targets participants that are readily available and agree to participate in a study (Lathan, 2007).

A convenient sample of 26 respondents was selected. The targeted respondents were 20 community members, one representative from the Community Development Committee, four officials from EThekweni Municipality, including a town planner, a project manager, a housing official and an environmental officer and a representative of the KZN Department of Human Settlements. The final sample size was 22 respondents because the four municipal officials declined to participate in the study due to the sensitivity of the topic. Available have been entered in the study, totalling to sample size of 21 respondents.

1.9.4.1. Data sources and collection

This section provides information on the data collection process.

PRIMARY DATA

Primary data was sourced through in-depth interviews and participant observation; and also through mapping and researcher observation. Schwartz and Schwartz (1955) define participant observation as a process of registering, interpreting, and recording data; the role of the observer may be passive or active. The form participant observation takes is primarily determined by the observer's experience, awareness, and personality. Anxiety and bias cause distortion, and their adequate handling is a major problem in refining the human instrument for gathering data. In-depth interviews are an open-ended, discovery-oriented method to obtain detailed information about a topic from a stakeholder. This qualitative research method's goal is in-depth exploration of a respondent's point of view, experiences, feelings, and perspectives (Wallace Foundation Website, 2009). The primary data

gathered by means of interviews was supplemented by secondary data from various sources to contextualize the study and provide a framework. Data collection was driven by the study's objectives.

SECONDARY DATA

Secondary was sourced from published and unpublished articles, books, reports, journals, newspaper articles, relevant dissertations and United National Annual Reports which provided the researcher with current knowledge on the focus of the study. Secondary data is used throughout the study in the form of citations.

1.9.5. Data Analysis Methods

Thematic analysis, which is a method to identify, analyse, and report patterns within data, was used to analyse the data. "It minimally organises and describes either data set in rich detail. However, it also often goes further than this, and interprets various aspects of the research topic" (Braun and Clarke, 2006: 82). This type of analysis allowed for common issues to be grouped under themes and interpreted clearly. It also allows for the presentation of a summary of the respondents' views.

1.10. Ethical Considerations

Ethics are the cornerstone of every research study. "Ethics provides us with the tools to determine whether or not we should do a certain action and the extent to which a past action should have been done" (Malloy, 2004: 60). Ethical issues were especially important in this study as the research covered sensitive issues. Informed consent on the part of respondents and anonymity were prioritised.

1.11. Structure of the Dissertation

1. The first chapter introduces the research topic and presents the general background to the study area; the research problem, the study's aims and objectives and the research questions. It also discusses the significance and limitations of the study. The research methodology and research methods used for data collection are also discussed. The chapter concludes by outlining the structure of the dissertation.

2. The second chapter presents the study's conceptual and theoretical framework. The main theories and concepts include the buffer zone concept, the lost space theory, the concentric theory and the location theory. The conceptual and theoretical framework has been presented before the reviewing of literature to help guide the flow of arguments.

3. The third chapter reviews the literature relevant to this research study. The literature review covers the following themes: landfill sites, spontaneous settlements, land invasion and urban planning control and precedent studies.

4. The fourth chapter presents the study's findings and an analysis of the results. This is followed by a discussion of the results in order to answer the research questions and achieve the objectives set out in chapter 1.

5. The fifth chapter presents the study's conclusions and recommendations based on the findings that aim to solve the research problem. It also provides a summary of the results.

1.12. Chapter Summary

This introductory chapter presented an overview of the research study; the background to the study area, the study's aims and objectives, the research questions and the problem statement. The study's significance and limitations were also discussed. The research methodology adopted for this study and data collection tools were also highlighted. A qualitative research approach was adopted. Primary and secondary data were gathered with a focus on the complexities of landfill sites and spontaneous residential settlements.

2. CONCEPTUAL AND THEORETICAL FRAMEWORK

This chapter presents the concept and theories on which this research study is based. Various theories were selected to guide the study and to refine the research problem. This chapter discusses the buffer zone concept, the lost space theory which falls under broad urban design theories, the concentric zone theory which falls under land use theories and finally, the location theory. Before the presentation of the concept and theories, definitions of key words are presented.

2.1. DEFINITION OF KEY WORDS

Spontaneous Settlements – “Haphazard housing development in the urban suburbs where the majority of the structures are without planning permit in uncoordinated layouts. The areas lack essential social and welfare infrastructure like water, electricity and health care and education facilities among others. Alternative names for spontaneous settlements are; squatter settlements, low income settlements amongst many” (Enkadem et al, 2014: 367)

Landfill sites - A landfill is a large area of land or an excavated site that is specifically designed and built to receive waste (US EPA, 2005)

Buffer Zones - A buffer zone is an area lying between two or more other areas and serves to reduce the possibility of damaging interactions between them (De Greve and Ebregt, 2000)

Proximity – Refers to the closeness of elements or forms (Zentall, 2013)

Solid Waste – “it is defined to include refuse from households, non-hazardous solid waste from industrial, commercial and institutional establishments (including hospitals), market waste, yard waste and street sweepings. Solid waste management encompasses the functions of collection, transfer, treatment, recycling, resource recovery and disposal of solid waste” (Schübeler, 1996:9)

2.2. THE BUFFER ZONE CONCEPT

While the principle of zoning has long been applied to many projects, the term “buffer zone” is relatively new (Ebregt, 2000). This concept can be approached from different angles, making it difficult to provide an overall definition. This section examines the evolution of the buffer zone concept and presents different definitions. It also considers the Biosphere Reserve Model in the context of buffer zones.

2.2.1. The Evolution of the Buffer Zone Concept

The conceptual thinking which underlines the fundamental principles of buffer zones is not new. By the 1970s, the concept was part of policy formulation and planning programmes in many multi-lateral

development organizations in the public and informal sectors. It arose in response to the need to protect core areas or zones from negative human activities (De Greve and Ebregt, 2000). Zoning, which establishes the type of land uses permitted on a parcel of land within the jurisdiction of a city, was applied prior to the introduction of buffer zones (City of Austin, 2008). The latter concept and its application have gone through various developmental stages. The early concept of buffer zones mainly focused on protecting designated areas from external pressures, particularly human pressure. The main emphasis was imposing restrictions on the utilization of park resources (Singh, 1995). Buffer zones are now used for different reasons such as security, convenience, environmental preservation or aesthetic purposes and they have gained widespread popularity in urban planning (Stadler, 2011).

Raymond and Jensen (2001) note that, in the traditional sense of the concept, buffer zones are very valuable and will continue to be needed. Marshall (2011) explains that, while buffer zones act as restriction zones, they may serve more than this purpose if they are well designed; they may be of benefit to local communities and others, consistent with protection, conservation and management of values and also help to enhance sustainable use.

2.2.2. Definitions of Buffer Zones

Gilmour (1999) defines a buffer zone as a clearly demarcated area with or without forest cover lying immediately outside the boundaries of a protected area that is managed to enhance conservation of the protected area and of the buffer zone itself.

De Greve and Ebregt's (2000) definition notes that a buffer zone is an area lying between two or more other zones and serves to reduce the possibility of damaging interactions between them.

For Martino (2001), a buffer zone is an area adjacent to protected areas, on which land use is partially restricted to provide an added layer of protection to the protected area itself while also offering valuable benefits to neighbouring communities.

In understanding the definitions of a buffer zone, it can be concluded that limited development such as industrial, commercial or residential development may take place within a proclaimed buffer zone. In terms of landfills, buffer zones are of paramount importance as they help to prevent the hazards posed by landfill gas, and the threat to groundwater as well as ensuring the long term availability of the landfill site by avoiding potential conflict between the site and adjacent land-uses. In the South African context, there has been very limited experience of relevant tools or conceptual models that can be applied to landfills in order to ensure good practice and the sustainable long term use of buffer zones (Gilmour, 1999).

At a descriptive level, it is understood that buffer zones are areas of land which increase the degree of spatial distance between differing land uses. Buffer zones are thus areas in which the physical environment alone prevents human settlement or activities. At a more functional level, buffer zones help reduce interaction and conflicts between competing and incompatible groups through the simple mechanism of spatial distancing (DeBoer, 1981).

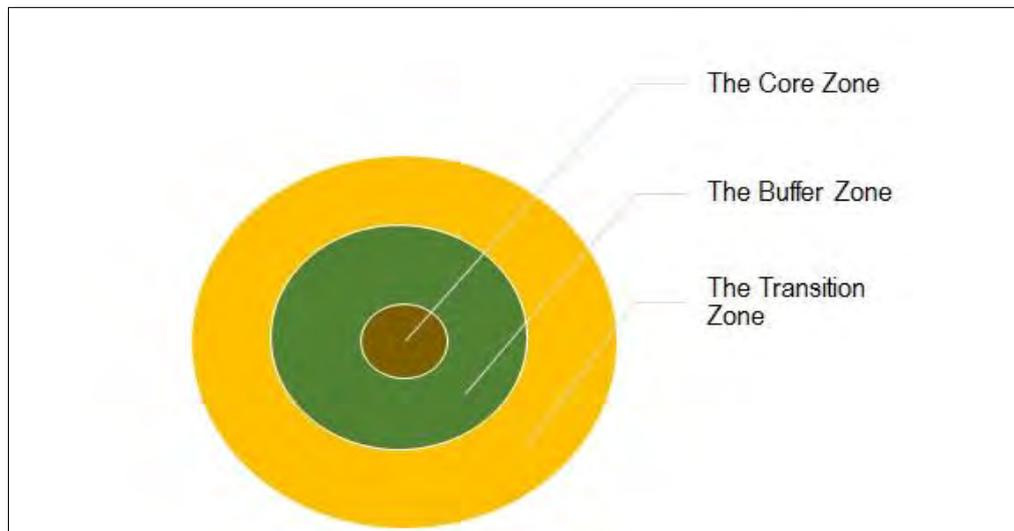
Interwaste Environmental Consultants (2011) note that the size of landfill buffer zones and minimum requirements for waste disposal are not prescribed by law. Ebregt (2000) observes that the preferred size of a landfill buffer zone varies and depends on traditional land use systems, and threats and opportunities but most importantly, the objectives and availability of land. The size of a buffer zone is often determined after negotiations between various relevant stakeholders but it primarily depends on the availability of land. However, in most instances these negotiations are dominated by the most powerful stakeholders; therefore it is crucial that all relevant stakeholders be fully involved in defining the size and the scale of a landfill buffer zone (Ebregt, 2000).

2.2.3. Biosphere Reserve Model

Garratt (2006) notes that, the Biosphere Reserve Model rests heavily on the concept of buffer zones. This model promotes environmentally sound and sustainable development in areas adjacent to land-uses such as national parks and landfills. The biosphere concept or model is inclusive by nature, thereby addressing the social, economic, environmental and cultural aspects of a region (Pool-Stanvliet, 2013).

The Biosphere Reserve Model has three zones with different levels of use and protection; the Core Zone, the Buffer Zone and the Transition Zone.

Figure 1: The Biosphere Reserve Model



According to Munyai (2014) the Core Zone must be afforded long term protection status by national laws. The Buffer Zone is the area or piece of land that surrounds or adjoins the Core Zone, limiting human activity and the Transition Zone contains diverse activities.

2.3. URBAN DESIGN THEORY: LOST SPACE THEORY

While South Africa has made strides in developing new ideals for post-apartheid planning, these ideals lack innovative thinking on land management. As a result, the country's towns and cities are developing without proper planning or an adequate framework to manage land in a manner that supports democratic goals, including sustainability, equity and efficiency. The issue of urban land management is not limited to South Africa but affects many cities across the world (PlanAct, 2007).

Inadequate frameworks for the use and management of urban land resulted in the formulation of the Lost Space Theory. "The lost space theory was introduced by Roger Trancik and he defined the lost space theory as an unshaped anti space that existed at the leftover unstructured landscape, unused sunken plaza, parking lots and abandoned water fronts, train yards, vacated military sites and industrial complexes" (Sahabuddin, 2011: 3).

Urban spaces are gradually being lost, posing significant planning challenges to cities across the globe. These spaces, which were once important social spaces in cities, are unable to find their real place and are no longer considered to play any effective role. Urban spaces which have lost meaning are termed

lost urban spaces, no man's land, unused spaces, and vacant urban spaces, amongst many other terms. They are unique to cities and have been not been utilised or used significantly. They are urban spaces which do not have a positive relationship with the surrounding urban environment or have less potential to be redesigned (Moghaddam, 2014).

