



**A Study of the Negative Impacts of Informal
Settlements on the Environment. A Case Study
of Jika Joe, Pietermaritzburg.**

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for admittance to the degree of Master of Housing in the School of
Built Environment and Development Studies: University of
KwaZulu-Natal, Howard College Campus.***

2017

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DEDICATION

This dissertation is dedicated to my mother, my late father and my daughter. My beautiful mother Phumzile Daphne Mahlobo, Mpangazitha this is for her. She has worked so hard raising us on her own and pushing my academic success. My father Nkululeko Jwili Msimang, you would be so proud of me, it is through your prayers that I was able to achieve this. This is also dedicated to my daughter Amukelwa. I hope one day you will read this and be inspired to work hard and know that education is the key to success.

LIST OF ABBREVIATIONS/ACRONYMS

RDP	Reconstruction and Development Programme
SMME	Small, Micro and Medium Enterprises
ECLAC	Economic Commission for Latin America and the Caribbean
GDP	Gross Domestic Product
AbM	Abahlali baseMjondolo
KRDA	Kennedy Road Development Association
BNG	Breaking New Ground
NEMA	National Environmental Management Act
CBD	Central Business District
IRDP	Integrated Residential Development Programme
UISP	Upgrading of Informal Settlements Programme
SRHP	Social Rental Housing Programme
NUSP	National Upgrading Support Programme
NDHS	National Department of Human Settlements
HDA	Housing Development Agency
UN Habitat	United Nations Habitat
HIV	Human Immunodeficiency Virus
KRDC	Kennedy Road Development Committee

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ABSTRACT

There are a number of reasons why informal settlements exist and why people decide to establish and develop them. The main concept is that informal settlements have become a perpetual challenge and adversely imposing negative impacts to the environment. Living in informal settlements leads to the exposure and vulnerability to environmental hazards to people and the land which they occupy.

Informal settlements are characterized by a lack of basic services, pollution, overcrowding and poor waste management. These characteristics impact negatively on the environment posing risk and susceptibility to health problems associated with informal settlements. Apart from the living conditions which are found in informal settlements, the notion of informal settlements being self-built by families and using temporary materials has its own negative impact on the environment.

People residing in informal settlements face challenges of service delivery. This is mainly due to the fact that land was occupied illegally, thus impacting negatively on the environment. A lack of basic needs and services leads to informal settlements having impacts on the environment. This includes inadequate sanitation which leads occupants to pollution, the use of coal and biomass fuel for lighting, causing air pollution and in turn contributing to the emission of greenhouse gases. Waste removal is an issue with which informal settlers' struggle and which causes land pollution and emerging and re-emerging infectious disease hazards. Thus, waste removal is a problem which the study is to discuss and to examine possible solutions thereof.

The main aim of the study was to investigate the impacts which informal settlements have on the environment and raise environmental awareness by illustrating how extreme the impacts of informal settlements are in impacting the environment. The main aim was to be achieved by using the following objectives: identifying environmental challenges which are caused by informal settlements, examining the sources of environmental challenges experienced in informal settlements, investigating solutions to reduce the negative impacts which informal settlements have on the environment, identifying health risks associated with the environmental impacts present in informal settlements and examining how waste is disposed of in informal settlements.

The research method used for the study was qualitative research. This type of scientific research method seeks answers to a question, systematically using a predefined set of procedures to answer the question, collects evidence and provides findings that were not determined in advance. This method was used in conjunction with interviews with municipal officials and questionnaires handed to 40 of Jika Joe informal settlement residents who were selected using random sampling.

The study was conducted on Jika Joe informal settlement in Pietermaritzburg, which is associated with a number of environmental challenges. Themes were used which focussed around sources of energy that were used for cooking in the informal settlement, possible solutions to the issue of informal settlements and their impacts on the environment, health risks associated with these settlements and the disposal of waste in informal settlements. These study areas were of great assistance in answering the research question.

In conclusion, research findings concluded that the research hypothesis is true, as it was found that informal settlements do pose negative impacts on the environment which desperately needed the development of recommendations for change. Such recommendations included the resolving and eradication of informal settlements, composting, the implementation of relocations and the creation of boundaries to name a few.

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Chapter One: Introduction to the Study

1.1 Introduction

Rural-urban migration is an ongoing phenomenon in the developing world and in the developed countries. “In most developing countries, informal settlements have marked the urban landscape for at least half a century. As cities have expanded, so have the informally developed residential areas” (Huchzermeyer and Karam, 2006:01). People continuously migrate to the city in search of better opportunities and ways of sustaining their livelihoods, and the number of informal settlements increase.

There have been debates on ways to eradicate or decrease the number of informal settlements in the developing cities. According to Abbott (2002), “the underlying characteristics of informal settlements are poverty and social exclusion” (Abbott, 2002:i). Poverty and social exclusion are the main characteristic of informal settlements. Informal settlers residing in such settlements are caught up in a cycle of poverty and are excluded from society.

“Informal settlements remain eyesores across major cities in South Africa. They consist of non-conventional housing built without complying with legal building procedures” (Tshikotshi, 2009:16). The current situation of informal settlements is complex and will not cease as a result of the social challenges South Africa is faced with. A rapid increase in the urban population and the limited capacity of the government to meet the high demand for building plots has led to mushrooming of the informal settlements (Scholz in Ali and Sulaiman, 2006:21). There are a number of reasons why informal settlements exist apart from urbanisation.

A lack of access to basic urban services such as water and sanitation can also be taken as an indicator of the prevalence of unserviced settlements (Napier, 2007:12). These are a few of the characteristics of informal settlements. The causes of these characteristics are that informal settlements are unplanned and therefore they are not catered for, lack basic services and in turn, the occupants engage in practices which impact negatively on the environment.

