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UNIVERSITY OF THE WITWATERSRAND

INVESTIGATING RESIDENTS' PERCEPTIONS OF ENVIRONMENTAL HEALTH IN INFORMAL SETTLEMENTS OF SOUTH AFRICA: THE CASE OF MAKAUSE, EKURHULENI MUNICIPALITY.



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DECLARATION

I declare that this research project is my own. It is being submitted for a master's degree (MSc DP) in partial fulfillment of the requirements of the School of Architecture and Planning at University of Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other Universities.

References have been duly acknowledged.

_____

Ntandokabawo James

_____

Date

ABSTRACT

The relationship between humanity and environment influences the health and quality of the environment. In turn, the state of the environment determines the quality of life that inhabitants are bound to live. Urbanization and shortage of housing among the economically deprived groups coupled with lack of affordable housing has encouraged formation of informal settlements in cities throughout South Africa. Poor environmental health conditions are characteristic of such settlements, and these conditions can be attested to numerous factors such as politics, policies as well as failure by local municipalities to strategically improve living conditions of the economically disadvantaged.

Twenty years into the new democratic South Africa, communities in these informal settlements are still faced with environmental uncertainties, poor service delivery and forced removals. Authorities are failing to come up with strategies that counter the ever growing urban poor populations that often result from migration of poverty. Communities of these settlements are not homogenous, and thus they perceive their prevailing environmental health conditions differently depending on their world view.

Makause informal settlement in Ekurhuleni Metropolitan Municipality (EMM) lack basic services such as sanitation, water and electricity, which compromise the environmental health of the area. Residents of this settlement have a history of staging marches in a quest to obtain basic services. Their protests have been intercepted by the heavy arm of the law in the form of South African Police Services. This has been tailored into many other factors that can inform perceptions of their prevailing environmental health. The focus of this dissertation is to investigate local environmental health perceptions in Makause informal settlement with attention to factors that inform these perceptions.

Semi-structured interviews formed the major research method employed for this research with a random selection of interviewees from the settlement. The sample generally expressed dissatisfaction with their prevailing environmental health and living conditions. This points to the fact that the government is faced with a task to improve living conditions in informal settlements around the country.

DEDICATION

This research report is dedicated to the James family (oJama kaSjadu, oFakade amaZizi anmnyama nenkomo zawo). My mother, sis' Thembeka James; my siblings uBheki, Thobekile, Duduzile, Thembinkosi, Sphiwo and Kholwani

Without the love and support, nothing is possible.

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To the Lord my saviour, words cannot describe what you are to me, indeed:

"*You, Lord, are all I have, and You give me all I need; my future is in Your Hands*" (Psalm 16: 5)

Special thanks to my supervisor, Dr Brian Boshoff. Thank You very much for your guidance and patience throughout the preparation of this research report.

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Thanks to Alfred 'General' Moyo and the members of MACODEFO for the warm welcome, protection and support during my field work in Makause. This wouldn't have been successful without your help.

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Thank You

UThixo anomeleze!

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ACRONYMS

ANC	African National Congress
CoJ	City of Johannesburg
DA	Democratic Alliance
DLF	Democratic Left Front
EIA	Environmental Impact Assessment
EJNF	Environmental Justice Networking Forum
EMM	Ekurhuleni Metropolitan Municipality
EU	European Union
HAD	Housing Development Agency
HIV / AIDS	Human Immunodeficiency Virus / Acquired Immunodeficiency Syndrome
IDP	Integrated Development Plan
IDRC	International Disaster Reduction Conference
IPCC	Intergovernmental Panel on Climate Change
MACODEFO	Makause Community Development Forum
SAPS	South African Police Services
SERI	Social and Environmental Research Institute
TB	Tuberculosis
TSF	Tailings Storage Facility
UN	United Nations
UNICEF	United Nations Children's Fund
UN DESA	United Nations Department of Economic and Social Affairs
US / USA	United States / United States of America
WHO	World Health Organization

CHAPTER 1: GENERAL ORIENTATION AND INTRODUCTION

Human actions associated with industrialisation, power generation and urbanisation in a quest for improved living conditions and standards has greatly altered the health of the environment. Rapid urbanisation, especially in the developing world has led to unmet demand on affordable housing and other public services. In South Africa, this has resulted in sprawling of alternative forms of housing such as informal settlements which are characterised by lack of service delivery and poor sanitation (Von Schirnding, 1994). These conditions further deteriorate the state of the environment since the poor, who often occupy these settlements are given no choice but to use the available sources of energy that further degrade the environment.

Informal settlements often lack decent housing and basic infrastructure (Lohnert, 2001), which often leads to poor environmental health and living conditions. The peripheral nature of informal settlement communities to socio-economic activities makes poverty a cycle that regenerates itself within them. It takes much courage and dedication for poor people from informal settlements to make it to the mainstream economics and socio-political spheres in South Africa. Poverty plays a major role in impeding informal settlements residents' from acquiring proper sanitation and service delivery so as to maintain or improve the environment they live in. Due to this predicament, environmental health in informal settlements is often degraded and the residents are vulnerable and prone to infections and diseases that result from their close interaction with the environment.

Environmental health is fundamentally concerned with the wellbeing of residents as well as the aspects of health as determined by the environment (Von Schirnding, 1994); these encompass land, air and water pollution as well as the state of the environment. When compromised, the state of the environment has negative effects on the inhabitants making them prone to numerous diseases and infections. There is a general increase in the linkages between health and the environment, and a paradigm shift towards environmental improvement and protection (*Ibid*). The best way to improve the living conditions and the quality of life of the citizens is to improve the environment in which they live.

Environmental health perceptions generated within residents of informal settlements are often thought to be informed by various factors such as education, income levels as well as politics or political clietelism (engaging in politics in anticipation of favours such as better services from politicians and political parties) as highlighted by Auyero (1999). However, there are different personal factors that influence informal settlements dwellers' perceptions on environmental health (Amuyunzu-Nyamongo and Taffa, 2004). Research conducted by Amuyunzu-Nyamongo and Taffa in four informal settlements of Nairobi (Kenya) in 2002 revealed that residents can identify uniform environmental health problems, but interpret causes from different world-views.

1.1 INTRODUCTION

A close relationship between humans and the environment has a huge influence on the health of the environment which in turn impacts on human health and wellbeing. Pruss-Ustun and Corvalan (2006) define environment as inclusive of the surroundings, influences and conditions that affect the behavior of an organism. Last (2001) define the environment as everything that is external to the human host and can be divided into biological, physical, social and everything that can influence the health status of the masses. Urbanization and shortage of housing has led to the creation of communities that experience poor environmental health as pressure on existing resources accumulate along with population numbers. In South Africa, this pressure and the housing backlog led to formation of informal settlements (Huchzermeyer, 2004).

This research report investigates residents' perceptions of environmental health in informal settlements of South Africa. Makause informal settlement in the Ekurhuleni municipality is used as the case study in this investigation. Migration of poverty from rural areas as well as inter-urban areas resulted in a massive housing backlog throughout the cities of South Africa (Lohnert, 2001: Huchzermeyer, 2004). Shortage of housing led to development of informal settlements, and these are characterized by poor sanitation and lack of service delivery (Lohnert, 2001). Pruss-Ustun and Corvalan (2006) argue that there is a direct relationship between the state of the environment and human health. Poor environmental health conditions make people sick and thus, have negative effects on residents while a clean environment has positive effects. Poor

environmental health conditions that are faced by residents of informal settlements are dominantly due to lack of basic services (Lohnert, 2001).

Informal settlements are a consequence of the exclusion of a section of the society from the formal processes of settlement formation (Huchzermeyer, 2004). Lohnert (2001) argues that South African cities are experiencing large scale mushrooming of informal settlements as a result of a wave of population migration from rural areas and other cities or even countries to larger cities of South Africa. Major destinations to this migration are cities in the Gauteng province, which is the country's economic hub. A wave of rural-urban migration within South Africa is a consequence of migration of rural populations from former homelands to the cities as a result of perceived better living conditions and employment opportunities (*Ibid*). The former homelands were deprived of major services and economic advancement opportunities.

Rural areas, formally known as Bantustans were socially and economically neglected by the Apartheid regime (Lohnert, 2001), which led these areas to trail behind in terms of development and social amenities. Changes in the political environment opened way for adjustments and unification, as people saw an opportunity to relocate to places that would allow them to access various services and opportunities (*Ibid*). Shortage of affordable housing, accompanied by high accommodation rentals around Gauteng ushered in mushrooming of informal settlements (Sommer and Parker, 2013).

According to Sommer and Parker (2013), the rate at which informal settlements are mushrooming does not give authorities a chance to plan for adequate service delivery and this has been an ongoing problem for authorities as highlighted by Lohnert (2001). Failure by authorities to cope with the expansion of informal settlements is due to ever changing population dynamics and numbers in these settlements. The rapid growth of population numbers in informal settlements leaves no scope for sustainable planning to be performed; hence service delivery in these settlements throughout South Africa is often poor (Nleya, 2011; Sommer and Parker, 2013; Lohnert, 2001). This is also accompanied by the fact that these settlements are often located on fragile grounds or areas that are not zoned for housing.

The term ‘slum’ in the developing world is associated with informal or low quality housing characterized by poverty, lack of access to basic services and insecurity (UN Habitat, 2003). The community of Makause relies on the state for services that can improve quality of their environment such as electricity and water. Poor living standards and conditions coupled with lack of basic services are the main characteristics of Informal settlements (*Ibid*), and there is a need for improved service delivery through immediate solutions so as to facilitate better living conditions in these settlements. Living conditions in informal settlements can be efficiently improved through incorporating public perceptions and participation through advocacy and participatory planning. However, this seems overlooked in the case of Makause.

According to Kofi Annan as cited in UN-Habitat (2003), 32% of the world’s population live in informal settlements, the majority of which is found in the developing world. This is a consequence of waves of rural-urban migration in the developing world. Rural-urban migration throughout South Africa exerted pressure on social amenities and housing (Sommer and Parker, 2013; Lohnert, 2001) this is an ongoing phenomenon. In recent years, the locus of global poverty has been transferring to urban areas through a process termed ‘urbanisation of poverty’ with informal settlements being the receiving pockets in cities (*Ibid*). In delivery of public services, residents of such settlements are not consulted to give their side of needs (White and Hunter, 2005). A top down approach is often employed thereby leaving them unsatisfied with decisions taken for them and on their behalf.

The general public is often excluded from decision making processes pertaining to environmental health, management and conservation (White and Hunter, 2005). Grievances and concerns from residents of the localities that are faced by environmental threats are usually overlooked. These people are often the most adversely affected by environmental degradation and are at the receiving end of environmental hazards due to their vulnerability and low resilience levels.

In the United States, it is mostly people of colour and the poor who usually settle near environmentally hazardous facilities (Brulle and Pellow, 2006). These people bear a bigger impact of the environmental burden from exposure to toxic substances (*Ibid*). The same scenario

prevails in South Africa. The poor are often pushed to the periphery of economic activities which impairs their ability to secure proper housing and thus they end up in informal settlements. Environmental health conditions along with the health of informal settlement dwellers is often threatened since poor communities are often vulnerable (IPCC, 2007). Poor service delivery in these areas, with lack of basic sanitation as well as low resilience nature of the community exposes informal settlement dwellers to health hazards.

Authorities often depend largely on scientific skills and technical strategies in environmental management, neglecting to incorporate the perspectives of people who are directly affected by the situation (White and Hunter, 2005). The consequences of this scenario include worsening the situation or solving the symptoms of the problem instead of tackling the cause of the problem. The human aspect such as perceptions and local rationalities of environmental change and degradation are usually ignored and taken for granted during policy formulation.

The more degraded the environment becomes, the more prone people living in that area become to diseases and infections (White and Hunter, 2005). This exposes these communities to various environmentally induced diseases such as tuberculosis since the population in this area is characterised by low resilience due to lack of access to proper health care and sustainable incomes to afford better medical facilities.

There is a need for a pragmatic bottom up approach to problem solving in terms of planning and service delivery. The research cast some light on the opinion of the Makause community about the services that they are being offered in terms of the health of their environment. The general public ought to be involved in decision making processes through invitation of representatives or flow of information between the policy makers and the public. Inclusion of local communities in the formulation or adoption of environmental agendas may improve policy makers' ability to respond to most important issues (White and Hunter, 2005).

1.2 PROBLEM STATEMENT

The state of the environment in informal settlements is usually poor and these communities are often at the periphery of socio-economic spheres (Lohnert, 2001; Nleya, 2011); which reduces chances of them getting out of such situations. Above all, prevailing poor environmental health conditions in these settlements perpetuate environmentally induced diseases and infections among residents (*Ibid*).

The mushrooming of informal settlements need to be investigated for efficient delivery of vital services such as sanitation. Proper planning can help in improving environmental health in these settlements and it entails sustainability and improvement so that residents can live in better conditions. According to Campbell and Marshall (2004) planning is a new skill in the field of professions and it aims to minimise negative externalities of development and urban growth in the twentieth and the twenty first century.

Public rationalities need to be taken into account when authorities are planning and implementing developments that directly impact on the wellbeing of the communities. The research serves to investigate community satisfaction and dissatisfaction in their prevailing environmental health pertaining development and service delivery as well as the extent to which participatory methods are used by authorities in Makause.

According to the World Health Organization (WHO) and UNICEF (2004) over a billion people worldwide do not have access to an improved water supply. The number of those who do not have access to any improved sanitation facility is over double that (*Ibid*). To make matters worse, about two million people globally die yearly as a result of diarrhoeal diseases (the bulk of whom are children), (WHO, 2008). Compounding such dismal prospects is the extent to which South Africa has been hit by HIV/AIDS (UNICEF, 2009).

1.3 RESEARCH QUESTION

What are residents' perceptions of environmental health in Makause informal settlement and what are the influences that inform these perceptions?

The importance of knowing residents' perception of their prevailing environmental health help in determining services that need to be improved in informal settlements for the betterment of living conditions. Since perceptions are often informed by various factors, the research also looked into different factors that are most likely to be of influence.

Sub questions

- What are the environmental issues and tradeoffs faced by the residents?

- Does socio-economic background and politics influence residents' perceptions of environmental health?

1.4 AIM AND OBJECTIVES

The aim of the study is to investigate residents' perceptions of environmental health in Makause informal settlement. Lohnert (2001) and Nleya (2011) argue that informal settlement dwellers are often not prioritised when it comes to service delivery and the state is faced with a challenge to adequately manage the ever increasing informal settlement population. This often leads to deterioration of environmental health in these informal settlements.

The objective of the research is to reveal residents' perceptions of environmental health in Makause informal settlement. Income and educational levels are expected to inform how people perceive the prevailing environmental conditions. However, this is not always the case since it does not need one to have any level of qualification to know the state of the environment they are exposed to.

Residents of environmentally degraded areas need to be given a platform to share their concerns and perceptions as far as their environment is concerned (Buijs et al., 2008). Estimating the extent of improper sanitation to the environment can be made more comprehensive and effective by obtaining first-hand information from the residents of informal settlements. This research is aimed at obtaining public environmental health perceptions in Makause informal settlement situated between Primrose and Bedfordview in the Germiston area (Ekurhuleni Municipality).

1.4.1 Rationale

Housing and infrastructure provision and services in urban areas are some of the major problems for the municipal and national governments in South Africa (Savage, 2007). Housing problems have escalated levels of poor people's exposure to environmental health risk, due to poor environmental conditions their economic status forces them to live under (*Ibid*). This has been greatly intensified by failure to provide affordable housing to accommodate the poor. The study will include a discussion on the major environmental health issues encountered by informal settlement dwellers and policies that are suitable to improve the conditions in which these communities live in.

1.5 RESEARCH METHODS AND DESIGN

1.5.1 Introduction

This chapter seeks to discuss the research design and methods that were used to obtain the data that was used in the study. Creswell (2009) portrays qualitative studies as typical small scale pieces of research that are intensive in nature. Quantitative methods measure numerical values in research; Qualitative variables yield categorical or non-numeric responses and data generated from these variables can be classified into different categories. Examples of such variables include marital status and sex (Creswell, 2009). Integrating qualitative and quantitative methods in research processes has become one of the favoured means of intensifying interpretability of data (World Bank, 2000). Furthermore, there is a growing acknowledgement of the use of these two methods concurrently and supplementary (*Ibid*).

In this research qualitative methods contributed in explaining and presenting non-measurable information such as personal opinions. Quantitative variables are numerical and were used to complement qualitative variables in the study to gain a deeper understanding of the data given.

1.6 METHODS OF DATA COLLECTION

Semi-structured interviews were a major tool for this project, a combination of open ended and closed ended questions were used as the main research instrument during data collection. Questionnaires were used to test various factors that are believed to inform perceptions of the environmental health since they often vary from one individual to the other. Ability of the interviewees to define the environment contributed in the assessment of knowledge levels as far as the environmental health in concerned. Educational levels are also expected to determine the amount of knowledge that one might have. However, there is a possibility that some educated individuals might not have sufficient knowledge of the environment due to different interests in fields of study.

Environmental problems that residents have experienced were expected to inform their perceptions of the prevailing environmental health. Comparison of the prevailing environment in Makause and the perceived ideal environment would inform the perceptions that residents have on their environment. The description of the prevailing environment in Makause was expected to highlight the perceptions that residents have and the changes of the state of environment that have taken place would highlight the current state of environmental health.

Additional information on the background of the area was gathered from selected individuals within the community. These were primarily those in leadership positions and those who have stayed in the settlement for longer periods spanning from 10 years and above. This information was used to understand the changes that have taken place in the settlement during the time of their stay, and their knowledge of any changes.

The first section of the questionnaire revealed socio-economic status of the residents to determine if they were residing in this settlement by choice or if that was all they could afford. The second section was meant to reveal their knowledge of environmental health as well as their perceptions of the prevailing environment. The third section dwelt mostly on the political

influence and knowledge of their constitutional rights. The entire questionnaire had questions that test their perceptions and factors that are most likely to influence these perceptions.

1.6.1 Sample Selection and Timeframe

Data on residents' perceptions was gathered through random sampling and a questionnaire method was used within the Makause informal settlement. A sample gathered this way limited chances of uniformity on perceptions and mentality. Communities are not homogenous; therefore random sampling accommodated different rationalities and worldviews that were most likely to emanate from residents of informal settlements.

1.6.2 Participant Recruitment

Interviews were conducted randomly with residents across the entire informal settlement so as to gain an understanding of how people from different parts of this settlement perceive their environmental health at a micro scale. The questions were structured to test their knowledge as far as the environment is concerned and to find out about their socioeconomic background and personal awareness of environmental issues. Participants were recruited randomly with the help from the Makause Community Development Forum (MACODEFO). These would span an age range from 18 to 66 years of age for ethical reasons.

The research is based on first-hand information that was obtained from the informants in the form of interviews. Respondents were enabled to supply information which is directly relevant to their respective backgrounds since people from different socioeconomic backgrounds often have different views of the environmental health (Bryman, 2008).

50 interviews were conducted (25 males and 25 females) from all three sections of the settlement. This would allow for equal representation from both males and females. From the information gathered prior to the field word, it was sensible to argue that females were perceived to be more affected by the prevailing environment in these areas since it was often their male counterparts who work; and thus they spent most of their time within the settlement.

1.6.3 Survey Development

The survey was initially conducted along with an Urban Politics and Governance course research on activists telling their stories, with Alfred 'General' Moyo being the focal interviewee. The initial visit introduced me to environmental conditions that residents of Makause encountered on a daily basis. This was followed by a series of meetings with members of the community committee which were meant to understand the dynamics of the informal settlement; then an attendance of the Democratic Left Front (DLF) meeting; a political party that work closely with informal settlements throughout the country, of which the chairman of Makause Development Forum (Alfred 'General' Moyo) is the regional coordinator.

Meetings with members of the community committee helped in the understanding of political, educational, social as well as other aspects of population dynamics in Makause. Attendance of the DLF meetings helped understand the nature of problems that informal settlements throughout the country are faced with and how residents of some these settlements intend to do to improve their living conditions.

1.6.4 Survey Administration

Questions were conveyed to the interviewee by use of their home language for those whose languages were South African or IsiZulu since that is a language most people in Gauteng understand. Their responses were then translated into English. This allowed the interviewees to express their views without language difficulties. This technique was aimed at obtaining information on a more relaxed environment as informants were able to communicate freely in their own language or IsiZulu.

1.6.5 Ethical Considerations

The proposal for this research was submitted and approved by the Wits Faculty of Engineering and Built Environment as well as the Ethics Board of the University of the Witwatersrand. Approval of the entry to Makause informal settlement to conduct a research was approved by the committee of the settlement. Consent was obtained from the interviewees during the period of the field work.

Interviews were conducted with non-vulnerable individuals within the age-groups 18 to 65. Minors and the elderly were not interviewed and no forms of payment or incentives were promised for interviews to commence. The basis for obtaining information used in this research relied on verbal consent or signing of a consent form.

1.6.6 Data Analysis

Descriptive statistics formed the basis for data analysis in this research. Data were analysed using a combination of qualitative and quantitative methods; quantitative for the numerical variables and qualitative for descriptive responses since the questionnaire comprise of both closed and open ended questions. This allowed for these methods to complement each other. Graphs and chats were used to present numerical data and descriptive methods were used to explain opinions that were given by the interviewees.

1.6.7 Limitations of the Method

- Language barrier, this was addressed by incorporating individuals who are multilingual.

- Reluctance of people to participate due to fear of disclosure even though assured of confidentiality. This was addressed by talking to individuals who were willing and comfortable to disclose information.

- Possible influence of my presence as a researcher, most people always try to answer questions in a way that they feel make them sound smart or the need to sound politically correct. This often distorts the truth about how they really feel about the subject in question. Incorporation of members of MACODEFO in the field work eliminated the idea of insider-outsider within the residents.

- Possibilities of obtaining falsified information especially on economic backgrounds are often high. People are generally reluctant to disclose their financial information and standings. Other questions were used to verify if the responses given were valid. These included how much they often spent per month and how were their savings on monthly basis.

- The credibility of research findings is always questionable whenever qualitative methods are used. To counter this problem all comments were cross checked with the interviewee and where there were contradictions an in-depth verification process of applying other related questions was done to gather as accurate information as possible.

CHAPTER 2: INTRODUCTION TO THE CASE STUDY

2.1 A PIECE OF PLASTIC CALLED HOME



Figure 2.1: A Place Called Home-The image depicts what is known as 'home' by many South African populations who dwell in informal settlements.

This chapter will provide an introduction into the chosen study area of Makause. Makause is an informal settlement located in the Ekurhuleni Metropolitan Municipality. This chapter will attempt to provide a background of the history, challenges and the dynamics of the informal settlement. This will be done through discussing the physical location and characteristics of the area. The chapter will move further to discuss the social/demographic make-up of the area, as well as some of the challenges it is confronted with. The last section of the chapter will discuss the prevailing politics of the area.

2.2 INTRODUCING MAKAUSE, ITS HISTORY, CHALLENGES AND DYNAMICS

Makause informal settlement is one of a series of informal settlements found in Ekurhuleni municipality. Geographically the settlement is located about 5km away from Germiston city centre and close to the suburb of Primrose. The study area is situated at a convenient location for

the community to access areas of potential employment such as Germiston and the surrounding suburbs of Primrose and Bedfordview.

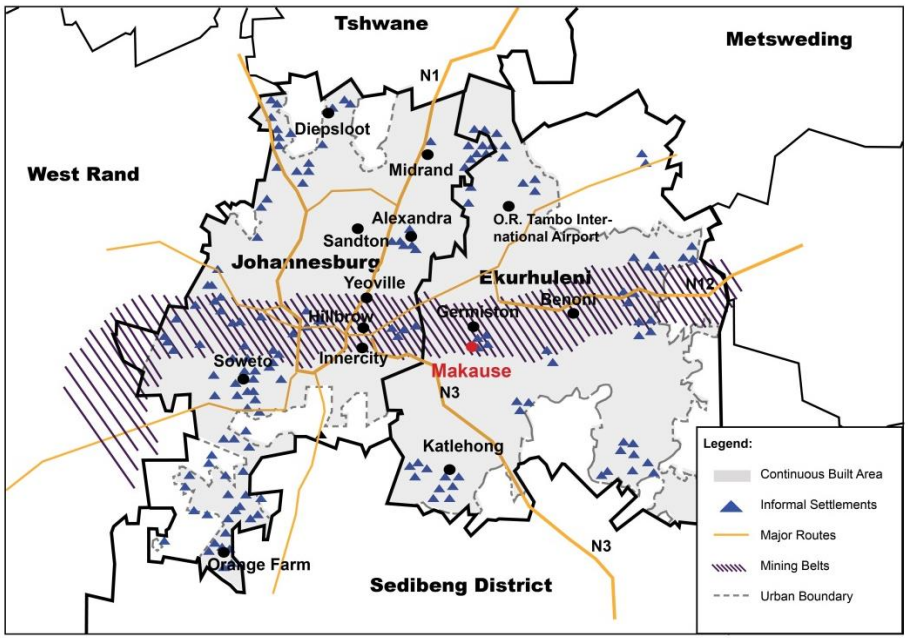


Figure 2.2: Makause in Context- The map illustrates Makause informal settlement in relation to Johannesburg and Ekurhuleni Municipal areas. It also outlines other informal settlements within their municipal zones

The name 'Makause' means socks in numerous local languages and it is claimed to have been originated by mine workers who used to buy large quantities of pairs of socks at a discount and sometimes on credit from an Indian shop owner, who they often called Makause since he was a socks dealer. The name got attached to a shop that was functional when mines in the area were operational, then later became a reference to the area. Mine workers often wear a couple of pairs of socks when going underground, thus the socks business was booming in what later became known as Makause. The shop was a landmark when giving people directions to the settlement which foreign mine workers were the first to occupy (communication with Moyo, 12 September 2013).

From the information gathered from a series of meetings with Alfred 'General' Moyo, the leader of Makause Community Development Forum (MACODEFO), the first group of people to occupy Makause informal settlement was a group of the Shangaan tribe from Mozambique. These were migrant workers who used to work for mines such as Simmer and Jack, the Bruma

Gold Mine when they were still functional. This group started squatting here when the mines were shut in the 1980s, however, police pressure and brutality forced them to leave but they kept coming back since they had nowhere else to go. On the contrary, De Waal (2012) argues that people started settling in Makause in the 1990s.

The first settlers of Makause were joined by migrant workers from Lesotho and other neighbouring countries as well as provinces of South Africa. Due to police brutality and evictions, this group of squatters decided to build underground shacks and some erected more temporary structures such as plastic dwellings that could be easily folded and carried when running from the police. The settlement grew bigger after the 1994 democratic elections, probably due to unification and the fall of apartheid. This resulted in a greater influx of people to what is today known as Makause (communication with Moyo, 12 September 2013).

2.2.1 Physical Characteristics

The settlement is characterised by densely populated informal dwellings, with inadequate services have led to a hygiene problem with the area being infested with rats. According to the Socio-Economic Rights Institute (SERI) "The residents share two functioning taps between them and five other makeshift water connections. They have no access to formal sanitation and there is no coherent program of refuse removal at the settlement" (SERI, 2012). Despite the poor living conditions and inadequate access to services, Makause still remains a pivotal location attracting from various places.

Makause informal settlement is located on an abandoned mining zone, directly above a mine shaft (Tau and Gifford, 2006). This area is understood as the industrial and mining periphery of Johannesburg. "The importance of these activities for the past and current regional economies is still visible today, in the urban landscapes marked by dominant industrial areas and huge mining land and dumps, often occupied by informal settlements. The location of this settlement already indicates the desperation of people to get close to their sources of income" (Bénit-Gbaffou, 2013: 189).

Under normal or average socio economic conditions no one would be willing to live on a mine shaft. According to Tau and Gifford (2006) a woman once fell into a mine shaft that is situated in

the middle of the informal settlement. Rescue operations ceased as they discovered that the geology of the area was unstable and was too risky for the rescue team. However, according to Maphumulo (2006) this woman's body was found 80m under the surface. Other claims included that a man also once fell into a hole in Makause and it took the rescue team 10 hours to find him. Unlike the woman, he was still alive. This highlights the kind of environment that residents of this settlement live in (Tau and Gifford, 2006).

Makause informal settlement is located 200m from a Tailing Storage Facility (TSF). Wind action often blows clouds of dust around which exposes the inhabitants of the settlement to lung diseases. Sewerage disposal is also poor. There is a stench of sewerage at some places and waste water flows through some shacks.



Figure 2.3: Physical Conditions in Makause-The images shows Makause's proximity to the Tailing Storage Facility (TSF) as well as lack of drainage infrastructure and refuse collection.

2.3 MAKAUSE DEMOGRAPHICS ACCORDING TO STATS SA (2013)

The study area is home to 2 625 people comprising of 4 races (Black African, Coloured, Asian and Other) as claimed by Stats SA (2013). 2 617 of the total of 2 625 inhabitants of Makause informal settlement are of black African descent and they make the bulk of the population. There are 1 337 females and 1 279 males of the black African community in the settlement. Of the 2 625 people who reside in the informal settlement, there are 3 Coloured individuals and they are all males. 2 individuals of the total population size of 2 625 people who live in this settlement are males of Indian or Asian descent, there are also two females who fall under the category 'Other', which could mean they were not identified with any race-group as shown in the figure below.