Definitions

Adepoju (2009) presents a definition of lost space extracted from Trancik's book. The theory is defined as follows:

"The lost space is the unstructured leftover landscape at the base of the high rise tower or the unused sunken plaza away from the flow of pedestrian activity in the city. The lost spaces are the surface parking lot that ring the urban core of almost all American cities and sever connection between the commercial center and residential areas. They are the vacant blight-clearance sites. Remnants of the urban renewal days that were for a multitude of reasons never developed. They are residential areas between districts and loosely composed commercial strips that emerge without anyone realizing it. Lost spaces are deteriorated parks and marginal housing projects that have to rebuild because they do not serve their intended purpose...generally speaking lost spaces are undesirable urban centers that are in need of redesign...anti spaces making no positive contribution to the surroundings and its users. They are ill-defined without measurable boundaries and fail to connect elements in a coherent way. On the other hand, they offer tremendous opportunity to the designer or urban developer and creative infill and rediscovery of many hidden resources of our cities" (Adepoju, 2009: 1).

Nefs (2006) emphasises that although lost spaces may be defined as many things, they simply refer to the emptiness of a piece of land; this land is not occupied by infrastructure or people. They are sometimes viewed as abandoned urban land with no activity and, in many cases, contaminated. Lost spaces in urban settings include areas such as wastelands, brownfields or degraded and deteriorating buildings and land.

In understanding the definitions of lost spaces, it can be concluded that they are empty pieces of land in urban areas that have not been utilized or are minimally utilized. Some lost spaces have the potential for future development, while others don't and are viewed differently. In a sense, a buffer zone, which is one of the prevailing concepts for this study, might be viewed as lost space because of the abovementioned characteristics, with the emptiness of the land being the most predominant. If a buffer zone that is vacant and presents as a lost space is invaded for residential purposes, the question arises

as to whether urban lost spaces are really lost spaces, or whether they have different meaning and uses to different people.

2.4. URBAN LAND USE THEORY: THE CONCENTRIC ZONE THEORY

Throughout history, geographers, urban planners and economists have developed models to describe patterns of land use. The Concentric Zone Theory of urban land use was developed by EW Burgess in the mid-1920s to explain social spatial structures. It emerged as a result of Burgess's observations and examination of the historical development of Chicago. The Concentric Zone Theory is based on the assumption that cities expand outwards from a central area in concentric rings of development, with each ring devoted to a different land use (Torrens, 2000). According to Burgess, the expansion of any city occurs in a radial manner, forming a series of nested concentric rings representing successive zones of urban land use (Stanley, 2012).

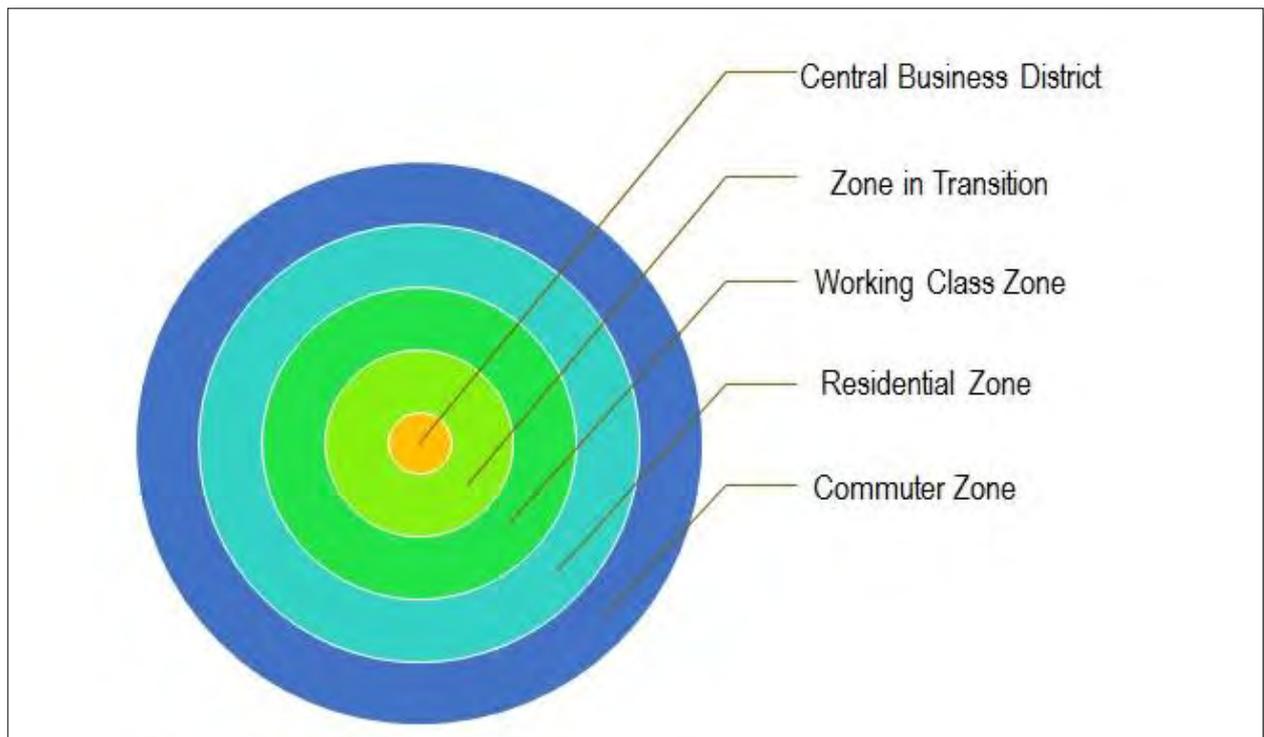
Pitzi (2004) notes that, the Concentric Zone Model assumes an urban place that is circular, with five functional zones in a concentric circle.

2.4.1. The Five Concentric Zones

Burgess classified the city into five broad zones (Figure 2) (Torrens, 2000):

1. The central business district (CBD): the focus of urban activity and the confluence of the city's transportation infrastructure.
2. The zone of transition: generally a manufacturing district with some residential dwellings.
3. The zone of factories and working people's homes: this zone was characterized by a predominantly working class population living in older houses and areas that were generally lacking in amenities.
4. The residential zone: this band comprised newer and more spacious housing for the middle class.
5. The outer commuter zone: this land use ring was dominated by better quality housing for upper class residents and offered better amenities.

Figure 2: Burgess's Concentric Model of Chicago (Torrens, 2000)



Based on the model (Figure 2) and its associated assumptions, it is believed that as a city grows and develops over time, the main business center, the CBD, also grows rapidly, exerting pressure on the zone of transition that immediately surrounds it, thus causing it to expand outward. This is a continuous process with each of the successive zones moving further from the CBD. Burgess suggested that inner city housing was largely occupied by low socio-economic groups, including immigrants and as their households grew, the CBD also grew, expanding outwards. Lower status residents then moved into adjacent neighborhoods, while more affluent residents moved further from the CBD (Schrenti et al, 2012).

2.4.2. Criticism of the Concentric Zone Theory

Like any model, urban land-use models and theories have limitations and are subject to criticism. The Concentric Zone Theory has been heavily criticized for being over-simplified. Burgess's circular model with concentric zones is difficult to observe in reality because the model is unhindered by physical environments such as topography which might influence the choice of location. The model does not explain and present real life land-use patterns. In real life cities, zones are not continuous, and zoning is often difficult to identify and is subject to change (Qazi and Qazi, 2010, Brown, 2013).

Allen et al (2005) note that, the Concentric Zone Theory's model of the city appears to be static. It suggests that people move outwards from the city center as they become wealthy. This outward

movement causes further displacement and when wealthy groups vacate deteriorating houses, poorer people move into them.

It is argued that the Concentric Zone Model or theory does not recognize that neighborhoods are very often shaped by the structure of transport networks; people tend to live in relation to distance and time. Transportation arteries are neglected in this model even though they play a major role in shaping land-use patterns. Indeed, had they been considered in the developed of this model, they would have distorted the concentric zone patterns, thus avoiding its over-simplistic and unrealistic nature (Qazi and Qazi, 2010).

Raynich and Hill (2011) observe that modern critics of the theory make the very important point that the model does not explain all cities of the world, as most cities do not expand in a concentric manner. Burgess's model suggests that cities expand radially from the city center; this is not the case with all cities and they do not grow radially (Haggerty, 1971).

2.5. LOCATION THEORY

The past two decades have witnessed increased interest in the analysis of location behaviour or patterns, leading to new breakthroughs in the understanding of the location phenomenon. Location Theory, which has its genesis in earlier studies that aimed to understand the location of plants and industries, in which the availability of raw materials and access to consumer markets were of primary importance, has played an important role in understanding the spatial distribution of places (Chan, 2011).

Location Theory is often linked with geographic spaces and patterns such as human settlements, industry siting and consumer behaviour in order to understand why places were located where they were. Ultimately, the main goal was to understand the factors associated with locational decision making and what makes a suitable location (Murray and Church, 2009).

According to Chan (2011), Location Theory studies the effects of space on the organisation of economic activities; it is a body of knowledge on the specific location of different activities. Beckmann (1968) explains that this theory raises the question of where and adds those of what, for whom, how and when. Location Theory is thus basically concerned with the geographical location of activities.

It is argued that, Location Theory may be a suitable model to explain the geographic location of economic activities, but it is not yet fully satisfactory. While, it is not difficult to present the factors affecting spatial economic activities and to demonstrate their influences, the theory fails to develop rules to explain the structure of the space economy (Higgins and Savoie, 2009).

The theory of location evolved about 200 years ago and one of its most notable proponents was Johanne Henrich von Thunen. The von Thunen model aimed to understand the location of cities and farms, balancing the costs of land and transport. It placed concentric rings of agricultural activities around a city in order for perishable goods to reach the market quickly. Since von Thunen, many other scholars have proposed more complex ways of understanding the location theory of places. Location theory is frequently applied by researchers seeking to understand the factors that influence geographic location. The von Thunen model was mainly used to understand historical agricultural land use and what has changed today, especially in core and peripheral areas (Feinberg, 2007).

Location theory is rooted in many disciplines, each with its own analytical traditions, including geography, mathematics, economics and engineering. The science of “where should it be?” is therefore multidisciplinary and continues to be of interest to researchers and practitioners in different fields of study (Murray and Church, 2009). In previous years, the various disciplines using location theory were largely unconnected because they sought to answer different questions. Today, different disciplines’ studies of location theory are rapidly converging as new data sources and new understanding of the relationships between the various theories of location behavior are continuously developed (Rowe, 2009).

2.5.1. Determinants of Location

- **Technological factors** include the physical characteristics or principles which influence the choice of location, together with infrastructural support such as highways, airports, railroads, a power and water supply and sewers; these technological factors support the establishment or functioning of a facility, industry or human settlement. One of the key factors that influence people to reside in close proximity to landfill sites is the availability of infrastructure put in place to accommodate the landfill’s operations, which very often attracts residential developments around a landfill whether it is hazardous or not.
- **Economic and Geographic factors:** people choose to live in a place that is convenient for carrying out their daily activities, both work and non-work. In most instances, economic factors lead to spontaneous settlements, with many residents of communities bordering landfill sites depending on the site for employment.
- **Political factors:** zoning is a political factor implemented by government authorities to represent institutionalized consensus in the community regarding the legitimate use of land. The Global Alliance for Incinerator Alternative, GAIA (2011) explains that land-use

management is of primary importance when it comes to issues of landfills and residential settlements.

- **Social factors:** segregation, dominance, gradient, centralization and decentralization and invasion and succession are social factors that determine geographic locations.

2.6. CHAPTER SUMMARY

This chapter has presented the concept and theories that have been used to guide this study. The buffer zone concept, the lost space theory, the concentric zone theory and the location theory have been clearly defined. These theories discussed relate to the research topic and they have given an early effort to understand how research questions can be answered and the objectives achieved.

3. LITERATURE REVIEW

3.1. INTRODUCTION

This chapter reviews literature that is relevant to this research. The first section discusses the background to landfill sites and different definitions of this term. The social, environmental and economic effects of landfill sites are also presented and evaluated and the regulatory framework for waste management is reviewed. The second section presents and analyses the literature on spontaneous settlements, including the background and definitions of this phenomenon and the reasons why spontaneous settlements emerge. The third section presents precedent studies on Ghana and Malaysia. The fourth section reviews the literature on land invasions, including a historical perspective on land invasion in South Africa, land invasion as a strategy to gain access and interventions to control land invasions. These cases were selected as precedents because of their similar characteristics and relevance to this research, given their social context. Finally, conclusions are drawn based on a critical analysis of the literature reviewed.