According to Agenda 21, South African legislation implemented Reconstruction and Development Programme (RDP), “the National Housing Programme aimed at the provision of housing and services while at the same time creating job opportunities and providing training (Agenda 21, 1997:01). The RDP was also seen as “a growth and development strategy to improve the economic performance of the country by attracting foreign investment and creating jobs, stimulating small, micro and medium enterprises (SMME), businesses and environmentally based businesses” (Agenda 21, 1997:01). This programme was not developed to cater for housing needs alone, but also for job creation and subsequently the access to housing and basic needs.

The Land Reform Programme too was developed for purposes of either reducing or eradicating informal settlements. The programme was aimed at the “redistribution and restitution of land to previously disadvantaged communities, especially women, with necessary support services such as training and education, thereby reducing dependence on marginal lands” (Agenda 21, 1997:01). The rationale of the programme was aimed at reinstating land to the previously disadvantaged thus leading to a reduction in the development of informal settlements.

Additionally, “the Water Supply Programme, too was aimed at poorer, rural communities to improve living standards and equity in water provision, and honing into the scarcity of water and its efficient utilization; and The Social Security and Welfare Systems, which are being revised so that targeted assistance is provided to the most severely affected sectors of society” (Agenda 21, 1997:01). All the above is legislation aimed at improving the socio-economic and environmental issues of South Africans and reducing informal settlements through job opportunities and subsidized housing.

This research paper examined informal settlements as a key factor of environmental degradation. The environment requires added attention due to a rise in pollution, climate change as a result of eco-unfriendly practices, degradation and poor waste management. The impacts which informal settlements have on the environment are harsh and result in extreme detriments for the future. Such impacts range from poor sanitation and waste management, soil erosion and degradation, water and land pollution and the basic environmental health of the area surrounding the settlements.

1.2 Problem Statement

People residing in informal settlements face challenges of service delivery. This is mainly due to the fact that land was occupied illegally, thus impacting negatively on the environment. A lack of basic needs and services leads to informal settlements having impacts on the environment. These impacts include inadequate sanitation, which leads occupants to pollution, the use of coal and biomass fuel for lighting, causing air pollution which in turn contributing to the emission of greenhouse gases (Napier, 2007:15). Waste removal is an issue with which informal settlers struggle. Inadequate waste removal causes land pollution and “emerging and re-emerging infectious disease hazards” (Napier, 2007:15).

“Climate change is a key concern within South Africa” (Ziervogel et al., 2014:605). There is a need for intervention and a solution as the more these impacts become prevalent in these settlements, the bigger the problem becomes and it could, in future, lead to bigger issues such as climate change which is already in the process of bringing about destruction. What should be taking place is that people settling informally should be aware of their surroundings and should be taking care of the environment as there is an environmental crisis.

Apart from the above mentioned problems, there should be more intervention focused on the housing problem which would subsequently lead to less informal settlements and reciprocally lead to less impact on the environment. The growth of informal settlements compounded the problem of meeting the demand for housing (Sexwale, 2013:01), there is a demand for housing however the projects in place are not meeting the demands. Interventions include the increase in the availability of RDP housing and low-cost housing, as well as the creation of job opportunities.

Due to poverty, lack of basic services and job opportunities, people are immigrating to the city from rural areas in search of better opportunities to sustain their livelihoods. This means undesirable urbanisation which is driven less by economic growth and more by rural-urban migration of the poor and the jobless (Sexwale, 2013:01). This results in people settling informally and impacting on the environment which informal settlers occupy by walking on grass as there are no demarcated foot paths. This causes soil erosion and land degradation. Secondly, people do their washing in rivers and pollute rivers by throwing their waste in and

around such water sources. There is a lack of waste management, so land pollution is the end factor as informal settlers are not registered and do not pay for waste management services.

If this issue is not addressed, the environmental impacts will increase causing further damage and contributing to issues such as global warming and climate change which have an impact on the world at large. Ecosystems will be impacted and in turn peoples' livelihoods will be disrupted (Herero, 2008:15). The health of people residing in such areas will be highly impacted on. Without the basic services being in their close proximity, this in itself will pose another problem. The aim of this study is, therefore, to investigate how informal settlements negatively impact on the environment.

Aim of the Study

Recent literature has focused on the impacts of informal settlements on the environment. However, this study aimed to examine this issue with a different point of view and thus contribute to the production of knowledge in a different manner, not just by consulting the available literature. This study brought about environmental awareness. Through investigating the impacts which informal settlements have on the environment, the study increased environmental awareness by illustrating how extreme the impacts of informal settlements are on the environment.

The study also questioned housing policy and implementation as a whole. Although informal settlements can have a detrimental effect on the environment, the challenge may not necessarily be the informal settling but the implementation and lack of housing projects which leave people with no choice but to settle informally and in turn impact negatively on the environment. Therefore this study contributed to and was influenced by policy implementation. Lastly, the study raised the issue of informal settlements being a perpetual challenge and realising that they will always be there. Thus, the search continues to find means of planning and structuring those settlements into formal housing, and to upgrade the already existing informal settlements.

1.4 Objectives

The study will be carried out to accomplish the following objectives:

- 1.4.1 To identify environmental challenges which are caused by informal settlements.
- 1.4.2 To examine the sources of environmental challenges experienced in informal settlements.
- 1.4.3 To investigate solutions to reduce the negative impacts which informal settlements have on the environment.
- 1.4.4 To identify health risks associated with the environmental impacts present in informal settlements.
- 1.4.5 To examine how waste is disposed of in informal settlements.

1.5 Main Research Question

To what degree do informal settlements negatively impact on the environment?

1.6 Subsidiary Questions

- 1.6.1 What are the environmental challenges caused by informal settlements?
- 1.6.2 What are the sources of environmental challenges experienced in informal settlements?
- 1.6.3 What are the possible solutions to the negative impacts which informal settlements have on the environment?
- 1.6.4 Are there any health risks associated with the environmental impacts present in informal settlements?
- 1.6.5 How is waste disposed of in informal settlements?