	Male	Female	Total
Black African	1279	1337	2617
Coloured	3	0	3
Indian or Asian	2	0	2
White	0	0	0
Other	0	2	2
Total	1285	1339	2625

Figure 2.4: Population group by Gender (Stats SA, 2013)

2.3.1 Educational information of the population

Of the total population of 2 625, only 51 people obtained tertiary qualifications, 558 individual males and females combined obtained secondary education. However, there are more females who completed secondary education (282) as compared to males (276). 706 individuals attained a range of education spanning from some primary to secondary level schooling. A total of 140 individuals did not go to school at all; this is made up of 85 females and 54 males as shown in the figure below.

	Male	Female	Total
No schooling	54	85	140
Some Primary	53	62	116
Completed Primary	25	24	49
Some Secondary	293	248	541
Completed Secondary	276	282	558
Higher	18	33	51

Figure 2.5: Highest Education by Gender (Stats SA, 2013)

2.3.2 Official employment status by Gender

746 individuals from the total population of 2 625 are employed and 506 are unemployed. 445 of a total of 1 258 males are employed and 301 of 1 339 of the female population are employed. With these figures we expect more income to be coming from the male population. More females are economically active even though unemployment rates are high in this population group.

	Male	Female	Total
Employed	445	301	746
Unemployed	199	308	506
Discouraged work-seeker	11	25	36
Other not economically active	153	221	374

Figure 2.6: Employment Levels by Gender (Stats SA, 2013).

176 households earn an income range of R19 601 – R38 200 per annum and only 4 households in the entire settlement earn within the range of R307 601 – R614 400 per annum which is the highest income level in Makause. A total of 132 households have no income and most households fall under the minimum wage category. The figure below shows household incomes in Makause.

No income	132
R 1 - R 4800	73
R 4801 - R 9600	86
R 9601 - R 19 600	142
R 19 601 - R 38 200	176
R 38 201 - R 76 400	125
R 76 401 - R 153 800	87
R 153 801 - R 307 600	21
R 307 601 - R 614 400	4
R 614 001 - R 1 228 800	0
R 1 228 801 - R 2 457 600	0
R 2 457 601 or more	0

Figure 2.7: Household Incomes. (Stats SA, 2013)

1 186 individuals in the total population of Makause do not have an income and 613 earn a maximum of R400 per month. 3 individuals earn within a range of R25 601 – R51 200 which highlights an income gap in the community. These income differences are likely to inform how people perceive the environment which they live in. Individuals with better salaries can afford to buy some services such as health care, those with lower incomes cannot afford. Most income

groups in the settlement cannot afford decent accommodation. The figure below shows income levels within the residents of Makause according to Stats SA (2013).

No income	1186
R 1 - R 400	613
R 401 - R 800	58
R 801 - R 1 600	221
R 1 601 - R 3 200	230
R 3 201 - R 6 400	117
R 6 401 - R 12 800	61
R 12 801 - R 25 600	19
R 25 601 - R 51 200	3
R 51 201 - R 102 400	0
R 102 401 - R 204 800	0
R 204 801 or more	0

Figure 2.8: Individual Incomes. (Stats SA, 2013)

2.4 CURRENT POLITICAL SITUATION IN MAKAUSE

Makause informal settlement is politically diverse with various political parties existing in the same space. This was demonstrated by a consensus from all politically active residents to fight for the same cause, service delivery, regardless of their various political affiliations. They did this successfully even though they were faced with violent retaliation from the South African Police Services (SAPS) (De Waal, 2012).

The Makause Community Development Forum was set up in 2007 as a committee that represent the residents of the settlement (De Waal, 2012). Makause is situated on land that has been earmarked for development, and thus authorities want to remove them. According to MACODEFO, evictions were carried out inappropriately since food parcels were used to lure residents. Use of food parcels was actually undermining the community (Meeting with Alfred General Moyo, November 2013). Those who resisted these attempts were threatened with violence. One of the committee members' shack was destroyed while he was away. Police were called but did not help or attend to the report (*Ibid*).



Figure 2.9: Social Protests in Makause- Residents of Makause marching for better service delivery (De Waal, 2012).

De Waal (2012) argues that Makause has been in existence since 1992, but General Moyo claims it has existed for longer. No matter the length of time this settlement has been in existence, there are no services from the authorities. The community organized and installed illegal water connections as they claimed their right to basic services. This is highlighted by the leader of the (MACODEFO) Alfred 'General' Moyo (De Waal, 2012). In 2008, the municipality installed two taps from the outskirts of the settlement.

There are tensions between Ekurhuleni municipality and the residents of this settlement, as highlighted by the events of police violence in curbing service delivery marches (De Waal,

2012). The committee also claimed that police in the Primrose area do not attend to criminal cases that are reported by the residents of Makause.

Alfred 'General' Moyo, a leader of the MACODEFO along with other members of the committee applied for a legal march against police brutality at the Primrose police station on the 19th of September 2012 but was attacked by the police (De Waal, 2012). Moyo claimed that the head of visible policing, Colonel Rackson Shuburi attacked him and asked why were they applying to march against the police force and accused him of challenging South African Police Services (SAPS) code of conduct (*Ibid*). Service delivery is supposed to be performed by an ANC led municipality which is also involved in the tensions with the residents of Makause informal settlement (*Ibid*).

The tension between the law enforcement units such as the SAPS and Metro Police and the residents of Makause is further highlighted by Colonel Shuburi's statement that if the residents continued with the march, the settlement would be turned into a Marikana scenario (De Waal, 2012). The Marikana incident was a clash of protesting mine workers and the police, and it resulted in the loss of 34 lives as police opened fire on the protesters. Moyo, as cited in the Daily Maverick (05 October 2012), said that the Colonel referred directly to the events of Marikana in a threatening manner.

Tensions with the police were also highlighted when members of the SAPS arrived at the MACODEFO office and interrogated the committee on the march which was being organized on the 4th of October 2012 (De Waal, 2012). The police promised to shoot the protesters and arrest the organizers of the march especially Moyo as he is the leader of the committee (*Ibid*). This shows that the community of Makause was denied their right to demand service delivery through invited and invented spaces.

The major reason why there is no service delivery in Makause seems to be the fact that the settlement falls under a DA controlled portion of Primrose and ANC is trying to control the area (De Waal, 2012). However, Moyo highlighted the fact that the community development forum is politically tolerant since members were concerned more with service delivery than political parties, hence hey only represent development in the settlement (*Ibid*).

CHAPTER 3: LITERATURE REVIEW

3.1 INTRODUCTION

The purpose of reviewing literature in research is to situate the study in the larger ongoing dialogue while filling the gaps (Creswell, 2009). This chapter aims to discuss relevant literature that is essential for the study. This chapter is aimed at discussing environmental health and environmental justice. Environmental justice has a direct impact on environmental health and the effects there of. The choice of these concepts was influenced by the fact that they provide discussions that are well aligned with the literature that relate to environmental health perceptions. The first section of this chapter introduces and discusses environmental health along with its components and problems associated with this concept. The second section discusses environmental justice from its global perspective down to the South African context.

3.1.1 The Environment and Environmental Health

A more practical definition of the environment is needed when trying to define environmental health (Pruss-Ustun and Corvalan, 2006). This is due to the fact that environmental health action entails changing the physical and natural environments as well as related behaviors (*Ibid*). An alternative definition of the environment includes all biological, physical and chemical factors that are external to an individual and his/her related behavior (*Ibid*). This can be modified to exclude natural environments that cannot be modified reasonably. The figure below shows an illustration that can be used to define the environment.

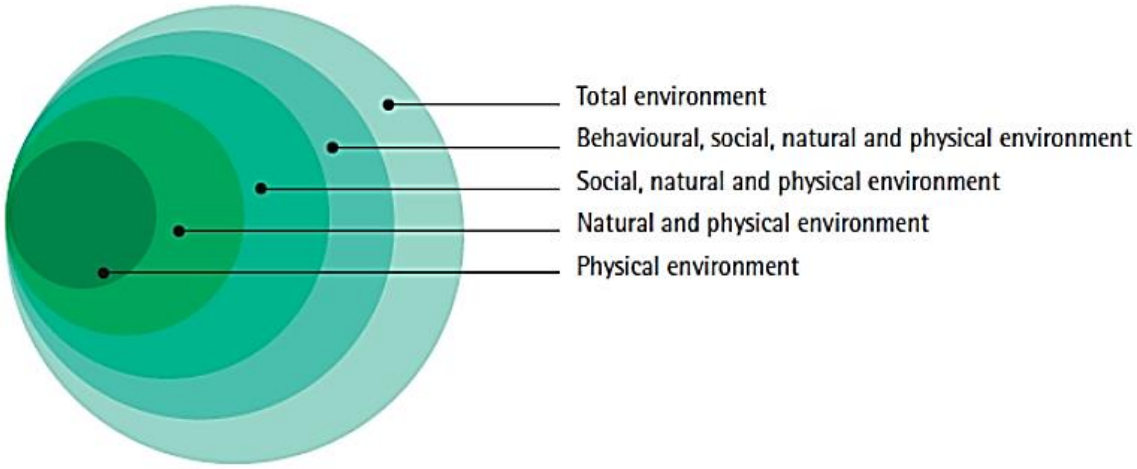


Figure 3.1: **Definition of the environment -** An illustration of one of numerous ways of defining the environment Adapted from Pruss-Ustun and Corvalan (2006, 22)

An inclusive way to define environmental health encompasses:

"the theory and practice of assessing and controlling factors in the environment that can potentially affect adversely the health of present and future generations" (WHO, 1993: 18). "As a science, environmental health has traditionally been grounded in medicine, epidemiology, toxicology, chemistry, ecology, and physics, with an associated focus on protection through regulation and standards" (Parkes et al, 2003).

Informal settlements in South Africa are characterized by poor sanitation perpetuated by lack of service delivery (Lohnert, 2001; Dixon and Ramutsindela, 2006; Huchzermeyer, 2009). This has resulted in prevailing poor environmental conditions in settlements such as Makause. These poor conditions often promote disease outbreak in the communities residing in these settlements. Environmental health problems are complex and they have an effect on all levels ranging from the micro (home environment) to regional, national and global levels (Von Schirnding, 1994). This entails problems such as acid deposition, global warming, ozone destruction and widespread diseases that are related to the increased chemical contamination of the environment (*Ibid*).

Environmental health problems in developing countries are largely poverty related and are a consequence of poor planning in urbanization and agricultural land use practices (Von Schirnding, 1994). Developing countries are faced with a burden of environmental disease as a result of old unsolved problems such as vicinity of mine dumps in the case of Makause, and emerging environmental problems which are a consequence of rapid urbanization (*Ibid*). Problems such as poor waste management and disposal, housing backlog and inadequate service delivery are a result of the failure by authorities to come up with strategies that adress rapid urbanization. Informal settlements in South Africa are the major receivers or the entry point for poor communities into the urban landscapes and they are the receiving pockets of urbanization of poverty (Lohnert, 2001).

South Africa has been undergoing urbanization as the economically active groups are still migrating to cities for perceived better incomes and education. The consequence of this wave of migration over the past years resulted in environmental health problems due to lack of basic service delivery in the receiving areas (Lohnert, 2001). These changes manifest in environmental health of both developing countries and highly industrialized economies simultaneously. South Africa possesses characteristics of the developing and the developed world since it is highly industrialized yet still undergoing the developing world trends in form of housing problems. The poor portion of the population is socio-economically deprived and simultaneously exposed to a spectrum of agents of environmental diseases and thus they suffer increasingly from problems encountered by both first and third world countries. These include air, land and water pollution from heavy industries and poor service delivery by the authorities (*Ibid*).

Health and environment decisions in the governmental spheres are taken by various authorities in industry and labour, housing and public works, sanitation, planning, water supply, agriculture, and many others (Von Schirnding, 1994). This intensifies the chances of better implementation since all spheres and all levels of governance are involved in the decision making. According to Schedule 4 part A [4(A)] of the Constitution of the Republic of South Africa (1996) all spheres engage in deciding environmental issues, but provincial and national spheres of the government have more power to decide. Lawless (2005) argued that there is a shortage of civil engineering professionals in municipalities to foster environmental sustainability. This could be one of the major causes of failure to implement proper sanitation measures in poor communities.

3.1.2 Sanitation

According to the Department of Water Affairs and Forestry (DWAF) (2001), sanitation encompasses principles and practices relating to the removal, collection and disposal of human excreta and refuse. These are basically products of the metabolic system of the community which include waste water and other substances that impact upon users, operators and the environment. Proper sanitation would include appropriate health, hygiene awareness, affordable and sustainable services that improve the health of the environment (*Ibid*).

The negative effects of unsanitary living conditions such as lack of proper sewerage disposal in informal settlements around South Africa affect the environment and the economy of the area (Khalane, 2005). Lack of service delivery in Makause has led to poor environmental health which exposes the residents to possibilities of disease out breaks. Lack of sewerage and wastewater disposal often leads to an outbreak of environmental induced diseases such as cholera and other diarrheal pandemics (*Ibid*). Settlements that are characterized by poor sanitation and environmental health expose the inhabitants to various diseases and infections (*Ibid*).

Sanitation facilities that are installed and managed properly have positive environmental effects which improve the living conditions and resilience of the communities (Longree et al. 1976; Navarro, 1994). This involves various activities such as food processing and distribution, solid waste disposal and sewerage treatment (*Ibid*). Navarro (1994) argues that health problems in crowded informal settlements are often a result of lack of sanitation facilities. This is the case with most informal settlements around South Africa (Brown, 2009).

Informal settlements are often affected by multiple environmental problems, other than basic sanitation; these encompass drinking water quality and basic cooking facilities and food storage (Brown, 2009). There is no electricity at Makause, and thus people rely on fossil fuels such as paraffin, wood and coal for cooking, lighting and warmth. This endangers their lives due to deterioration of the environment they live in, as well as high levels of exposure to indoor air pollution which is induced by the fossil fuels used.

Indoor and outdoor pollution, coupled with environmental deterioration often spark a variety of environmentally induced diseases, infections and behaviors that can be detrimental to the inhabitants. The figure below highlights types of environmentally related infections and diseases as well as behaviors and their impacts on public wellbeing in the society. It highlights environmental contribution to disease outbreak in areas of poor environmental health.

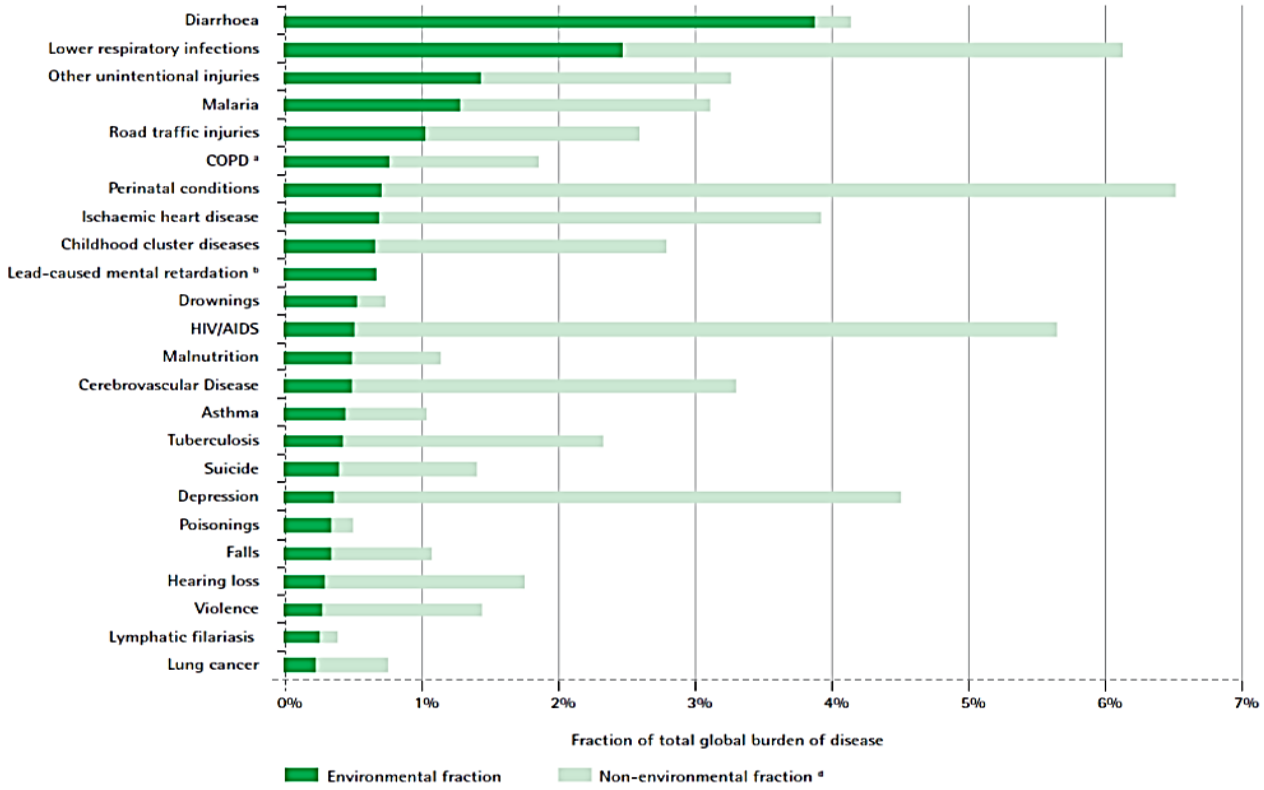


Figure 3.2:Environmental contribution to diseases - Adapted from Pruss-Ustun and Corvalan (2006, 7).

3.1.3 Pollution

Rapid urbanization in South Africa has the potential to result in detrimental situations such as the rise in the levels of environmental pollution (Von Schirnding, 1994). Changes resulting from pollution with impacts in the quality of water, land and air are most likely to be felt in the cities since they are the hub of processing. The metabolic systems of cities coupled with domestic air pollution problems arising from burning of fossil fuels as sources of power in informal settlements and poor locations contribute to the deterioration of environmental health in low

income areas (*Ibid*). Von Schirnding (1994) argue that there is an unsatisfactory situation that was prevailing in South Africa regarding hazardous and solid waste control and she claims that there is a need for a comprehensive waste management policy that would include implementable and appropriate legislation. Judging from the prevailing condition in informal settlements, this has not been achieved (Brown, 2009).

Makause informal settlement, along with other non-electrified informal settlements poses a threat of high levels of emission since fossil fuels are the only source of power. With the increase in households and population numbers in these areas, air pollution from combustion of coal and wood used for domestic space heating and cooking is likely to increase (Von Schirnding, 1994). This would have detrimental consequences with severe implications that entail respiratory problems and acute respiratory infections in young children, which is the second highest killer in children under the age of 5 years (*Ibid*). The situation is often intensified by overcrowded living conditions and poor nutritional status (*Ibid*).

Water pollution and unsanitary conditions often lead to severe threats pertaining to the health of human populations from disease outbreak (WHO, 2009). Cholera, typhoid and other diarrhoeal diseases result from inadequate water supply and sanitation facilities (Von Schirnding, 1994; WHO, 2009). There is insufficient water supply in Makause as indicated by distances travelled by the residents to water sources and the fact that there are long queues in these sources. Some major services are often poorly or even completely not delivered in informal settlements of South Africa, thereby increasing vulnerability of informal settlement dwellers (Lohnert, 1991). There are no visible services in Makause except for a few taps which the residents initially took an initiative to provide for themselves, and then the municipality installed a few more.

According to Von Schirnding, (1994) and the Department of Water Affairs and Forestry (2001), diarrhea continues to be the primary killer of young children in South Africa. Cholera, worms, eye infections and skin diseases as well as increased risks for HIV/Aids-infected individuals are some of the major health problems associated with poor sanitation (Department of Water Affairs and Forestry, 2001).

Ambert (2006) argues that the housing environment also plays a role in perpetuating the spread and exposure of inhabitants to numerous forms of infection and diseases, especially those that

are infected by HIV/Aids and other diseases of such magnitude. Informal settlements are often characterised by poor housing conditions; this gives way for breeding of various vectors there by perpetuating disease outbreak. Rodents are most common in such areas (*Ibid*).

The state of environmental health in the area plays a role in prolonging or reducing the life span of the infected as well as spreading the diseases (Ambert, 2006). Sanitation, air and land pollution are major factors that contribute to the state of environment that affect health of the masses. Poor environmental health in informal settlements deteriorates the condition of residents that are infected making them chronically ill in the early stages of any sickness (*Ibid*).

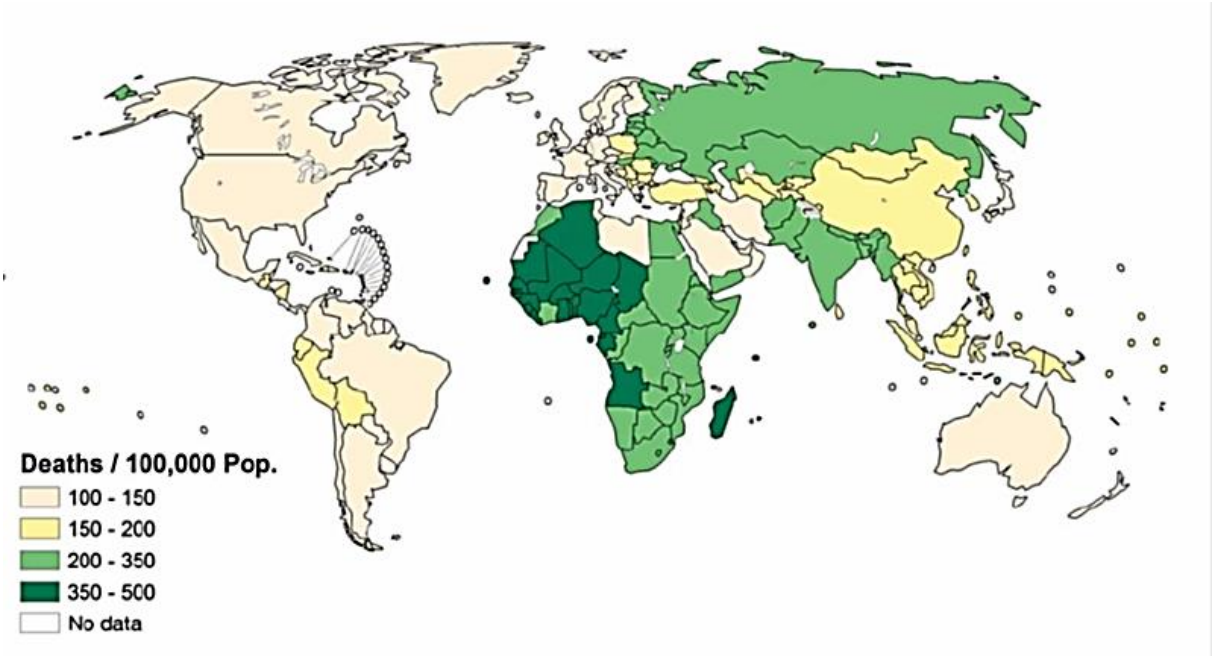


Figure 3.3: Regional environmental disease burden in 2002 - Adapted from Pruss-Ustun and Corvalan (2006, 6). The disease burden was measured by deaths per 100 000 population for the year 2002**.**

According to Brown (2009) environmental pollution is dynamic and complex hence the need to be prioritised so as to improve living conditions for the poor. Pollution has wide implications on authorities' aim to provide a better life for all. The complexity of environmental pollution is mainly rooted in the fact that it interferes with socio-economic, political, physical and institutional conditions in settlements (*Ibid*). Informal entrepreneurship is the only viable form of

economic activity in Makause, the figure below shows informal businesses that are thriving in the area.



Figure 3.4: The informal economy of Makause - The area is failing to attract major businesses due to its informal status and poor environmental conditions (Photo by N James, 2013).

3.2 ENVIRONMENTAL JUSTICE

Environmental justice can be defined as a social transformation that is directed towards meeting basic human needs and enhancing quality of life, and thus economic quality, health care, housing, human rights, environmental protection, and democracy (McDonald, 2002). Environmental quality is becoming more linked to human equality (Agyeman et al., 2002; Patel, 2009). Worldwide, problems surrounding environmental issues are almost always linked to questions of social justice, equity, rights and people's quality of life (Agyeman et al., 2002). Environmental justice is about incorporating environmental issues into the broader framework of human rights and democratic accountability (McDonald, 2002).

According to Dixon and Ramutsindela (2006), the often location of informal settlements at the periphery of South African cities is a consequence of apartheid planning as well as a quest by black people to claim a right to the city. This resulted in black people residing in areas of poor quality that are not fit for human inhabitation such as old mining grounds in the case of Makause and fragile land such as Alexandra informal section (Jukskei river informal settlements). This resulted in the current demand for better living conditions and basic services in the democratic South Africa (*Ibid*).

The focus of environmental justice has been largely on the conditions under which poor people live (Dixon and Ramutsindela, 2006). The main aim of environmental justice is to demand interventions that would promote equality and fair treatment for all. This would entail involvement of all people regardless of race and socioeconomic background in development, implementation and enforcement of environmental laws (*Ibid*). It should be difficult to implement environmental justice measures in areas such as Makause since the authorities regard them as illegal residences.

The proximity of hazardous waste to poor communities has been used as evidence of injustice (Dixon and Ramutsindela, 2006). The location of Makause on a mining site with an abandoned shaft in the middle highlight the desperation in which the community strives to survive. Waste material disposal is inadequate as highlighted by piles of garbage at the fringes of the settlement.

Focusing on natural environment in Makause will not make much of a difference since the inhabitants have to exist and utilise that environment; on the other hand, focusing on the residents while neglecting the natural environment will not do justice. Bringing the two together would promote a better environmental justice that would benefit both the physical and anthropocentric environments.

3.2.1 Environmental Justice in South Africa

The concept of environmental justice was imported to South Africa in 1992 at the Earth Life Africa conference which led to the formation of the Environmental Justice Networking Forum (EJNF) (McDonald, 2002; Myers, 2008; Patel, 2009; Walker, 2009).The issue of environmental justice in many countries including South Africa emanates from the issues of human inequality which leads to poor environmental quality (McDonald, 2002; Agyeman et al., 2002; Myers, 2008).

During the apartheid era, environmental issues were seen by black South Africans as a ‘white’ issue and environmental policy was seen as an explicit tool of racially based oppression (McDonald, 2002; Patel, 2009). These environmental injustices led to environmental degradation suffered mainly by non-white South Africans; for example they worked under unsatisfactory conditions and their segregated residential areas were often placed near heavy industries (Patel,

2009). A good example is that of the communities living in the South Durban area which are close to a number of polluting industries (Freund, 2001; Patel, 2009). Furthermore, penalties for polluters were negligible and seldom enforced (Patel, 2009).

In the post-apartheid era the environment was redefined to include the living space of black South Africans, and so it became apparent that environmental initiatives were related to other post-apartheid and democratic objectives (McDonald, 2002; Patel, 2009; Walker, 2009). A wide range of organizations quickly adopted this new environmental discourse and within a few short years began to question and challenge the environmental practices and policies of the past, and the concept of environmental justice was central to this new discourse (McDonald, 2002). When the new South African Constitution was finalized in 1996, it included a Bill of Rights that grants all South Africans the right to an 'environment that is not harmful to their health and well-being' and the right to 'ecologically sustainable development' (section 24 of the Constitution) (McDonald, 2002; Walker, 2009).

An environmental justice movement as diverse as this in its political orientation and demographic composition is however bound to have deep splits and has led to certain issues being questioned (McDonald, 2002). McDonald (2002) asks the question of the possibility to reap the benefits of a broad coalition of interests with core beliefs in the environmental rights and dignity of human beings? Agyeman et al. (2002) attempt to answer this by suggesting that the success of the environmental justice movement can indeed be seen in the mutual benefits of a coalition between environmental and social concerns. The mainstream environmental movement (wilderness preservationists and conservationists) was criticized for being too elite (Agyeman et al., 2002; Myers, 2008) and therefore benefited from adopting a social justice approach. Similarly, the social justice movement gained an increased credibility, resources and support by incorporating the mainstream environmental approach (Agyeman et al., 2002).

A history of disempowerment and racial discrimination, poverty and rights were bound to be the crux of South Africa's environmental agenda (Dixon and Ramutsindela, 2006). The new Constitution and the changing political environment has led to the growth of environmental rights with the Constitution stipulating the rights citizens have to water, housing, health care, a clean environment as well as dignity (*Ibid*). These are often violated, especially in poor

communities and informal settlements (Lohnert, 2001; Dixon and Ramutsindela, 2006). This is indicated by the poor communities' lack of access to basic services such as sanitation and water disposal services. This can be witnessed in numerous poor communities and informal settlements around South Africa (*Ibid*).

The placing of environmental rights at the centre of the new constitution has strengthened the environmental justice movement if South Africa, however, many observers still critique the way in which environmental management has since been practiced (Patel, 2009; Walker, 2009). Many argue that the sustainability frame which is well established in South Africa has been dominant, and is often interpreted in ways that have failed to shake off the legacies of established colonial approaches to environmental management (Walker, 2009). The mainstream practices of environmental management such as sustainable development in South Africa are based on assumptions that apply to the developed world and do not always take into account the social context of development (Walker, 2009).

The issues of poverty and social inequality that are prevalent in the developing world often remain neglected (Walker, 2009), and the poor and the natural environment continue to be marginalized in decision-making (Patel, 2009). Tools such as Environmental Impact Assessments (EIAs) that are meant to promote sustainable development seem to fail in their attempt to promote public participation (Patel, 2009). This demonstrates that the tools for implementing sustainable development are not neutral, and that their use has specific political, social, developmental and environmental consequences (Patel, 2009). The environmental justice movement has not, as yet at least, had an impact on the established dominant policy frames such as the sustainable development frame (Walker, 2009).