3.2. LANDFILL SITES

3.2.1. Background

Landfill sites are the most commonly used and oldest method of waste disposal, receiving up to 95% of global waste which continue to increase in quantity due to rapid population growth in urban areas (Hird, 2013). Landfill sites are the preferred method for waste disposal because they are generally cheaper than other methods such as composting and incineration (Vellini, 2007). However, their management has long been of concern to policy makers and the public at large due to the infamous impacts of landfilling operations such the inevitable release of landfill gas and leachate (El-Fadel and Massoud, 2000). The management and the operation of landfill sites worldwide cannot be painted with a single brush as they vary significantly in design, capacity, the type of waste received and management (Hird, 2013).

3.2.2. Definitions

Hester and Harrison (1995) define landfills as sites designed for the deposit of waste onto land in a manner that prevents harm to the environment and people; through restoration, the land may be re-used for another purpose.

While there are slight variations in the definitions of landfills, there seems to be a general consensus that a landfill is an area of land on which different waste is deposited for its management to prevent or minimise social, economic and environmental impacts.

In assessing the future of landfills, Vellini (2007) explains that they are expected to remain the major method for the disposal of different wastes that cannot be re-used, recycled or burnt. The design, management and control of landfills have changed considerably in recent years due to their highly recognised impacts which call for efficient management of Municipal Solid Waste (MSW). Hester and Harrison (1995) argue that although landfills will remain the major route for waste disposal, their future is somewhat uncertain and difficult to predict. While these sites will undoubtedly continue to be an important waste management option, current and continuing changes in waste management regulation and control, together with political factors and social pressure, will lead to changes in the management of waste as a whole.

3.2.3. Effects of Landfills

While landfills are one of the most important methods to dispose of waste produced by human beings, large costs are associated with them. The real costs of landfills have led to increasing public concern about the management of solid waste. Many nations have implemented waste management strategies to manage waste effectively and efficiently in a sustainable manner. As landfill sites are the most convenient method of waste disposal, it is important to evaluate their benefits as well their environmental, social and economic costs. Numerous chemical and epidemiological studies have demonstrated that landfills have potentially harmful social, environmental and economic effects (Lee and Jones-Lee, 1994).

This section of the literature review discusses the social, environmental and economic impacts of landfill sites identified through desktop research. Different types of landfills have different costs depending on the content of the site. Because of their impacts, "Landfill sites should not be located in the immediate proximity of occupied dwellings, waterways and water bodies. A minimum distance of at least 500 m (buffer zone) should be provided" (ISWA, 2013:10). The Bisasar landfill site contains MSW; therefore it is important to discuss solid waste before discussing the impacts of landfills.

Solid Waste is defined as non-liquid material that no longer has any value to the person who is responsible for it. The words rubbish, garbage, trash or refuse are often used as synonyms for solid waste. Solid waste is generated by houses, public spaces, shops, offices, streets and hospitals. Municipal Solid Waste refers to solid waste, management of which is the responsibility of municipal or other government authority (Asnani and Zurbugg, 2007).

Twardowska et al (2004) further explain that solid waste is a type of waste that predominantly consists of materials that have the properties of solids. Tadese (2004) states, that solid waste is the waste that arises from human and animal activities that is normally solid and is discarded as useless or unwanted.

Table 1: Sources of Municipal Solid Waste and Types of Solid Waste

Sources of Municipal Solid Waste	Types of Solid Waste
Residential	Food waste, food containers and packaging, cans, bottles, paper and newspaper, clothes, garden waste, e-waste, furniture waste
Commercial Centre (Office lot, small shop, restaurant)	Various types of paper and boxes, food waste, food container and packaging, cans, bottles
Institutional (School, university, college, hospital)	Office waste, food waste, garden waste, furniture waste
Industry (Factory)	Office waste, cafeteria waste, processing waste
City Centre (Drainage and Road)	Various types of garden waste, construction waste, public waste

Source: Abas and Ta Wee (2014)

Table 1 presents the different types of solid waste that is transported to landfills sites as it is discarded as useless or unwanted. Solid waste can be categorised as hazardous and non-hazardous. The USA EPA (2005) defines hazardous waste as waste that has a chemical composition or other properties that makes it capable of causing illness, death or other harm to humans and other life forms if mismanaged or released into the environment.

The threat posed by hazardous waste has caused problems in terms of management and disposal. Such problems are not confined to National Regulatory Agencies (NRA) and officials as this issue has spilled over into the international arena (O'Neill, 1998). Although issues of waste management have become an international concern, states and local governments typically approve decisions to place hazardous and non-hazardous facilities in specific locations (Guerrerg, 1995).

3.2.3.1. Social Impacts

The social life of people living in the proximity of landfill sites is affected by landfill operation activities. Lehmann (2007) notes that the unpleasant smells that come from the landfill can become a serious nuisance to people living in the vicinity of the site. Different odours emanate from fresh deposits of solid waste, landfill gas, plants that treat leachate and some waste treatment works such as composting facilities.

The atmospheric emissions from landfills usually include dust and gas which are often raised during the operational stages of a landfill, with adverse health effects on neighbouring communities as well as on

staff working at the sites. Landfill gases vary in quantity and quality over time; the main components of gas produced at landfills include methane, carbon dioxide, benzene and vinyl chloride. Benzene and vinyl chloride are highly toxic. The vehicles that work on site usually produce gaseous emissions and also cause noise and traffic which may lead to road accidents. Other social impacts include windblown litter and visual intrusions (Basili et al, 2007).

McLaren and Tuan (2005) observe that the odour from a landfill may not pose the same risk as those posed by leachate and gas but can be highly disturbing in terms of quality of life. A socio-economic assessment of landfill sites conducted by the Urban-Econ (2010) highlights that, the bad odour from landfill sites attracts flies and other insects which may result in the spread of germs and diseases. This can result in those who live in the proximity of landfill sites feeling uncomfortable or insecure in their own homes.

3.2.3.2. Environmental Impacts

According to El-Fadel et al (1997), landfills originated as a way of protecting the environment from the undesirable impacts of alternative methods of waste disposal such as open-air burning, open pit dumping or ocean dumping. However, landfills have resulted in new impacts that are primarily due to the formation of leachate and gas.

Landfill leachate is generated when the capacity of the water content of the solid waste is greater than the capacity of the waste; the field capacity is the quantity of waste within landfills that can be held against the pull of gravity (Lehmann, 2007). "Thus the potential quantity of leachate is the amount of moisture within landfills in excess of the field capacity" (Lehmann, 2007: 6). In most cases the runoff of the leachate from landfills and other hazardous toxins can reach and contaminate groundwater or nearby surface water.

Armbrister's (2001) article on a regional solution for solid waste disposal in Southwest Virginia discusses the major threats to environmental health posed by landfills; he notes that water quality is most affected because the landfill leachate that seeps directly through the soil contaminates the underlying groundwater as well as the surrounding water supply. While it might be argued that landfill sites will always pose serious threats to the environment, a cooperative system of solid waste management might help to lighten the environmental stress resulting from landfilling.

Gas from landfill sites such as methane which is formed when waste from the site is chemically broken down pollutes the air, but this type of pollution is overlooked because its effects are not obvious (Armbrister, 2001). Gas and leachate are the inevitable consequences of solid waste disposal in landfill

sites that are primarily generated due to climatic conditions, microbial decomposition and the characteristics of the wastes (El-Fadel et al, 1995). The gas and the leachate eventually migrate from the landfill to the surrounding areas, with serious environmental and social impacts. Environmental concerns regarding landfills include but are not limited to fire, unpleasant odours, landfill settlements, global warming, groundwater and air pollution and damage to vegetation (El-Fadel et al, 1995).

Solid and hazardous wastes and their associated risks need to be thoroughly understood and efficiently and effectively managed. As the management of waste is a global challenge, it is crucial that potential threats to health, the environment and humans are reviewed and are a major priority when it comes to designing or engineering landfills so as to eliminate the hazards arising from toxic leachates as waste decomposes (Lisk, 1991).

3.2.3.4. Economic Impacts of Landfills

One of the economic impacts that arise from being situated in close proximity to a landfill site is depreciating property values. Reichert et al (1991) observe that property values are impacted by the presence of a landfill from both the supply and demand side. On the supply side, contractors may not be eager to build and lenders may also be reluctant to extend credit on properties that are situated close to landfills. On the demand side, property buyers who are aware of the existence of the landfill, and its potential nuisance and health problems will, in most instances avoid purchasing these properties or only be persuaded to do so at a significant discount. Authors such as Pettit and Johnson (1987) argue that landfill sites do not always have negative impacts; infrastructure such as new roads or electricity that accompanies landfills very often attracts residential development.

Percival and Clesceri (2002) state that the positive impacts of landfills cannot be ignored; they have attracted human scavengers throughout history. Scavenging is a recognised activity, especially in less industrialised or poor, developing nations. Percival and Clesceri (2002) add that scavenging which is also termed informal recycling, helps support members of the poorest section of populations and because this activity is well recognised, it is often well-organised and can provide this group with basic necessities. Scavenging at landfill sites is sometimes considered degrading by society but it is often the last resort for poor, unemployed people and sometimes pays more than ordinary jobs, especially in the poorer areas of the world.

Gonzales (2003) explains that scavengers go to landfill areas that are being levelled by landfill bulldozers in the hope that the bulldozers will inadvertently uncover garbage that may have value. Others go to areas of the landfill that have already been burned or are sometimes still burning to sift through the ashes in the hope of finding metal or other items that could be of value. Percival and

Clesceri (2002) note that scavengers on landfill sites are not generally attracted to waste such as plants or food, but rather seek materials that can be traded for money or reused. Landfill scavenging has become a survival strategy that can help the poorest of the poor meet their basic needs.

3.2.4. Regulatory Framework

While landfills can be examined from an economic growth perspective in a developing nation like South Africa, the negative externalities that result from landfill activities cannot be ignored as they impact the environment and human health. South Africa is experiencing increased economic development. Industrial, commercial, mining and power operations all produce waste that in many instances is very hazardous (Taljaard, 2011). There is therefore a need to pay urgent attention to waste management.

South Africa has introduced various pieces of legislation to regulate waste management, including the Environmental Conservation Act (Act No. 73 of 1998), the National Environmental Management Act (ACT No. 107 of 1998) and the National Water Act (Act No. 36 of 1998). The need for uniform legislation to regulate waste management and promote sustainable waste management led to the promulgation of the National Environmental Management: Waste Act (Act No. 59 of 2008) (NEMWA).

3.2.4.1. National Environmental Management Waste Act No. 59 (2008)

The NEMWA was the first environmental legislation in South Africa to provide a coherent and integrated legislative framework to address all the issues of waste management. It repealed previous legislation with regard to waste management. The NEMWA states that waste should not be disposed of or treated in a manner that will have negative environmental outcomes, or impact human health or property (Taljaard, 2011). The preamble to the NEMWA states that:

“Sustainable development requires that the generation of waste is avoided, or where it cannot be avoided, that it is reduced, re-used, recycled or recovered and only as last resort treated and safely disposed of”.

The NEMWA emphasises that waste at landfill sites should be managed in a sustainable manner and should be treated and disposed of safely so as to minimise the impacts associated with these sites. Tammemagi (1999) notes, that, in the past, convenience was the main factor in selecting a landfill site. However, extensive evidence on the impacts of landfills suggests that waste disposal sites should not be located close to residential areas as they pose serious risks to health and well-being. The NEMWA stresses the need for sustainable development in the context of waste management.

Tammemagi (1999) further suggests that general principles for the management of waste should include protecting health and the environment, placing no burdens on future generations and conserving resources. Based on the NEMWA and the general principles of sustainable waste management, it can be concluded that methods of waste disposal and treatment at landfill sites should not impact on the environment, use available valuable resources or place a burden on future generations.

3.3. SPONTANEOUS SETTLEMENTS

3.3.1. Background

The continued growth of spontaneous settlements in both developing and developed countries is alarming. Cities have grown considerably due to the number of people flocking to urban centres. This phenomenon is associated with political, social, and economic factors as well as the cultural characteristics of a city. The primary factor that contributes to the phenomenon of spontaneous settlements is migration from rural to urban areas in search of a better life (Francis, 2009).

In South Africa, spontaneous settlement is seen as the result of the housing crisis that originated during the apartheid period when the government made few efforts to provide housing for the expanding urban population, especially after the 1960s. By the 1980s, apartheid housing policies had resulted in housing backlogs, massively overcrowded housing in the Black townships and illegal spontaneous settlements on the urban peripheries of cities or close to cities (Knight, 2004). Since 1994, the democratic government has taken steps to provide housing and basic services to citizens. However, this has not been sufficient to eradicate spontaneous settlements (Knight, 2004)

Francis (2009) argues that there is no housing crisis in South Africa but rather a crisis in the lack of real, substantive development programmes. Spontaneous settlement is a housing problem that often occurs due to the lack of jobs and developmental support for low-income groups. He argues that South Africa should focus its energy on empowering the poor. Furthermore, in the long term, meeting housing and basic services needs should not focus on government programmes, but on economic strategies that will help reduce the gap between the rich and the poor, especially in terms of unemployment.