1.7 Hypothesis

The development of informal settlements may have environmental impacts that in future can lead to bigger environmental problems, health risks and disrupted livelihoods.

1.8 Dissertation Outline

This dissertation consists of 7 chapters.

Chapter 1 introduces the study objectives, research problem and direction which the study will annex.

Chapter 2 involves the research methodology employed to address the research problem.

Chapter 3 comprises of the conceptual and theoretical framework of the study, examining concepts and theories in connection to the study.

Chapter 4 constitutes the literature review, which explores literature on the topic, on a local and international scale.

Chapter 5 covers the historical background of the study area, describing the dynamics and in depth analysis of the focus area of study.

Chapter 6 depicts research findings, data analysis and interpretation, focusing on data collected through interviews, focus group sessions and existing literature on the topic.

Chapter 7 includes the summary of findings, conclusion and recommendations; this will cover the outcomes achieved from the study and what conclusions can be drawn from information gathered.

Chapter 2: Research Methodology used in the Study

2.1 Introduction

This chapter depicts the research methodology used in the study. It will discuss which research method was used for the study, the way in which data was collected, the types of data collected, the research tools used for the study, how the data was analysed, and what the limitations of the study were.

2.2 Research Methodology used in the Study

The research methodology used for this study was qualitative. This type of research can be defined as “a type of scientific research which seeks answers to a question, systematically uses a predefined set of procedures to answer the question, collects evidence and provides findings that were not determined in advance” (Family Health International, 2015:01). The reason as to why qualitative research was chosen was because the research study was having a problem which needed to be solved and solutions in the end will be best determined through this type of research method.

2.3 Primary Sources of Data

Primary data is “collected from the field under the control and supervision of an investigator, also described as data that has been allocated specially for the purpose in mind” (Kadam et al, 2013:05). Interviews, questionnaires and observations were used as the methods of data collection.

2.3.1 Sampling Method Used

The informants, whom primary data was collected, included a government official from the department of Human Settlements, the ward councillor of Jika Joe and 40 of the informal settlement residents from the Jika Joe informal settlement. 40 out of 400 participants were chosen because

Sampling for Jika Joe Informants

The Jika Joe informal settlement houses approximately 400 people. 40 were targeted to participate in the study. Information needed from informal settlement residents was information on the impact they have on the environment and whether they are aware of it or not. Sampling is “the act, process, or technique of selecting a suitable sample, or a representative part of a population for the purpose of determining parameters or characteristics of the whole population” (Mugo, 2011:01). Obtaining a number of the Jika Joe settlers to participate was attempting to have the views of the population as a whole. With a population between 400 and 500, 40 individuals responded to the questionnaire after being randomly selected. Therefore the study was able to cover 10% of the total population.

Mixed method sampling which involves the combination of qualitative and quantitative research methods was used for selecting participants. Informal settlement participants were selected at random using random sampling and each respondent had an equal opportunity of being selected to participate in the research. Each respondent had an equal opportunity of being selected to participate as each of the population members were assigned a unique number. The numbers were placed in a bowl and the researcher selected those unique numbers according to the sample size of 40 individuals.

Random sampling was used for selecting participants. A simple random sample is obtained by “choosing elementary units in such a way that each unit in the population has an equal chance of being selected” (Mugo, 2011:07). A simple random sample is free from sampling bias. Each respondent would have had an equal chance of being chosen to participate in the research.

Sampling for Government Officials

For the Government officials, purposive sampling was used. Purposive sampling “also known as judgemental, selective or subjective sampling is a non-probability sample that is selected based on characteristics of a population and the objective of the study” (Palys, 2008:25).

The government officials were selected based on their employment specification. One government official was from the Department of Human Settlements and the other was the Ward Councillor of Jika Joe informal settlement.

Government officials were identified according to their relationship with the subject at hand. Officials who deal with the upgrading of informal settlements at the department of Human Settlements were most suitable for interviewing, as they are well informed about pre-existing environmental issues in informal settlements. The Ward Councilor from the Jika Joe informal settlement was approached and interviewed, as the ward councillors observe the environmental and socio-economic challenges of informal settlements and thus have better insight regarding the topic. The government officials would supply information regarding issues they face with regard to the environment in and around informal settlements. Such issues include waste disposal, sanitation, sources of environmental challenges and health risks associated with environmental challenges in the Jika Joe informal settlement.

2.3.2 Research Tools Used

For the purpose of answering the main research question, there were interviews, questionnaires and observations conducted. Interviews were directed to a ward councilor from the Jika Joe informal settlement under the Msunduzi Municipality and an Informal Settlement Manager from the Department of Human Settlements. Questionnaires were designed and directed to the informal settlers from the Jika Joe informal settlement. Questionnaires were given to the participants who were selected using random sampling. Observations were done in the area to gain insight of the physical environmental impacts of these informal settlements. Pietermaritzburg was the research site.

2.3.2.1 Interviews

An interview is a “meeting at which information is obtained (as by a reporter, researcher, television commentator or pollster) from a person” (Webster, 2005:25). Interviews can be characterised as in-depth or semi-structured whereby these interviews “explore the experiences of participants and the meanings they attribute to them” (Tong et. al., 2007:03). Researchers encourage participants to “talk about issues pertinent to the research question by asking open-ended questions, usually to one-to-one interviews” (Tong et. al., 2007:03).

The participants that were interviewed were the ward councillor from the Jika Joe informal settlement under the Msunduzi Municipality, and an Informal Settlement Manager from the Department of Human Settlements in Pietermaritzburg.