Perceptions of environmental health often differ between places where there is environmental justice and places where it is not practiced (Senier *et al*., 2008). This is due to the fact that environmental justice includes everyone in decision making which gives those who are directly affected by environmental change a platform to voice their concerns. Informal settlement dwellers are often eliminated from decision making. Perceptions that are informed by participatory decision making are often bound to be better when compared to those developed by a top-down approach (*Ibid*).

CHAPTER 4:INFORMAL SETTLEMENTS AND ENVIRONMENTAL HEALTH

4.1 INTRODUCTION

Characterization and general understanding of urban informality has varied and evolved overtime. "Generally labelled shanties, squatter settlements or slums, the existence of informal housing areas had been recognized and condemned long before the 1970s" (UN-Habitat, 2009,133). Urban informality was understood within the legal framework and the informal sector was classified as completely illegal and unwelcomed (*Ibid*).

This chapter discusses informal settlements and driving forces behind their formation as well as a ways in which planning can affect or influence living conditions in these settlements. The later section of the chapter discusses informal settlements in the Ekurhuleni municipal zone, social justice in informal settlements as well as vulnerability of informal settlement dwellers.

4.2 GENERAL UNDERSTANDING OF INFORMAL SETTLEMENTS

Writing in the mid-1990s Wratten (1995) and other development theorists correctly predicted that most of the world's population will migrate to urban areas (cities and towns). Today the United Nations projects that over 50% of the global population has migrated and is living in cities and towns (UN, 2009). According to the UN-DESA, population numbers of urban dwellers are expected to increase to "three quarters by 2050". This has led to pressure on resources with housing being the most affected (UN, 2009, 1). Due to high cost of living and housing, the poor are often forced to locate in neglected areas where land is believed to be cheap or abundant. Here they form settlements that are then labelled informal since these areas are often not zoned for residential purposes or human inhabitation.

In the early 1980s most African countries adopted the structural adjustment programmes which led to the neo-liberalization of the economies (Hart, 2010). At the heart of these neo-liberal policies was the principle of privatization which transferred most of the strategic key sector of the economies into private ownership (*Ibid*). This has since led to lack of service delivery and sanitation in informal settlements since the inhabitants cannot afford to purchase some services, thus they rely on the government to provide (*Ibid*).

According to UN-Habitat (2009) the urban formal-informal dichotomy manifests in various ways. South African context makes it difficult to distinguish between formal and informal. This is due to a fine line that has been created by the authorities by formalising the informal settlements through provision of basic services such as water, electricity and tarred roads. UN-Habitat (2009) emphasizes that it is significant to recognize and appreciate continuous existence of the direct and indirect interrelatedness between the formal and the informal sector, particularly with regard to the understanding of urban development.

UN-Habitat (2009) outlines the significance of contextualizing when trying to understand informality, particularly when generating appropriate policy responses to challenges that accompany the emergence and extension of urban informality. According to UN-Habitat (2009, 150) "there is no single planning model for responding effectively to the challenges arising from urban informality". This means that the planning model response will only be effective when responding to informality in countries where it is contextually relevant (*Ibid*).

4.3 VULNERABILITY OF INFORMAL SETTLEMENT DWELLERS

Amongst social scientists there is consensus that the concept of vulnerability and entitlement enhance our capacity to adequately conceptualize and understand poverty (Wratten, 1995). People are considered vulnerable when they appear defenceless, insecure while exposed to various risks and shocks (Chambers, 1995). The socio-economic state of informal settlement dwellers renders them vulnerable since they are generally economically disadvantaged, thus their resilience to the unhealthy environment they are often exposed to is very low (UN-Habitat, 2003).

Vulnerability as a measure of poverty deviates from the reductionist approaches advanced by the income based definition of poverty (Chambers, 1995). For example, the 2009 economic crisis was a result of irresponsible issuing of home loans as a strategy to improve the standard of living of some American citizens, however, those loans only made the poor poorer and more vulnerable. What led to the 2009 economic crisis was a perfect example of the inadequacy of a technocratic understanding of welfare (Wratten, 1995).

The concept of vulnerability categorizes people into specific vulnerable groups. For example the old, women, children and disabled are said to be the most vulnerable to food insecurity (Chambers, 1995). Most children in the informal settlements are exposed to unhealthy environments and there is less access to health care since the residents often rely on the public service delivery system (UN-Habitat, 2003).

CHAPTER 5:PLANNING THEORIES THAT CAN BE APPLIED FOR IMPROVEMENT OF ENVIRONMENTAL HEALTH IN MAKAUSE

5.1 INTRODUCING THE CHAPTER

This chapter provides an introduction to planning theories that can be used to improve the state of informal settlements in general. The first part of the chapter gives a detailed discussion of advocacy planning as the theory of choice that directly speaks to the prevailing situation in Makause and other informal settlements around South Africa. The second section of this chapter entails a discussion of participation and the participatory turn. Types of participation as highlighted by Arnstein (1969) are also discussed with reference to the study area. The last section of this chapter gives a comparison of prevailing participation situation in Makause and that of Crossroads informal settlement in Western Cape.

5.2 ADVOCACY PLANNING

According to Davidoff (1965), advocacy planning allows for planners to be representatives that advocate for planning that caters for different rationalities. He highlights the fact that there are no homogenous societies in this world, and thus planners need to be representative of the common interests. On this account, it would be a wrong assumption to claim that residents of Makause have similar interests across the whole settlements. Different rationalities are highlighted by members of the community that are part of the ANC backed mob that is claimed to be unruly (de Waal, 2012).

Davidoff (1965) argues that planners need to advocate for social change and unification and he also emphasised that they need to cease being neutral and take a stance. However, it has proven to be hard for planners to make independent decisions since planning is still questionable as a profession. Scholars such as Healy (1985) and Evans (1993; 1995) as cited in Campbell and Marshall (2004) critique the standing of planning as a profession. In the case of Makause and South Africa as a whole, political influence in planning is one of the major drivers that determine areas that befit development. On this account, conflicts with a ruling political party are bound to yield detrimental effects, as is the case with Makause informal settlement.

Kennedy Road informal settlement is also undergoing the same predicament as highlighted by Gibson (2008). Residents of Kennedy Road informal settlement are well known for their movement 'Abahlali Basemjondolo' which successfully took authorities to court. Since the government is the major employer of planners, thus the ruling party has an influence on the planning field (Todes and Mngadi, 2007). This situation can be one of the explanations for lack of development and basic services in Makause which is leading to social unrest and clashes with the municipality.

The emergence of participation norm influenced decision making strategies, power as well as the organisational structures of independent actors included in policy formulation in the name of participatory democracy (Saurugger, 2008). Collaborative decision making in events such as spatial planning often involves argumentation which usually entails discussions with input from individual participants responding to each other (Kebler et al, 2005).

5.3 PARTICIPATORY TURN IN PLANNING

Over the past decade, culture of public participation has expanded, it has propagated and infiltrated all levels and kinds of decision making throughout the world leading to the participatory turn, according to Saurugger (2010). The 1990s saw the introduction of participation by the civil society in decision making processes in Europe. This meant that politics and decision making was no longer solely articulated by political parties and the state, but also by agencies within the society. During this period, decision making processes became a political imperative at the European Union level with the inclusion of the general public through organised collective social action and individual choices (*Ibid*).

The European Union institutions such as the European Commission engaged in a reflection process on the legitimacy and role of the civil society, leading to the introduction of Article 47 on participatory democracy in the Constitutional Treaty (*Ibid*). This new discourse influenced conception of democracy and led to incorporation of the civil society into the political system of EU.

Development of the participatory turn in the EU democracy was perpetuated by the idea of a civil society participation in the decision making processes. This was initially done to improve

the democratic character of institutions (Saurugger, 2010). Inclusion of the civil society in decision making, in the form of participation was met by resistance and challenges from a diverse set of actors. This exposed the participation norm to criticism with civil society organisations falling back to differentiation between civil society organisations and interest representatives in which participation was divided between a democratic and a functional part, with the former as represented by civil society organisations and the later by interest representatives (*Ibid*). Existence of the participatory norm is based on power struggles among diverse actors that compete for legitimacy and influence in the eyes of the European public and other institutions and its acceptance is a question of normative framing (*Ibid*).

According to Ferrer and Sherman (2008) the participatory turn led to shift in the power dynamics in decision making and advocates for a collective influence towards common goals. This gives the general public power to inform the decision making and things that need to be considered when making those decisions.

5.4 PARTICIPATION

Participation refers to the public's ability to take part and influence decisions that directly affect their environment. It has been proposed to contribute to policy formulation through engagement and debates (Ernoul, 2010). It also increases government accountability, build support for agency programs and reduce community tensions as well as increase the sustainability of the actions (*Ibid*). Participation has also propagated as a radical form of democracy. According to Arnstein (1969) citizen participation entails the redistribution of power that enables the often marginalised and excluded classes and individuals to be deliberatively included in the planning and decision making processes. The concept of participation has influenced the demand for the implementation of participation at all levels of decision making spheres (*Ibid*).

Arnstein (1969) argues that no one has ever openly criticised participation in principle since it is viewed as the correct way of planning developments. Participation is seen as a way of redistributing power. The concept is regarded as the cornerstone for democracy and the idea of involving the civil society in decision making is vigorously applauded by everyone (*Ibid*).

5.4.1 Types of Participation

Cornwall (2004) introduces the notion of participation where individuals in power can arrange for the community to meet and discuss developments that would then directly affect their lives. This is often done peacefully in an orderly account and often in the absence of social movements that perpetuate radical approaches to decision making and planning. The power holder in this case can be the developer or the local authority in the form of committees that represent the public and the invited spaces would entail public meetings or ward meetings depending on the scale of development (*Ibid*). Invited spaces can be utilised through a series of meeting between the developer and the beneficiaries during the course of the project cycle.

Participation can also be initiated by the community through inventing spaces and platforms to amplify their voices so they can be heard by the holders of power. Miraftab (2006) refer to this type of participation as invented spaces. This is often the case when the community is dominated by social movements.

5.4.2 Levels of Participation

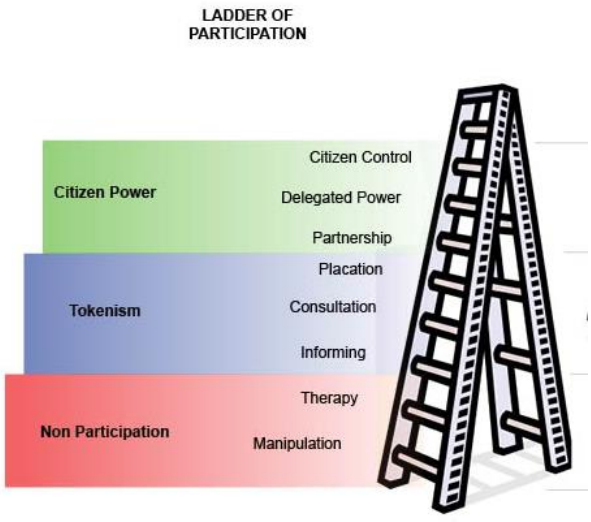


Figure 5.1: A Ladder of Citizen's participation (Arnstein, 1969)

The ladder explains levels of participation with each level corresponding to the extent of citizens' power in determining the end product. It originated in relation to citizen involvement in planning in the United States of America in 1969. Level 1 reflects the least extent of participation where the general public is manipulated to align with the decision maker. Manipulation (level 1) and therapy (level 2) are regarded as non-participation levels since the decision will be already taken (Arnstein, 1969).

Levels 3, 4 and 5 entail informing the public in a consultative manner in decision making. The power still lies with the authorities or the developer; people are just informed so they can be partial participants in the implementation of projects. Levels 6, 7 and 8 reflect a shift of power and influence to the general public or the recipients, thus they participants that engage in these levels have the power to determine the end product hence it is termed 'citizen power' (Arnstein, 1969). Level 8 has the 'have-not' citizens, those pushed to the political, social and economic periphery gaining more seats in the decision making spheres (*Ibid*).

5.5 COMMUNICATIVE PLANNING: THE CASE OF CROSSROADS INFORMAL SETTLEMENT (WESTERN CAPE)

Problems and conflicts are solved through successful communication, learning and collaboration so as to reach an agreement and a consensus (Healey, 1999 as cited in Holgersen and Haarstad, 2009). Communicative planning entails the flow of information or a direct contact between all the stake holders, the planner and the beneficiaries. In so doing, there are high chances of keeping all the stakeholders informed with the decisions being taken and the progress made. There are tensions between the residents of Makause informal settlement and the authorities due to poor communication and undermining of people's interests by the municipality (General Moyo, discussion, 12 September 2013).

Communicative planning is an approach that aims to realise the democratic potential of planning in the society's contemporary conditions and diverse social structures, it is also known as collaborative planning (Healey, 1999 as cited in Holgersen and Haarstad, 2009). In this approach, participants are given a platform to voice out their concerns while planners are given a chance to gain valuable local knowledge and then conflicts can be resolved (*Ibid*). Communication did not occur in the case of Crossroads; the authorities imposed their decision

on the residents which led to the failure of the project. The same occurred in Makause as indicated by General Moyo that even those who had agreed and left, later came back and reclaimed their spots in the settlement. Authorities did not engage the community on a possibility of reaching an agreement for relocations.

Authorities and planners tried to create a presumed 'proper' living environment and a 'proper' community but were met with resistance by the people in Crossroads; an informal settlement in the Western Cape Province in South Africa (Watson, 2003). This was due to the fact that planning was done in the absence of proper communication, thus residents of Crossroads were not satisfied by the development. A project that was meant to upgrade the informal settlement met massive resistance from the landlords and women (*Ibid*). Residents were not part of the decisions that led to this attempted upgrading, and they were not informed until the time of the implementation (*Ibid*), this led to dissatisfaction hence resistance.

This relates to attempted removals of residents of Makause to a location called 'Springs' in the Eastrand area, still under Ekurhuleni municipality, where they were promised service delivery (General Moyo, discussion 12 September 2013). Moyo claimed that the authorities brought food parcels to lure residents to agree to forced removals. Some members of the community agreed and left, however, Moyo said that the majority of the community refused due to fear of detaching from their livelihoods by being pushed far from their sources of income. Some were skeptical because of the use of food parcels as a way of buying out people's consensus, according to Moyo.

Communicative planning is not an answer to the planning problems, but it gives all stakeholders a chance to engage in decision making (Watson, 2003). On that account, it is not surprising that different players in confronting the proposed development in Crossroads had different agendas and rationalities. The same applies for Makause since communities are not homogenous. Watson (2003) argues that planning theories have failed to come up with an approach that would accommodate the interests of everyone in a multicultural society with diverse rationalities.

According to Innes (1996) communicative approach is based on consensus building that is aimed at the provision of opportunity to reformulate comprehensive planning. The approach is aimed at addressing complex issues where multiple interests are at stake. This is often overlooked,

especially concerning service delivery in informal settlements of South Africa as highlighted by the cases of Crossroads.

There has to be a mutual understanding between the developer, the planner and the beneficiaries for planning projects to be legitimate (Innes, 1996). There seems to be a misunderstanding of the notion of proper citizens and proper living environment by the authorities. Communicative and participatory ways of planning and development often minimize tensions and dissatisfaction.

Communicative planning processes are influenced by the forces of communication and trust (Harwood and Zapata, 2006; Voogd and Woltjer, 1999). Communities are so diverse and they are always bombarded by issues of differences. These are social, racial, gender and other socio economic factors that inform different rationalities. Communication becomes vital in such circumstances. The resistance incidents at Crossroads could have been avoided through communicative ethics, which emphasise the importance of consensus building as highlighted by Habermas (1990) as cited in Voogd and Woltjer (1999).

Communicative planning reduce the gap between the planners and administrators as well as the general public, and the rationality which informs the strategies and tactics of those who are attempting to survive, materially and politically, in the harsh environment of African cities (Voogd and Woltjer, 1999; Watson, 2003). The clash of rationalities, or the differences in world view between the various parties involved could be minimized through allowing the society to engage in different levels of decision making to reach a consensus (Arnstein, 1969; Watson, 2003).

Watson (2003) calls for an urgent need for planning theorists to think further on the issue of planning in a context of conflicting rationalities, recognizing of power as it both shapes and maintains them. Communicative planning seems to better serve the issue of multiculturalism and different rationalities so as to avoid incidents such as that of an attempted upgrading of Crossroads Informal Settlement.

Communicative planning was not used in the cases of Crossroads informal settlements, and thus there were problems between residents and the authorities for the former; and the ongoing squabbles for the latter. Collaborative planning advocates for a bottom up approache while the

decision regarding developing Crossroads settlement was top down. Some stakeholders (the residents) were not included in the decision making processes. The project was not meaningful to some stakeholders since there were no participation processes and there was no mutual understanding of interests since there was no representation for residents. There was no authentic dialogue since the residents did not get a chance to openly voice out their concerns.

5.5.1 CONCLUSION

It is important for authorities to apply planning theories that include all stake holders in development. Exclusion of other stake holders in decision making pertaining to developments that directly impact on their lives and livelihoods can lead to resistance and disruption on implementation. Residents of Crossroads informal settlement protested against a proposed insitu upgrading due to failure of the authorities to engage them in decision making.

Participation in planning reduces conflicts and resistance on proposed developments since all stake holders would have contributed in deciding on the developments to be implemented. Communities often feel entitled when they are given a chance to contribute on developments that directly affect them. Community participation should be considered at every level of project development for processes to run smooth. Levels of participation should also be taken into account as argued by Arnstein (1969). Each level can fit into a form of participation depending on the type of development to be implemented. However, tokenism and citizen power are ideal in planning since they allow for citizens to play a leading role in deciding on development.

CHAPTER 6:FINDINGS FROM FIELD WORK

6.1 INTRODUCTION

This chapter forms the essence of the research as it discusses the findings from the field work. These are presented in qualitative and quantitative means by use of graphs and pictures so as to enhance the understanding of the arguments and claims made by the interviewees. The layout of the discussion is guided by the structure of questionnaire. The first part of the discussion is on the informants' personal information, followed by a discussion on environmental health then a discussion on political influences. These will be related to the literature as well as other information obtained through meetings.

Data obtained through communication with Stats SA did not match the data that was obtained from the field in terms of the demographics of Makause. Stats SA (2013) claimed that Makause was home to 2 625 individuals, while the study sample and MACODEFO claimed that there were about 15 000 people staying in the settlement at the time of the field work (December 2013). Personal observations of the settlement are in support of the data given by the residents of Makause since this is primary information. From personal observations and information given by MACODEFO, It was clear that the population of the settlement was more than 2 625 as given by Stats SA (2013).

The research focused on all four sections of Makause and the completed survey revealed that the informal dwellings in this settlement are distributed in a matrix-like format which makes it difficult for any form of in situ upgrading without re-structuring the settlement. The dwellings are densely clustered which also poses a fire hazard as indicated by the fire that engulfed the settlement in 2012 (De Waal, 2012). All parts of the settlement were represented in the research so that their perceptions could be tested.

6.2 SAMPLE CHARACTERISTICS

6.2.1 Gender

The reasons that informed a choice of equal numbers in gender included the fact that environmental health often affects males and females differently and at different levels. Males usually leave the settlement for most of the day while females are often left behind to deal with the harsh environmental conditions due to traditional domestic responsibilities. This exposes females to environmental health consequences as compared to their male counterparts. A selection of 25 individuals from both males and females was done and a total of 50 individuals were interviewed as shown in the figure below.

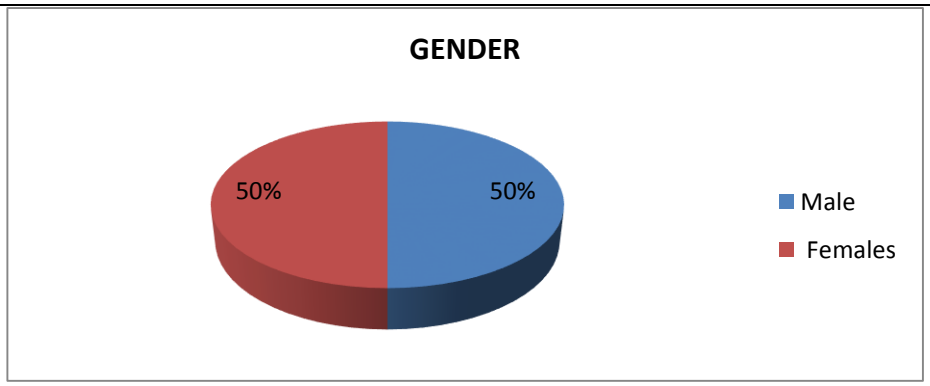


Figure 6.1: Gender of the study sample – The sample was deliberately made up of 50 individuals with 25 males and 25 females to maintain a balance of representation.

6.2.2 Demographic Structure of the Sample

The demographic structure of the sample highlights that the population of Makause is dominantly made up of the economically active group and the bulk of the population ranges from 25 to 54 years of age. This reveals that the settlement was occupied primarily with income generation intentions and for economic reasons. The existence of this settlement is a reflection of shortage of housing. The figure below shows demographic characteristics of the sample.

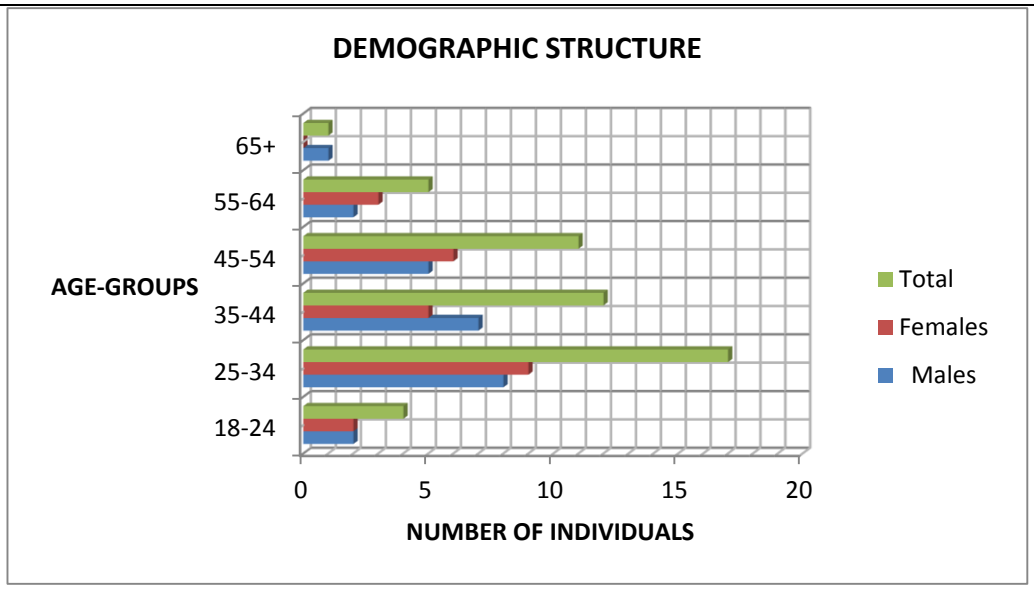


Figure 6.2: Demographic structure of the study sample – There were more people in the 25-34 age group representative of the most mobile and economically active population**.**

There were only 4 individuals in the 18 – 24 year age category out of a sample of 50 interviewees. This could highlight the fact that people of this age and below are still dependant on their parents either in the rural areas or their places of origin. They come to Makause to start their own livelihoods as soon as they become independent, which is often around the age of 20. The destination is usually determined by their economic backgrounds, with enough money they would often settle in more decent rented areas that are close to employment opportunities. However, due to harsh economic conditions, they end up in informal settlements like Makause.

There were 17 out of 50 individuals in the 25 – 34 year age category in the sample within the economically active age-group. This supports the claim that most residents of Makause came to the area for economic reasons. This age-group is often made up of recent school leavers and graduates from high schools and other institutions. In South Africa this is the group that highly affected by unemployment, and thus they came to Makause for employment opportunities available in Germiston (about 5km away) and nearby areas.

35 – 44 year age group is often characterised by individuals who are established in life. Unfortunately in Makause these individuals are still trying to make ends meet as they still cannot

afford proper accommodation. There were 12 individuals within this age group in the sample, 7 of which were males and 5 females. There were 11 individuals in the 45 – 54 year age group; this is a group characteristic of people whose economic activity is declining. Other age groups within this section of economic activity included the 55 – 64 age group and those at 65 years of age and over; these often rely on social grants.

6.3 LENGTH OF STAY IN MAKAUSE

Individuals who had stayed in Makause for a longer were assumed to have had witnessed changes in the settlement and its socio-political and economic characteristics. As revealed by the responses, general changes encompass installation of water taps and the building of a clinic. Negative changes recorded in line with the length of stay were population growth that led to overcrowding and pressure on scarce resources as well as deterioration of the environment.

Even though Makause was established in the 1980s, individuals who took part in the study started residing in the settlement from the 1986 – 1990 period. A possible reason could be the fact that those who used to stay there became economically inactive and moved back to their places of origin. Hoogendoorn (2010) argues that people of South Africa often have second homes, where they originally come from. These are usually rural homes that were a result of apartheid policies.

There are waves of population migration between cities and these rural areas as a result of this phenomenon. As people become economically active, they migrate to cities for perceived job opportunities and incomes. Some; as in the case of Makause, migrate from other countries and relocate close to job opportunities. When they grow older or pass the phase of economic activity, they then return to their places of origin. The city would have become their second home for they would have established livelihoods, ties and networks (Hoogendoorn, 2010)

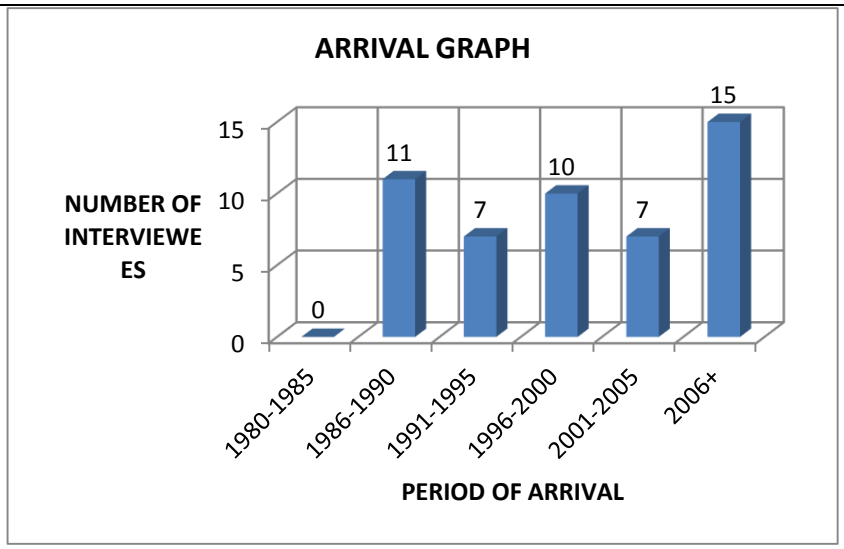


Figure 6.3: Arrival periods at Makause – Representative sample of Makause informal settlement arrived in the area on different intervals. The earliest arrived during the 1986-1990 period and the latest arrival were from 2006 to date.

22% of the interviewees arrived in Makause in the 1986 – 1990 period. They are expected to have seen improvements, such as the construction of the clinic and installation of water taps. Only 14% arrived within the 1991 – 1995 period, these are also expected to have witnessed some changes since this phase ushered in democracy and a freedom of movement within South Africa. 10 individuals arrived during the 1996 – 2005 period.

30% of the sample arrived in Makause after 2006, this would made sense when they claimed that they had witnessed a few changes or no change at all in the environmental health conditions of the settlement. 14% arrived in the settlement within the 2001 – 2005 period; these are expected to have witnessed more changes compared to those who arrived at later stages.

6.4 EDUCATIONAL BACKGROUND

Education levels were expected to possibly correlate with levels of environmental knowledge since awareness is often common in schools. Education was also expected to be able to influence environmental health perceptions since it is believed to enhance the amount of knowledge that an individual can possess. The higher the education level attained, the more the chances of understanding environmental health. Education was also expected to correlate with employment

rates since the higher the level attained the higher the chances of being employed and the incomes thereof.

Education levels are low in Makause with the bulk of the residents attaining up to secondary level as revealed by the chart below. Under normal circumstances there is a positive correlation between education levels and income levels. On this account we expect income levels to correspond with the education levels. 21 % of the sample group attained up to primary education, 71% up to secondary level and only 8% attained tertiary education as shown in the figure below.