3.3.2. Definitions of Spontaneous Settlements

Browning (2006) defines a spontaneous settlement as a type of housing which involves both the organised and incremental invasion of public and private land.

Monga (2011) defines spontaneous settlements as a type of settlement that does not comply with a country's building and planning regulations; they are thus considered illegal settlements.

Djukic and Stupar (2009) note that spontaneous settlements are illegal or unauthorised in the sense that their construction is undertaken outside of institutions and their legal systems.

For Rather (2003), a spontaneous settlement is an area characterised by over-crowding, deterioration, unsanitary conditions or the absence of facilities or amenities. Any or all of these conditions endanger the health, safety or morals of their inhabitants or the community.

According to Srinivas (1991), spontaneous settlements have physical, social and legal characteristics. They can be identified by the informality that is reflected in the style of housing and neighbourhood design. Illegality is also a factor that determines this type of settlement. Furthermore, they are often located in places found to be inappropriate by government authorities and private and public sector investment is therefore not forthcoming. Settlements that develop spontaneously often experience a low quality of living as they are vulnerable, with high rates of poverty, and little or no provision of basic services such as sanitation, leading to high levels of social stress within the community.

3.3.3. Why Spontaneous Settlements?

Monga (2011) explains that local governments are not obliged to provide spontaneous settlements with basic socio-economic services and facilities since they are considered to be illegal. Such services include decent housing, good quality water and waste management services. This means that most residents in spontaneous settlements live in shelters with substandard structures in unsanitary and degrading environments. Several factors lead to the construction or establishment of spontaneous settlements. In the context of this research study, the Kennedy Road settlement which developed in the proximity of a landfill site may have developed due to the different factors discussed below.

3.3.3.1. Economic Hardship

Poverty is regarded as a better indicator of the economic hardship of the poor than the cost of housing. Poor families in low income neighbourhoods face serious hardships that have to do with a lack of economic advancement. The poverty experienced in spontaneous settlements is more than a lack of income or a high level of unemployment. Baumann et al (2004) stress that poverty is extended by poor nutrition and health, overcrowded housing, an increased school dropout rate and the stress resulting from the social and physical environment in low income spontaneous settlements.

Wu et al (2010) identify three broad processes that drive urban poverty: the decline of the state-owned economy, changing welfare provision and urbanization and rural migration. They add that urban poverty

is a very complex phenomenon which is intertwined with institutional legacies. Economic factors often push people to reside near hazardous areas such as a landfill because they are searching for survival strategies such as employment or scavenging from the landfill.

3.3.3.2. Housing Affordability

The issue of housing affordability has been discussed and debated throughout history in an attempt to find ways to better position this issue on countries' national agendas. The politics of housing affordability are complex, as housing is a large expense that many families worldwide struggle with. While this issue should therefore be a priority in national politics, the opposite is often the case (Lang et al, 2008). South Africa is no exception when it comes to the issue of housing affordability. The South African government at different levels has attempted to address this issue by targeting low income groups; however, this has not put an end to the mushrooming of spontaneous settlements which are usually located on the urban fringe.

According to Turffrey (2010), housing prices have risen sharply in relation to earnings; the more people there are with better paid jobs, the more the price of housing increases. This means that those who were able to afford housing in the past are no longer able to do so. Furthermore, the private sector has shown no mercy when it comes to this issue; many tenants are struggling to afford rent. For poor people in the city that cannot afford housing, spontaneous housing is often their only option. They resort to self-help spontaneous shelter despite the poor living conditions in these areas because it is cheap (Khan and Thring, 2003).

3.3.3.3. Poor Societal Groups in Urban Areas

In a democratic country like South Africa, previously marginalised and disadvantaged groups of people have conformed to the trend of moving from rural to urban areas in search of greener pastures. According to Altenburg (2013), rural-urban migration is a form of internal migration within the borders of a single country; it refers to the movement of people from the countryside to the cities, often the metropolitan cities of a country. Push and pull factors lead to rural-urban migration. The push factors are a lack of basic services, including but not limited to education and health care, or lack of employment, etc. Mayur and Sulewski (2014) believe that the major pull factors of rural-urban migration are access to markets, transportation and education, leading to an exponential urban growth.

Rural-urban migrants who come to the cities often have expectations of getting a job, not realising that many lack the necessary skills and qualifications to acquire the type of employment they desire in order to improve their lives. Rural-urban migrants fail to obtain formal jobs; they then rely on the informal sector as a source of employment and do not make sufficient money to sustain them or to afford life in

the city. When they struggle to find an affordable place to stay, they erect shelters in spontaneous settlements, leading to the growth of such settlements and also to resistance to the eradication of spontaneous settlements because residents depend on their jobs in the city to maintain their livelihoods and have nowhere else to stay.

Vacant urban land is often invaded by the urban poor. The high cost of housing, and unemployment or low wages have influenced the urban poor to invade any available land as they desperately seek to fulfil their housing needs. Spontaneous settlements often emerge in areas with vacant land; it is for this reason that many such settlements are on the fringes of cities where land is often left unoccupied (Simposya, 2010). Land appears vacant if there is no activity on it; its emptiness is construed as being available for different things, including the formation of spontaneous settlements. However, vacant land could already be being used for a purpose, including inactive landfill site buffer zones.

3.4. PRECEDENT STUDIES: Ghana and Malaysia

The precedent studies selected share some characteristics and are relevant to this research; they represent early efforts to understand the issues that arise from residing in close proximity to landfill sites and will help to challenge or confirm the concepts and theories presented in this research study. They will also help the researcher to gain a broader understanding that will help generate new findings from this research study. The first part of this section presents the rationale for the selection of the two case studies and describes their location and social context. This is followed by an analysis and evaluation of both case studies. Finally, conclusions are drawn based on a critical review of the most notable facts and ideas presented in this chapter.

Ghana and Malaysia are both developing nations that use landfill dumping as their main method of MSW disposal. They are therefore relevant to this study in South Africa which is a developing nation that also uses the landfill method for MSW disposal. Both the precedent studies provide an international perspective on landfills and their impacts. One of the objectives of this research study is to determine the advantages and disadvantages of living in close proximity to landfill sites; therefore both case studies represent an early effort to answer this question as they focus on the impacts of landfills on the surrounding environment.

3.4.1. Social Context

3.4.1.1. Ghana – Accra

Nations across the world have been and continue to experience rapid urbanization. The Accra Metropolitan area in Ghana is no exception. With a population of three million people and a floating population of 300 000 the city has witnessed rapid urbanization over the past four decades, with the urbanization rate estimated at 3.7% per annum (Osei et al, 2011). This has resulted in increased waste generation and pressure on waste management (Benneh et al, 1993).

According to Osei et al (2011), Accra's population generates 500-1800 tonnes of waste per day. Solid waste management is a serious challenge. The Oblogo landfill is an example of a disposal site in the region. It started operating in 2002 but is not a properly hygienic engineered landfill. It is a difficult for the government to construct a proper landfill in Accra due to land disputes in the country (Oteng-Ababio, 2011).

Boadi and Kuitunen (2003) note that, while government officials in Accra are committed to effective solid waste management, they lack proper land use planning and this hinders effective sanitation and waste management practices. The authors go to explain that poor land use plans or policies, coupled with a lack of financial and human resources make it impossible to operate and maintain disposal sites at minimum sanitary levels in the Accra metropolitan area.

3.4.1.2. Malaysia

Malaysia is considered one of the most successful developing nations in terms of economic growth (Abas et al, 2014). The country has also witnessed rapid urbanization, with the urban population growing at a rate of 24% per annum or about 600 000 per annum since 1994 (Sanazi et al, 2011). Rapid economic transition and urbanization led to increased solid waste generation which makes MSW management vital. In 2003, the average amount of MSW generated was 0.5 to 0.8 kg per person per day and it is estimated that by the year 2020, MSW in Malaysia will increase to 31 000 tonnes per day (Sanazi et al, 2011).

Agamuthu et al (2009) note that landfilling has been the main waste disposal method in Malaysia for many decades; however the country is facing serious landfill problems which include overflowing landfills, a shortage of land, unsuitable landfill sites and no leachate treatment. The Malaysian authorities have come up with MSW initiatives such as privatisation for better management.

Nadzi and Larsen (2012) note that, while rapid urbanization and economic transition in Malaysia call for effective and efficient MSW management, the level of management of solid waste appears to be dangerous and unsatisfactory. The Malaysian government is committed to striving towards effective MSW management but the current status of landfilling disposal may require the adoption of measures or initiatives aimed at achieving effective solid waste management which includes solid waste storage, collection, transportation and disposal.

3.4.2. Evaluation and Analysis

A study carried out in Accra, Ghana, aimed to assess and evaluate the appropriateness of the location and the operation of the Oblogo landfill, and to determine the composition of the solid waste dumped at the landfill as well as the extent of the contamination of the surrounding environment by landfill leachate, specifically water and soil. Osei (2011) administered a questionnaire survey in the community where the Oblogo landfill is situated and field measurements were also carried to determine the concentration of nutrients and metals in the landfill leachate, water and soil using a UV Spectrometer and Atomic Absorption Spectrometer. Osei (2011) concluded that the Oblogo landfill is not well located because it is in conflict with other land uses such as residential areas, schools and farms, thus posing a serious threat to the surrounding inhabitants. Another factor that led to this conclusion is the fact that it is situated on a slope that ends in an ecologically important wetland. The survey further revealed that the landfill generates bad odours and produces leachate that is released into the wetland and leads to the scattering of waste by scavenging birds, flies and vehicles transporting waste that have become a nuisance (Osei et al, 2011).

The Malaysian study conducted by Sharifah et al (2011) aimed to determine community perceptions of the impact of odour from landfill sites on the human and physical environment. This was determined by establishing the sensory odour intensity detected by the human nose. Sharifah et al (2011) conducted a questionnaire survey within a 2km radius of two selected active landfill sites; the respondents resided in the study areas. It was found that the bad odour coming from the landfills was disruptive to the everyday life of the neighbouring communities, affecting their outdoor activities. The survey also revealed that bad odour is often experienced at night, forcing community members to close their windows and doors to reduce the smell and that the duration and intensity of the bad odour was highly influenced by the weather, particularly the wind direction (Sharifah et al, 2011).

In analysing these precedents, it can be concluded that both case studies were conducted in developing nations that are experiencing rapid urbanization which is responsible for increasing solid

waste generation; both case studies revealed that proper solid waste management is a major problem for municipalities.

As noted in the introduction to this section, these precedents were expected to provide an early understanding of the advantages and disadvantages of living in proximity to landfill sites which is one of the objectives of this research study. It is clear that living close to a landfill site has serious negative impacts. The case studies reveal that the location of landfills often conflict with adjacent land uses because of the infamous social, economic and environmental impacts of landfills.

While the positive impacts of landfills such as offering employment opportunities or scavenging on site which are survival strategies cannot be ignored, the negative impacts surpass the positives. These negative impacts are causing increased public concern and complaints from residents residing in close proximity to the landfill site. From the precedents, it can be argued that in as much as many municipal authorities are striving to achieve efficient and effective MSW management, the management of solid waste remains unsatisfactory and therefore requires urgent attention.

International perspectives on the issues surrounding landfill sites and adjacent land uses are important. The precedent studies provide vital insight into the impacts of landfills on surrounding environments, and reveal how MSW is managed in Ghana and Malaysia, thus giving the researcher early insight into the advantages and disadvantages of living in close proximity to landfill sites.

3.5. URBAN PLANNING CONTROL

Urban growth is an issue that has been discussed in urban planning for many decades. The urban growth phenomenon is understood as an increase in the urban population which occurs as a result of two factors; the natural increase in the population and migration from rural to urban areas (Bhatta, 2010). In the post-apartheid period, the South African government has adopted legislation that seeks to bring previously disadvantaged groups of people closer to cities or urban areas as a way of correcting past distorted spatial patterns and providing equal opportunities to the poor. This has led to many poor communities settling on the urban fringe and forming spontaneous, illegal settlements due to the pull factor of proximity to urban labour markets. These settlements are seen as a means of housing the urban poor (Horn, 2009).