2.3.2.1.1 Ward Councillor

The ward councillor of Jika Joe informal settlement was interviewed. The information which was required from her was information on the state of the environment within Jika Joe. The negative impact which Jika Joe has on the environment and the environmental health of the informal settlement together with that of the people who reside in it was important information that was required. The ward council was well informed regarding the settlement and had a vast amount of knowledge regarding the area. Therefore, she was selected for an interview as she was the most suitable individual to respond to the questions posed by the study.

2.3.2.1.2 Manager-Informal Settlements

An informal settlement manager from the Department of Human Settlements in Pietermaritzburg was also interviewed. The information required from this municipal officer included the status of informal settlements, and the negative impacts informal settlements impose on the environment. Secondly, information on waste management and its collection in informal settlements was also required. The informal settlement manager was selected for an interview due to the fact that he deals with issues similar to those raised in the study. Moreover, the respondent had information on policy and legislation regarding the topic at hand.

2.3.2.2 Questionnaires

A questionnaire is “a structured technique for collecting data with a series of written questions for which the respondents have to provide answers” (Bell in Beiske, 2002:09). Various people are asked to answer the same set of questions and the person answering the questions records his or her answers (Beiske, 2002:09).

40 individuals from Jika Joe were asked to complete a questionnaire. The information required from the questionnaires was on the following issues: environmental challenges caused by Jika Joe, sources of the above mentioned environmental challenges, possible solutions to reduce the negative impacts which Jika Joe has on the environment, health risks associated with the environmental impacts present in Jika Joe and lastly how waste is disposed of in Jika Joe.

2.3.2.3 Observations

Observations involved walkabouts within the Jika Joe informal settlement for 2 hours. Observations were effective in analysing the degree to which Jika Joe has negatively impacted on the environment within the settlement. A checklist was developed to consider which issues were to be observed on the ground. The checklist for observations to examine the type and the extremity of negative impact Jika Joe had on the environment was as follows:

- If waste was disposed of in a manner which impacted negatively on the environment.
- If there were any environmental challenges experienced in Jika Joe, and what those challenges were.
- The sources of environmental challenges found in Jika Joe.
- If there were any potential health risks associated with the environmental challenges present in the settlement.
- If the community or government had taken any interventions in trying to solve the environmental challenges experienced in Jika Joe.

All the above observations were in line with the objectives of the study.

2.4 Secondary Sources of Data

There are a number of definitions for secondary data, such as “data gathered and recorded by someone else prior to the project” (Kadam et al, 2013:14). This type of data is found in existing literature. Thus, the sources for this type of data were books, journals, the internet and newspapers. Other definitions state that secondary data is “data that was collected by someone else for another primary purpose” (Johnston, 2014:09), or data which involves the

investigation to learn what is already known and what remains to be learned about a topic through reviewing secondary sources and investigations others have previously conducted in the specified area of interest, (Johnston, 2014:09).

The functions of secondary data are to assist in the gathering of information and literature to support new findings on a particular topic. Furthermore, functions include investigations to study what already exists and what remains to be learned about a topic (Creswell, in Johnston, 2014:10). Secondary data assists in providing literature to gain more knowledge on the research topic and to provide basic understanding of what the study involves.

Secondary data is useful in that it is “readily available and inexpensive to obtain” (Johnston, 2014:10). Utilizing this type of data saves time and is economical. Money as books are readily available in libraries and on the internet and they have become easily accessible. With secondary data, there is the ability to compare studies of longitude and of international source without having to be there physically, (Johnston, 2014:10).

Secondary data was utilized in the study through multimedia, including books, journals and articles from the internet. This data was used in determining the meaning of terms used in the conceptual framework, and determining data on theories connected to the study. Furthermore, secondary data was also used to explore and to assist in gaining an understanding of the negative impacts of informal settlements on the environment, on a local and international scale.

2.5 Data Analysis

Data analysis is a process of inspecting, cleaning, transforming, and modelling data with the goal of discovering useful information, suggesting conclusions, and supporting decision-making (Kadam, 2013:14). This is where the interviews conducted with government employees, as well as answers from questionnaires consisting of Jika Joe informal settlers and also, observations are made useful and can answer the research question.

Data was analysed using thematic data analysis. Thematic data analysis is “identifying, analyzing and reporting patterns (themes) within data” (Braun and Clarke, 2006: 79). It

minimally organizes and describes your data set in detail. However, “frequently it goes further than this, and interprets various aspects of the research topic” (Braun and Clarke, 2006: 79). Therefore, there were discussions on data received from the interviews and focus groups, and descriptions drawing conclusions based on information provided by informants and photographs taken during the observation sessions.

2.6 Limitations of the Study

During the process of developing this study, it was noted that research is a challenging process which requires time and involves encountering problems and setbacks. There were a number of issues which were possible limitations to this study. The difficulties faced involved getting hold of the municipal officials for interviews as they always had busy schedules. Furthermore, getting hold of the informal settlement leader was a challenge as he was expected to avail himself for accompanying the observations. He often ended up not being available. Another challenge involved acquiring a total number of 40 people to participate as people were not too keen on participating and thought it was some political campaign. Analysing the collected data was also a bit of a challenge, as there were a large number of questions for both interviews and questionnaires. Choosing which questions were to be used for the representation of data was time consuming and confusing.

The way in which some of the limitations were overcome was through persistence. In terms of getting hold of the municipal officials and the informal settlement leader, persistence assisted in this matter. Continuous calls were made until appointments were secured. Although acquiring all the 40 respondents was timeous, at last a total of 40 was reached through changing the manner of approach.

2.7 Conclusion

This chapter has discussed, in depth, the research methodology used in this study. The types of methods used for data collection have been named and described. The way in which participants were chosen, why they were chosen specifically, and the information which was needed from them was noted. The different types of data were identified and the way in which that data was used or analysed was also examined. The chapter concluded with

limitations of the study, which are an indication of challenges that came with the carrying out of this study.