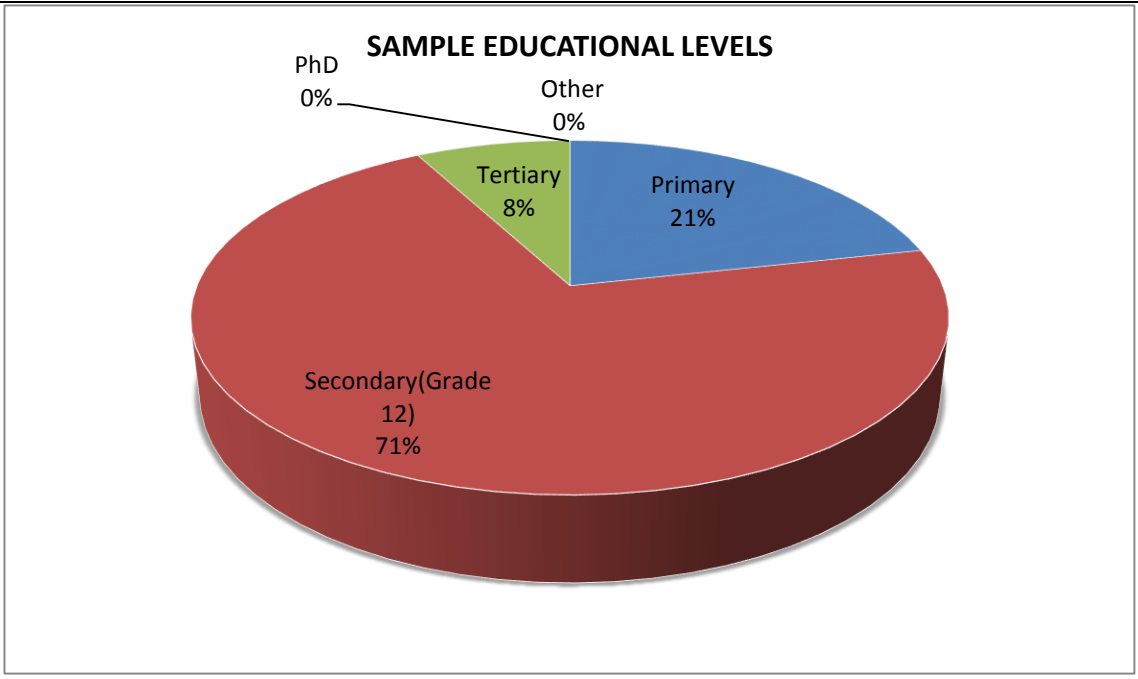


Figure 6.4: Educational levels– The study sample highlighted that most residents in Makause obtained secondary level education.

According to Stats SA claim, of a total population of 2 625; 140 individuals (10%) did not receive any form of schooling, 116 people (8%) received primary education; only 49 (3%) of the 116 individuals who received primary education completed it. 541 individuals (37%) received secondary education and 558 (38%) completed secondary education. These figures distort the credibility of the claims by Stats SA since the number of individuals who received secondary

education is lower than the number of those who completed it, this is impossible. In turn this also discredits the whole population claim. According to the data given by Stats SA, 51 individuals attained education levels higher than secondary schooling as shown in the figure below.

Data supplied by Stats SA highlights claims by Lohnert (2001) that authorities in South Africa do not keep track of informal settlements statistics and records. This makes it difficult to implement plans to upgrade these settlements.

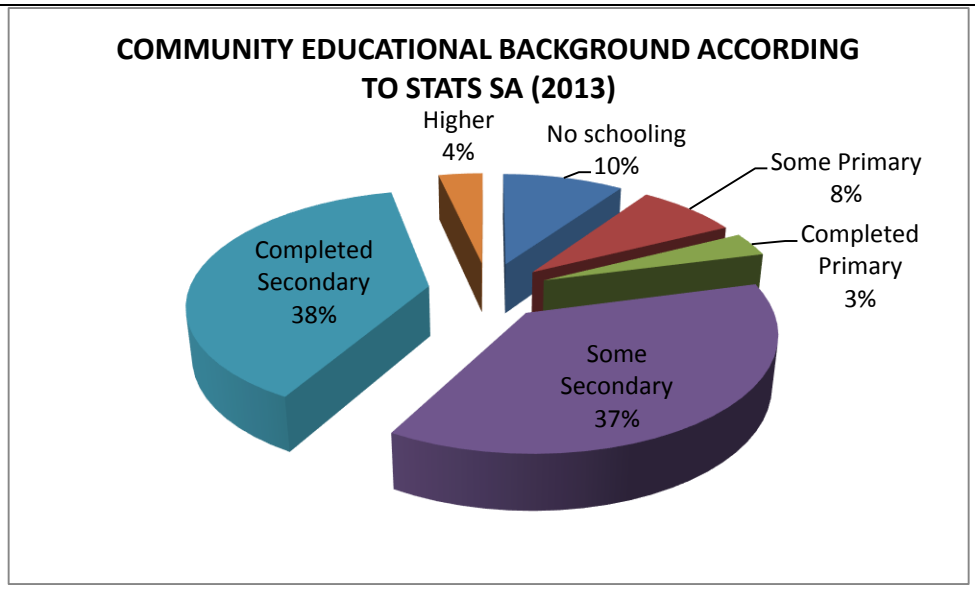


Figure 6.5: Community education levels according to Stats SA (2013).

In a meeting held on the 14th of January 2014, the Makause Community Development Forum claimed that there are no public schools close by. Available schools are private and are too expensive for the community of Makause. Most children in the area have since dropped out of school due to lack of adequate funds to further their education.

6.5 REASONS FOR COMING TO MAKAUSE

The general reason for migration to cities in the developing world is perceived better incomes, job opportunities and living standards. This also applies in the South African context where people migrate from rural areas and other cities for better opportunities, with cheaper areas with affordable accommodation as entry points for migrants. On this account, people relocate for different reasons; and thus residents of Makause came to this area as a result of different push and pull factors as shown in the chart below.

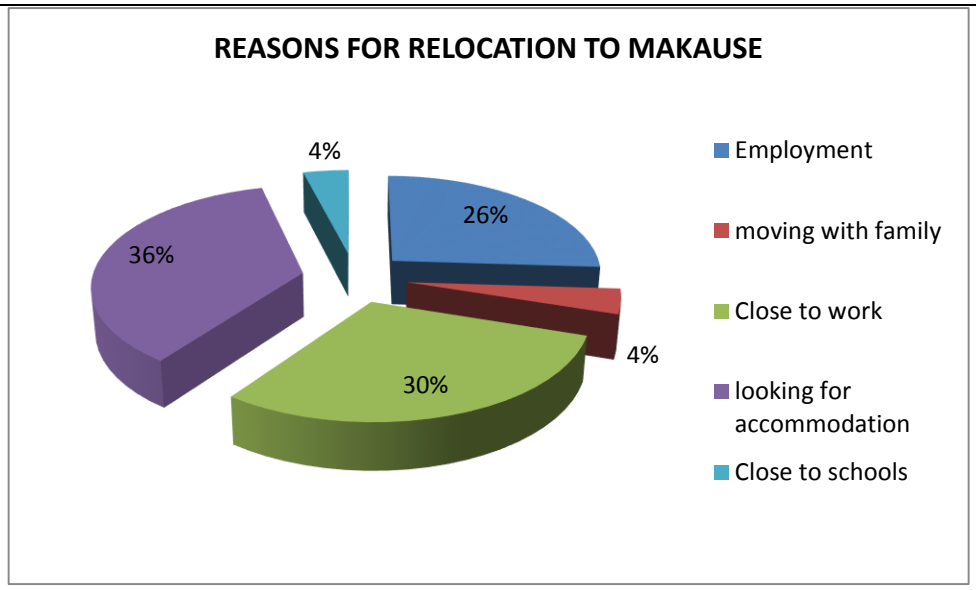


Figure 6.6: Reasons for Relocating- The sample's reasons for relocating to Makause**.**

Even though people came to reside in Makause for various reasons, all reasons given by the interviewees are related to accommodation problems due to shortage of affordable housing and proximity to employment opportunities. On rare occasions respondents claimed that they came as a result of family movements and relocation as shown in the chart above.

6.5.1 PLACES OF ORIGIN

Residents of Makause came from all provinces of South Africa, thus a representation of different cultures and backgrounds. 17 individuals claimed to have come from various parts of Gauteng mostly other informal settlements. The rest who came from other provinces were originally from

rural areas and some small towns. 5 individuals came from other countries such as Zimbabwe, Mozambique and Malawi.

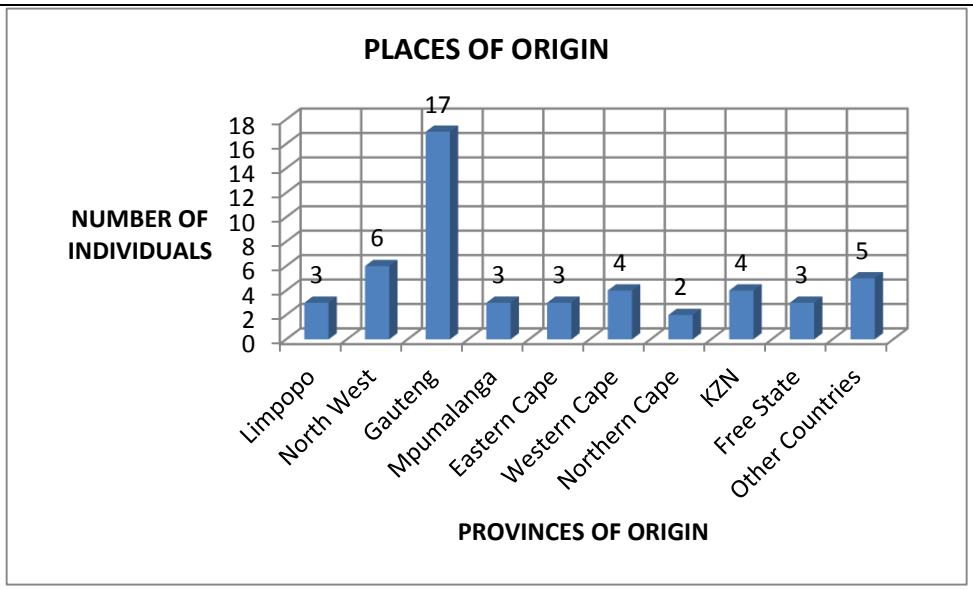


Figure 6.7:Interviewees' places of origin.

Along with other informal settlements, Makause is regarded as one of the entry points for poor people who migrate to Johannesburg and Ekurhuleni as highlighted by Lohnert (2001). Most scholars interpret this phenomenon as migration of poverty, whereby economically deprived populations migrate to urban poor areas for perceived better economic opportunities. Residents of this informal settlement claimed that they came because they could not afford housing elsewhere. From the discussion held with the interviewees, it was concluded that the younger individuals within the group were trying to reach a state of financial stability so that they can move to better places while their older counterparts anticipated an insitu development that will improve their living standards in Makause.

6.6 HOUSEHOLD SIZES

Population density is directly linked to environmental health in the context of informal settlements (WHO, 1999). Wood et al. (2001) argued that there is a direct interrelation between the state of environmental health and human population. Sections of high population density in settlements like Makause are expected to have intensified environmental health problems since there are more individuals in a small piece of land, there by leading to easy spread of diseases. Overpopulation is one of the major problems that were raised by the residents of Makause, and they claimed that the population was increasing at a tremendous rate. According to MACODEFO (meeting, 12 January 2014), high population density made it difficult to distribute the little resources they could gather in the form of aid.

Population growth is directly related to population density, the rate at which population increases often determine the increase in pressure on resources (WHO, 1999). This can be tracked by monitoring the annual net rate of population growth. High population growth rate is often associated with numerous urban problems such as housing, sanitation and other basic services and social welfare. MACODEFO highlighted that the community is now faced with shortage of spaces to build their dwellings due to the rate at which the settlement is expanding. On that account, there are infillings going on within the settlement and this is intensifying population density thereby further deteriorating the environment.

Household sizes play one of the major roles in determining the living conditions and standards in poor communities. Depending on their incomes, household sizes determine the amount of resources consumed and the surplus accumulated. Bigger households dwelling in small housing spaces such as shacks are often affected by more problems compared to smaller ones due to easy disease spread and contamination.

28% of the interviewees were sharing a shack with two other individuals, and thus 3 people per shack; 24% resided in pairs most probably as couples. 24% resided in fours and 8% stayed by themselves in their shacks. Of interest was an individual who claimed that there were 8 of them sharing a shack and on close examination I came to find that he was a foreign national (Zimbabwean). They had to stay together for security and ability to save money so they can support their families back home.

4% that claimed to share their shacks with six other people; this made it seven people per shack which is overcrowding. Too many individuals in the same shack perpetuate the spread of contagious diseases such as tuberculosis (TB). With low levels of income and access to health care, this would pose a serious health threat to the residents.

There was also an individual who claimed to share a shack with 5 other people; as well as 6% that shared their shacks with 4 other people. The graph below shows results of the field work and investigation on population and household sizes, indication high rates of overpopulation per shack. Shacks in Makause are dominantly between 3 and 4 square metres, they are too small to host more than two people.

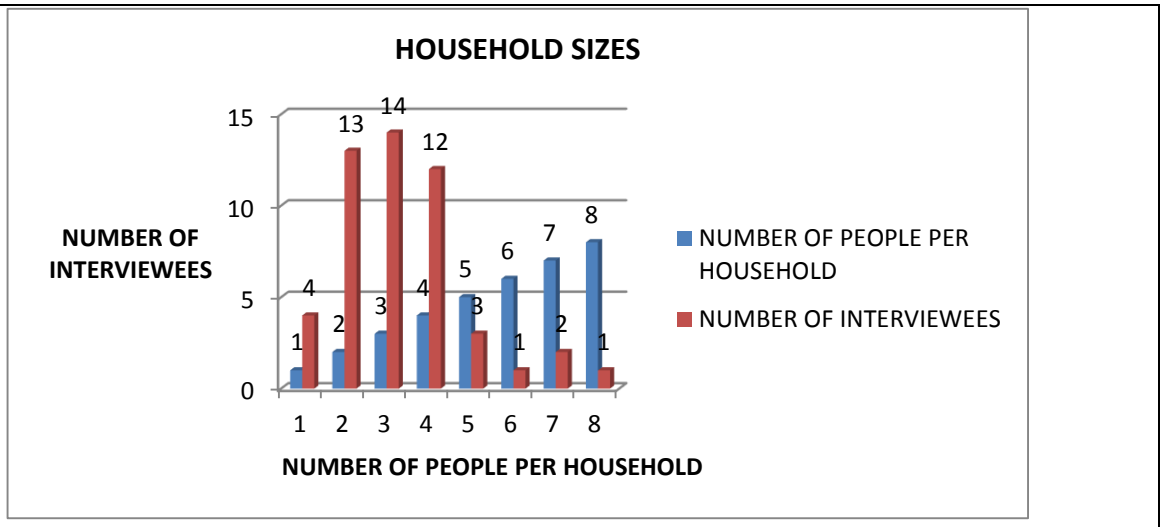


Figure 6.8:The sample's household sizes.

6.7 ECONOMIC STATUS

To determine the economic status of the interviewees, a question was drafted on whether the interviewee or the spouse there of was working. 52% of the sample group did not have jobs and their spouses were also unemployed. 48% were either employed or their spouses had jobs. This generally highlighted high unemployment rates within the community as represented by the sample. The chart below shows the information on interviewee or spouse employment rates.

Those who had jobs or had their spouses working answered ‘yes’ while those who were not working and their spouses were also jobless answered ‘no’.

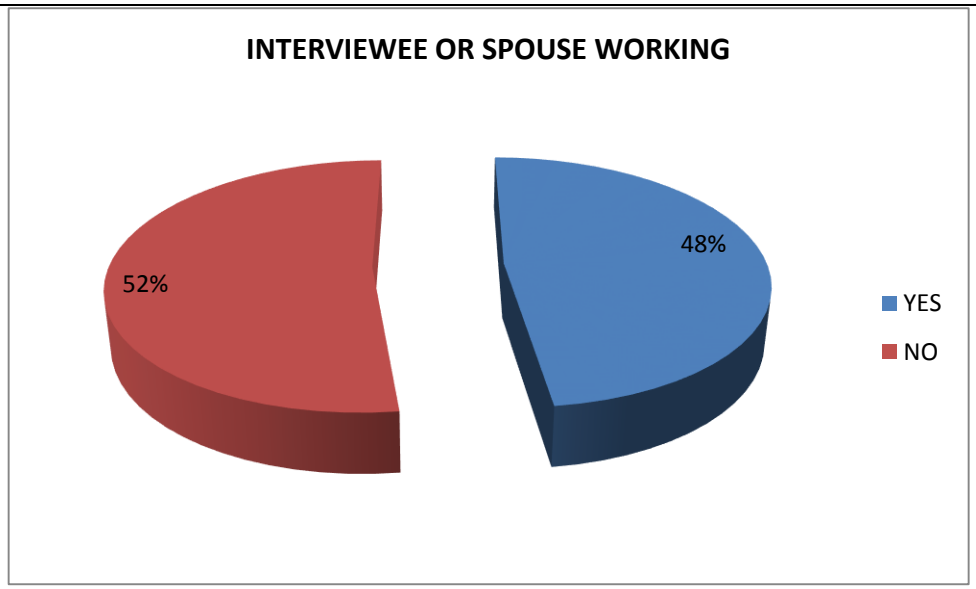


Figure 6.9: Interviewee and spouses employment chart.

36% of the sample had family members who were employed, this highlighted a potential boost in their finances. However, 64% of the interviewees had no family members that had jobs within their households. This again highlights high unemployment rates within the community. The figure below shows the number of individuals with family members who are employed.

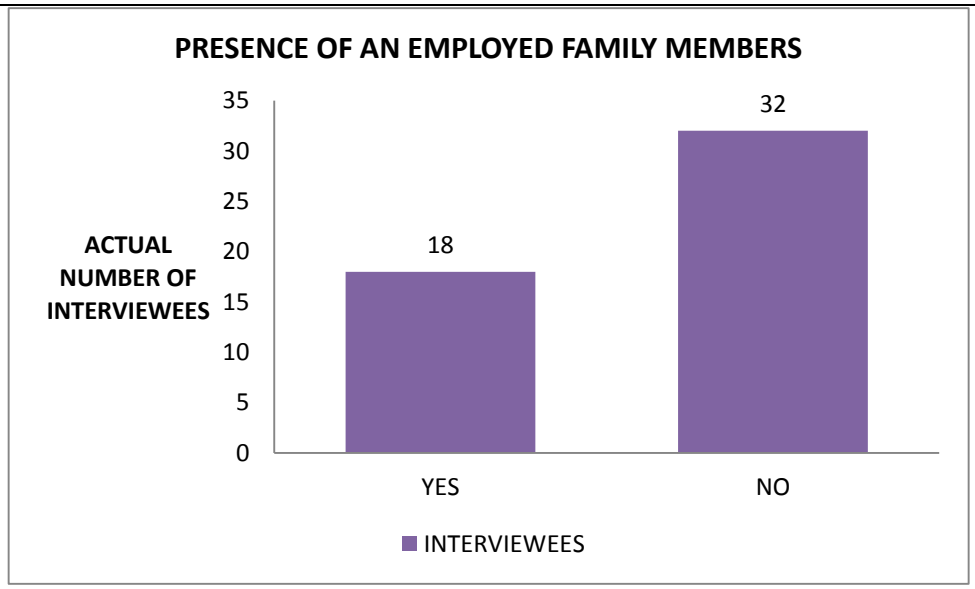


Figure 6.10: Presence of employed family members in the study sample.

6.7.1 Income Generation in Makause

Even though Makause is characterised by high unemployment rates, there are other means that residents rely on for income generation. 46% of the research sample claimed to have other means of income generation other than employment while 54% relied solely on salaries from their respective jobs as shown in the chart below.

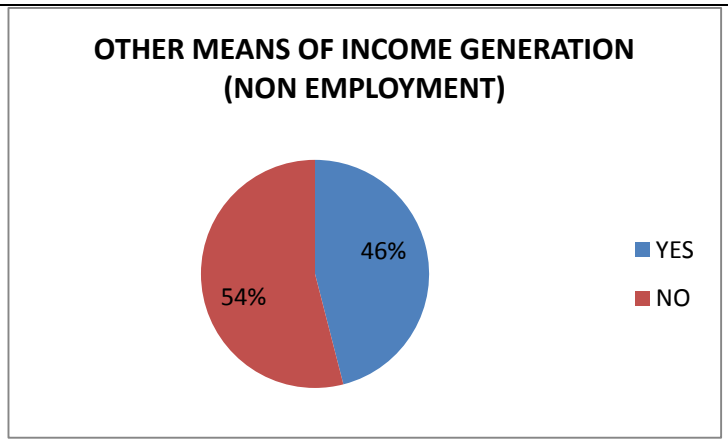


Figure 6.11: Other means of income generation in Makause.

The community of Makause engage in numerous income generating activities to supplement their low incomes, and those who are not employed rely on these activities for a living. Of the 46% that engage in alternative means of income generation, 13 individuals practice recycling. This entails collection of recyclable waste material such as iron, copper, aluminium and plastics. These materials are then sold to recycling companies around the Germiston area. Pictures below show bags of collected bottles for recycling.



Figure 6.12: Recycling in Makause- Recycling is done to supplement salaries and as a main source of income to some residents.

There are numerous other ways which residents of Makause make an income from, these are highlighted in the graph below and discussed further.

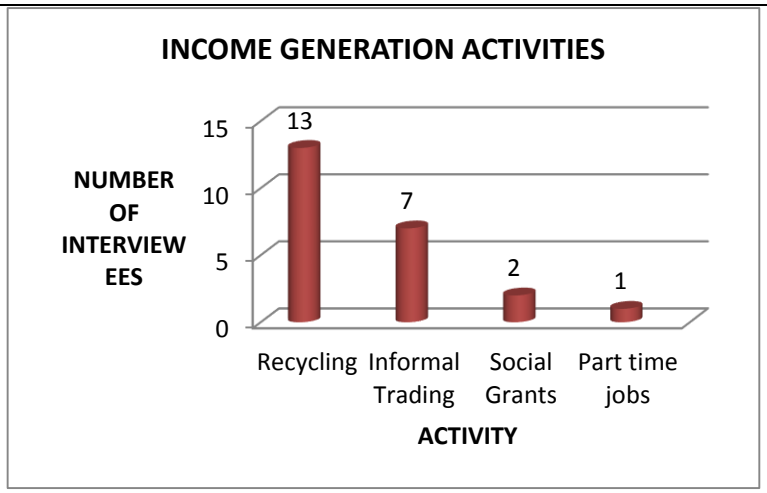


Figure 6.13: **Income Generation Activities-** Information on income generation activities.

7 individuals engage in informal trading which encompass selling of fruit and vegetables, spaza shops (tuck-shops) and hair salons as shown in the pictures below. 2 individuals relied on social grants while one person made a living through part time jobs.



Figure 6.14: Informal businesses in Makause (Photos, N James, 2013).

The sample highlighted the fact that there are more females that rely on recycling compared to males. The majority of males made a living through informal trading within the settlement and beyond. Recorded social grants were earned by males; there were no females in the study group who was earning grants or who had part time jobs. The graph below shows that females either had salaries, practiced recycling or engaged in informal trading where they sold fruits and vegetables such as tomatoes and bananas.

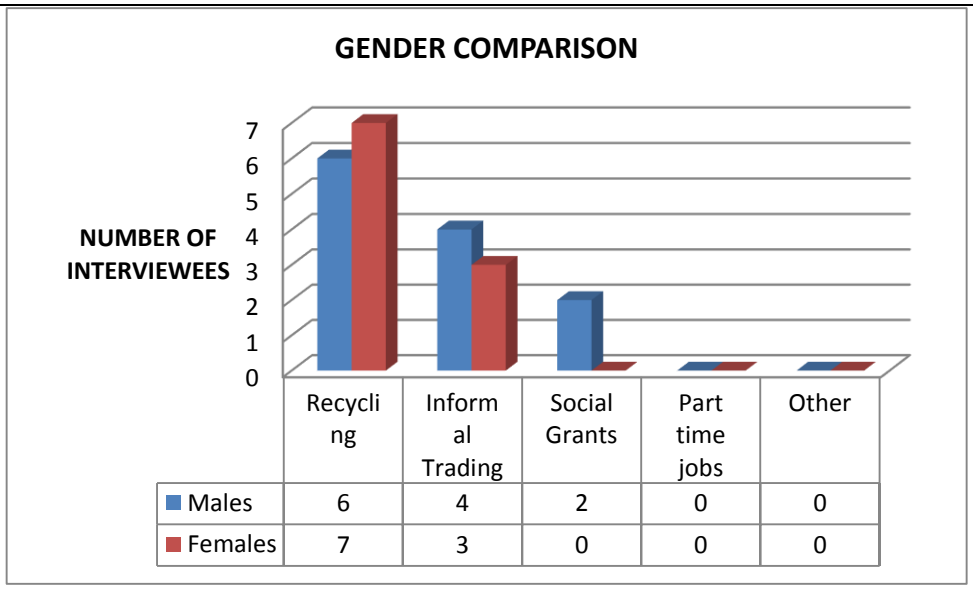


Figure 6.15: Gender comparisons on income generation.

Some females made a living through selling cooked food such as mieliepap (smooth maize meal porridge) and meat stew or roasted chicken as shown in the pictures below.



Figure 6.16: Income generation by women of Makause informal settlement

Most households in Makause rely on single incomes (one person's income) and this make their livelihoods difficult to sustain since these are often minimum wages. Most households survive on an income less than R1000 per month. The income contributions graph (below) shows that 60% of the households of the study sample relied on a single person's income for survival. 26%

relied on 2 people's incomes, 8% relied on three individuals' incomes. A single household relied on 4 people's income and only 2 households had 5 people contributing financially to their livelihood.

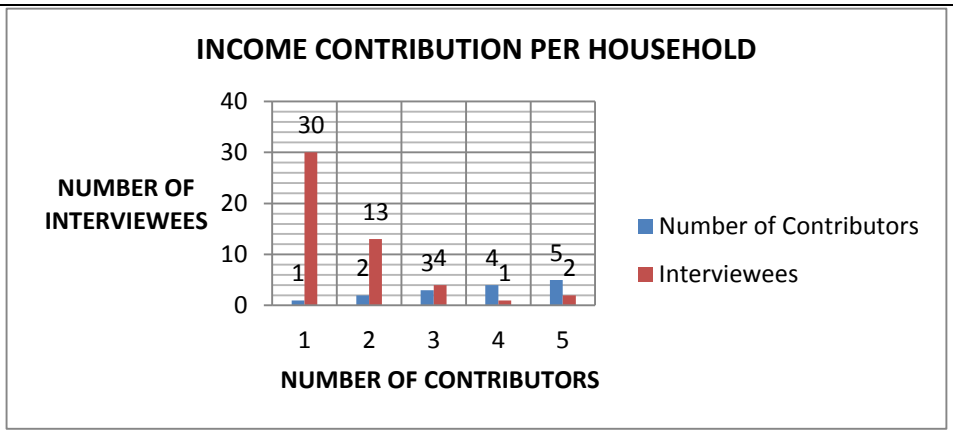


Figure 6.17: Income contribution per interviewee's household.

Sources of income that were declared in Makause encompass work (employment), informal trading, recycling and social grants. The highest monthly household income recorded was in the R6100 – R7000 range with the lowest range below R900. 2% of the households recorded this income and 44% which was the majority recorded a monthly income that was below R900, this highlights the fact that the majority of residents cannot afford but rely on government services which are also scarce in the area. This can then be linked to the poor state of environmental health and health care in this settlement.

Unemployment rates are high and those that are employment are in the minimum wage category. This contributes to the low standards of living evident in the settlement. The bulk of households rely on low incomes that are often brought by a single individual in the household. The graph below shows monthly household incomes in Makause.

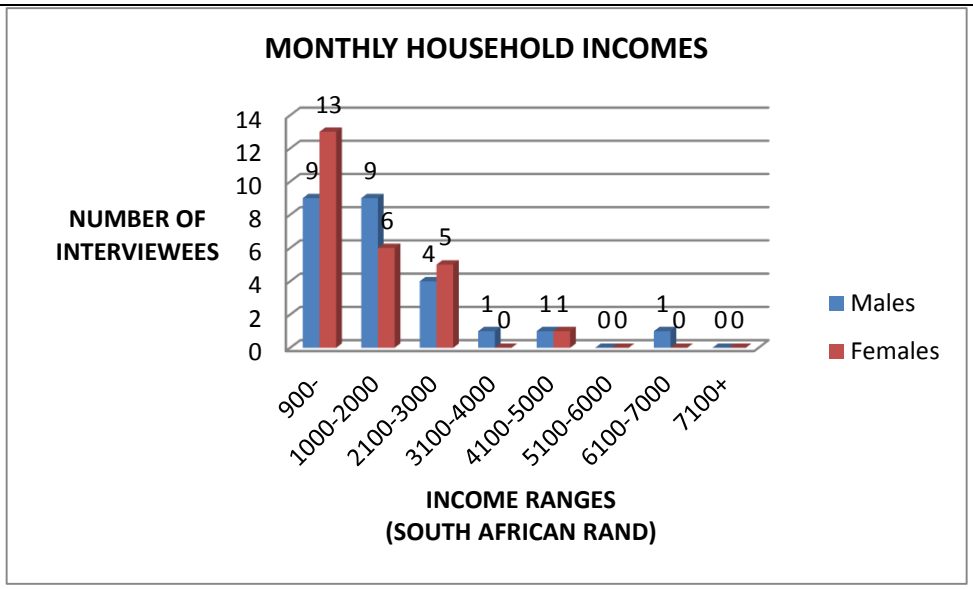


Figure 6.18: Monthly household incomes within the sample.

6.8 ENVIRONMENTAL HEALTH PERCEPTIONS IN MAKAUSE

96% of the sample of residents in Makause understood what environmental health entails, only 4% did not understand due to language barriers. Those who could not understand environmental health generally could not speak English or any of the South African languages. Explanations had to be done in foreign languages such as Portuguese for individuals from Maputo (Mozambique). The chart below shows percentages of understanding the environment and environmental health.