Fertner's (2012) study of urbanization, urban growth and planning in the Copenhagen Metropolitan Region notes that urban growth often occurs without planning, and that spatial planning relates directly to urban growth and expansion. It is argued that spatial planning is a tool that influences development, directing it to a particular route, and it can sometimes become a problem rather than a solution to urban

growth issues. Bhatta (2010) observes that it is important that consistent and well thought-out planning policies and legislation are implemented because a lack of policies and legislation may be the primary cause of uncontrollable urban growth. However, a proper urban growth legislative framework does not necessarily mean that the problem will be solved; successful implementation and enforcement is of paramount importance.

Increased urban growth and continuous land invasions and spontaneous settlements in South Africa's urban peripheries may to some extent be regarded as evidence of land-use plans which were not successfully established, developed and maintained. The formation of spontaneous settlements on the urban periphery suggests the notion of lost spaces, where large tracts of land have been left vacant or partially developed with no significant urban activities (Satterthwaite, 2007).

3.6. LAND INVASION

Conflict over land has become an endemic problem around the world, especially in developing economies. Hidalgo et al (2010) note that countries that are marked by weak political institutions, a highly skewed distribution of property, incomplete land and credit markets and poorly or unevenly enforced property rights tend to experience invasions whereby the poor or the low income class resort to activities that are illegal, invading public or private properties and occupying them as a means of meeting their housing needs until they are either forcibly expelled or granted title deeds. This section of the literature review presents a historical perspective of land invasion in the South African context. It goes on to assess land invasion as a strategy to gain access and also discusses responses to land invasion.

3.6.1. Historical Perspective

South Africa and many other nations across the world have long experienced conflict over the ownership of land. South Africa has been left with a complex and difficult legacy which is the result of the country's history of conquest and dispossessions, forced removals and racially skewed distribution of land. In the democratic era, land ownership and land development patterns continue to reflect apartheid economic and political conditions (Department of Land Affairs, 1997).

Royston (1998) notes that, apartheid policies and legislation led to racially skewed and inequitable patterns of land distribution. The author adds that the quantity and location of land allocated to Black South Africans by the apartheid regime was tightly controlled through legislation such as the Black Communities Act and the infamous Group Areas Act, along racial lines; this led to insufficient land being allocated to this population group.

Mashabela (1996) explains that, as a result of this situation, community struggles around housing became a fundamental part of the broader struggle against apartheid. Land invasion was one of the many strategies adopted by civic organisations to bring down apartheid. Land invasions that resulted in illegal spontaneous settlements on the peripheries of many urban areas across the country emerged as an alternative strategy to ensure access to land. According to Moghaddam et al (2014), many urban centres have unused spaces which are termed lost spaces as they have not been used at all or significantly. Lost spaces have no relationship with the surrounding environment. Mashabela (1996) adds that land invasions usually happen on urban peripheries, which may be lost urban spaces.

Spontaneous settlements which are discussed in depth in the following section occurred sporadically from the 1980s in South Africa, but increased significantly in 1990 and 1991 as the period of democratic reform began (Royston, 1998). The rapid growth of land invasions in the 1990s was the result of the movement from overcrowded townships and hostels, rural-urban migration and more recently, the lack of planning and indecisive action in the context of local government. Olufemi (2004) concludes that land invasion is an on-going issue in South Africa. It appears to be a desperate cry for decent and affordable housing by the poor and landless.

3.6.2. Land Invasion: A Strategy to Gain Access

In articulating the need for housing, community-driven land invasions have been adopted as an effective form of land delivery and the land invaded either becomes a recognised settlement or local government is forced to deliver (Azuela et al, 1998). Land invasion is seen as an alternative that poor people use to access land on which to erect shelters. Invasions always occur spontaneously and they are persistent because poor people, including the homeless, lack the necessary resources to build their houses formally and legally; hence, they resort to illegal and non-formal means of accessing land to build shelters.

The extent of land invasions in urban areas cannot be underestimated. Furthermore, the government's strategy of evictions remains a major challenge to land, housing and policy makers (Olufemi, 2004). Macedo (2000) notes that the majority of invaders invade land found by government authorities to be unsuitable for occupation; these areas include river banks, landfills, riparian areas prone to annual flooding and steep slopes prone to landslides, because these areas are often left vacant and are in close proximity to urban areas and job opportunities. Landfill buffer zones that are left vacant can be viewed as lost urban spaces, presenting the potential for invasion.

3.6.3. Interventions to control Land Invasion

Cases of land invasion which in the context of this study lead to unauthorised spontaneous settlements may be difficult to control or to stop completely. According to Enemark and MacLaren (2008), efficient land-use control is vital in dealing with land invasion and spontaneous settlements. The authors add that a global approach to land-use management may be a solution to these issues. The three fundamental principles of land-use management are (Enemark and MacLaren, 2008):

Decentralisation to devolve tasks to the lowest possible level so as to combine responsibility for decision making with accountability for financial, social, and environmental consequences.

Comprehensive planning that combines overall land use policies and more detailed land-use regulations into one planning document covering the total jurisdiction. This should emphasise that “planning is politics” and not just bureaucratic regulations.

Participation that serves as a means to create broader understanding of the need for planning regulations and enables locally-based dialogue between government and citizens around development opportunities and the need for development control.

Magalhaes and Eduardo (2005) note that an efficient land-use management approach is required because land invasion or the illegal occupation of land has become a widespread and recurring phenomenon that requires extensive governmental interventions. It is important that government authorities develop relevant and effective policies aimed at addressing the complexities of spontaneous settlements in urban areas. Revised urban plans and policies will provide practitioners with valuable knowledge for the design, implementation, management or control of urban issues.

In South Africa, the main response to land invasion has been evictions. Furthermore, government authorities often attempt to stop land invasions by criminalising the poor and the landless, supported by legislation such as the Unlawful Occupation of Land Act 19 (1998), further excluding the homeless in their quest to access land for secure tenure and housing. The government does not condone land invasion; hence the zero tolerance approach to the phenomenon even though it does seem to be a sustainable approach to deal with the issue (Olufemi, 2004).

Hofmeyr (2008) is of the opinion that, in its efforts to deal with land invasion and spontaneous settlements, the South African government has sent out confusing messages that have deepened the divide between the state and the urban poor and heightened opposition. Therefore, all spheres of government, national, provincial and local, must make a significant effort to promote and establish

communities that are economically and socially viable in order to prevent land invasions for residential settlements.

It can be concluded that the South African government's different responses or interventions such as evictions are not effective. While government has adopted various policies and plans, it has failed to address the primary causes of land invasions and only focuses on very low income groups and landless people. Rapid urbanization leads to the conclusion that it is not possible to have an urban area without spontaneous settlements. Urban plans and government policies should thus incorporate the poor and landless in order to avoid the continued struggle to access land through invasion.

3.7. CONCLUSION

This chapter presented insightful information that enables a broader understanding of the research topic. It reviewed the literature on landfill sites, spontaneous settlements and land invasion as well as precedent studies of relevance to this research. The literature review revealed that landfill sites are the most predominant method of waste disposal and management. The social, environmental and economic impacts associated with landfill sites were discussed. The review also examined the factors that influence the formation of spontaneous settlements. Spontaneous settlements on a landfill buffer zone occur through land invasion. Historical perspectives of land invasion in South Africa were discussed, as well as interventions to control such invasions. The precedent studies were carefully selected and evaluated and analysed due their similarities or relevance to this research.

4. RESEARCH FINDINGS AND ANALYSIS

4.1. Overview

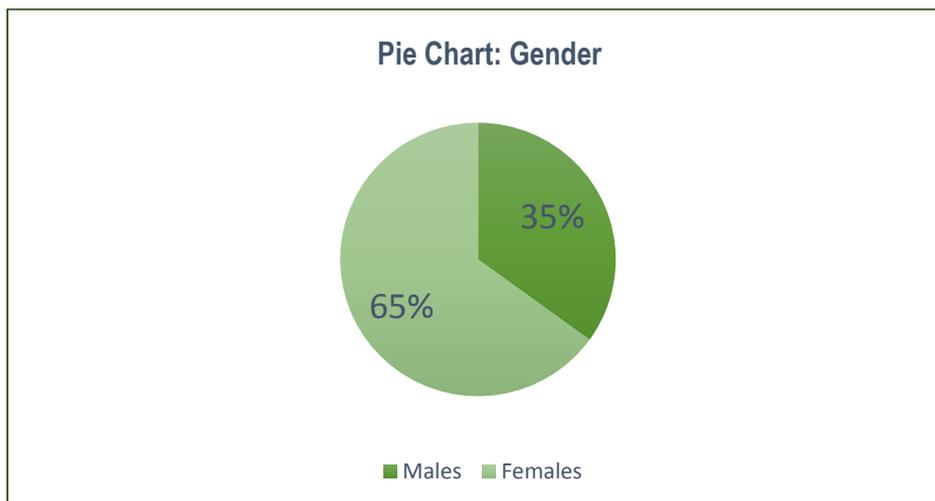
This chapter presents the analysis and findings from the data derived from various interviews. The responses were analysed using thematic analysis. The data are presented in figures to facilitate readability, followed by a discussion later in the chapter. The findings presented in this chapter form the basis for the conclusions and recommendations set out in chapter 5.

4.2. KENNEDY ROAD SETTLEMENT'S RESIDENTS INTERVIEWS

The interviews at the Kennedy Road settlement were conducted in November 2014. To ensure that the sample size was representative of the whole community, interviews were conducted on a Sunday to accommodate those that were working or at school during the week. The interviews were held from 09:00 to 18:00. One of the main obstacles was navigating through the community, as it is very dense. The representative from the Community Development Committee volunteered to accompany the researcher. This enabled different groups of people to be reached because the representative was familiar with the network of paths within the settlement. The findings are presented below.

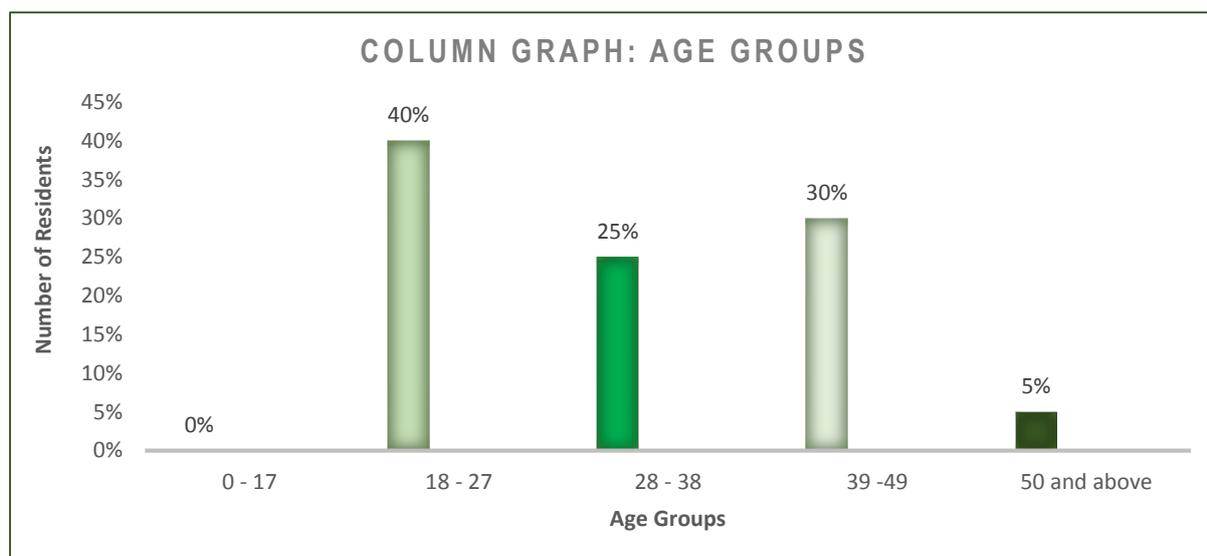
4.2.1. Demographics

Figure 3: Gender



Source: Author, 2014

Figure 3 shows that 65% of the respondents were female and 35% were male. An analysis of this trend is analysed in the analysis section of this chapter.