Chapter 3: Conceptual and Theoretical Framework

3.1 Introduction

This chapter unveils the concepts and theories that have been identified as relevant to the study. Concepts and theories established in this chapter are those that will assist in identifying the problem and reciprocally create solutions to the impacts of informal settlements on the environment. The concepts to be discussed include the environment, informal settlements and negative impact, while theories associated with the study are the Development Theory and Bronfenbrenner's ecology of human development theory.

3.2 Conceptual Framework

The key concepts of the study consist of environment, informal settlements and the negative impact.

3.2.1 The Environment

Previous literature has defined the environment in a number of different ways. However, two types will be discussed here and one will be discussed in depth as it will be referred to in the context of the study.

The environment is a term that comprises all living and non-living things. According to Sands and Peel (2012), the environment refers to "the objects or the region surrounding anything, which encompasses both features and the products of the natural world and those of human civilisation" (Sands and Peel, 2012:80).

However, the development of informal settlements impacts on the physical environment including soil erosion, land, air and water pollution and unhealthy waste management practices. Therefore the environment is "the natural world, as a whole or in particular geographical area, especially as affected by human activity" (Benedetts, 2013:112). The development of informal settlements impacts on the physical environment as affected by

human activity. Such activities include soil degradation and pollution of water bodies in close proximity to informal settlements.

For the purpose of this study, environment refers to “the physical, chemical, biological, social and economic conditions and factors that surround people and affect all living things” (Sowman and Urquhart, 1998, 08). Social and economic conditions lead people to live in informal settlements. The factors involved pose impacts on all living things. The way in which they treat the environment which they occupy impacts on the sustainability of the environment and the health of its occupants.

3.2.2 Informal Settlements

Informal settlements can be defined in various ways. According to (Abbott, 2001), informal settlements can be seen to have two inter-related sides to them. “One relates to the physical environment and revolves around the dwelling that families occupy while the other relates to the families themselves, their needs and circumstances” (Abbott, 2001:i). One side of informal settlements is focused on the natural environment and the physical structure of the settlement, while the other side refers to the residents who occupy informal settlements, and their socio-economic issues.

The 2009 National Housing Code’s Informal Settlement Upgrading Programme defines informal settlements on the basis of “illegality and informality, inappropriate locations, restricted public and private sector investment, poverty, vulnerability and social stress” (Housing Development Agency, 2012:12). Settlements which demonstrate one or more of the characteristics mentioned above are regarded as informal and, in turn, pose negative impacts on the environment as a result of the daily practices of its occupants, including environmental degradation which occurs during the process of developing such settlements.

The informal settlement to which the study referred is located in Pietermaritzburg under the Msunduzi Municipality. This settlement is informal due to the fact that it was created through a process of unassisted self-help and tends to have two or more of these following characteristics, “1) most houses are self-built by the families occupying them using initially temporary building materials. 2) The settlements are illegal in some way (whether that is the

land tenure, or the house construction or both), 3) the settlements are unserviced, and 4) are mostly occupied by people living in situations of poverty” (Napier, 2007:05).

The above mentioned definition of informal settlements is most suitable for this study as each of the four characteristics which informal settlements are categorised by represent a challenge for the environment. This means that deforestation occurs in order to acquire space for the settlements to be developed. Consequently, land degradation occurs. The settlements are unserviced, resulting in occupants defecating within the settlement, washing their clothes in rivers which are in close proximity to the settlement, and disposing of their waste in and around the settlement resulting in air, water and land pollution.

3.2.3 The Negative Impact

The term “negative” is “a fact, situation or experience that is negative, is unpleasant, depressing, or harmful” (Macmillan Publishers, 2009:28). Alternatively, impact is “the action of one object coming forcibly into contact with another or a marked effect or influence” (Webster, 2005:30). In conjunction, a clearer understanding of the term ‘negative impact’ would be “a situation resulting in harmful influences”. In terms of the study, one can say that the development of informal settlements results in harmful influences on the environment.

The above mentioned definition is most suitable for this study, as it is clearly in line with what the study intends to achieve, which is researching what harmful influences the establishment and development of informal settlements have on the environment. Informal settlements definitely pose negative impacts on the environment, and those will be discovered and unveiled later in this study. With regards to the study, negative impact refers to all the threats caused by Jika Joe residents to the environment in which they reside and its nearest surrounding areas.

3.3 Theoretical Framework

The theoretical framework of the study was based on two theories. These theories were used to inform the study on the direction it should take to investigate the topic at hand. The

theories which were used include the Development Theory and Bronfenbrenner's Ecology of Human Development Theory.

3.3.1 Development Theory

The foundations of the theory of development emerged in the 1950s from the research of the Economic Commission for Latin America and the Caribbean -ECLAC- (Reyes, 2010:05). One of the most representative authors was Raul Prebisch. The principal points of the Prebisch model are that in order to create conditions of development within a country it is necessary to develop a more effective coverage of social services from the government, (Reyes, 2010:09).

This theory encompasses four principles: modernisation, dependency, worlds system and globalisation. The relevance of the dependency theory to the study is that it combines elements from a neo-Marxist perspective with Keynes' economic theory - the liberal economic ideas which emerged in the United States and Europe as a response to the depression years of the 1920s, (Reyes, 2010:09).

Dependency argues that before the era of modern economic growth (until about 500 years ago), the world's major regions were not densely connected to each other (though extensive trade networks existed) (Joshi, 2015:05). When capitalism began to spread, the ceaseless search for profit began: through the production of agricultural goods in colonies or other lands, and Western Europe's ability to drive unequal bargains. This fundamentally changed the social structures of the Third World, (Joshi, 2015:05). Poverty in the Third World is not 'traditional' or accidental. It is a necessary companion to the richness of the developed world.

The way in which this theory was applied to the study was by the assessment of whether industrialisation and the development of South Africa has been true to benefiting its population or whether the developed world has benefited and grown at the expense of the poor. Therefore, we have informal settlements, and the way in which people treat their environment been detrimental effects on modern economic growth.