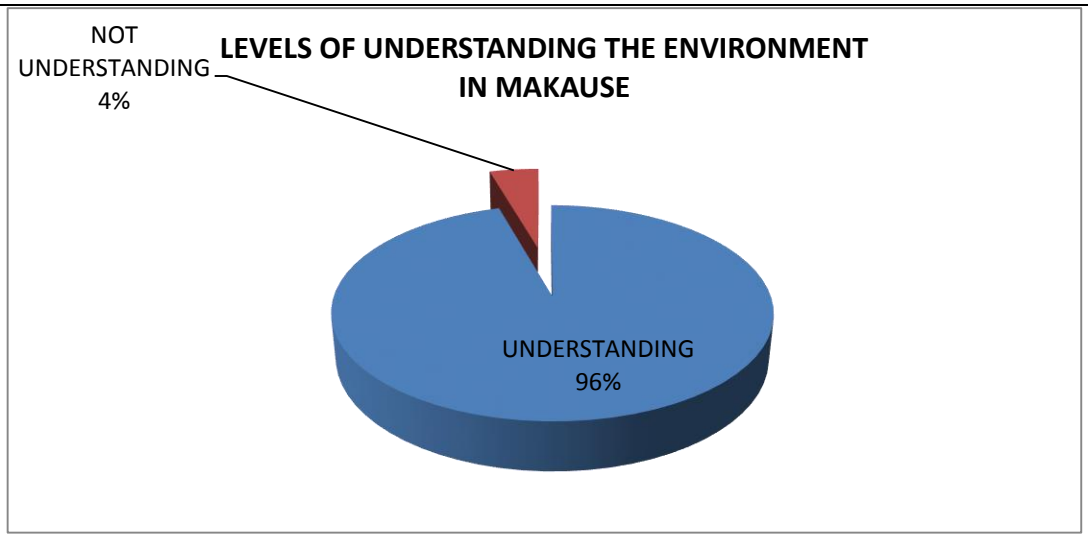


Figure 6.19: A chart of environmental understanding in Makause.

Most residents in the sample claimed that the state of environmental health was better when they arrived at Makause when compared to current prevailing conditions. The graph below shows that 50% of the total interviewed sample of 50 individuals claimed that the state of the environment has deteriorated due to lack of service delivery and overcrowding. This perception could be due to the fact that the majority of the interviewees felt that the rate and levels of deterioration outweighed positive developments such as installation of water taps and building of a clinic in the area.

38% claimed that environmental health conditions were worse when they arrived, and thus they have witnessed some improvements such as the installation of water taps and the construction of a clinic nearby. 12 % of the sample population argued that environmental health conditions remained the same regardless of water installations and provision of the clinic by the authorities. Residents' opinions regarding the state of environmental health when they first arrived at Makause and the current prevailing conditions is shown on the graph.

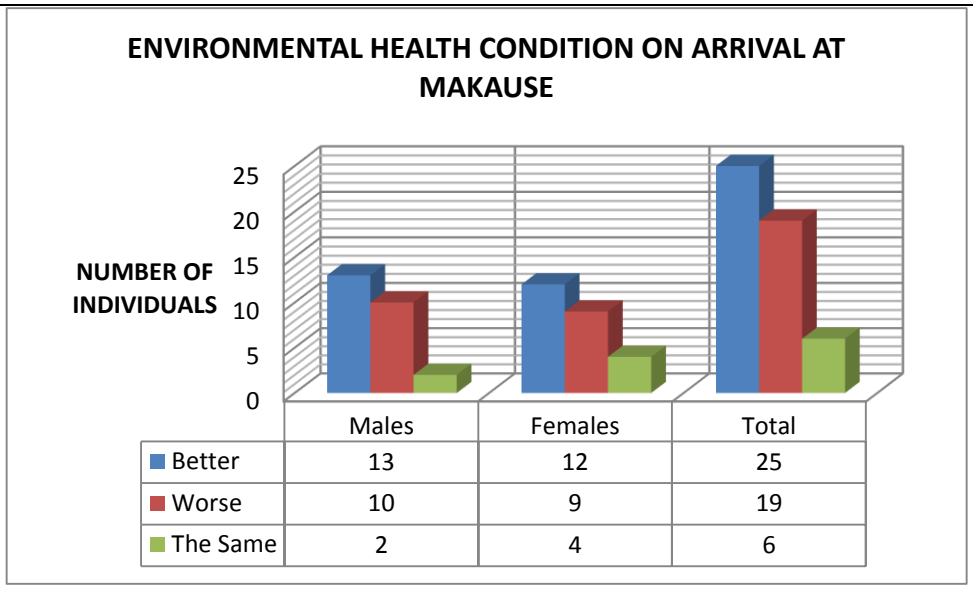


Figure 6.20:Environmental health conditions on arrival.

Despite the dissatisfactory nature of the prevailing environmental health conditions in Makause as highlighted by the interviewees, there were positive aspects of the environment in the settlement, and these are showed in the graph below. However, interviewees were divided when it came to the issues of water and the clinic. Only a few acknowledged the presence of both. Some felt there are few taps in proportion with population numbers and there were too far for some individuals. Some claimed that the clinic was useless since "it is understaffed, there is a constant shortage of medicines and people from this settlement are often ill-treated" said one of the interviewees. According to the interviewees, most residents have been turned away without proper treatment and the clinic staff prioritises residents from the surrounding suburbs to those of Makause.

7 individuals could not think of any positive aspects of the environmental health in Makause. They were dissatisfied with everything that was happening in their community. The installation of water taps and building of the clinic was not adequate for them to recognise it as a positive aspect of the environment. This is due to dissatisfaction with the changes as highlighted in the above paragraph.

Some of the positive aspects raised by the interviewees include the presence of vegetation and cleaners in some parts of the settlement as well as communal living. The interviewees highlighted that mutual understanding within the community made it easy for the community to cope with problems; and thus making the community resilient.

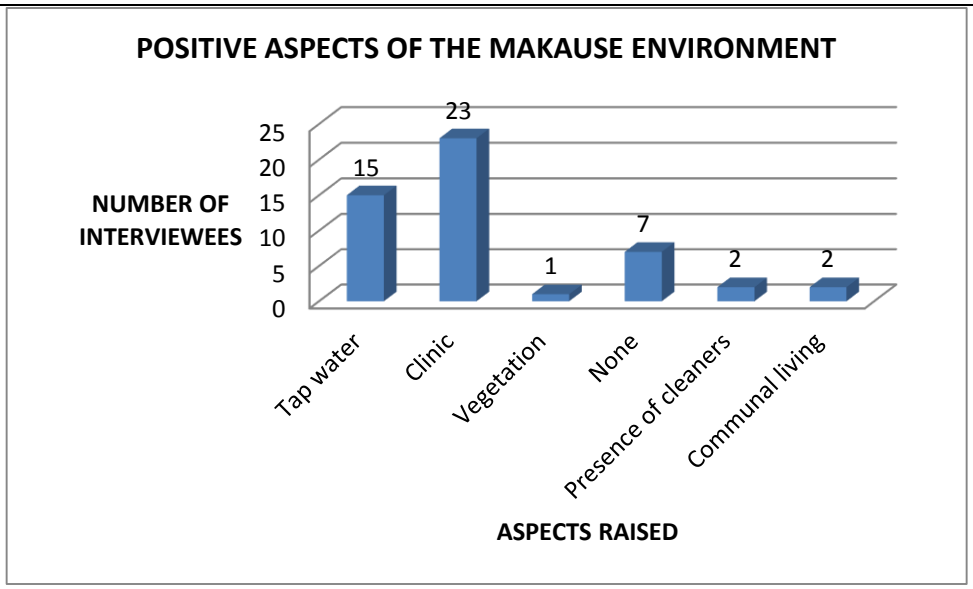


Figure 6.21: A graph of positive aspects of the Makause environment.

A single individual pointed out the importance of vegetation in the areas and highlighted how it traps dust from the tailings storage facility close by. Suggested possible causes of positive environmental health conditions that can prevail in Makause included improved service delivery, community efforts to improve their own environment as well as efforts from authorities and the community. The percentages of interviewees that raised these causes are shown in the chart below.

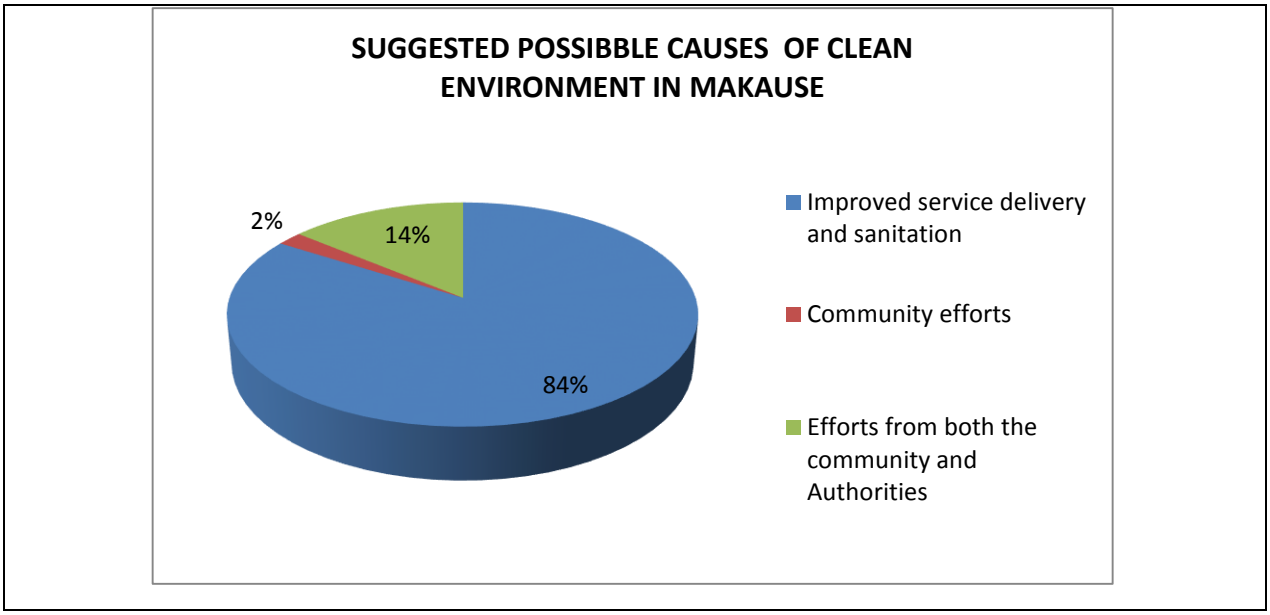


Figure 6.22 A chart showing suggested causes of a positive environment in Makause

Improved service delivery and sanitation is a cry for all informal settlements throughout South Africa as argued by Lohnert (2001). It has proved to be difficult for authorities to be able to meet sanitation requirements and service delivery in informal settlements.

Residents of Makause installed their own water taps when authorities failed to deliver. Alfred 'General' Moyo explained that they could not wait anymore, and they could not stand having water pipelines running through the settlement while residents did not have any supplies. On that account, they decided to collect money and buy pipes that they then used to connect and supply the community with water.

There are tensions between the authorities and residents of Makause and this is proving to be a major problem in trying to jointly improve sanitation and service delivery in the area. According to MACODEFO (meeting 12 January 2014), the municipality proposed to install chemical toilets at the fringe of the settlement. This was not agreed upon since residents felt that these temporary structures would pose a health hazard due to lack of maintenance and it was going to be dangerous to go there late at night since there is no electricity and crime rates are high in the area.

Negative aspects of environmental health in Makause were generally aligned to lack of service delivery, however; overcrowding was another issue that kept surfacing during the interviews. 7

residents highlighted that, besides lack of services in the area, there seems to be a population influx leading to further deterioration of the environment. Residents' expressions on the prevailing negative environment in Makause are shown in the graph below. 68% of the interviewees blamed authorities for the negative aspects of the environment. These claims were related to lack of basic sanitation.

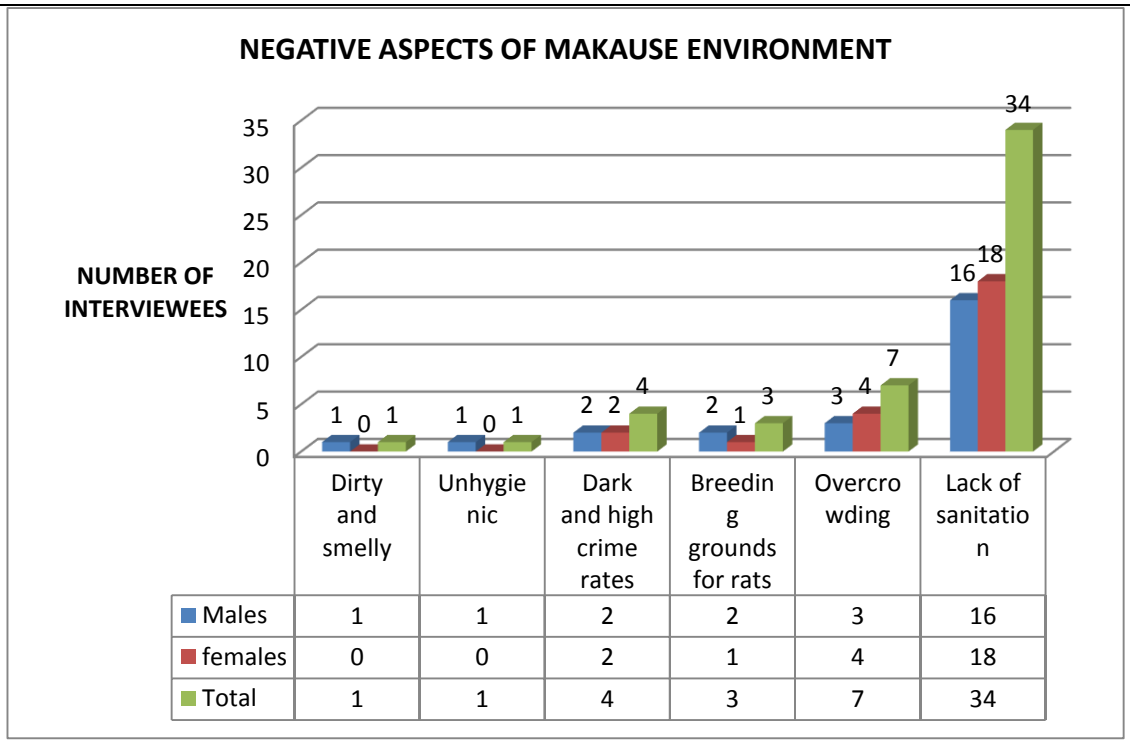


Figure 6.23: Perceived causes of a negative environment in Makause.

The causes of the negative environment raised ranged from negligence by the community as highlighted by the photo below; lack of sanitation and service delivery as well as environmental trade-offs residents face on their daily struggles to survive. Some residents raised the point that individuals who practice recycling make a lot of garbage in the area and they cause a lot of soot with their extraction processes. Since there is no service delivery in the area, access material from recycling and consumptions is left lying around posing as a health hazard.

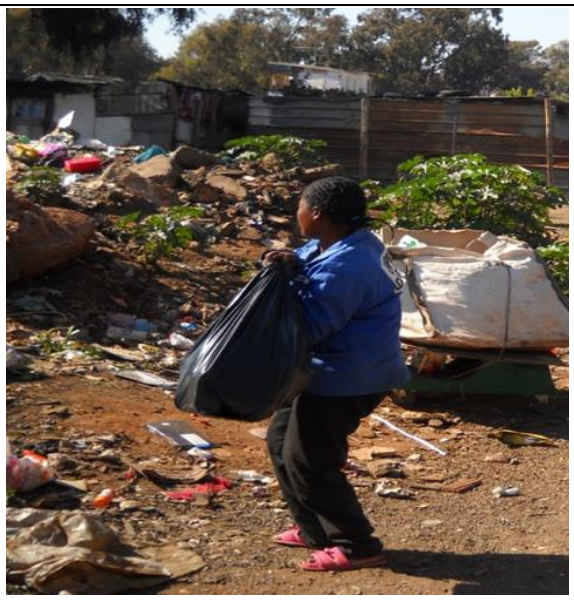


Figure 6.24: **Community negligence -** A woman disposes of her domestic waste in Makause, this kind of behaviour was labelled as negligent by the interviewees (photo by N James, 2013)**.**

The chart below shows other suggested causes of a negative environment in Makause informal settlement. 69% of the interviewees claimed that lack of service delivery was the major cause of a negative environment. 20% attested it to community negligence and 11% was claimed to be a result of environmental trade-offs such as recycling activities that the community practice as a means to survive.

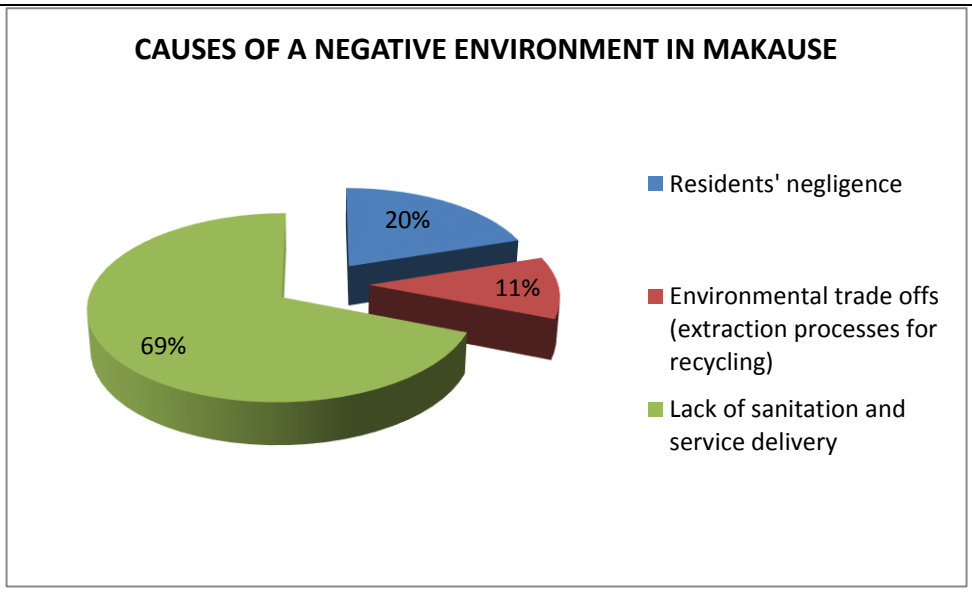


Figure 6.25: Perceived causes of a negative environment in Makause.

Of interest is the fact that poor livelihoods in the area were mentioned as one of the causes of a negative environmental health. Residents who rely on recycling for income were accused of leaving their garbage everywhere after selecting recyclable materials from their daily collections. Some were accused of creating a lot of soot and smoke during copper wire extracting processes. This smoke was said to have serious effects to residents who reside downwind from these recyclers.

6.8.1 Environmental Health Changes in Makause

There seems to have been changes in the environmental health conditions in the settlement as revealed by the building of the clinic and installation of water taps, as well as the presence of municipal cleaners in other sections of the settlement. Some, as discussed earlier only raised negative changes as perpetuated by population growth and negligence as well as inefficiency of the clinic and water supply.

The chart below shows the percentages of interviewees who acknowledged indication of change, either positive or negative and those who claimed that there were no changes. Both responses made sense due to the fact that the research was based on perceptions as well as the fact that others arrived in recent years. Also of importance to note was the fact that some individuals felt that negative changes outweighed positive developments cancelling any developments achieved.

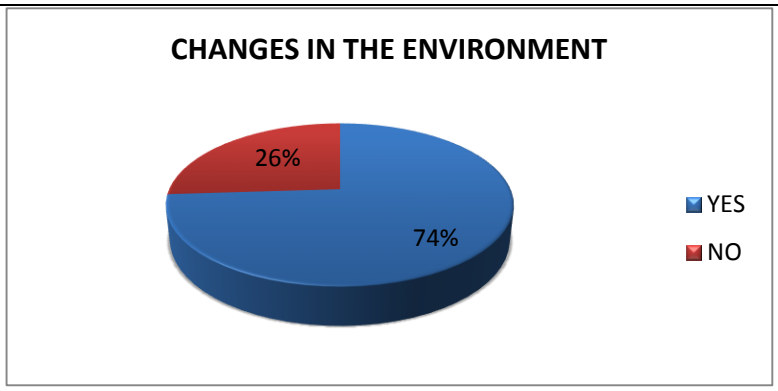


Figure 6.26: Possible witnessed changes in Makause environment - The study sample's responses on possible changes in the environment since their arrival. When asked whether they had witnessed any changes in their environment, some acknowledged the changes such as a hospital and water hence answered 'yes'; however, some overlooked it and answered 'no'

74% of the interviewees acknowledged changes in the environmental health regardless whether positive or negative and 26% could not highlight or acknowledge any changes. From the responses shown on the chart above, one can deduce conflicting perceptions within the community possibly due to exposure to better or worse environments than that of Makause.

When asked to rate their environmental health conditions, 90% of the study sample claimed that the environment they live in is bad. These were mostly people who had stayed at Makause for more than ten years. 6% claimed that the environment was good; however, most of these individuals often compared Makause to their previous places of residence which they claimed to have been worse. They overlooked the prevailing state of environment and focused on their reasons for coming to the area, which was dominantly convenience to job opportunities.

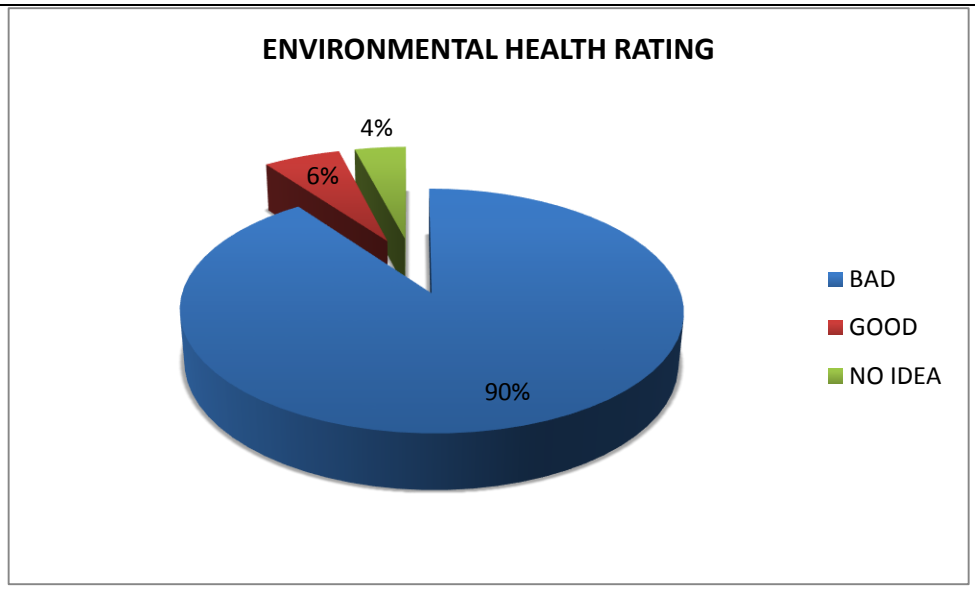


Figure 6.27: A chart showing interviewees' environmental health rating.

6.9 HOUSING CONDITIONS

Dwellings in Makause informal settlement are constructed of cheap materials which residents find around the area and in Germiston. These were dominantly cardboards, of which 38%of the interviewees used to construct their shacks. These structures burn easily as highlighted by the

extent of damage that was caused by a suicide fire of the 13th October 2012 tragedy (De Waal, 2012). A suicidal woman set herself and her shack on fire and the blaze raged through 18 other dwellings leaving scores of people homeless.

30% of the sample group live in shacks that are made of poles and plastics. These are non-durable and cheap materials that can easily catch fire in such events. Other materials used encompass corrugated iron as well as brick and mortar; as shown in the graph below.

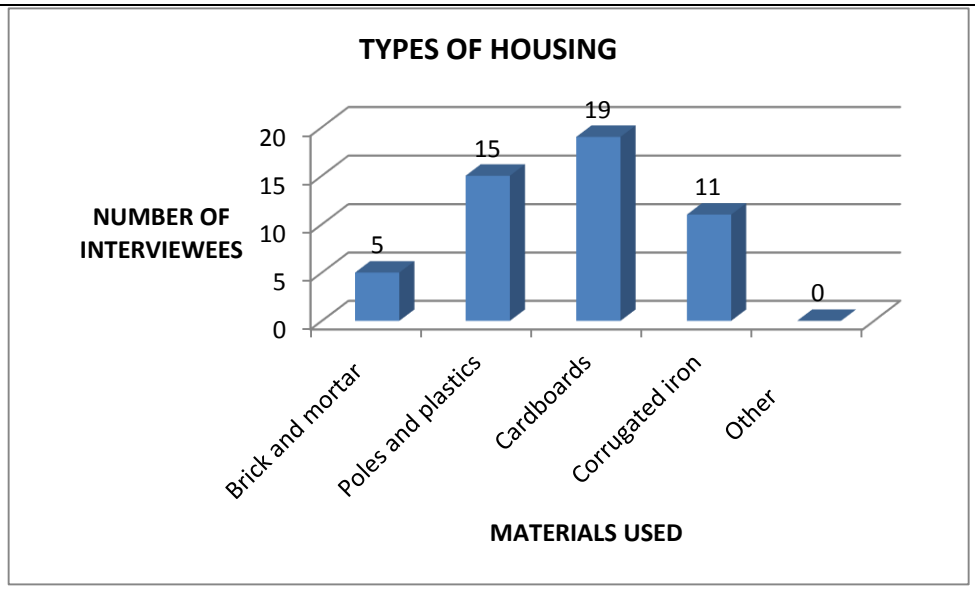


Figure 6.28: Types of housing in Makause.

Based on the data and information gathered the major materials used in the construction of shacks allow dust and other particles to circulate thereby affecting the inhabitants in numerous ways. These dwellings expose inhabitants to environmental risks during windy and rainy conditions, rendering them vulnerable to infections associated with these exposures. Figure 6.29 shows some types of dwellings that are found in Makause informal settlement.

A)



B)



Figure 6.29: Types of dwellings in Makause: Cheap material is often used as shown in the picture A. Picture B depicts a brick and mortar structure; such structures are often constructed of recycled materials (brick reuse). Residents cannot afford to buy proper material for construction (Photo by N James, 2014)

Residents of Makause can be categorised as living in unsafe, unhealthy and hazardous housing when looking into the conditions they live in. This exposes them to various effects of the environment that can be detrimental to their lives. Their dwellings are not well ventilated and they are overcrowded and closely clustered as there is no proper planning in the settlement layout. De Waal (2012) describes the settlement layout as "the shacks are wedged right up against each other. Space is at such premium there that you can't even slide a hand between most dwellings", (Daily Maverick, 16 October 2012).



Figure 6.30: Settlement patterns in Makause - Dwellings are wedged right against each other with narrow walk ways between clusters (photo by N James, 2013)

6.10 TYPE OF ENERGY USED

Fossil fuels are the commonly used source of energy in Makause these include paraffin, candles, firewood and coal. Prioritisation of environmental pollution as argued by Brown (2009) is not applicable in the Makause context since the settlement is not electrified. Sources of energy for domestic use are the source of one of their numerous health problems since these produce high amounts of carbon dioxide and other impurities that compromise the quality of air in their dwellings.

Paraffin is the cheapest and commonly used form of energy, 48 of the 50 interviewees use it for cooking; 38 use it for lighting and 26 use it for heating in cold weather. Other forms of energy used are wood/coal and candle as shown in the graph below.

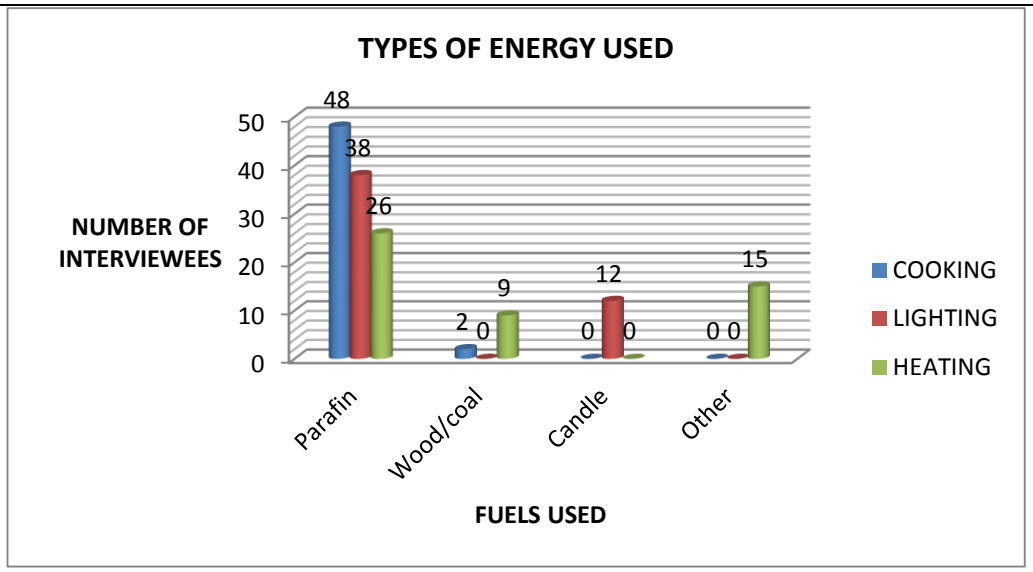


Figure 6.31: Types of energy used in Makause

Chemical components of paraffin make it hazardous if consumed, thus having such a substance exposed to children pose a threat to their health since medical advice should be obtained if someone accidentally swallows it (Chilcott, 2006). Ingestion of paraffin can lead to excessive vomiting, as well as lung and skin damage (dermatitis) as a result of exposure (*Ibid*).

Like most chemicals, there has been a certain level of exposure to paraffin for it to cause adverse health effects. Breathing large quantities of paraffin vapour or ingestion can result in non-specific signs such as dizziness, vomiting and headaches (Chilcott, 2006). This puts the community of Makause at a risk since this is their most preferred and readily used form of energy. Chilcott (2006) also argues that if paraffin is inhaled direct into the lungs, a severe injury called pneumonitis occurs. Animals and humans that are often exposed to paraffin end up developing skin cancer or eczema (*Ibid*).