Figure 4: Age Groups

Source: Author, 2014

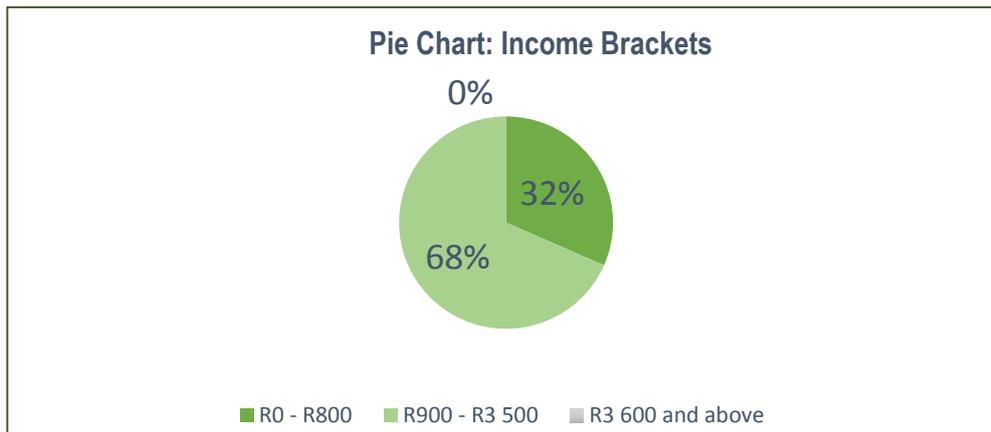
The above figure shows the respondents' age groups. The majority (40%) were aged 18 to 27 years, while 30% were between the ages of 39 and 49, 25% were in the age group 28 to 38 and only 5% were aged 50 and above.

Table 2: Employment Type

Type of Employment	Number of Respondents	Percentage (%)
Self-Employed	6	30
Disability Grant	0	0
Child Support Grant	2	10
Rental Income	0	0
Formal Employment	1	5
Other Employment (Informal, odd jobs etc.)	13	65

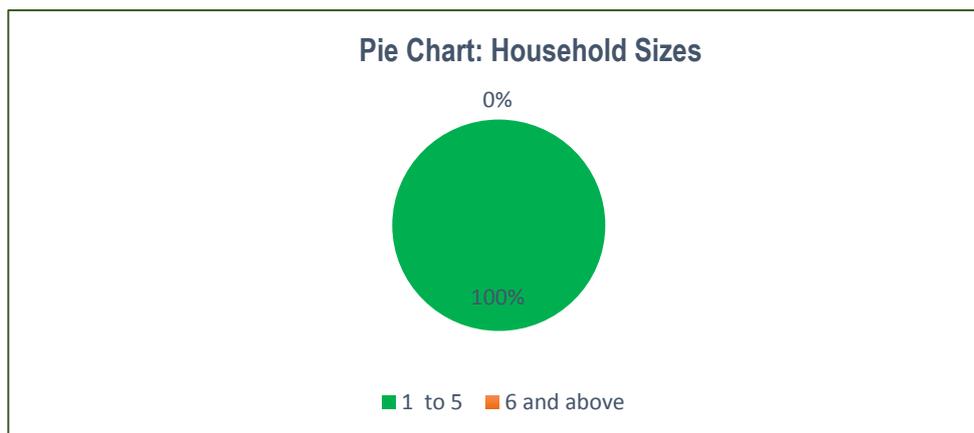
Source: Author, 2014

Table 2 shows that 30% of the respondents were self-employed while 65% depended on informal jobs, 10% received their household income from child support grants and only 5% were in formal employment. This does not reflect a community with sound economic status because the majority of the residents rely on informal jobs for their survival which often points to poor living conditions. It can thus be concluded that Kennedy Road is a low income community.

Figure 5: Household Income

Source: Author, 2014

Sixty eight per cent of the respondents received an average monthly income of between R900 and R3 500, while 32% earned between R0 and R800 a month and none earned more than R3 500.

Figure 6: Household size

Source: Author, 2014

All the respondents stated that they live in households of no more than five people. This may be due to their small shacks that cannot accommodate large groups of people.

4.2.2. Spontaneous Settlements

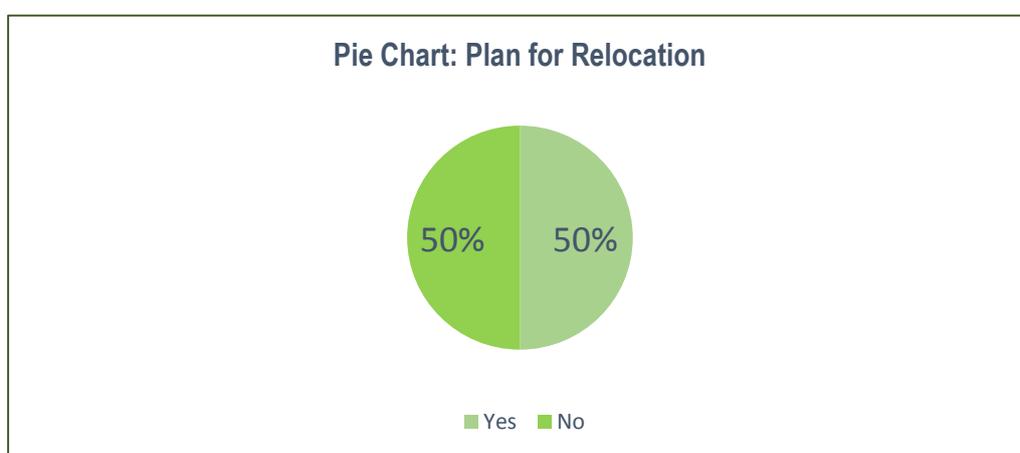
4.2.2.1. Reasons for resident location

When the respondents were asked about the factors that led to their residence location, they cited employment as the main factor. They explained that they left their homes in search of jobs and when they came to Durban, they found Kennedy Road to be the most convenient and affordable area to live; it is also close to the city centre. Others stated that Kennedy Road is close to their work places.

4.2.2.2. Living Conditions

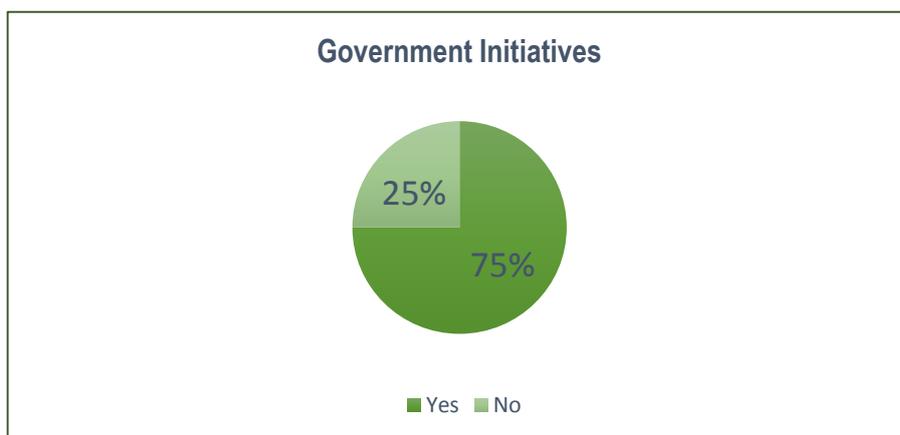
Seventy five per cent of the respondents complained that they live under very bad conditions which have affected their lifestyles. Concerns raised included poor service provision (sanitation, water and electricity), frequent shack fires, no decent houses, an uncontrollable community, bad odours from the landfill site, and high levels of crime and violence. Twenty five per cent of the respondents stated that they live under good conditions, do not experience any problems and feel privileged that they have shelter and do not have to pay rent. These respondents felt that the problems the community experiences are similar to any other residential area and they were happy that the Community Development Committee was committed to resolving any problems.

Figure 7: Relocation Plans



Source: Author, 2014

Asked about their future plans for relocating from Kennedy Road to another residential area, 50% of the respondents said that they had no plans to relocate because they believe that there is hope for the development of the area. They added that they had adapted to the living conditions and the settlement is more affordable than other areas and is also convenient since it is situated close to their places of employment. The 50% of the respondents that stated that they plan to relocate said that this was due to the fact that they were not happy with the environment. They complained of high crime rates and slow service provision and were not convinced that the community would be developed or upgraded.

Figure 8: Government Initiatives

Source: Author, 2014

The respondents were asked if they were aware of any government initiatives to uplift their community. Seventy five per cent answered in the affirmative, citing various government initiatives that have helped their community, including employment programmes, the provision of tin houses for a small percentage of the total population, and the provision of sleeping sponges, toilets and water. The government has also built a community hall. One respondent stated that the government is always prepared to help the community, especially during times of crises. Twenty five per cent of the respondents were not aware of any government efforts or initiatives to help their community.

4.2.2.5. Residents' Perceptions of the Future of the Community

The majority of the respondents felt that there is no future for their community. They were of the view that, while government has made promises to develop the community, these promises have not been kept. It is therefore unlikely that development will take place and the people of the Kennedy Road community will continue to suffer. The respondents also stated that their concerns are not being taken seriously; they felt that the community will remain in its current state for another 50 years or more. However, other respondents argued that they were content with the living status of the settlement and they further elaborated that they do not see anything wrong with their settlement or the way in which they live.

4.2.3. Landfill Sites

4.2.3.1. Community Benefits from the Landfill Site

Asked if they benefitted at all from the landfill site, only one respondent answered in the affirmative and explained that they received employment from the site and were grateful for the opportunity.

4.2.3.2. Negative Impacts of the Landfill Site

A significant number of respondents identified negative impacts of the landfill site, including:

- Dust
- Bad Odours
- Noise
- Renting out of electricity from the landfill site to the Kennedy Road residents
- Criminals use the landfill site as a hiding spot
- Run-off water with waste from the landfill during the rainy season
- Wind-blown waste

Respondents stated that these impacts have severely affected their lifestyles, especially their health. A very small number of respondents responded that they were not aware of any negative impacts. They added that, when there were negative impacts in the past, they raised their concerns and the landfill operators assured them they would minimise the impacts. They said that they had not experienced problems since then.

4.2.3.3. Negative Impacts: Residents' Protection Initiatives

Asked what measures they had adopted to protect themselves from the negative impacts noted above, only a few respondents said that they had adopted measures such as trying to keep their doors and windows closed at all times possible, while other mentioned that they bath regularly and use antiseptics to protect themselves from germs that may be present in the area. A significant number of respondents answered no to this question and explained that they are unable to protect themselves from the negative impacts, with one respondent elaborating that they have adapted to their living conditions.

4.3. INTERVIEW WITH A REPRESENTATIVE OF KENNEDY ROAD'S COMMUNITY DEVELOPMENT COMMITTEE

The Kennedy Road settlement's community development representative plays the role of a ward councillor. He is a man in the 39 to 49 age group who has formal employment, resides in a household of less than five people, and earns an average income of between R0 and R800 per month.

4.3.1. Asked about the role of the Community Development Committee, he stated that, *'there are ten members in the community development committee. We deal with different issues ranging from housing delivery to safety and security in the area. Community members report issues of concern to us and we then report to the relevant stakeholders.'*

4.3.2. Concerning living conditions in Kennedy Road, the interviewee explained that, the first problem that the community faces is overcrowding; he added that the problems are self-evident; people do not have decent houses, sanitation and electricity.

4.3.3. The interviewee stated that the main issues raised by community members with regard to the planning or future development of the Kennedy Road community are the provision of water, electricity, toilets and housing.

4.3.4. Asked about the relationship between the Bisasar Road landfill site and the Kennedy Road settlement, the Community Development Committee representative described this relationship as good due to effective communication channels. The community has been able to raise issues such as the bad odour. The landfill operators took the matter seriously although change is not quick to come about.

4.3.5. The interviewee identified both negative and positive impacts of the landfill on the Kennedy Road community.

- The negative impacts are most prevalent during the winter season; when it is windy, waste from the site is blown into the community. Other impacts include bad odours and noise from the landfill trucks.
- Employment is a positive impact; the interviewee explained that some Kennedy Road community members receive employment from the landfill site.

4.3.6. Asked about the relationship between the community and the municipality, the interviewee stated that everything that happens within the community happens through the municipality. For example, when many shacks were burnt, the municipality put great effort into building new shacks for those affected.

4.3.7. With regard to current and future municipal development initiatives in the community, the interviewee stated that the municipality had promised many things and had fulfilled most of their promises. For example, they introduced container toilets and stand pipes, but when it comes to housing delivery, the community is still waiting.

4.3.8. The interviewee's extensive knowledge of issues affecting the Kennedy Road community enabled the identification of the root causes of its continued growth, including:

- Unemployment
- Close proximity to urban centres

- Affordable housing

4.3.9. Asked about the future of Kennedy Road considering on-going issues such as housing development and environmental management, the interviewee explained that, while progress is slow, the community believes that development will take place in the future. In the meantime, they are learning to adapt to their living conditions in order to maintain a positive view of their future.