The housing situation has been perceived as a developmental issue as it is directly influenced by development. Hettne (1995) defines Development Theory as sets of ostensibly logical

propositions, which aim to explain how development has occurred previously, and/or the way in which it should occur in the future. He notes that “development theories can either be normative, in such a way that they can generalize about what has generally been the case in an ideal world; or positive in the sense of dealing with what has generally been the case in the past” (Hettne, 1995:67).

“Development has also been perceived as a process of expanding the real freedoms that people enjoy and requires the removal of major sources of “ poverty as well as tyranny, poor economic opportunities, social deprivation, neglect of public facilities and the intolerance or over-activity of repressive states” (Sen, 1999:03). Development theories include modernization and growth, basic needs and redistribution, structural adjustment, sustainable development, and participatory development. In relation to this study, it is relevant to explore this theory as the perpetual challenge of the development of informal settlements stems from development challenges and stagnancy in development resulting in occupants taking matters into their own hands and settling informally.

3.3.2 Bronfenbrenner’s Ecology of Human Development Theory

This theory, published in 1979, has influenced many psychologists in terms of the manner of analysing the person and the effects they have on different environmental systems that he encounters. The ecological systems theory has since become an important theory that became a foundation of other theorists' work (Bronfenbrenner, 1994:16).

Also known as the Human Ecology Theory, the Ecological Systems Theory states that human development is influenced by the different types of environmental systems. Formulated by renowned psychologist Urie Bronfenbrenner, this theory assists us in understanding why we may behave differently when we compare our behaviour in the presence of our family and our behaviour when we are in school or at work, (Bronfenbrenner, 1994:16).

The way in which a person treats the environment that they occupy is based on a number of things, including their housing needs and socioeconomic status. The immediate need for housing results in informal settling which in turn results in land degradation and deforestation in the development of a settlement. Thus, the way in which this theory will be applied in this study is through assessing the way in which informal settlers treat the environment in which

they occupy. This leads to the mind-set behind informal settlements having negative impacts on the environment.

Bronfenbrenner's ecology of human development is relevant to this study, as the study aims to examine the negative impacts of informal settlements on the environment. Bronfenbrenner (1994) explores the interrelationships amongst human beings, their surroundings, and their interactions with regard to different ecological levels, in an effort to understand the subtle influences that these levels have on the individual (Nhlapo, 2013:20). According to Bronfenbrenner (1994), this theory takes into account the aspects of the environment beyond the immediate situation surrounding the subject.

The Ecology of Human Development Theory consists of six ecological models of human development, namely: individual, microsystem(family), mesosystem(environment), exosystem(culture), macro system(social support), and chrono system (Bronfenbrenner, 1994:16). This depicts the relationship humans have with the environment and what their social status suggests about the way in which they will treat their surrounding area. Hence, we find informal settlements imposing such negative impacts on the environment as a result of their informal state.

According to Saegert et al. (2003), an ecological systems model takes into account an individual's behavioural pattern in relation to their culture; the socioeconomic situation in terms of their housing needs, ownership, settlement patterns, and quality. The way in which a person treats the environment that they occupy is based on a number of factors including their housing needs and socioeconomic situation. The immediate need for housing results in informal settling which in turn results in land degradation and deforestation to make space for the development of a settlement (Saegert et al, 2003:13).

3.4 Conclusion

This chapter has unpacked the concepts and theories which are relevant to the study. The concepts described have assisted in identifying the problem of the study which is the negative impact of informal settlements on the environment. However, the theories explored in this chapter gave a greater meaning to the proviso of the challenge and the possible solutions of such. The theory of development possesses the solution to the problem of the negative

impacts of informal settlements on the environment. The solution, according to the development theory is developing a more effective coverage of social services from government within the country in order to create conditions of development. Bronfenbrenner suggests that the way in which a person treats the environment that they occupy is based on their housing needs and socioeconomic situation. The above means that the shortage and need for housing results in the negative impacts in informal settlements.

Chapter 4: Literature Review

4.1 Introduction

For the purpose of answering the research questions posed by the study, one needs to engage with literature to understand the dynamics of the topic at hand and to gain an understanding of what other authors have proposed. This chapter will discuss the study in depth through the use of international and local case studies and necessary literature.

4.2 Literature Review in the International Context

The literature review of the study was based on the challenges of informal settlements, environmental challenges on a global and local context, the access to basic services in informal settlements, waste disposal and management in informal settlements, the negative impact on informal settlements on water sources, the nature of informal settlements and that in relation to the environment, the importance of the environment to human beings, pollution as an environmental challenge resulting from informal settlements, policy and legislative framework on informal settlements and the environment and a contrast amongst global and local case studies.

4.2.1 The Challenge of Informal Settlements in an International Context

Housing is a perpetual challenge globally. Wherever one goes in the world, there is bound to be a form of informal housing present. “Informal development processes have historically generated more and better housing options for the vast majority of the urban population in Brazil and several other Latin American countries” (Fernandes, 2011:16). Brazil is specific to the study as it clutches similar housing challenges to those present in South Africa.

As with any other country globally, “urbanization is one of the root causes for the spread of informal settlements on the fringe of Zanzibar” (Ali and Sulaiman, 2006:19). By virtue land is administered and the planning policies which come with that “have often been seen as rigid and inadequate to meet the increasing demand for housing by the poor majority” (Ali and

Sulaiman, 2006:19). These factors have also added to the housing challenge, and contributed to the mushrooming of informal settlements.

Globally, people choose to settle informally as a result of the unavailability of housing in urban areas and the lack of opportunities such as jobs and education in rural areas. “A large sum of people choose to live in informal settlements in urban areas in search of better living conditions, health care facilities, education and opportunities” (Abbott, 2002:20). They are therefore forced to develop and live in informal settlements, due to the lack of housing and the inability to afford the available housing.