Coal and wood are other forms of energy used in Makause. According to Straif et al. (2006), exposure to coal fumes leads to lung cancer and tumours, and thus the residents of Makause have a high risk of this infection since this seems one of the major sources of indoor heating. Straif et al. (2006) argued that combustion emissions from wood are mutagenic because of the presence

of compounds from various chemical classes present. This can have effects such as altering the DNA of the exposed humans and other species of fauna.

Picture ‘a’ below shows a resident holding his gas cooker. When asked how often he uses it; his response was, “We do not have electricity in this area, so we rely on paraffin, gas and firewood for domestic energy. I have been using this stove since I arrived here many years ago”. Picture ‘b’ shows a man warming himself and water on a fire outside his shack in Makause.

a)



b)



Figure 6.32: Alternative energy in Makause – a) a man carries his gas cooker in the streets of the informal settlement. b) a man warms himself and water on a fire outside his dwelling (photos, N James, 2014).

Straif et al. (2006, 977) states that “About half of the world’s population, mostly in low-resource and medium resource countries, use solid fuels for cooking or heating, often in poorly ventilated spaces. WHO identified indoor smoke from combustion of solid fuels as one of the top ten risks

for worldwide burden of disease". This highlights the dangers posed by the prevailing conditions in Makause.

Pruss-Ustun and Corvalan (2006) argued that the state of the environment directly affects health and the behavior of organisms living within it. Environmental conditions as a result of sources of energy used affect the residents of Makause in many ways since they are exposed to this environment on a daily basis. Fossil fuels that are used as a source of energy have a greater potential of contaminating indoor air which they breathe throughout the night as they sleep. This exposes they to various respiratory diseases associated with this contamination.

The mere fact that they are using combustible materials to heat, cook and light their dwellings is a potential hazard judging from the type of materials used for construction. These dwelling are dominantly made of poles, plastics and cardboards which are all flammable. The settlement pattern is haphazard with shacks closely clustered making it easy for fires to pose a potential hazard. If a single shack catches fire from the windward side of the settlement, it will take a short period of time for the whole section of the settlement to be gutted. This is a double threat since a fire-truck cannot enter into the settlement due to narrow pathways as claimed by the authorities regarding the 2012 fire incident (De Waal, 2012).

Indoor air pollution often leads to childhood morbidity due to acute respiratory illness (WHO, 1999). Due to reliance on fossil fuels for energy, inhabitants of Makause informal settlement are faced with high levels of exposure to acute respiratory illnesses. This is accompanied by the fact that they live in poorly ventilated dwellings and they cannot afford good medical care. Residents claim that the local clinic is under-equipped and often experience shortage of medicines. Residents of Makause also claim that they experience poor treatment in this clinic as compared to their richer counterparts from the nearby Primrose area. WHO (1999) argues that respiratory illness also increase infant mortality since it usually affect children under the age of five.

In a meeting held with the Makause Community Development forum (MACODEFO) on the 14 of January 2014, the committee claimed that they mobilised and organised a march on the 24th of November 2013 to demand electrification of their settlement. A memorandum was delivered to the mayor's office and solar energy installation was promised.

The committee was aware of the fact that a budget of 150 million rand was set aside for developing informal settlements in Ekurhuleni. They claimed that they seem to have been cut out of this budget, most probably due to the fact that Makause is a category C informal settlement. Category 'A' informal settlements are those in the municipal plan and they readily benefit from the IDP. Category 'B' informal settlements are those in the process of being formalised and included in the municipal plans. Category 'C' (which Makause falls under) are settlements that are not in the municipal plans and municipalities often do not have sustainable plans for these settlements. They are often located on private land and are sustained by interim plans. It is often difficult to develop these areas since they are privately owned. A good example is Makause since the land is owned by different entities, a trust and an individual (according to the committee).

6.11 AVAILABILITY OF CLEAN WATER IN MAKAUSE

Interviewees confirmed that the community has access to clean tap water in all three sections of the settlement. The community initially made illegal connections then the municipality installed 4 taps to serve about 15 000 residents and the community perceive this as failure by authorities to meet their demands. There is a 100% access to tap water in Makause despite the fact that they have to stand in queues for this resource. Initial installations were done by residents during the 1993-1994 periods, after they got tired of waiting for the authorities to provide.

In a meeting with the community development forum (MACODEFO) on the 12th of January 2014, the committee made it clear that available water taps were inadequate for the community. Their estimations pointed that there are about 5000 residents per section in three sections of Makause. Sections 1 and 2 had 4 water taps each, serving 5000 residents. Section 3 has 6 taps serving 5000 residents. Some residents claimed to travel several hundreds of meters to fetch water, of which they have to stand in long queues since there are fewer taps.

The committee claimed that the municipality installed on two water taps for 15 000 residents of Makause. Residents felt that this was an insult to their plight for major services. These taps were installed in the outskirts of settlement making it unsafe to fetch water during late hours especially considering the fact that there is no electricity or proper streets in the area.

6.12 SOLID WASTE MANAGEMENT

Lack of sanitation is the major issue facing the residents of Makause, lack of excreta disposal being the crux of the problem since this leads to direct contamination even of their food storage through flies and other means. Residents of Makause lack access to basic sanitation there by exposing them to sanitary related diseases and infections. As argued by WHO (1999) lack of access to basic sanitation often leads to diarrhoea morbidity in children and the community as a whole. Residents of Makause are faced with solid waste management problems. In the meeting held on the 14th of January 2014, the committee (MACODEFO) highlighted that solid waste removal only occur along the main road (picture below) for people driving past not to see the realities of the environmental health conditions in the area.



Figure 6.33: Cleaning the fringes of Makause **- One of the two main roads that run along the fringes of the settlement (Photo by N James, 2013).**

78% of the individuals interviewed denied any form of refuse collection in Makause. This is due to fact that refuse collection only take place along the main road as argued by the committee, and these people could be residing in the interior of the settlement where there isn't any form of refuse collection. This explains the 78%'s (shown in the graph below) denial of refuse collection in the area.

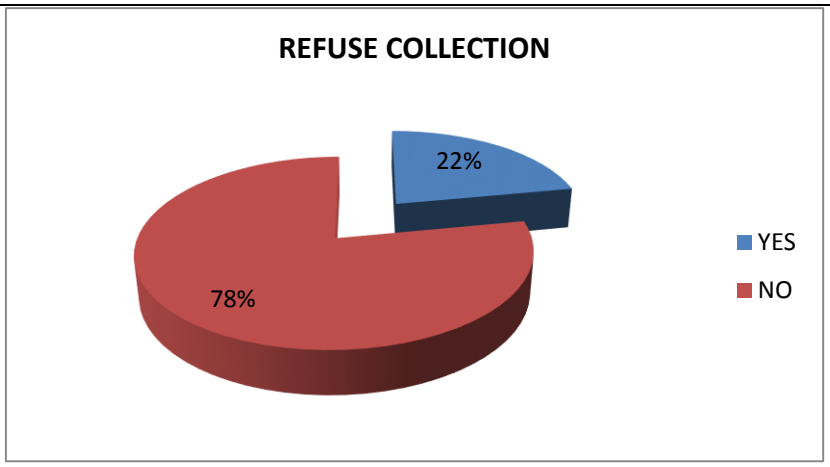


Figure 6.34: Refuse collection in the area.

The remaining 22% claimed to have seen people collecting garbage along the main road, which is where they often stay. The general claim by the residents was that the authorities only collect refuse from the fringes of Makause where mostly tourists pass-by while the interior was left contaminated as shown in the picture below.



Figure 6.35: Solid waste accumulations in Makause – There are areas in central parts of Makause where refuse seem to be accumulating (photo by N James, 2013).

Residents who claimed existence of refuse collection gave different frequencies in collection period. The chart below shows percentages of those who claimed monthly collection frequencies, daily frequencies and those who had no idea regarding these frequencies.

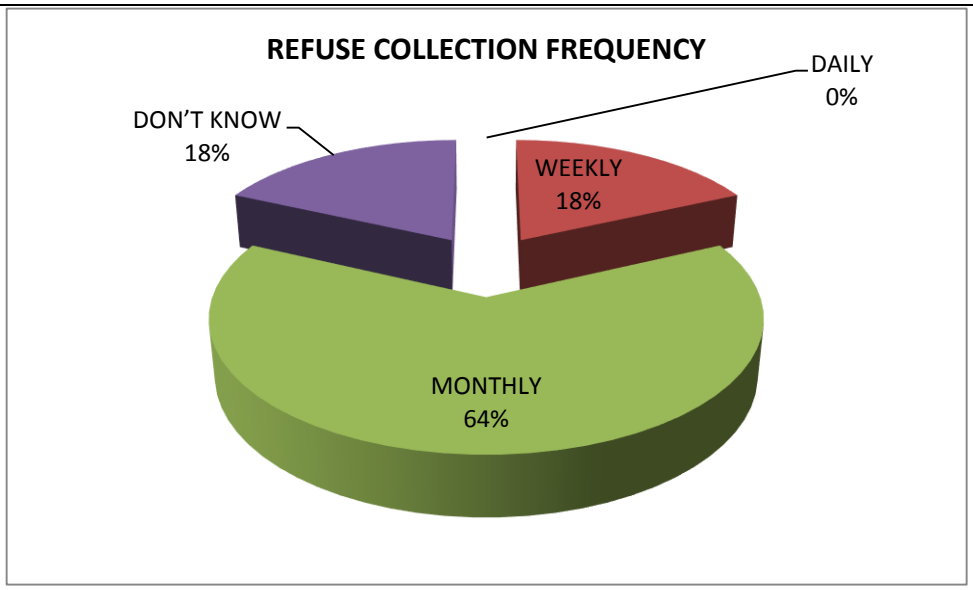


Figure 6.36: Refuse collection frequency – The frequency of refuse collection in the areas that had such a service in Makause varied from monthly to weekly according to the data given by the sample group.

6.13 TOILET FACILITIES

Residents of Makause informal settlement suffer a double blow in terms of air pollution. The first being the ambient concentrations of air pollutants associated with urban areas. This was ushered in by means of industrialisation and reliance on petroleum for energy, especially in terms of urban motorised forms of movements as argued by Scorgie et al. (2003) as well as domestic use of fossil fuels as highlighted by Straif et al. (2006). Urban environments are known to be notorious for outdoor pollution due to high concentration of industries and population densities as characteristic of Makause.

There are no domestic and sewerage disposal facilities in the settlement; the community rely on the pathways for water disposal and it lack basic sanitation. Residents commonly use hand-dug pit latrines and those who do not have such structures relieve themselves in any means possible.

This result in a stench that is characteristic of the settlement and it also pose a health hazard to the community.

The committee claims to have turned down chemical toilets that were offered by Ekurhuleni metropolitan municipality due to lack of sustainability. This by the municipality was influenced by a constitutional court case headed by Harry Gwala informal settlement. The committee believed that this was a short-cut by the authorities into the scheme of things instead of taking the proper route to informal settlement development. They also highlighted the impending problems of acquiring a service provider in case these toilets were installed, and thus maintenance problems. On the long run, these were going to be a health hazard since they already are in other areas where they have been implemented, such as Phola Park (Ivory Park: City of Johannesburg).

6.14 POLITICS AND SERVICE DELIVERY

68% of the study sample denied any form of political affiliation or alignment to any political party. The reasons given highlighted a sense of lost confidence in politics such as, “I don’t believe in empty promises”, “I feel betrayed by politicians” and “politicians and politics are not helping us with anything”.

32% of the interviewees were affiliated with political parties and claimed to be politically active. Most of them felt that political intervention would improve their situation. Some expressed emotional attachments to political parties, for example the statement, “memories of the struggle force me to”. The chart below shows the percentage of interviewees who claimed to be aligned to political parties versus those who denied any involvement with political parties.

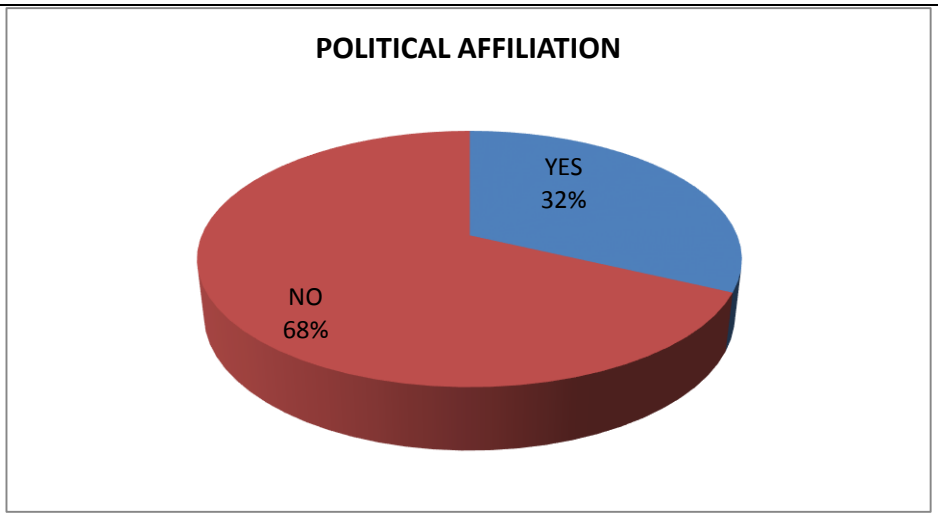


Figure 6.37: Political affiliation – 68% of the interviewees denied any form of political affiliation, and thus they answered 'NO' and 32% claimed to be aligned to political parties, they answered 'YES'

Residents of Makause denied any serious political activity except internal politics such as formation and support of committees such as MACODEFO. Some individuals believed that this lack of political activity has a negative effect on service delivery; these raised a sense of political clientelism since they believed political parties would provide services after people show some support. Some claimed that people were concerned more about internal politics and there were squabbles for leadership in this political sphere.

33 individuals within the study sample expressed presence of a link between politics and service delivery. This was highlighted by one of the interviewees who mentioned the importance of main-stream politics in service delivery. He explained how politics influence service delivery at a microscale, on this account, Makause was invisible. He said, "The reason there is no service delivery is because the politics in Makause is dead, political activity could lead to better service delivery".

Another individual raised the importance of politics in fighting for service delivery and improved environmental health conditions. Interplay of politics and service delivery was interpreted in numerous ways as highlighted by responses such as, "people voted, they did not get services promised, they stayed away from politics, and still there is no service delivery". This did not completely detach politics from service delivery, but pinned delivery to the nature and quality of

leaders that get elected. The individual did not look at politics in the light of invented and invited spaces of negotiations but as a mandate that politicians need to be given so they can fulfil their duties and promises.

17 individuals felt no connection between politics and service delivery; they claimed that services can be implemented independent of any political activities. The figure below shows numbers of individuals within the study group who felt that there was a link between service delivery and politics (YES) versus those who could not see any connection (NO).

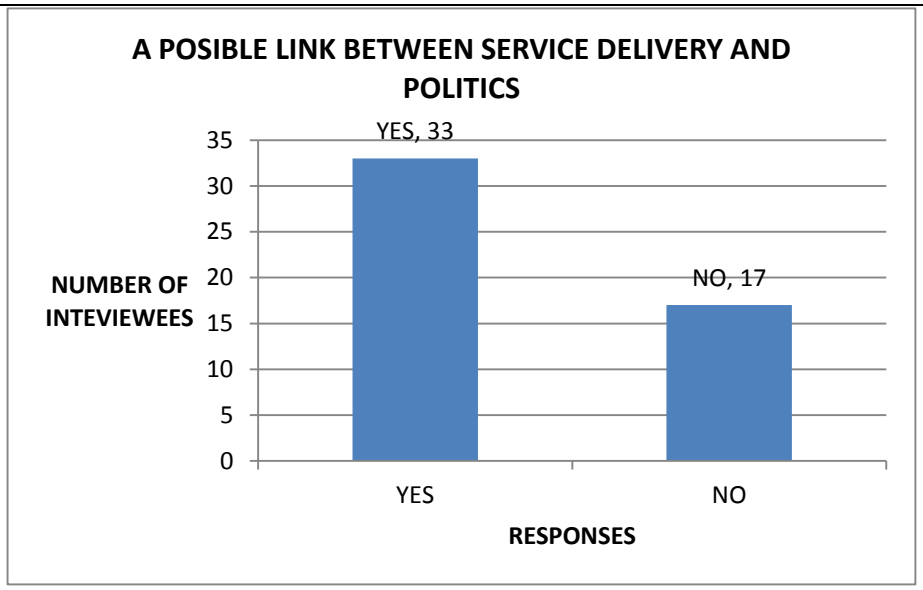


Figure 6.38: Service delivery and politics – Most interviewees detected a link between politics and service delivery. They understood that service delivery is a municipal function.

Another point of interest was that, residents felt that their misunderstanding with the municipality is the reason for lack of service delivery in the area. They also explained how politicisation of service delivery in South Africa is working against Makause. One interviewee stated that, "ANC promised improved services to us and we voted them into power; after failing to deliver, we shunned ANC and their candidates that is why there is no service delivery here". Some explained lack of service delivery as a consequence of political carelessness by the residents, and thus no political party can claim the settlement as their stronghold; on that

account, they are not represented politically. This reduces their chances of recognition and inclusion in the scheme of developments and in situ upgrading.

Politically, Makause is under a section of Ekurhuleni that is run by the Democratic Alliance (D.A.); and the councillor is Tania Campbell, a member of the party. This has sparked most claims that lack of service delivery is due to tensions between the local municipality (which is run by ANC) and the micro-politics as represented by the DA councillor.

39 individuals did not know who the ward councillor was; when asked the possible reasons why they did not know the councillor, different reasons were given. These spanned from the uselessness of knowing the councillor to the aloofness of the individuals who hold power to make decisions in the area. Some even claimed that the councillor did not care about their settlement, so they had no interest of even knowing her. Only 11 individuals from a sample of 50 knew who the councillor was, as shown in the graph.

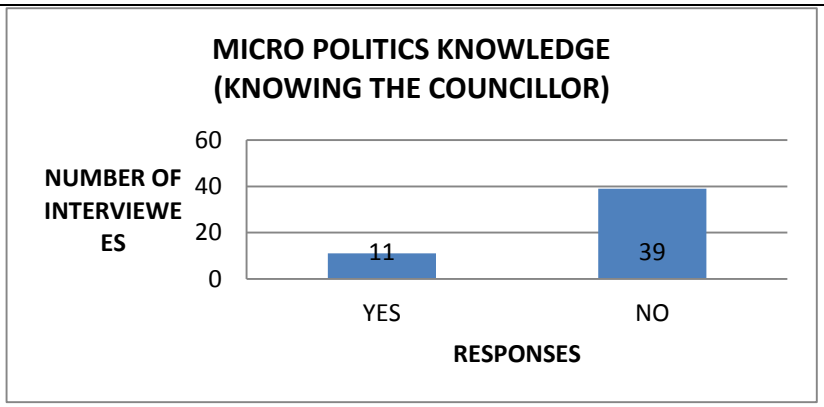


Figure 6.39: Knowledge of micro-politics – Most individuals in the study group had no idea on who the councillor was.

The mere fact that most individuals did not know who the councillor was highlighted the reason why 78% of the 50 interviewees felt that the councillor was not making any efforts to develop the area. Had the councillor been active, most residents would have known her. 10% claimed to have witnessed efforts by the councillor and 12% did not know whether she was making any efforts or not as shown in the figure below.

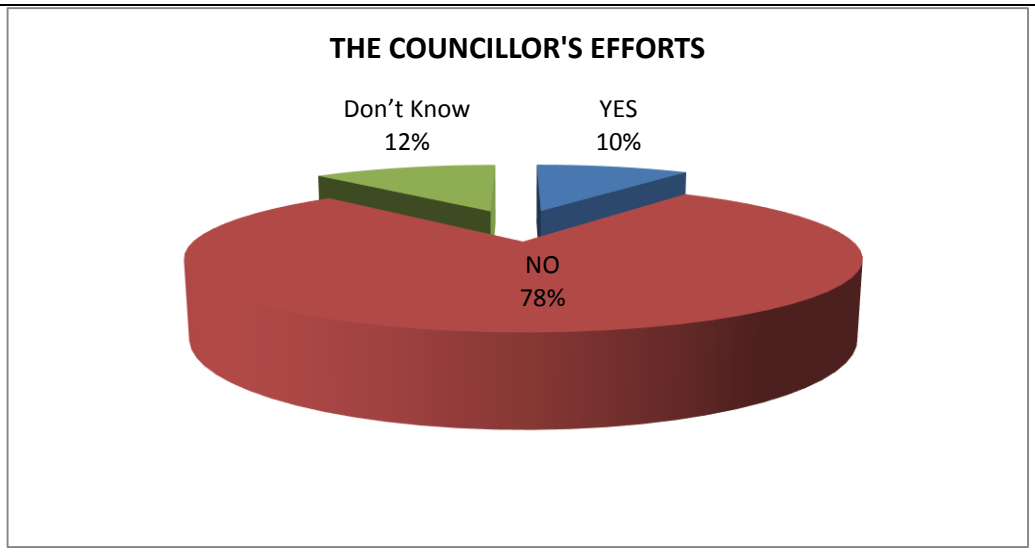


Figure 6.40: Councillor's development efforts - A chart showing responses of possible efforts by the councillor.

Lack of local political knowledge reveals detachment of the community of Makause from the authorities and politics of the area. This seems to have played a major role in lack of service delivery, hence a poor environmental health in the area. The community seem to lack representation in decision making spheres, as highlighted by MACODEFO's plight to engage in main stream decision making when it comes to service delivery and development.

74% of the interviewees had never left Makause before, and 26% had left and came back. These later percentage had left for different reasons such as forced evictions and voluntary shifting to other settlements. Those who were evicted claimed to have been promised a better place elsewhere; but they were not satisfied by the new location due to the fact that it was far from their work places and job opportunities. One individual said, "I was promised a better place, and this place turned out to be Tsakane which is just the same as Makause, even worse it is about 40km from where I work. I was just dumped there without any material to build a shelter, so I came back". The figure below shows the percentage of the study sample that once left Makause to settle somewhere else and that of individuals who never left the study area.

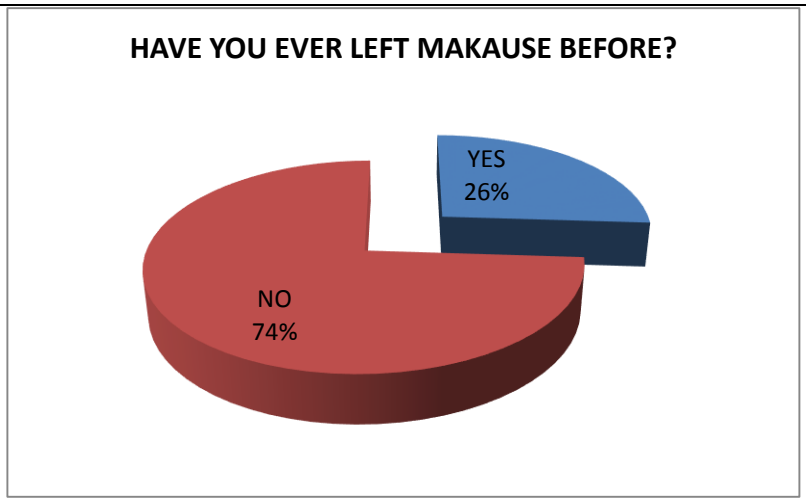


Figure 6.41: Evictions and voluntary resettlements – A chart showing percentages of residents who once left Makause and those who never left before.

Those who were taken to Tsakane claim to have been lured by food parcels as incentives, this was attested to by MACODEFO; who claim to have saved other residents from this treachery. Some did not fall for the food parcels, so they just resisted, some claimed that they were not given any alternative places to go to and some simply did not want to leave. One of the individuals who resisted the eviction said, "I did not like where they were taking us because it was far from town and I didn't have anywhere else close to my work where I can resettle".

6.15 FORCED REMOVALS

Most informal settlements are often threatened by forced removals, hence a risk in the sustainability of their livelihoods (McDowell, 2002). According to MACODEFO, Makause residents were confronted by the authorities and forced to vacate the land and make way for industrial development (meeting, 14th of January 2014). McDowell (2002) argues that the key impoverishment risks and components are often faced by relocated individuals include joblessness; thus as they are moved to places that are far from areas where they make a living, thy have to face new survival hustles. Sudden removal of informal settlement dwellers often leave them landless and homeless. According to the legislation, residents of Makause do not have land since they do not have title deeds or a letter from the authorities that give them a right

to live in the area. Other major risks encompass marginalisation, food insecurity, loss of access to common property resources, increased morbidity as well as community disarticulation.

It is with disbelief that residents of informal settlements still face forced removals in the work of the new democratic South Africa. The cartoon below illustrates little changes in the manner in which evictions were conducted during the apartheid era and 20 years into the democratic South Africa.

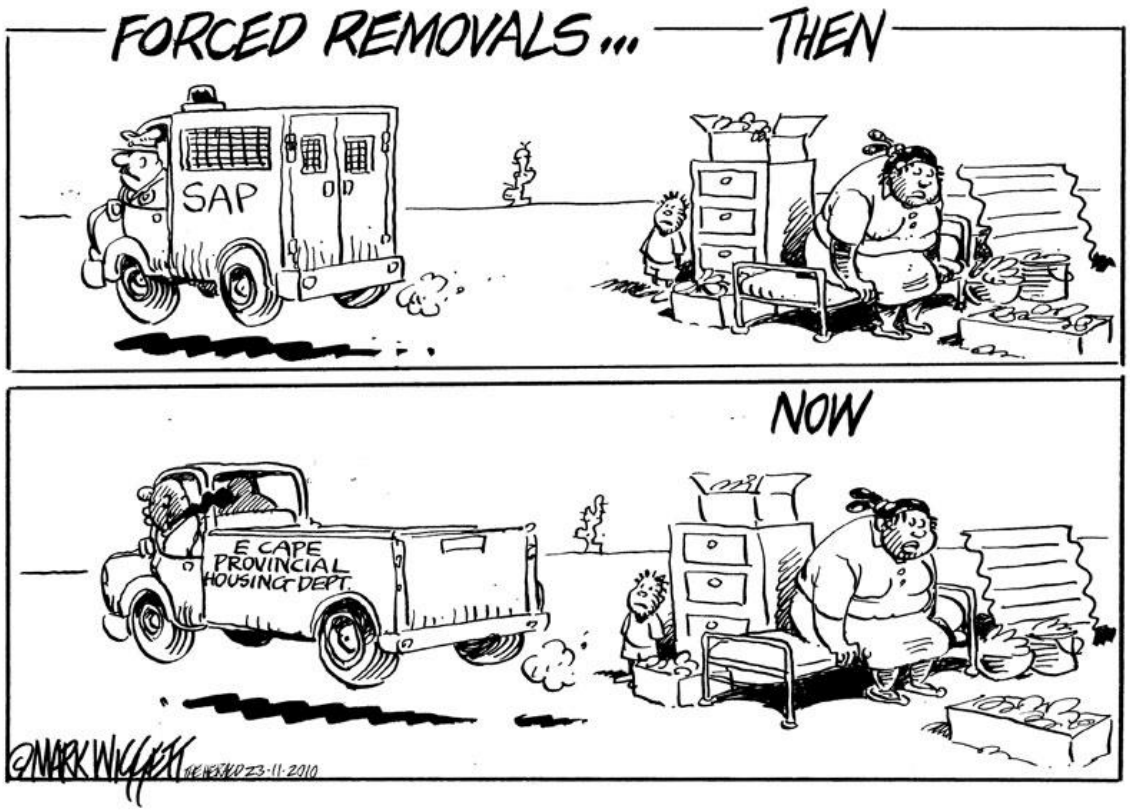


Figure 6.42: Evictions then and now- **A different version of forced removals with the same consequence**
Source: **http://africartoons.com/cartoon/2568 accessed 12/02/14**

67% of the sample group that had left Makause before were victims of forced and tricked evictions. It is fair to term Makause removals 'tricked' due to use of food parcels to lure people away. 33% of the study sample were not evicted, but had left voluntarily due to different reasons such as trying out new places with perceived better services and sanitation. The chart below

shows the percentages of individuals who were evicted at Makause as well as those who left voluntarily.

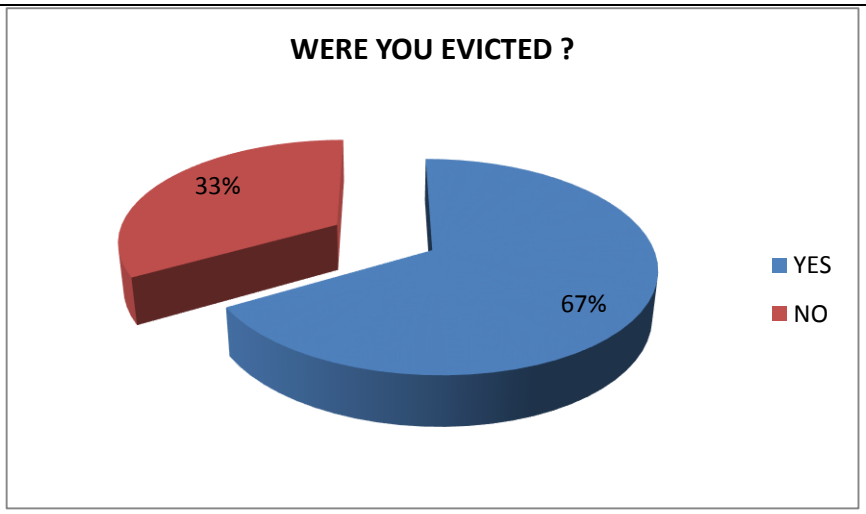


Figure 6.43: Forced removals - A chart showing percentages of forced removals.