4.3.10. The interviewee stated that the message that the Community Development Committee would like to send to municipal officials with regard to planning and developing Kennedy Road is that full community collaboration should be encouraged and all relevant stakeholders should be fairly and equally represented in development projects, especially community members or representatives since they are aware of the major issues confronting the community and what is required of short or long term development plans.

4.3.11. The final comments made by the Community Development Committee representative were that, with everything that is happening in Kennedy Road, their greatest concern is children. Many children in the community do not receive an education, negatively affecting their future prospects. Children's health is also of concern due to poor sanitation.

4.4. ETHEKWINI MUNICIPAL OFFICIALS' INTERVIEWS

Municipal officials declined to participate in this research study due to the sensitivity of the project.

4.5. KWAZULU-NATAL (KZN) DEPARTMENT OF HUMAN SETTLEMENTS INTERVIEW

4.5.1. The interviewee defined spontaneous settlements as follows:

"They are unplanned settlements which result from the lack of provision of suitable land and housing by municipalities."

4.5.2. One of the objectives of this research study was to understand the factors that influence the formation of spontaneous settlements. The KZN Department of Human Settlements representative was asked to identify the main factors that influence the formation or emergence of spontaneous settlements. His response was:

"Poverty, unemployment and lack of suitable or affordable housing opportunities in urban areas"

4.5.3. The representative was asked if spontaneous housing formation or developments are more of a political issue than a technical or an urban design one. His response was:

“Not all the time, there are special challenges that municipalities need to address by preparing housing set up plans that talk to the current status quo of their cities”

4.5.4. The interviewee was asked to identify the biggest challenge in eradicating spontaneous settlements. He responded as follows:

“Funding, suitable alternative land and provision of supporting bulk infrastructure”

4.5.5. When it comes to the question of whether we can plan for spontaneous settlements, the interviewee emphasised that:

“Yes we can plan for spontaneous settlements by accommodating them for future development through allocating land for new settlements within the Spatial Development Framework (SDF) and the Integrated Development Plan (IDP).”

4.5.6. With regard to the Kennedy Road settlement, the interviewee was asked if there are any plans to provide housing for the settlement. He responded:

“In terms of the department’s Community Residential Unit (CRU) and social housing, there are no planned pipeline projects for Kennedy Road within the next three years”

4.5.7. The interviewee was asked his opinion of the future of Kennedy Road and he stressed that:

“It has potential for disease spread, it is a red flag because people are going to the Bisasar Road landfill for food and children play there. The landfill site is very hazardous especially with fumes coming from the site. Kennedy Road needs to be prioritized by the municipality for relocation”

4.5.8 The interviewee's final comments included:

“The challenge is we will never meet the housing demand but we have to deliver what we can in a manner that is sustainable and respond to people’s needs”

4.5. DISCUSSION

This section analyses the study’s findings using thematic analysis. This will facilitate the interpretation of the findings, the generation of opinions and the implications of the findings. The primary purpose is to answer the research questions posed in chapter 1, to prove or disapprove the hypothesis and to confirm that the study’s aims and objectives have been achieved.

4.5.1. Analysis

4.5.1.1. Demographics

Figure 3 showed that more females participated in the study than males; this implies that there are more females living in Kennedy Road than males. According to Ricketts (1989), the continued growth of female-headed households is of grave concern because these households are often more affected by poverty than other families, due to children's dependence on their mothers and thus women's ability to work. It was found that the majority of the respondents earned between R900 and R3 500 per month, with the rest earn less than R800 a month; this indicates that Kennedy Road is a low income community with most of its residents living below the poverty line.

Table 2 showed that 65% of the respondents were employed in the informal sector, 35% were self-employed, 10% were dependent on the child support grant and the remaining 5% were employed in the formal sector. It was noted in chapter 3 that Kennedy Road began as a place of transition to accommodate migrants from the countryside and other areas of KZN in search of better opportunities. The reason why only a small percentage of the population is employed in the formal sector may be the fact that when many migrants' families move to the cities, spontaneous settlements tend to grow. It then becomes difficult for the formal sector to provide jobs to these migrants who often do not have the requisite education or skills to work in this sector. Ultimately, the informal sector offers employment opportunities. Kennedy Road is no exception.

The majority of the respondents were aged between 18 and 27, with very few aged 50 and above. This signifies that Kennedy Road has a young and productive population. The settlement is located on the urban fringe and therefore offers access and opportunities to urban environments; it has therefore attracted the young age group that is highly mobile and seeking employment and better opportunities. The fact that few people aged 50 and above seem to be attracted to this area may be because this age group is no longer productive and is no longer able to source opportunities in urban environments which require them to be very productive. People in this age group are thus more likely to relocate to their rural homes.

Figure 6 showed that all the respondents lived in households with five or less members. Many houses in spontaneous settlements are very small and are used for multiple purposes; therefore they cannot accommodate more than five people. Personal observations revealed that the Kennedy Road settlement is overcrowded with many people and shacks that are in reality more suitable for only one person.

5.5.1.3. Spontaneous Settlements

This research study was guided by the location theory, the theory of lost spaces and the theory of concentric zones. Location theory seeks to explain the choices of geographic location; therefore it was important to understand why residents chose to live in Kennedy Road. All the respondents cited employment opportunities as the main pull factor for living in the settlement. This is due to the fact that Kennedy Road is close to the city of Durban with its rapidly growing economy. It therefore offers easy access to the urban environment, and savings on transport and accommodation.

Despite these seeming advantages, residents' lifestyles are compromised by the negative impacts of the settlement's proximity to the landfill site. The respondents stated that they live under very bad conditions. Personal observations suggest that the community suffers severe material deprivation, and the respondents pointed out that they do not have decent houses and lack adequate services including water and sanitation. The community leader explained that the problems in Kennedy Road need no explanation since they are very much evident. Community members also noted that there are frequent shack fires due to illegal electricity connections and the paraffin lamps and candles used by those that have no access to electricity.

While it was not possible to solicit the views of officials from EThekweni Municipality, the municipality seems to be overwhelmed by the increased number and growth of spontaneous settlements within the municipality, and are hard pressed to provide basic services to such settlements. It can be concluded that living conditions in the settlement are similar to those in other such settlements, not only in Durban but South Africa as a whole.

The representative from the Department of Human Settlements defined spontaneous settlements as housing that is not planned. One of the objectives of this research study was to determine whether or not it is possible to plan for spontaneous settlement. This interviewee was of the opinion that this is possible by accommodating them in future development plans. He added that the biggest challenges in eradicating spontaneous settlement are funding, the lack of suitable alternative land and the provision of infrastructure. This suggests that the issue of spontaneous settlements is complex and persistent and thus needs to be prioritised and carefully planned for.

With regard to living conditions, roughly equal numbers of respondents planned on relocating and remaining at the settlement. It is generally assumed that people living in spontaneous settlements have a sense of helplessness and tend to adapt to their living conditions. The respondents that do not plan to relocate may therefore have adapted to their living conditions, and may have psychologically accepted these conditions. Lack of motivation and initiative to improve their current social and economic

conditions may be another reason why people do not plan to relocate. Those that plan to do so are very aware of the bad living conditions in the settlement.

Planning and development interventions are required from government in response to spontaneous settlements. Therefore, it was important to establish whether or not the respondents were aware of any government initiatives to uplift the Kennedy Road settlement. 75% of the respondents stated that they were aware of such initiatives while 25% stated that they did not know of any initiatives. This suggests that the government is indeed making an effort to help the community; the fact that some respondents were not aware of any government initiatives may be due to a lack of exposure or communication with regards to such initiatives.

A significant number of respondents felt that there is no future for their community. They noted that development is likely to never occur, because the government has made many promises such as the provision of decent housing, but most of these promises have not been kept. South Africa has a long history of racial segregation; the Black majority were forced to live in under-serviced areas not appropriate for human habitation such as spontaneous settlements. The democratic government is still struggling to eradicate the injustices of the past; therefore the provision of services or the upgrading of spontaneous settlements, including Kennedy Road, has been a long process. Other challenges that hinder the development of the Kennedy Road settlement include its geographic location running through a steep slope and being adjacent to a landfill site, making it almost impossible for development or proper planning of the area.

5.5.1.3. Landfill Sites

Landfill sites often offer opportunities to local communities such as jobs and monitored scavenging. It was therefore important to establish whether or not the Bisasar Road landfill site offered any opportunities to the residents of Kennedy Road since they are in close proximity to each other. Only one respondent stated that they were receiving benefits from the landfill sites with the rest are unaware of any benefits. It should be noted that, allowing scavenging or access to the landfill site to waste pickers may have negative impacts as they might disrupt or interfere with the daily operations at the site, and scavenging might pose risks to scavengers' health and safety.

A significant number of the respondents complained about the negative impacts of the landfill site, including dust, bad odours, noise, the renting out of electricity by the landfill operators to the community, criminals' use of the landfill site as a hiding place, and wind-blown waste and run off water from the site to the community during some seasons. While landfill sites have both negative and positive impacts, the predominant impacts felt by the Kennedy Road community are negative. This may

be due to the fact that the settlement is located in very close proximity to the landfill site, specifically on the landfill buffer zone which was meant to separate the landfill from other land uses including residential areas. The respondents explained that, while they are aware of the impacts of the site, they are unable to protect themselves; only a few respondents stated that they take measures to protect themselves from the negative impacts.

5.5.1.4. Comments

In analysing the findings, it can be concluded that Kennedy Road is a low income residential area that is poorly serviced. It is dominated by those in the productive age group, and its residents are predominantly female. The residents of Kennedy Road live below the poverty line and chose to live in the settlement despite the detrimental impacts of the landfill site that is adjacent to the community and the bad living conditions due to their quest to find employment in the urban environment. The community is aware of the poor living conditions, but are reluctant to move because they are able to gain access to the opportunities offered by the urban centres in the settlement's proximity. They are also aware of government initiatives to help them, but believe that the government makes promises that are never kept. Those that recognise the government's efforts to help uplift the community feel that development is very slow and that their social and economic predicament persists despite these efforts. Therefore the majority of the residents believe that there is no positive future for their community.

- *Research Problem:* The problem statement for this research study highlighted that living in close proximity to landfill sites can have adverse effects on the surrounding environment and human health. The findings of this study show that the Kennedy Road settlement which is located on a buffer zone of the Bisasar Road landfill site, experiences detrimental effects from the landfill site including, amongst many; dust, smell and noise pollution.
- *Hypothesis:* The hypothesis set out in chapter 1 argued that spontaneous settlements emerge on vacant urban land through land invasion by the urban poor in search of land for housing. The study's results confirm the hypothesis; Kennedy Road residents moved into the area because it was vacant, underutilised urban land that helps them meet their need for housing at an extremely low cost.
- *Aims and Objectives:* The main aim of this research study was to understand the factors that influence the emergence of spontaneous settlements in close proximity to landfill sites. The results reveal the dynamics that influence people's decision to live in spontaneous settlements,

such as searching for employment and the inability to afford urban housing. The objectives of this study were:

To determine the costs of living in close proximity to a landfill site.

The research results revealed that there are negative costs to living in close proximity to a landfill site, there are many detrimental effects associated with landfills. From the findings, respondents clearly indicated the major costs which they face include bad odour, noise pollution, wind-blown litter and dust amongst many. The costs of living in close proximity to a landfill site have been determined.

To establish whether it is possible to plan for spontaneous settlements.

Although it was not possible to gain insight from the eThekweni municipal officials on whether spontaneous settlements can be planned for, the KZN department of Human Settlement was of assistance in answering this objective. The interview with the representative from the department revealed that it is possible to plan for spontaneous settlements by accommodating them for future development through the allocation of land for new settlements within the Spatial Development Framework (SDF) and the Integrated Development Plan (IDP).

To gain insight into the major challenges in eradicating spontaneous settlements.

There are major challenges to eradicating spontaneous settlements. These challenges have been revealed from the study findings as; funding, suitable alternative land and provision of supporting bulk infrastructure.

- *Concept and Theories:* The buffer zone concept provided a clear understanding of buffer zones and three relevant theories helped to ground this research. These were the lost space theory, the concentric zone theory and location theory. By understanding the lost space theory, it can be stated that the piece of land that Kennedy Road settlement emerged on was perceived to be an urban lost space. The location theory allowed the understanding of the factors that influence the choice of location, and from the results, it is clearly revealed Kennedy Road was chosen as a settlement because of the opportunities the area offers which include housing at very low cost and the area's closeness to employment opportunities. Through the concentric zone theory, it is revealed that Kennedy Road is situated outside the city of Durban which is the central business district, it can then be concluded that the settlement is a zone of transition which is the zone following the CBD zone.