Nairobi can be used as an example, because the population of Nairobi has been growing at a fast rate and therefore there has been an imbalance regarding the relationship between the population and housing. “Rural migration and the natural growth of the urban population have been largely absorbed in the fast growing urban informal and unplanned settlements” (Nairobi Water, 2009:01). Roughly the same situation which faces South Africa impacts on Nairobi as well. People leave the rural areas in search of better opportunities, while remaining in a cycle of poverty with no shelter, thus resorting to informal settling.

Examining Zanzibar (Tanzania), the area seems to be faced with a multitude of housing challenges. According to Ali and Sulaiman (2006), over 70 percent of urban residents in Zanzibar live in informal settlements and a vast majority of the dwellers live in extremely poor conditions (Ali and Sulaiman, 2006:22). The challenge stated above is as a result of “a rapid increase in the urban population and the limited capacity of the government to meet the high demand for building plots” (Ali and Sulaiman, 2006:22). With a growing urban population, the government can provide to the limits of its resources, as the available resources have never been sufficient enough to meet the demands of the increasing populations.

In the case of America, “most affordable housing in the United States, unlike the housing in many industrialized countries, is provided by the private sector. Only about 1.3 million units out of an overall stock of 97 million are directly publicly owned” (Quercia and Galster, 1997:98). In contrast, housing in the United Kingdom is “owned and operated by local authorities (Whitehead in Quercia and Galster, 1997:98). The above illustrates the degree to which housing is a challenge globally. In the American example, “the private sector develops

new units for higher-income households and the units previously occupied by these households are expected to become available to households with lower incomes-to filter down” (Quercia and Galster, 1997:98). This becomes a housing challenge as there is a large gap created by this process between the high, middle and low income households. The practice of filtering down impacts immensely on the lower income households as they are required to wait for the high income households to avail these units. There can be a long wait, resulting in the development of informal housing, i.e. informal settlements.

The main concern with the housing challenge in Mumbai, used as an example in this study, is the rising real estate prices, which means “more and more people with perfectly respectable jobs cannot find affordable housing to buy or rent, not to mention those who are self-employed or on the lowest strata of society” (Patel, 2005:60). The housing challenge in Mumbai lies not in an increase in urban population and the need for housing rising, but it lies mainly on the fact that housing is expensive and as a result of “urban blight and the stopping of residential construction because of the Rent Act” (Patel, 2005:60). Examples closer to South Africa include Nairobi and Tanzania. These countries also face housing challenges and the development of informal settlements. In the case of Nairobi and other cities in Kenya, “they have been unable to keep up the pace of planning and developing infrastructure to meet the demands of a growing population with the population (4 to 5 percent average growth per year since the 1990s)” (Nairobi Water, 2009:19).

4.2.2 Environmental Challenges in a Global Context

An environmental challenge/problem is “any change in the state in the physical environment which is brought about by human interference with the physical environment and has effects which society deems unacceptable in the light of its shared norms” (Thomas, 2001:16). The establishment of informal settlements has immediate impacts on the physical environment, which society deems as unacceptable. The above means that informal settlements on their own are an environmental challenge.

The reality is that “humans have changed the way the world works in ways that nature never intended. An example is the disruption of the carbon and nitrogen cycles that change the natural flow of life” (William and Ross, 2013:18). Human activity plays a huge role in the

sustainability of nature and the environment. Thus informal settlements impact immensely on the environment.

The environmental challenges which the world as a whole is faced with result from “increases in population, consumption and technology” (William and Ross, 2013:19). Increases in population and the unavailability of job opportunities are the biggest challenges leading to the development of informal settlements, whereby the growth of informal settlements has resulted in many, and complex socio-economic and environmental consequences. The environmental consequences include “pollution, deforestation, flooding, waste of agricultural lands and the like” (Ali and Sulaiman, 2006:24). In 2013, the world’s population reached 7 billion people and is projected to reach 9 billion by 2045 (William and Ross, 2013:19). With such increases in the population, the demand for land and natural resources will increase as well, leading to negative impacts on the environment.

Analyzing environmental challenges in a global context. China was used as an example in this study. China is one of the fastest growing countries with the quickest growing economy in the world, and this is bound to have a large impact on the environment. With China’s growing economy comes accelerated environmental degradation (Liu and Raven, 2010:20). In an effort to reduce environmental impacts, China chose “environmental protection as a national principle and sustainable development as a national strategy” (Liu and Raven, 2010:20). However, China is still “ranked near the bottom among all the world’s countries in terms of environmental sustainability” (Liu and Raven, 2010:20), meaning that although the country put policies into place, the policies never became a reality and environmental degradation still exists largely in China (Liu and Raven, 2010:39).

4.2.3 Access to Basic Services in Informal Settlements

Basic services consist of resources which are vital to the functioning of human-beings and their wellbeing as a whole. Such services are characterised by certain indicators, such as water, sanitation and electricity (Housing Development Agency, 2012:05). Informal settlements are unplanned and unstructured which therefore paves way for the inability of basic service provision. In South Africa, informal settlement dwellers are largely impacted in terms of the access to basic services. However, this section examines how basic services are accessed in informal settlements on an international level.

Using Nairobi in Kenya as an example, in the case of access to basic services in informal settlements, a group of researchers in Kenya had found possible solutions to the issue at hand. The researchers found that their possible solutions would have a “wider relevance for Kenya’s urban development policies and well-being among the urban poor” (Muungano, 2015:22). Above the development of strategies to combat the issue of the unavailability of basic services in informal settlements, there were challenges noted which depicted how informal settlements lack basic services, how informal settlement dwellers access such services, and how that impacts the livelihoods of the dwellers.