According to Cernea (1997), involuntary population displacement as a result of development programmes has reached a magnitude and frequency that gives this phenomenon a global relevance and a need to formulate policy-guided solutions. Makause residents are at the brink of being forcefully moved away from sources of their livelihoods to make way for an industrial development (Discussion with MACODEFO, 14 January 2014). Refusal of the residents to leave highlights the knowledge of the consequences of displacement.

Consequences of developments that involve removals were highlighted by programmes in India that resulted in displacement of approximately 20 million people over a period of about 4 decades; about 75% of the displaced population has not been rehabilitated (Cernea, 1997). This empirical evidence suggests the fact that it takes a very long time for the livelihoods of dispersed populations to stabilize back to their normal state. This suggests that relocating the residents of Makause can disrupt their livelihoods and destroy their social networks thereby crippling their survival ways. Impoverishment, lack of social justice and equity are the most common consequences of forced relocations throughout the world (*Ibid*).

Homelessness can also result from displacement and forced removals, loss of housing and shelter can be temporary for most displaces or immigrants from other regions of the country or the world; but it remains a chronic condition to others (Cernea, 1997). People often progress from being homeless to cheaper forms of housing, then proper housing as they climb the socio-economic ladder. This is highlighted by social housing projects in the inner-city Johannesburg.

Loss of a family home as a result of forced removals is closely linked to a group's loss of cultural space and this often leads to alienation and deprivation (Cernea, 1997). This is evident with all informal settlements that are undergoing formalisation processes throughout South Africa. These settlements often lack social amenities, health facilities and basic services as well as infrastructure. Displaced families also often experience a lasting sense of placelessness (*Ibid*).

If replacement policies do not provide housing improvement in the receiving areas or if there is no compensation for demolished shelters, the chances of homelessness increases (Cernea, 1997). According to the 1990 bank report on the Cameroon- Douala Urban resettlement, of over 2000 families that were displaced less than 5% received loans to help pay for assigned house plots (*Ibid*). This means that the rest of the group could not afford to pay, thus they were left homeless. About 20% of the relocatees in China's Danjiangkou reservoir became homeless and destitute (*Ibid*).

6.16 POLICE BRUTALITY

Police brutality towards demonstrators has become a talk of the day in South Africa, as evidenced by the Marikana massacre and numerous responses to service delivery protests throughout the country. The community of Makause was told, "Mess with us and you'll be the next Marikana." (De Waal, 23 January 2014). The cartoon below shows a common ways of police response to protests around South Africa; protesters often encounter the brutal arm of the law; with possible fatalities.



Figure 6.44: Response to service delivery protests – SAPS is now known to be ruthless when it comes to dealing with protesters (Sowetan live, 23 January 2014)

54% of the study sample was victims of police brutality through their marches for service delivery: "police always respond violently no matter how peaceful the marches are", said the treasurer of MACODEFO. Some members of the committee such as Alfred 'General' Moyo were unlawfully arrested and charged with public disturbance. They are still undergoing court cases with no charges imposed. However, 46% of the sample had not experienced police brutality before, as shown in figure 6.43.

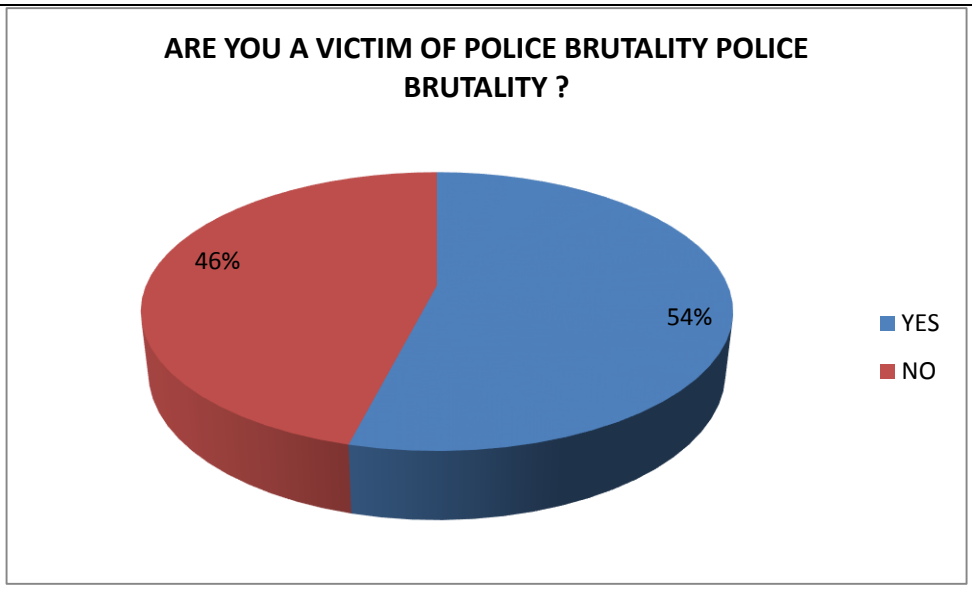


Figure 6.45: A chart showing percentages of police brutality victims – The police force often strengthen its arm when dealing with protests in South Africa. This has been a common scene in the local media and news.

Police brutality has become a common way authorities use to deal with protests. This has resulted in numerous casualties countrywide. The community of Makause has been warned by the authorities that they could find themselves in an unpleasant violent situation if they took to the streets in protests for service delivery.

6.17 CONCLUSION

The data discussed was obtained through questionnaires and a series of meetings with members of MACODEFO. Demographic representation was taken into consideration during the field work so as to accommodate different opinions between males and females. From the results, it was established that females did not necessarily stay in the settlement most of the time when compared to males as would be an expectation on traditional grounds.

30% of the sample arrived in Makause after 2006 which 70% arrived prior to that which gave the majority of interviewees a chance to witness changes over a longer period of time. This gave chance to disclosing most of the changes that took place in the settlement. Those who had been in the settlement for a shorter period of time were expected not to have seen that many changes compared to those who had been there longer.

Different sections of the settlement seemed to have different opinions especially pertaining to the current state of the environment. There were differences in each section with those closer to the main road being much cleaner and better saved when compared to the inner sections. Toilets were hand dug and there was lack of basic services hence residence pointed out that their environment was generally polluted.

CHAPTER 7:DISCUSSION

7.1 INTRODUCTION

This chapter aims to discuss legislation and policies that are aimed at improving the situation of poor areas along with communities that live in poverty. There are policies that protect the poor and advocate for improvements in their living conditions. These encompass local constitutional rights as stipulated by the Constitution of the Republic of South Africa as well as the international policies that were coined to promote environmental health and sanitation.

7.2 CONSTITUTIONAL RIGHTS

The Constitution highlights values on which the state is founded, human dignity is the first of these values (Algotsson and Murombo, 2009). Human dignity in this context entails the achievement of equality and advancement of freedom and human rights. The founding provisions also establish the supremacy of the Constitution over all South African legislation (*Ibid*). Section 7 (1) of the Bill of Rights in the Constitution states that *The Bill of Rights* is a cornerstone of democracy in South Africa. It affirms the democratic values of human dignity, freedom and equality. In essence, the community of Makause is being deprived of their dignity as they are denied to exercise their democratic right.

They have a democratic right to protest and demand service delivery, however, any acts of protest in this area is curbed by police brutality. Section 7 (2) stipulates that 'the state must respect, protect, promote and fulfil the rights in the Bill of Rights. Contrary to outlines in the Bill of Rights, the state (through SAPS) has become cruel to the citizens as highlighted not only in the case of Makause but with all protests throughout the country. Contrary to section 9 (1) of the Constitution which states that everyone is equal before the law, police seem to be immune the law of South Africa since they easily get away with their reckless acts of violence. This has crippled the residents' ability to demand service delivery and thus they perceive their environment as unhealthy. On this account, the effects of legislation and poor governance does inform their perceptions as this is directly tailored to service delivery and the way they utilise invented spaces in a quest to obtain basic services.

The figure 8.3 shows a member of MACODEFO holding one of the placards they used to march against police brutality in their marches for service delivery. As argued by De Waal (2012) authorities have resorted to imprisoning activists so they can silence the community in its plight for services and hence better environmental health.



Figure 7.1: Makause community against police brutality **– the cruel arm of the law has been a major hindrance to the community's fight for better services and basic sanitation.**

7.2.1 The Local Government and Municipal Systems Act in Support of Informal Settlements

The local government under the Municipal Systems Act enables municipalities to uplift their communities economically and socially, including granting access to basic services (Algotsson and Murombo, 2009). Basic municipal services as outlined in the Municipal Systems Act include delivery of services that are necessary to ensure an acceptable and reasonable quality of life and a reduction of risks in public health and environmental safety (*Ibid*).

The community of Makause only benefited through installation of water taps that seem inadequate for the residents due to seemingly ever increasing population numbers (MACODEFO meeting, 14 Jan 2014). After a lengthy existence (from early 1980s) residents of Makause are still without toilets or proper drainage systems in their settlement. This renders their health and safety as risky. Pictures below highlight lack of drainage services in the area; the streets have become surface drains for domestic waste water.



Figure 7.2: Domestic waste water in Makause – domestic waste water is thrown on the streets where it flows in smelly streams that join up downslope forming a slow flowing body of smelly water.

7.2.2 Human Rights (to a Clean and Healthy Environment)

Section 24 of the Constitution states that everyone has the right to an environment that is not harmful to their health or well-being. This includes the exposure to unsafe or unhealthy environments; however, this is one of the most violated rights in informal as well as other formal settlements throughout South Africa. The location of Makause close to the tailings dam and at an abandoned mine shaft points out the fact that the settlement is on polluted land. This should push

the authorities to prioritize improving environmental conditions in the area so as to reduce environmental health risks.

Residents of Makause perceive their surrounding environment as unhealthy, as indicated by the field work results. They are also aware of the fact their rights are being violated since they have been given the permission to settle in this area by the owners of land (MACODEFO, meeting 14 January 2014). Land owners gave the residents a right to settle after talks with the committee regarding selling the land to the government for resettlement.

7.2.3 Rights to Adequate Housing

Section 26 (1) stipulates that everyone has the right to have access to adequate housing. This gives residents a right to protest for better housing that does not compromise their health. However, (2) of Section 26 states that the state must take reasonable legislative and other measures, within its available resources, to achieve the progressive realisation of this right. The main point being 'within its available resources', meaning the provision of housing is dependent on availability of resources. This forms a defence mechanism for failure by authorities to deliver. This limits effectiveness of claims and protests by the residents for better housing.

Section 26 (3) highlights the fact that no one may be evicted from their home or have it demolished without a court order made after considering all relevant circumstances. It goes on to state that there is no legislation that may permit arbitrary evictions. Residents of Makause feel that proper procedures were not followed when evictions were carried out and the alternative place for resettlement was not suitable for them, which was their reason to resist the removals as well as the return for those who had left.

A member of MACODEFO highlighted that the community was fighting for implementation of the former Chapter 13 of the Housing Code (which was later amended to Volume 3 of 4 of the Housing Code. The community want the municipality to follow procedure that will benefit all stake holders; the land owners (who are willing to sell to the government and help in remediation), the community as well as the government.

7.2.4 Environmental Health Risks As Highlighted By the Field Results in Makause

Defects in buildings	Insect and rodent-vector disease, overcrowding related illnesses, dust and damp-induced illnesses, injuries, burns, neuroses, violence.
Defective water supplies	Faecal-oral diseases, insect-vector diseases, heart diseases, cancer.
Defective sanitation	Faecal-oral diseases, insect and rodent-vector diseases, stomach cancer.
Poor fuel/inadequate ventilation	Acute respiratory infections, perinatal effects, heart disease, chronic lung disease, lung cancer, fires/burns.
Defective refuse storage and collection	Insect and rodent-vector diseases, injuries and burns.
Defective food storage and preparation	Excreta-related diseases, diseases due to microbial toxins, cancer.
Poor location	Enhanced respiratory disease risk, chronic lung disease, heart disease, cancer, neurological/reproductive diseases, injuries, neuroses.

Figure 7.3: Indicators of unhealthy living in informal settlements: adapted from WHO (1997).

7.3 GLOBAL POLICIES THAT RESPOND TO ENVIRONMENTAL HEALTH PROBLEMS

There have been many international policies that are meant to respond to the environmental health problems throughout the world. These encompass Health for All (1970s), Agenda 21 (1992), The Habitat Agenda (1996), Cities Alliance (1999) as well as the Millennium Development Goals (2000). These policies focus on improving the environmental health and living conditions in human habitats. Savage (2007) argues that these international policies were developed to improve housing conditions and health in the third world countries. This could be due to the fact that environmental health problems are associated with poverty and poor living conditions (UN, 1992; 2003; WHO, 1998; Savage, 2007). Informal settlements of South Africa ought to be realised in the light of these policies but the evidence presented by Makause reveals otherwise.

7.3.1 Agenda 21

As an environmental policy, Agenda 21 was adopted in Rio De Janeiro at the United Nations Conference on Environment and Development which took place from the 3rd to the 14th of June in 1992 (UN, 1992). According to Payne and Majale (2004), the key element of the agenda was eradication of poverty through promotion of sustainable development and granting the poor access to resources that would perpetuate sustainable living. This directly filters down to the situation in Makause where residents do not have access to proper housing, sanitation or service delivery. This situation greatly compromises the environment in which they live and their quality of life.

Agenda 21 entails all aspects of environmental health, which highlights the importance of prioritising nature above humankind; Equity, which uses the law to reengineer humanity; and the Economy, which advocates for redistribution of wealth. These form the triple Es (EEE) of sustainable development (UN, 1992; Payne and Majale, 2004). These triple Es form the basis for any development that can be termed sustainable. The situation in Makause is not aligned to anything that is advocated by Agenda 21. The environmental health is poor and proposed developments in the area do not comply with the triple Es policy. The figure below shows how sustainable development can be attained.

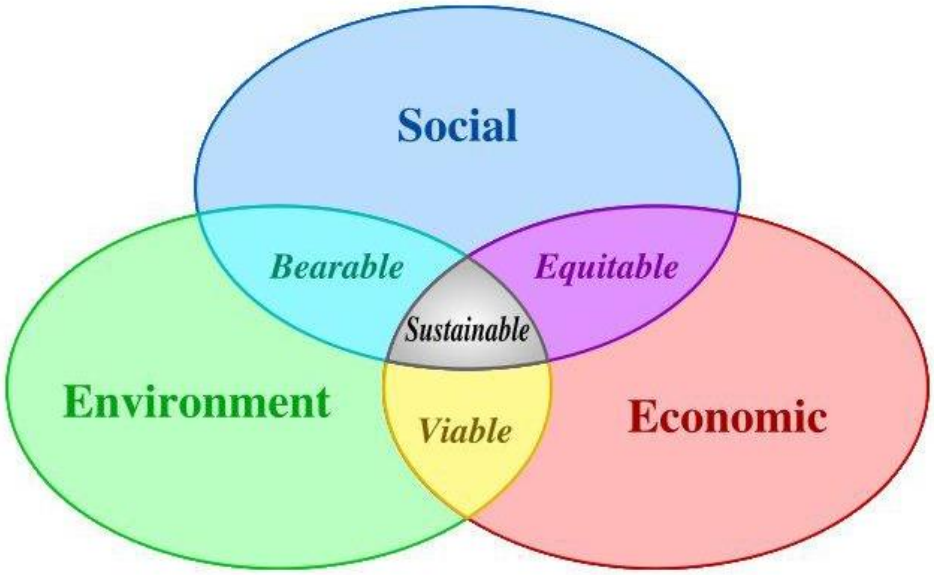


Figure 7.4: Sustainable development - Adapted from UN Agenda 21, http://big.assets.huffingtonpost.com/GeorgiaAgenda21.pdf accessed 03-08-2013

Contrary to the Agenda 21 principles, the figure below shows the prevailing conditions in Makause. Poor environmental health in the settlement is accompanied by intense poverty, with some residents surviving on incomes as low as R200 (about 20 US dollars) per month (according to the field survey).



Figure 7.5: Poverty and prevailing environmental health conditions in Makause - Principles of sustainable development are fetched for the community of this settlement due to unhealthy environmental conditions (picture below). Residents are living on the brink of being forcefully evicted to make way for industrial development (Source: meeting with MACODEFO, 16th December 2013) (Photo by N James, 2014).

7.3.2 Health for All

Health 21 or Health for All policy was an initiative by the World Health Organisation (WHO), with three explicit goals which are: to improve equity within and between countries; to improve the quality of life for all as well as increasing life expectancy; and grant everyone access to sustainable health systems and services (WHO, 1998). Savage (2007) argues that this policy was a result of a series of conferences that were held in the 1990s, including the Rio De Janeiro United Nations Conference on Environment and Development. Informal settlements of South Africa such as Makause have not yet benefitted from this policy, as revealed by the living standards and conditions in these settlements.

The Health for All policy advocates for each member states of the WHO inhabitants to enjoy the highest attainable standards of health (WHO, 1998). This policy regards the promotion of environmental health in communities as one of every human being's fundamental rights (*Ibid*). By so doing, the policy affirms the dignity and worth of every human being. Despite this, there is a general difficulty in trying to satisfactory unify communities with different socio-economic,

cultural and political backgrounds due to varying rationalities and accessing of resources (Watson, 2003). This is rife as in South Africa as evidenced by the gap between the rich and the poor as well as the prevailing urban management challenges (Kusel, 2009).

Makause informal settlement is not a beneficiary of any of the three explicit goals of the Health for All policy. The quality of life in the settlement is poor, as evidenced by lack of basic services that directly impact on human wellbeing such as sanitation and health care. The policy advocates for an increase in life expectancy, the community of Makause has no access to a good health care system. The survey results suggested poor services in the nearby clinic which is bombarded by medical shortages and unprofessional staff. The community of Makause cannot afford services that command high prices such as a good health and medical care. This defies the goals of the Health for All policy.

Time-bound pilot initiatives such as the Special Integrated Presidential Projects (SIPPs) which were launched in 1994 during the State of the Nation's Address by President Nelson Mandela in May made attempts to improve environmental health in poor communities (*Ibid*). However, most informal settlements that did not get to be included in the development plans such as Makause did not benefit from such initiatives.

7.3.3 The WHO Healthy Cities Program

The WHO Healthy Cities Program speaks directly to the situation in South African informal settlements in that it was initiated largely in response to the deteriorating conditions associated with urbanisation. Savage (2007) argues that this is a unique program which focuses on urban poverty and health inequalities. This relates to informal settlements throughout South Africa since these settlements are receiving pockets of urbanisation of poverty (Lohnert, 2007). These are waves of migration by poor people from rural to urban areas. There is intense population mobility and resource exchange between rural and urban areas of South Africa (Hoogendoorn, 2010). This explains the outcome of the field survey which highlighted that most of the residents of Makause originated from rural areas.

The Healthy Cities Program concept is underpinned by the principles of Agenda 21 and the World Health Organisation's Health for All strategy, and thus it places special emphasis on the

needs of vulnerable communities, participatory governance as well as the environmental, social and economic determinants of health (Thomas et al. 2002). The community of Makause live in an unhealthy environment and are excluded in any spheres of governance and they are pushed to the periphery of social and economic activities.

7.3.4 The Habitat Agenda

The Habitat Agenda was adopted at the United Nations Conference on Human Settlements (Habitat II) by 171 governments in 1996 (Savage, 2007; Payne and Majale, 2004). These governments committed to the provision of adequate shelter and promotion of sustainable development in urban areas. Goals of the Habitat Agenda include the recognition of the imperative to improve the quality of human settlements. This would entail eradication and improvement of poor and informal settlements. Settlements profoundly affects the daily wellbeing of the inhabitants, thus improving them greatly improve the environmental health status and the quality of life.

According to the United Nations (2003), the main theme of the Habitat Agenda focuses on the urbanising world. Rapid urbanisation is believed to be the major contributor to shortage of housing in South African cities, the Habitat Agenda directly communicate to the problems that faced by these cities. This policy acknowledges the fact that a large segment of the third world population lacks shelter and sanitation.

7.3.5 Cities Alliance

The Cities Alliance organisation was established in 1999 by the UN Habitat and the World Bank with the aim to fulfil the vision of 'cities without slums' (Savage, 2007). According to the UN Habitat (2003) and Payne and Majale (2004) this would be achieved by focusing on city development strategies and in-situ upgrading of slums so as to improve living conditions by 2020. In-situ upgrading has been taking place around South Africa but has proved to be difficult due to different world views and priorities among informal settlements residents (Watson, 2003).

7.3.6 The Millennium Development Goals

The Millennium Development Goals came as a result of a consensus by member states of the United Nations in 2000 (Savage, 2007). These goals are aimed at perpetuating sustainable development especially in the third world through integration of principles of sustainable development to the policies of developing countries (*Ibid*). Goal number 7 and 10 are aimed at sustaining a healthy environment and reducing the proportion of people who lack access to proper sanitation and safe drinking water. Goal number 10 also seeks to improve lives of at least 100 million informal settlement dwellers by 2015 (Payne and Majale 2004). This reveals the fact that informal settlements are a worldwide phenomenon and authorities are constantly trying to alleviate it as highlighted by in-situ upgrading and relocations in informal settlements throughout South Africa.

Global policies that were put in place as a response to environmental health problems represent a milestone in an effort to resolve health, housing and equity problems. It is unfortunate that attaining these goals is not easy for developing countries that are recovering from colonialism and apartheid, such as South Africa. Thomas et al. (2002) argue that even though countries like South Africa incorporated development policies from the Millennium Development Goals, there is a disconnection between policies and local action. One of the reasons is the fact that urban development professionals in South Africa are sometimes inadequately informed about the links between the environment and health and thus a research is needed to highlight these links (*Ibid*).

7.4 SOUTH AFRICA IN RELATION TO INTERNATIONAL POLICIES ON ENVIRONMENTAL HEALTH

South African legislation has been formulated to adress the problems posed by informal settlements through eradication of poverty, unemployment and inequality (Brown, 2009). Informal settlements are one of the major challenges facing municipalities throughout the country and eradication and upgrading are the only viable options. The slums Act of 2007 and Social Housing Act of 2008 were meant to facilitate upgrading of the existing informal settlements (*Ibid*). However, this has since failed to improve the living conditions of squatter camp residents. Failure to implement this legislation is highlighted by the poor state of environmental health and service delivery in these settlements (Huchzermeryer, 2004). This

could be due to the fact that most of these settlements are situated on land that cannot be developed for human settlement because of numerous reasons spanning from unsuitability for human settlement; and occupation of land that is reserved for economic development. This is the case with Makause; the settlement is situated on land that was allocated for industrial development (MACODEFO meeting, 14 January 2014).

Goal number 7 of the Millennium Development Goals is aimed at ensuring environmental sustainability with the quest to achieve a significant improvement in the lives of at least 100 million slum dwellers (Brown, 2009). These are aimed at trying to improve living conditions and environment for the poor, who are often dwellers of informal settlements. This goal seems to be far-fetched for most informal settlements around South Africa. These settlements lack basic services that are required for the improvement of human lives and living conditions. The figure below shows lack of basic sanitation in Makause with open drains which pose a health threat to residents.



Figure 7.6: Sewerage and domestic waste water disposal in Makause - Open drains are characteristic of dusty narrow streets that separate clusters of shacks in the settlement.

7.4.1.1 Planning and Informal Settlements in South Africa

According to Platt (2004) planning has transformed in nature and state in South Africa. There has been a shift in the structures and instruments with which planning is undertaken, these encompass legislation and policies. Political transition in South Africa brought expectations of

improvement in conditions in which planning is undertaken (Platt, 2004). This did not work well with informal settlements such as Makause that are being excluded in service delivery and in decision making spheres.

Reconstruction of ways of planning are expected to promote pro-poor policies, instead, the poor are often pushed to the periphery of concerns (Lohnert, 2001). Residents of Makause installed their own water taps when authorities failed to provide. The settlement still lack proper sanitation after 25 years of existence. This highlights the fact that political transition and planning still exclude the poor in decision making and service delivery. The Integrated Development Plan (IDP) is meant to integrate previously fragmented urban fabric of South African settlements; however, informal settlements seem not to fully benefit from it (Lohnert, 2001; Kellet and Moore 2003; Cross et al, 2010). An ongoing lack of service delivery in informal settlements is highlighted by the case of Makause where residents undergo periodic fruitless service delivery protests as explained by the Makause Community Development Forum (MACODEFO) (meeting, 14 January 2014).

Platt (2004) argues that a transformed planning system emerged, centred on the notion of integrated development planning. However, Informal settlements often fall away from the scheme of these plans since they are still voiceless and living in environmentally unhealthy conditions. The prevailing conditions at Makause are evidence of planning's influence by politics since decisions are made within the spheres of government.

There are claims that new approaches to planning are based on indigenous and conventional planning systems that advocate for a bottom up approach (Platt, 2004). These plans seem not effective as evidenced by the nature of local politics and prevailing environmental conditions in Makause. According to De Waal (2012) residents in this settlement have a poor relationship with the ANC government since the residents are under the leadership of activists who fight for equality and service delivery through mainstream politics. This has led to stagnant service delivery, police brutality and some members of the Makause Community Development Forum (MACODEFO) such as Alfred 'General' Moyo being arrested (*Ibid*). On this account, planners need to take a stance so as to function independent of political influence.

The question of how planners can focus on the physical environment and avoid being socially biased as argued by Healy (1991) take a centre-stage in most current researches. The best that planners can do in the case of Makause is to improve the physical environment by applying the sustainability concept, for residents to have better living conditions. Instead, planners seem to neglecting the settlement as influenced by the authorities (MACODEFO meeting, 14 January 2014). There is a need for planners to factor in environmental health in planning so as to influence improvement in human health and living conditions. The primary reason for community marches throughout the country is aligned to demands for basic services.

Tibaijuka (2006) argues that planning is in a state of flux and claims a need to reconfigure the way forward as planning plays a major role in dealing with global challenges. This reconfiguration will have to grant planners from across the globe the ability to bring unification within communities from different socio-economic backgrounds. This can only be feasible through incorporation of masses that are at the receiving end of planning and development; in decision making processes. Assuming what masses want often lead to resistance and protests by the residents highlighted in the case of an attempted upgrading of Crossroads informal settlement of the Western Cape in South Africa (Watson, 2003). A proposed development that excluded public participation was shunned by the residents due to the fact that they were not consulted prior to the final decision (*Ibid*).

Understanding and considering the plight of the poor such as the informal settlement dwellers as well as prioritizing them in decision making leads to progressive planning. Knowing the perceptions and needs of the general public promote a pragmatic approach to solution of planning problems. It is important for planners to consult who they are planning for and keep them informed at all levels of development (Watson, 2003).

The issue of poverty is the major player and cause for numerous challenges facing planners. Tibaijuka (2006) stresses that planners need to understand the importance of the profession in dealing with urban poverty. Informal settlements such as Makause seem to be neglected as planners get absorbed by the political and economic influence. Prevailing capitalist economic conditions coupled with the political environment neglect the poor and focus on middle and upper classes that can afford the best services that can be provided. The capitalist nature of the

economic base which has been adopted in most countries has resulted in high levels of inequality as the state is left in a compromising situation on whose needs has to be prioritized (*Ibid*).

Rapid urbanization, with the informal settlements being the receiving zones for both internal rural-urban and international migration in South Africa has crippled the ability of the state to deal with demand for services (Lohnert, 2001). The planning profession has been beleaguered by the failure to counter this pressure, possibly due to its reliance on economics and politics for influence and support (Udy, 1994). Increased demand for infrastructure and other social amenities has perpetuated the downplaying of the interests of the poor in favour of the wealthy communities that has money to pay for services. On this account; a blind eye is often cast upon poverty ridden areas such as Makause informal settlement.

The community of Makause informal settlement is subject to the same conditions that informal settlements in South Africa are subjected to. Poor service delivery and their situation at the periphery of socio-economic spheres. In the event of a suicidal fire, as highlighted by De Waal (2012), the fire trucks could not extinguish the fire that left scores of people homeless. The compact nature of Makause informal settlement was claimed to be the reason for failure of the authorities to extinguish the fire and the reason for the outbreak of fire to become a disaster.

Fires are one of many problems that informal settlements are faced with, according to Gottsmann (2009). There is no need to emphasize poor living conditions and lack of basic services and infrastructure in these settlements. Makause is characterized by a cluster of shacks with narrow pathways that can barely fit an emergency vehicle. It makes sense for the authorities to claim failure of the fire truck to reach the heart of the informal settlements in the events of fire. There is a need for improved service delivery through immediate solutions so as to facilitate better living conditions (*Ibid*).

Gottsmann (2009) argues that informal settlement dwellers are often located at the periphery of major services and are near enough to serve but not close enough to be served. This means that the authorities claim the difficulty to provide services to settlements at the periphery. Informal settlements are located on convenient grounds where they can provide services to the formal and informal sector highlighting their activity and contribution to the GDP. Makause boasts resourcefulness and innovation. According to Gottamann, (2009) informal settlements are

characterized by wide ranging methods of existence and these include internal policing, trading and construction. These are all resolved on a scale suited to the environment.