- *Significance of the Results:* The results are important in generating conclusions with regard to the research topic and allow for recommendations to build the body of knowledge and offer new directions for future research.

- *Implications of the Study:* There is a need for future research on spontaneous settlements and how they develop. The results of this study identified elements that could be investigated such as municipalities efforts to dealing with spontaneous settlements and which types of housing projects can be implemented to deal with such issues.

4.6. Chapter Summary

This chapter has presented the findings of the study and went on to discuss and analyse them in depth. From the results, the research aims and objectives have been achieved. Theories and concept were also tested and their relevance to this study has also been presented.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. An Overview

The conclusions and recommendations of this research study are drawn from the case study of the Kennedy Road settlement through the data collected from various stakeholders. The findings and analysis allowed an understanding of the complexities that lead to the formation and continued growth of spontaneous settlements in close proximity to landfill sites. The study's hypothesis was that spontaneous settlements are the result of the invasion of vacant land which in this case is a vacant landfill buffer zone, by the urban poor in search of cheap land for housing. The initial aim was to understand the complexities of spontaneous settlements in close proximity to landfill sites. The heart of this dissertation is Chapter 4, which presented the study's findings and the analysis, allowing clear conclusions and recommendations to be drawn and presented for knowledge building and for the purpose of future research.

5.2. Outcomes

This study aimed to understand the complexities that lead to the formation of spontaneous settlements on vacant landfill buffer zones. Chapter 4 showed that a range of compelling reasons contribute to both the formation of spontaneous settlements and their persistence. The inability to afford housing in urban environments and the search for employment were identified as the two main factors that influenced the formation and continued growth of the Kennedy Road settlement. The advantages and disadvantages of living near a landfill site were also highlighted, with the major advantage being jobs at the landfill for Kennedy Road residents and the main disadvantage being the negative impacts of the landfill site. The research questions and objectives set out in chapter 1 were therefore answered.

The study's findings responded to its hypothesis and aims and objectives. It was noted that the main factor that influenced the choice of location was employment. It can also be concluded that Kennedy Road residents live under very bad conditions, lack basic services and decent housing and suffer the negative impacts of the Bisasar Road landfill site. Almost half of the respondents stated that they were reluctant to move from the settlement because the urban environment offers opportunities such as employment. Those that indicated that they planned on relocating added that they feared that they would not be able to afford housing in the urban centre. The location theory which guided this study was useful in determining the reasons for the choice of geographic location.

5.3. Summary of Research Findings

5.3.1. Demographics

There were more female than male respondents, suggesting that more women live in the settlement. A large number of the respondents were employed in the informal sector and earned an average salary of between R800 and R3 500 per month. Kennedy Road is dominated by a youthful and productive population between the ages of 18 and 27, followed by the 39 to 49 and 28 to 38 years age groups. There are few people over the age of 50. The small size of the shacks in the settlement means that most households comprise of five people or less. In a nutshell, Kennedy Road is a low income residential area characterised by impoverishment, inadequate facilities and services and deprived living conditions.

5.3.2. Spontaneous Housing

Kennedy Road is a spontaneous settlement. People residing in this settlement live under very bad conditions. They lack basic services such as adequate water, sanitation, electricity and housing. Residents are well aware of their living conditions and are also aware of the government's efforts to help plan and manage their community. However, they argue that service delivery is very slow; therefore development or upgrading of the Kennedy Road settlement that upholds human rights is unlikely to occur. Many of the respondents expressed the desire to move out of Kennedy Road, while others stated that it is their home and they do not plan on relocating because they have adapted to their living conditions.

5.3.3. Employment

Employment as an economic factor is the main force that influenced residents to live in Kennedy Road; residing in the settlement is thus a 'survival strategy'. The lack of employment in the areas where they used to live pushed them out of these places and pulled them to Kennedy Road that is situated on an urban fringe, providing convenient access to the urban environment that offers many opportunities such as employment. Some residents have found jobs, while others are still looking for work. Many of the respondents work in the informal sector and earn low wages which are sufficient to sustain them but not to afford expensive urban housing. They resorted to living at Kennedy Road because of the availability of land and cheap housing.

5.3.4. Landfill Site

Kennedy Road is located on the Bisasar Road landfill buffer zone; buffer zones separate one land use from another for various reasons. In the case of a landfill site, a buffer zone is meant to protect the adjacent land uses from the infamous harmful effects of landfills. There is no buffer zone between the Kennedy Road settlement and the Bisasar Road landfill site; the findings of this study therefore show

that residents experience harsh impacts from the landfill site because of the close proximity of these two land uses. The impacts include dust, noise from the trucks on site, bad odours, the renting out of electricity from the landfill site to the Kennedy Road residents, criminals using the landfill site as a hiding place, run-off water with waste from the landfill during the rainy season and wind-blown waste. The majority of the Kennedy Road residents are unable to protect themselves from these harsh impacts and only a few are taking precautionary measures such as keeping their doors and windows closed most of the time. Despite these negative impacts, the community receives some benefits from the landfill such as employment.

5.3.5. Municipal Planning

Kennedy Road is an illegal spontaneous settlement located on land that is supposed to be a buffer zone for the Bisasar Road landfill site; land reserved for a different purpose was invaded by the Kennedy Road residents. It is EThekweni Municipality's responsibility to plan and manage the settlement. Municipal officials did not participate in this study, making it impossible to gain a broad understanding of municipal planning and management of the Kennedy Road settlement.

5.4. RECOMMENDATIONS

Based on the findings of this research study, it can be concluded that, as a democratic country, South Africa is failing in its approach to spontaneous settlements because of the continued formation and growth of these settlements in the urban landscape. Seen through a humanitarian lens, in most cases spontaneous settlements are not suitable or appropriate for human habitation. Approaches to deal with these types of settlements can be regarded as ineffective in the sense that poor urban inhabitants living in spontaneous settlements are marginalised from the country's democratic vision which enforces human rights and promotes equality and fairness for all. The following recommendations are therefore made to guide future approaches to planning and managing spontaneous settlements as well as providing ideas for future research on issues pertaining to spontaneous settlements.

- *Transformation of vacant, underutilised urban spaces*

Despite South Africa's continued efforts to adopt and implement housing programmes and policies to meet constant demand, the country is battling to provide decent housing for its population, particularly the urban poor. To meet their need for housing, the urban poor have invaded vacant, underutilised urban spaces. It is therefore vital that urban planners prioritise the transformation of vacant urban land into sustainable urban amenities that will benefit urban residents and to an extent, the ecosystem. This land could be transformed into active green open spaces or gardens that will help to improve urban biodiversity or strengthen the city's greenbelt, offering various benefits such as carbon absorption or the beautification of urban neighbourhoods. Landfill buffer zones are often left vacant and inactive. It is of

paramount importance that they are well managed and transformed into amenities in an early effort to avoid invasion that may result in spontaneous settlements.

- Promotion of Collaborative Planning

Proper planning is critical in all processes; therefore it is important that the authorities work directly with residents in dealing with issues pertaining to spontaneous settlements in order to gain a broader understanding of the actual dynamics of the settlements and establish relevant and effective development programmes that are not purely based on theoretical assumptions. Collaborative planning that involves all relevant stakeholders will promote future development or upgrading plans that are implementable on the ground, instead of focusing on relocation programmes.

- Enforcement of Legislation

Landfill sites have serious environmental and health impacts, and people residing in close proximity to such land uses are at risk of being highly exposed to these impacts. In a democratic country like South Africa, it is important that environmental justice be at the heart of discussions about landfill sites and their impact on adjacent residential areas. Kennedy Road requires urgent attention because residents' health is being compromised. It is vital that that the country's comprehensive and rich legislation, including the constitution, protects citizens from exposure to hazardous environments. Immediate action is therefore required to deal with the issue of the Kennedy Road settlement.

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CONSENT FORM FOR RESEARCH PARTICIPANTS

Title of Project

Understanding the Complexities of Spontaneous Settlements in Close Proximity to Landfill Sites: A Case study of Kennedy Road Settlement, eThekweni Municipality.

Purpose of the Study

As part of the requirements for a Masters degree in Town and Regional Planning, I have to carry out a research study. The purpose of this study is to understand the dynamics or the complexities that influence invasion of landfill buffer zones that result in the development of residential settlements

Voluntary participation

your participation in this research study is voluntary. You may choose not to participate and you may withdraw your consent to participate at any time. You will not be penalized in any way should you decide not to participate or to withdraw from this study.

Who has reviewed this study?

The University of KwaZulu-Natal's Department of Ethics has reviewed the proposal of this research study and they have approved it, allowing the study to take place.

Confidentiality:

Your participation in this study will remain confidential, and your identity will not be stored with your data. The data will be kept confidential for the duration of the study. On completion of the thesis, they will be retained by the University of KwaZulu-Natal for Five years and then destroyed.

Time required: Participation will take approximately thirty minutes to complete.

For further queries

If you need any further information, you can contact me

Name and Surname: Jeconitta Mogano

Phone Number: 079 7471 730

Potential benefits

There are no known benefits to you that would result from your participation in this research

Consent

I.....agree to participate in the research study conducted by Jeconitta Mogano.

- The purpose and nature of the study has been explained to me in writing.
- I am participating voluntarily.
- I give permission for my interview recorded
- I understand that I can withdraw from the study, without repercussions, at any time, whether before it starts or while I am participating.
- I understand that I can withdraw permission to use the data within two weeks of the interview, in which case the material will be deleted.
- I understand that anonymity will be ensured in the write-up by disguising my identity.
- I understand that disguised extracts from my interview may be quoted in the thesis and any subsequent publications if I give permission below:

(Please tick one box :)

I agree to quotation/publication of extracts from my interview

I do not agree to quotation/publication of extracts from my interview

I have read all the information provided on this form, I am at least 18 years of age and above, and consent to participate in this study

Participant:

Name of Participant

Signature

Date

Researcher:

Name of Researcher

Signature

Date

Questionnaire Number:



Time of Interview

Start:.....

End:.....

Date:.....

Master of Town and Regional Planning (2014)

Dissertation Questionnaire

Dissertation Topic:

Understanding the Complexities of Spontaneous Settlements in Close Proximity to Landfill sites: A case study of Kennedy Road Settlement, EThekweni Municipality

Identification of Respondents

PROVINCE: KWAZULU-NATAL

INTERVIEW LOCATION: Kennedy Road Settlement

Interview Status:

COMPLETE

NOT COMPLETE

READ OUT LOUD

There is no right or wrong answer. The interview will take about thirty minutes. Your answers will be confidential. They will be put together with nineteen other people I am talking to in Kennedy Road Settlement to get an overall picture. I will not be recording your name, and it will be impossible to pick out from what you say, so please feel free to tell me what you think.

You have the right to terminate this interview at any time, and you have the right to refuse to answer any questions you might not want to respond to. Are there any questions you wish to ask before we begin? _____

Specify: _____

2.5. What do you think is the future of this community with regards to the issues that seem to be persistent (housing development and environmental management issues)

3. LANDFILLS

3.1. Are there any benefits that you receive from the landfill? If yes, what are they?

3.2. The Bisasar Road Landfill is in very close proximity to this settlement (Kennedy Road), Are you aware of the negative impacts that come from the landfill? If yes, can you list at least two?

Questionnaire Number:



Time of Interview

Start:.....

End:.....

Date:.....

Master of Town and Regional Planning (2014)

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Specify: _____

2.5. What are the impacts (both negative and positive) of the landfill on Kennedy Road?

2.6. With regards to the issues ranging from housing delivery to waste management, would you say that there is a positive relationship between this community and the municipality?

2.7. What are the current or future development initiatives or project being implemented by the municipality?

3. FINAL COMMENTS

3.1. What message would you send to municipal authorities (e.g. housing and town planning departments) with regards to the planning and development of this community?

3.2. Do you have any final comments? If yes, what are they?

We have come to the end of the interview. Thank you for participating!

Questionnaire Number:



Time of Interview

Start:.....

End:.....

Date:.....

Master of Town and Regional Planning (2014)

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Specify: _____

Base Map: Kennedy Road Settlement and Bisasar Road Landfill Site



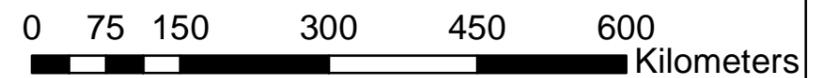
Locality Map: EThekweni Municipality



LEGEND

-  Highway Roads
-  Major Roads
-  Kennedy Road Settlement
-  Bisasar Road Landfill Site

1:7,620,360



Prepared by: Mogano Jecanitta
Email: jecanittam@gmail.com

Date: November 2014

UKZN: Master of Town and Regional Planning