Cairncross and Feachem (1993) argue that environmental health entails understanding and the ability to manage health related diseases that inhabitants of an area are exposed to. Makause residents are exposed to environmental hazards since there is no basic service delivery. There are two taps that were installed to supply the whole settlement of 2 617 inhabitants (according to the Stats SA, 2013) however, the media claims that this informal settlement is home to about 30 000 people (De Waal, 2012). Having such a huge population supplied by only two water taps results in a shortage of water according to Cairncross and Feachem's description of adequate water. MACODEFO highlighted that the distance travelled by the community to water sources is beyond what legislation stipulates; and the ratio of residents to taps is overwhelming.

Residents of Makause informal settlement are exposed to excreta-related infections since they use hand-dug pit latrines such as those shown in the figure below. All diseases in the faecal-oral category and most water based diseases as well as others that are not related to water are caused by pathogens that can be transmitted in human excreta (Cairncross and Feachem, 1993). Shallow hand dug latrines can be used for a short period of time, and then they become a health hazard as they get filled up. Figure 5.3 below depicts hand dug pit latrines that residents commonly use at Makause.





Figure 7.7: Hand dug pit latrines in Makause - There are no further sanitary plans if a latrine like this fills up, except to dig and construct another one. This is not a sustainable way to dispose of excreta since such latrines are not safe for children.

There is no proper sewerage disposal, drainage system or service delivery in the area hence the community has resorted to providing their own services. Excreta from the settlement can be seen flowing within the shacks in narrow walkways where it can come to direct contact with the residents. This exposes them to excreta-related infections, and their socio-economic status makes it difficult for them to access health care.

Excreta related infections that are influenced by water supply may be reduced by improvements in supply and the quality of water (Cairncross and Feachem, 1993). Other excreta related diseases can only be eradicated by improvement in excreta disposal methods; these would encompass improvement of toilets, treatment, methods and types of transport as well as the final disposal or reuse of the excreta (*Ibid*). This seems unrealistic for Makause due to the absence of basic services such as sewerage disposal.

Due to lack of service delivery, Makause residents can be labeled prone to refuse induced infections. Cairncross and Feachem (1993) argues that poor refuse disposal promotes fly-breeding which in turn perpetuates disease outbreak due to infection transmission. This can also promote diseases associated with rats, such as salmonellosis, leptospirosis, endemic typhus and rat-bite fever (*Ibid*). Lack of refuse collection in Makause might lead to numerous health problems and lack of access to health-care would intensify these problems. The figure below shows conditions in some parts of the settlement.



Figure 7.8: Lack of refuse collection in Makause – Such condions have become a haven for vectors that transmit diseases and infections.

Stationary and slowly flowing water within Makause informal settlement form possible breeding grounds for culex quinquefasciatus mosquitoes (malaria transmitting type). These mosquitos breed in wastewater retained in blocked channels and they transmit filariasis (Cairncross and Feachem, 1993). This would expose the inhabitants to vast diseases associated with presence of stationary water, such as malaria. Improving sanitation and service delivery would reduce the

chances of such outbreaks; however, the political situation (not being in good terms with the authorities) and the fact that Makause is located at an area demarcated for industrial development (according to General Moyo, 05 October 2013) diminishes the chances of any improvements.

Housing-related infections are also looming in Makause and these are perpetuated by location of housing, which most likely has major effects on the health of the inhabitants. Makause is located on old mining grounds with a tailings dam in the vicinity and an old mine shaft in the middle of the settlement. Drainage in the area is also poor, and thus there stationary water poodles all over the settlement. According to Cairncross and Feachem (1993), location, design and the quality of a house is most likely to determine environmental health problems that the inhabitants are most likely to face. A house located in high vector concentrations may subject inhabitants to increased disease transmission, especially vector borne diseases (*Ibid*).

The situation at Makause is most likely to hinder domestic hygiene which bears diseases that are related to it. Cairncross and Feachem (1993) argue that domestic hygiene entails considering all faecal-oral infections and water washed infections. The informal settlement can be infested by such infections due to the prevailing environmental health conditions such shortage of water and lack of sanitation.

Type of housing in Makause exposes residents to airborne infections due to the fact that it is not protective. According to Cairncross and Feachem (1993), housing has an influence on the habitants' susceptibility to airborne infections and diseases. These include meningitis, diphtheria, pneumonic plague as well as measles. Shacks are often made of cheap and scrap material that allows polluted air and pathogens to be blown in and around the settlement there by exposing inhabitants to airborne infections. Residents of Makause are also exposed to possible respiratory infections since the settlement is not electrified and thus residents rely of fire for domestic energy.

Informal settlements around Gauteng lack some or all basic services as argued by the HDA (2012), 31% had piped water; leaving 69% exposed to contaminated water illnesses or infections associated with such conditions. The distance from the water source is one of the major problems faced by informal settlements. Some residents of Makause obtain water in access of 500m to 700m which according to the Community Development Forum, is against the rules of water

supplies (MACODEFO meeting, 14 January 2014). 9% of the total population in informal settlements of Gauteng have no access at all, this pose a serious health threat since water is one of the basic services that communities cannot live without.

14% of the households in informal settlements around Gauteng do not have any form of toilet facilities, this leave them with no options but to relieve themselves in any ways possible at a time. 79% of households living in informal settlements around Gauteng province do not have access to electricity (HDA, 2012). This gives them no option but to rely on affordable forms of energy that are not good for their health and environment. Fossil fuels are the most commonly used forms of energy in informal settlements and these are environmentally unhealthy and often make users sick through inhalation or ingestion (Chilcott, 2006; Straif et al, 2006).

7.5 CONCLUSION

The Bill of Rights in the constitution of South Africa as well as the international policies discussed advocate for better living conditions for the poor. However, not much is done on the situation of Makause despite the outcry by the community. Most informal settlements of South Africa are faced with sanitation challenges as highlighted by Brown (2009). Despite the stipulations by the policies, environmental conditions and service delivery in informal settlements remain poor.

CHAPTER 8:CONCLUSIONS

8.1 INTRODUCTION

This chapter seeks to discuss conclusions that were drawn from the data obtained and meetings held with members of the community as well as the Community Development Forum. Some of the conclusions were drawn from observations made, for instance, housing typology in the settlement as well as distance to water taps. There were contradictions between numbers that were given in the Stats SA data and the actual demographics in the area as observed and given by the committee.

8.2 DEMOGRAPHICS

The community of Makause is mainly composed of the age groups that range between 25 and 34 years of age; this highlights the need to provide affordable housing for the low income economically active population in the cities of South Africa. The economically active populations are known to be highly mobile throughout the world as they seek for better employment and income opportunities. These age groups need to be priorities in housing planning processes. Failure to focus on the comically active age-groups in housing often result in scenarios such as those prevalent in informal settlements throughout South Africa.

8.2.1 Population Size

From the information that was given by the interviewees as well as Makause Community Development Forum (MACODEFO), and looking at the potential carrying capacity of the settlement; it can be concluded that Makause is overpopulated. The settlement is underserviced, and thus it cannot sustainably host a population of about 15 000 individuals. This scenario renders the residents of the area vulnerable to environmentally induced diseases and infections since there is a general lack of sanitation.

The data obtained revealed that the carrying capacity of the area was greatly surpassed as highlighted by numerous individuals who share a small dwelling with a number of people. This further deteriorates the environment and increases the proneness of inhabitants to environmentally induced illnesses.

The population size in Makause readily overshadows the scarce services that are present, such as water. There are a few taps to serve multitudes of residents which put immense pressure on that resource. Queues can be witnessed in all water sources; as a matter of fact these sources (tap areas) have become rendezvous for community members.

8.3 EDUCATION AS AN INFLUENCE OF PERCEPTIONS

From the data that was obtained from the field work, it can be concluded that levels of education does not readily influence environmental health perceptions in degraded areas such as Makause. This is due to the fact that there is no educational qualification needed for one to realise the levels of pollution in such settlements. Levels of environmental pollution are so high and are coupled by lack of basic sanitation, of which the residents can readily define as unhealthy.

Educational levels at Makause are generally low; however, this did not necessarily determine the knowledge of environmental health. The study revealed that education changes individual worldviews; however, everyone has a clear understanding of environmental health and has the capability of engaging with it at different levels. It did not take attaining higher levels of education for the community of Makause to realise that they are living in an unhealthy environment. Even though levels of understanding and defining the environment were different, the general knowledge was the same. The community proved to be ill informed on environmental conservation as evidenced by recklessness in disposal of waste water and waste material. They just littered everywhere and disposed of their waste water on the streets. Intermediate plans could be made for disposal of waste material.

The prevailing situation in Makause triggers the need to develop indicators that can help in monitoring environmental health conditions. Briggs (1999) argued that environmental health indicators can help raise environmental health awareness and improve the focus on issues affecting all stakeholders. There is a need for authorities to engage in environmental awareness in the area and inform the recyclers on the importance of a clean environment and persuade them to process their material at the leeward fringe of the settlement so they would not pollute the ambient air. Environmental conservation initiatives need to be established in informal settlements so that residents can learn to conserve their own environment regardless of levels and quality of services available.

Most interviewees blamed fellow residents for the current state of environmental health in Makause. Initiating environmental education and the importance of hygiene can improve understanding of potential links between environment and health. Apart from recycling processing residue that litters the area, Makause lack basic services such as solid waste disposal, and thus they tend to throw their domestic garbage everywhere. This becomes a health hazard since stakes of garbage turn into breeding grounds for rats and other vectors. The figure below shows garbage accumulation in the central parts of Makause.



Figure 8.1: **Garbage accumulation in Makause -** A picture showing one of the garbage stakes around the settlement (Photos: N James, 2013).

The field survey highlighted the fact that there are only a handful of factors that inform environmental health perceptions. From the data and information obtained, it can be ruled out that education cannot inform environmental perceptions. This is due to the fact that despite ability to define and demonstrate understanding of environmental health, individuals from different educational background interpreted the effects of environmental degradation the same way. There were no indicators of educational levels in these interpretations.

8.4 SOCIO ECONOMIC LEVEL AS AN INFLUENCE OF PERCEPTIONS

White and Hunter (2005), argue that the poor are often active participants of environmental conservation even though there is a general consensus by most scholars that economic growth is often prioritised over environment. Residents of Makause are dominantly in the minimum wage zone which generally put the entire community at different scales of low socio-economic spheres.

The study sample demonstrated a great deal of understanding the poor state of the environment they live in as well as dangers associated with such environments. They explained the consequences of an unhealthy environment and gave strong reference to the prevailing environmental situation in Makause. This highlighted the fact that socio-economic levels do not have much of an influence in informing perceptions on environmental health. Low socio-economic populations perceive the environment as much as their higher socio-economic counterparts.

8.5 HOUSING CONDITIONS

Housing forms one of the most important elements of social, physical and economic aspects of community life. According to the CoJ (2000c), if housing conditions are unsanitary, inadequate, and unsafe, they affect the physical and mental health as well as privacy and security of the citizens. Informal settlements are often associated with poor housing coupled with social and environmental problems (*Ibid*).

Poor housing conditions are one of the major characteristics of Makause; residents perceive these as unhealthy since they have been exposed to the consequences of living in such housing. Most individuals within the study sample (19 out of 50) live in shelters made of cardboards. They perceived these dwellings as unhealthy since they rely on fossil fuels and fire for domestic energy. These forms of energy produce fumes that cause various lung and skin infections. Residents were aware of health problems associated with these kinds of environments.

Other materials used for in construction of shelter included poles and plastics, which can easily catch fire that can reap through the settlement in no time; corrugated iron, whose conditions and temperature often influenced by the prevailing outdoor environment. Corrugated iron shacks get

extremely hot if outdoor temperatures are high and cold if temperatures are low. A few individuals (5 out of 50) used brick and mortar to build their shelter.

The general perception was that housing conditions were not suitable for human inhabitation. Apart from the materials used in construction of dwellings, the residents were aware of the poor settlement patterns used. The settlement is clustered and closed packed into a nucleus with narrow walkways in between smaller closed packed sections of shacks.

8.6 TYPE OF ENERGY USED

The source of energy at Makause (fossil fuels) is the major player in indoor pollution. According to the WHO (2008), particulate matter and gases affect different parts of the respiratory system depending on their inherent characteristics. Based on the analysis conducted in 2002 by the WHO, indoor smoke from solid fuels such as coal and wood accounted for the third highest disability-adjusted life years (DALYs) for children under the age of 4. Exposure of residents to indoor pollution in Makause poses a threat by increasing proneness of the community to environmentally induced health problems and infections.

The community was conscious of the diseases and infections that are caused by exposure to indoor pollution. An individual from the community related a story of how a couple was found dead one morning in the nearby informal settlement. He claimed that the cause of death was excessive inhalation of fumes from an '*Imbawula'*, (a contained coal fire used for heat in cold environments). This form of a heater is known to be a health hazard especially in poorly ventilated enclosures. On this account, they perceived their sources of energy as a health threat and unsustainable.

8.7 APPROACHES TO REDUCE INDOOR AIR POLLUTION

Reduction of indoor air pollution in informal settlements can encompass elimination or controlling the sources of pollution. This entails reduction in the use of fossil fuels through electrification or use of cleaner fuels such as gas. In the case of Makause informal settlement, improvement in the quality of kerosene stoves (which they commonly use) is a good milestone that can be taken. Regular maintenance of cooking and heating systems can also play a role in

the reduction of indoor pollution. For Makause, electrification seems far-fetched since the authorities seem not interested in developing the area for human habitation but industrial development (MACODEFO, meeting 14 January 2014).

Choosing non-volatile, non-toxic building materials can also lead to indoor pollution reduction. The problem in areas such as Makause is the fact the community is economically deprived and exists at the periphery of spheres of opportunities and privileges. They often use the cheapest material they can get for construction of dwellings since they cannot afford what can be labelled as proper or non-toxic materials.

Most shacks at Makause are not well ventilated, which compromises the quality of air that inhabitants inhale on a daily basis. Well ventilated shack and building designs can help reduce indoor pollution. However, poor ventilation is often one of the characteristics of informal settlements found around South Africa.

8.8 AVAILABILITY OF CLEAN WATER IN MAKAUSE

Even though residents of Makause have tap water, there were complaints about the pressure on these taps they are few serving multitudes. There is a need for the authorities to improve on the number of taps per section of the settlement. This would reduce the pressure and queues that residents have to withstand before they can access water. Other complaints regarding water supply was distances from sources. Most residents, especially from the central part of the settlement claimed that they could not fetch water after dark due to crime.

Health interventions and policy can also be improved so as to intensify community resilience in poor areas. This can be done strategically by comparing areas in terms of their environmental health status, so as to help target action where it is most needed or to help allocate resources (Briggs, 1999). However, this has proved to be difficult due to immense inequality as part of remnants of the apartheid era (Gray-Knoesen, 2009).

Informal settlements of South Africa lack monitoring trends to closely watch the state of the environment, in order to identify potential risks to health. According to Briggs (1999), monitoring the state of the environment perpetuates the inception of initiatives that leads to the

betterment of environmental health. This is also likely to trigger the urge to assess the effects of policies or other interventions on environmental health

8.9 POLITICS AND SERVICE DELIVERY

The results obtained from the field work (questionnaires and meetings) suggest that residents of Makause generally feel that there is a relation between service delivery and politics. They seem to use their political influence in the form of invested and invited spaces to demand basic services. However, they feel like their rights have been corroded and downtrodden, hence their sense of democracy has dwindled to a mere trickle. They view national politics as full of deception, which has led to environmental health deterioration in low income communities such as theirs. They feel that the new South African dream perished with the resignation of the late former president, Nelson Mandela. The figure below highlights how the study sample interpreted South African national politics and its proclaimed democracy.



Figure 8.2: **South African democracy in the eyes of informal settlement dwellers -,** with the prevailing socio-economic and environmental conditions in Makause; the general feeling among residents was that current national politics seem to resemble the apartheid era.

Source: http://www.zapiro.com/Cartoons/m_100819mg.jpg - accessed 12/02/14

CHAPTER 9: RECOMMENDATIONS

9.1 Introduction

This chapter seeks to discuss conclusions that were drawn from the field work that was undertaken in Makause. These conclusions are based on both the data obtained from questionnaires, information obtained from the meetings that were held with the committee as well as observations are shown in the pictures throughout the research report. Conclusions will commence with a discussion on the state of environment in Makause. This will be followed by a discussion on knowledge levels of environmental health among residents; then environmental health perceptions as highlighted by the study sample and the committee will be discussed to sum up the research findings.

9.2 Environmental Conditions in Makause

Makause informal settlement is characterized by poor environmental conditions due to lack of service delivery and basic sanitation. Lack of these two key components that directly impact on human and environmental health can be attested to the fact that informal settlements often exist in areas that are perceived as unsuitable for human inhabitation. Makause is located on old mining grounds which the authorities have industrial development plans for. This could explain part of a multiple reasons for not developing the area.

On the other hand, it would make sense to argue that political interference in service delivery has played a role in cutting Makause out of the development plans in the area. The continuous struggle for better sanitation and service delivery by the community is a result of this neglecting by the authorities. Marches are a strategy adopted by the residents to find their way into the planning spheres and to amplify their plight for services.

9.2.1 Sewerage Disposal

The area lack sewerage disposal infrastructure, some people rely on shallow hand–dug latrines which become a health hazard over-utilized. Some relieve themselves in any dark corners they can find. This perpetuates possibilities of excreta contamination, and in turn diseases associated with these conditions such as diarrhea. Pit latrines that are used by some residents become a

health hazard as they get full since flies will gain access to the excreta; and are not safe for children.

Residents are exposed to domestic waste water as it flows along the streets due to lack of defined drains. The streets are characterized by shallow streams of dark smelly domestic waste water. This exposes children to numerous diseases especially if they accidentally drink the water as they play in these streams. Most residents within the sample group showed much concern on this issue and they claimed that most people were physically unhealthy.

9.2.2 Domestic Waste and Recycling Residue Disposal

Heaps of accumulated domestic waste can be seen throughout the interior of the settlement. The municipality seems concerned with the fringe which one of major routes commonly used by passers-by to Germiston. There are no waste disposal services in the interior of the settlement as explained by the residents. Only those who resided by the fringe witnessed the collection of waste, while those who resided in the interior of the settlement denied existence of such a service.

Recycling residue could also be seen throughout the settlement and soot from extraction processes could be seen in some parts of the settlement. This soot could be detrimental as it induces lung diseases to the residents as they are frequently exposed to these conditions. Residue from recycling processes could also be seen around the settlement; these were also a health hazard as they were inorganic material that does not decompose, for example rubber and plastic tubing. Accumulation of domestic waste provides breeding grounds for various vectors in the area and contributes to possible disease outbreak

9.2.3 Energy Used

Makause informal settlement is not electrified, and thus residents rely on different sources of energy whose emission components deteriorate the state of environmental health. Sources of energy used largely contribute to indoor and outdoor pollution within the area, thereby exposing residents to various infections.

Residents were conscious of the dangers posed by sources of energy they used for domestic purposes. They showed concern on their levels of exposure to these substances and some even attested their sicknesses to sources of energy they used such as paraffin and coal. There are various diseases and infections that are associated with fumes result from burning these substances. Had there been electricity in Makause, the community would be spared from exposure to these fumes hence better environmental health conditions in the settlement.

9.2.4 Availability of Water

There are few water taps in proportion to the population of Makause; this can be witnessed by the distance travelled by some residents to get to water sources. From observations made as well as claimed by the residents, it can be concluded that households would restrict use of water so as to cut down on trips to the tap. This would happen especially to the elderly, disabled and sick community members.

The community needs more water tapes installed so as to reduce the distance travelled by some members of the community to water sources. Residents also showed disappointment in authorities' lack of efficiency and ability to install more taps. Shortage of water leads to poor hygiene there by resulting in diseases. Water is ideal for economic prosperity and better living standards.

9.2.5 Lack of Proper Streets

Lack of proper planning and layout of the settlement can be blamed for lack of services such as firefighting. The streets are narrow and the settlement pattern is nucleated; this gives no room to widen the walkways into driveways. A fire that swept through Makause as discussed by De Waal (2012) could not be put out as a result of the nucleated nature of the settlement without proper streets that can accommodate vehicular movement.

Lack of properly planned and maintained driveways in Makause impedes some services such as ambulances and other emergency vehicles. This increases the vulnerability of the community. Poor planning has a negative effect on the wellbeing of the community of Makause. According to the meeting with MACODEFO (14 January 2014) and De Waal (2012), the layout of Makause

has been used by the authorities as an excuse for failing to save the shacks that were gutted by fire which swept a section of the settlement.

9.2.6 Health Facilities in Makause

There is a clinic in Makause, but the community disputes its existence due to lack of proper treatment by the staff and adequate medication. Claims by the sample group that there is shortage of medication and that some members of the community have been turned away untreated highlights the perception of limited access to health facilities.

The perception of lack of a medical facility by the community highlights lack of trust and reliance in the authorities. According to the field research data obtained, the community feels that the clinic was meant for residents of richer 'Primrose' area even though it is in their vicinity. On this account, they cannot access proper services since they cannot afford to pay the commanded fees, and thus they feel that there is no health facility for them.

9.2.7 Politics

Data obtained from the sample as well as information obtained from the meetings with the committee portrayed Makause community as politically neutral, with no dominant political party. Most individuals denied any association with political parties but micro-politics in the form of MACODEFO. However, most of the individuals in the study felt that politics played a bigger role in influencing service delivery in the area.

They attested lack of service in Makause to lack of support by the ruling ANC since they were in tensions with the municipality. Since rolling out of service delivery is a municipal function, they felt lack of basic services was the authorities' way of punishing the community. Informal settlement dwellers are known to be politically vibrant as argued by Huchzermeyer (2004), but the community of Makause is concerned with service delivery regardless of who is in power.

9.3 Residents' Environmental Knowledge

The study sample displayed vast knowledge of the environmental health as heighted by their ability to define and explain the effects it has on their wellbeing. Educational and income levels as well as gender did not have any influence on environmental health perceptions. This removed these from a list of potential factors that can inform environmental health perceptions. One does not need to be educated or earn a lot of money to understand the nature of environment they live in. The community of Makause lives in an unhealthy environment due to inability to afford housing in areas that are suitable for human inhabitation.

The community had knowledge of the impacts of a poor environment, some had already been sick due to exposure to poor and contaminated environment. The community was willing to relocate given they were going to a better place that is convenient to their livelihood strategies. This highlighted their understanding of the poor environment they are exposed to on a daily basis. Most of the interviewees complained of the stench of flowing water as well as faecal excreta they often woke up to each morning and explained how these conditions would impact on their health.

Residents' understanding and interpretation of environmental health is in line with Pruss-Ustun and Corvalan (2006)'s definition. Their health status is influenced by their surroundings, their exposure to the prevailing environmental conditions. Proximity to the mine dump, stench of flowing waste water, odors from filling up pit latrines and the smelly soot from recycling material extraction processes.

9.4 Environmental Health Perceptions

According to the data obtained from the field, residents of Makause perceive their environment as contaminated and unhealthy. They pointed out lack of basic services that led to deterioration of the environment. Lack of basic sanitation was pointed out as the major root course of an unhealthy environment in the area. The sample group gave a comparison of an ideal healthy environmental to that of Makause. In their comparisons they associated basic services with a clean environment, and Makause lack this service.

Wide paved streets were one of the characteristics of a healthy environment according to the study sample. Makause is characterized by narrow streets that impede vehicular movement. These streets are muddy when wet and dusty when dry, however, they are often wet due to domestic west water that flow in shallow streams that meander with these narrow walkways. These are perceived as environmentally unhealthy by the community as they expose them to numerous diseases and infections.

Shortage of water tapes as indicated by queues that residents have to encounter before they can get their turn to fetch the resource is associated with perceived shortage of water. Availability of water with easy access was pointed out as one of the characteristics of a healthy environment; this highlighted that the situation in Makause was not satisfactory. Even those who stayed closer to water sources complained of the queues which made no difference from those who stayed further away.

A good health care with accessible facilities was one of the given characteristics of a healthy environment. Makause residents complained of lack of proper treatment and shortage of medication in their clinic. This led to some members of the community to dispute its usefulness. Even those who acknowledged its existence claimed that most residents of the settlement were turned away and people from the nearby suburb (Primrose) were prioritized. The general perception was that there was lack of a proper health care facility that could be afforded and accessed by the community without being discriminated against.

Electrified settlements were perceived as environmentally healthy by the study sample; residents of Makause still rely on cheap fossil fuels for domestic use. This exposes them to indoor and outdoor pollution in turn which perpetuates lung infections and other diseases. Other than pollution from burning fossil fuels, lack of electricity promoted violent crimes in the area.

The community of Makause resides in dwellings that are made of cheap and poor building materials. These increase chances of infections and disease outbreak due to poor ventilation. Proper housing was pointed out by the interviewees as one of the major characteristics of a healthy environment. Residents perceived their housing as poor and not suitable for human habitation but they had no option but to stay there due to their economic situation.

Residents of Makause perceived their prevailing environment as unhealthy; this has been the fuel for their on-going struggle for service delivery. Basic services seem all the community has been marching for and the authorities have been harsh to the leaders of the community and members who participate in the quest for better living conditions. The community lives under poor environmental health conditions posed by exposure to various factors that can induce illness and diseases.

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ADDENDUM

QUESTIONNAIRE

The purpose of this questionnaire is to gather information on residents' perceptions of environmental health in Makausi informal settlement. The data collected will be solely used for a Masters (MSc DP) research; titled 'Residents Perceptions of Environmental Health in Informal Settlements of South Africa: The Case of Makausi, Ekurhuleni'. The research is aimed to investigate residents' perceptions of environmental health and factors that inform these perceptions. The interviewee has a right to stop the interview at any point when he/she feels uncomfortable, and the identity as well as the information given will be kept confidential and destroyed after use by the researcher. There are no rewards, incentives and sanctions for not or participating.

Date……..

Interviewer: Ntandokabawo James

1. PERSONAL INFORMATION

1.1) Male… Female… Age group

18-24

25-34

35-44

45-54

55-64

65+

1.2) Level of education: Primary ☐

Secondary ☐ **Grade 8 – 10 …….** **Grade 11 – 12……**

Tertiary ☐ **PhD……. Masters…… Honours……**

Degree…… Diploma…… Certificate…

Other ☐ **…….....**

1.3a) When (in which year) did you come to Makausi?.....,

b) Why did you come?.....

c) Where did you live before you came to Makausi?.....

1.4a) Are you or your husband/wife employed? Yes….. No…..

b) Are there others in the family who are employed? Yes …….. No……

c) Are there any other means of survival other than working? Yes…… No…….……

d) Activity……

e) How many people contribute to your household financially at the moment? .....

f) Amount earned by the family per month……..

2. ENVIRONMENTAL HEALTH

2.1) What was Makausi like when you first moved here?

The same ☐

Better ☐

How?.....☐**.....**

Worse

How?.....

Other ideas.....

…….....

.....

2.2) Please describe the environment in your understanding?

.....

.....

.....

.....

2.3) Please give any positive aspects of your environment.

.....

.....

.....

.....

.....

2.4) What causes the environment to be positive in your view?

……

……

……

……

……

2.5) Please give any negative aspects of your environment.

……

……

……

……

……

……

2.6) What causes the environment in your view to be negative or harmful?

……

……

……..……
…….

2.7a) Have there been any changes in the environment since you arrived here? Yes…. No…..

b) If yes, what are the main changes?

……
……
……
……..……

2.8) Please describe how you see a healthy environment in an ideal world? What would it look like?

……
……
……
……

2.9) Is there anything else that you would include in a healthy environment?

……...…
……
…….

2.10) What effect does a healthy environment have on public health?

……
……
……
……..……
…….

2.11) How do people affect the health of the environment?

……
……
……
……
…..……..

2.12a) How would you rate your environment?



Bad

Why?.....☐.....

Good

Why?.....☐.....

No idea

b) What do you think contributes to this? (First two)

.....

.....

……..…

……..……

……

2.13a) Which forms of fuel do you use for

cooking?.....

b)

Lighting?.....

c)

Heating?.....

2.14) Where do you get water

from?.....

2.15a) Where do you dispose of waste

water?.....

b) Domestic

waste?..... ☐

2.16) What type of accommodation do you reside in? Brick and mortar

Poles and plastics ☐

Cardboards ☐

Corrugated iron ☐

☐

Other

2.17) Household size, how many people stay in your shack?.....

2.18a) Is there any form of refuse collection in the area? Yes…….. No……..

b) If yes, how often? **Daily** ☐

Weekly ☐

Monthly ☐

2.19) What do they usually collect?.....

3. POLITICAL INFLUENCES

3.1a) Are you affiliated/member of a political party? Yes ……. No……

b) Why/Not?.....

3.2) How is the political atmosphere in Makausi?

……
……
……
……
……
……..

3.3a) In your opinion, is there any link between politics and service delivery in Makausi?

Yes…….. No……..

b) What makes you think so?

……
……
……

……
……

3.4) How does the state of service delivery influence environmental health?

……
……
……
……
……

3.5a) In your opinion, do you think people should stay here in Makausi? Yes……..
No…….

b) Why?
……
……
……
……
……

3.6) What kind of support are you expecting from the authorities, in terms of sanitation (Ekurhuleni Municipality)?

……
……
……
……
……

3.7a) Do you know who the councillor of this area is? Yes …….. No……

b) If not,
why?.....

c) Is he/she making any efforts to improve service delivery in Makausi? Yes……..
No……

d) Why?

……
……
……
……
……

3.8a) Have you ever left Makausi before? Yes…… No……

b)Why?.....

.....

3.9a) Have you ever been evicted (or attempted) from Makausi? Yes…….. No……..

b) Did you go? Yes…….. No…….

c) Why?.....

3.10) Have you ever been a victim of police brutality here in Makausi? (Including threats by police) Yes…….. No……..

Thank you for your co-operation and time. If you have any explanation seeking questions, please feel free to ask.