According to Muungano (2015), researchers explored the relations between settlement types and service provision as well as examined alternative models of service delivery (Muungano, 2015:22). The above results means that the research conducted on possible solutions to the issue of the access to basic services in informal settlement found that there is a relationship between the type of settlement and the basic services provided in that area. Other ways in which people living in informal settlements gained access to basic services were also noted.

In the case of Mukuru, an informal settlement located in an industrial area in Nairobi, “households are usually crowded into tiny iron shacks with only minimal service provision. The above depicts a continuation in the trend of informal settlements lacking access to basic services. According to Muungano (2015), “just 3.6% of Mukuru households have access to adequate bathrooms, 7% have adequate toilets, 29% have adequate water, and although 78% have electricity, these tenuous illegal connections frequently expose residents to regular blackouts and elevated risks of electrocution” (Muungano, 2015:22). Research conducted in the Mukuru area depicts that the informal settlement have slight access to basic services; however it is still not adequate enough for the whole population. The above stated facts leave the Mukuru population prone to sanitation and water borne diseases, as well as electrocution and fires within the settlement, due to illegal electricity connections.

Nairobi is used as one of the international examples, as there are many other countries globally which also hold the challenge of the lack of access to basic services in their existing informal settlements. Another country which we can learn from in the issue of access to basic services, is Brazil. In Brazil, informal settlers face challenges as with any other country in the world regarding the access to basic services in their settlements. The way in which water is accessed in Brazil’s informal settlements is “by tapping into a water main that runs near the

settlement” (Rufin, 2015:16). According to Rufin, (2015) the task of obtaining water is a difficult one because the water main is always at the bottom of a hill which creates a difficult journey for those living near the top as the walk back to their residents is steep (Rufin, 2015:16) .

In terms of sanitation, approximately “50% of Brazil’s informal settlers have access to an in-house toilet facility” (Rufin, 2015:17). The number of people who have access to toilets is equal to those who do not, which means that the availability of sanitation facilities does not meet the needs of the informal settlements population in Brazil. Although there is that 50% of in-house toilet facilities, those facilities however, “have sewerage running through open ditches which eventually ends up at street levels” (Rufin, 2015:17) which in turn leads to health hazards.

Apart from water, sanitation and electricity being challenges in informal settlements globally. There is also the issue of security of tenure, where “most slum dwellers have no security of tenure and live under the constant threat of eviction” (UN-HABITAT3, 2015:27). It is every country’s goal to “provide basic services (including water and sanitation) to all poor people, including security of tenure and improved housing at affordable prices and to ensure the delivery of social services of education, health and social security to poor people” (Kranthi and Rao, 2009:05). There is a link between security of tenure and the access to basic services, and that link is in that if people have security of tenure they are guaranteed access to basic services, if the land which people occupy belongs to them rightfully, governments are able to provide basic services.

4.2.4 Waste Disposal and Management in Informal Settlements

Waste is one of the many challenges which cause informal settlements to impact negatively on the environment. When waste is poorly managed, it becomes a threat to health and a major social and environmental problem. With regard to waste management, there are a number of countries in both the developing and developed world where examples can be drawn, as waste in informal settlements is a global challenge. With the case of Montego Bay in Jamaica, one can note that in terms of solid waste collection, “garbage is supposed to be collected twice weekly on specific days in residential areas” (Ferguson, 1996:14). However, in actual fact “collection varies from twice weekly in formal sector residential

neighbourhoods to never in some of the largest areas of informal sector communities” (Ferguson, 1996:14).

There are a number of reasons as to why the collection of waste is such a challenge in informal settlements. Reasons to the above stated include “the lack of road access to large areas of informal settlements, a lack of cooperation by residents, density and inadequate finance” (Ferguson, 1996:14). As a result of a lack of basic services in informal settlements, there are no roads leading to and within settlements, and they are usually densely populated. What this insinuates with regard to waste collection is that waste collection trucks have no access to informal settlements and, therefore, it is impossible to collect waste. This is a global issue as all informal settlements encounter this challenge.

Nigerian informal settlements “lack effective refuse collection services and have no central sewage system therefore; the main mode of solid waste disposal is through chart pushers who eventually dispose waste in unknown destinations on the existing streets” (Olajide, 2010:20). Waste is a serious challenge for informal settlements as there are no facilities for proper disposal. The disposal of waste in and around informal settlements has a detrimental effect on the health of those who reside in them. Zanzibar is also faced with similar waste disposal and management issues as its informal settlements “lack established collection points and have piles of garbage scattered in and around the settlement” (Ali and Sulaiman, 2006:25). Some residents choose to bury or burn their waste which is also a challenge in itself.

According to Antwi (2008), solid waste management is an expensive process and is a difficult task to manage in developing countries (Antwi, 2008:38). Solid waste is not often given as much attention as it requires and there is usually “insufficient funding and poor cost recovery for solid waste management” (Antwi, 2008:38). It is noted that practically, “all local authorities in developing countries have been unsuccessful in working out cost effective strategies to alleviate the problem of low cost recovery” (Antwi, 2008:38). Apart from the failure of strategies regarding cost-effective waste management, informal settlement dwellers’ attitudes towards waste management and ineffective supervision and monitoring of waste management practices in informal settlements by local municipal authorities have an impact on the way in which waste is disposed of and managed in these settlements.

On a positive note, some informal communities in the world, such as some in Nairobi, have created solutions and strategies for waste management. Although practiced all over the world,

the re-use of refuse has worked for Nairobi's informal settlements. "Recycling and composting are land-saving and pollution-reducing strategies" (Peters, 1998:28). The implementation of these strategies in Nairobi's informal settlements has assisted them tremendously. Nairobi has waste management as one of their biggest environmental challenge which is why in their informal settlements they were "found to be undertaking composting as an income generating and environmental management strategy" (Peters, 1998:28).

4.2.5 The Negative Impact of Informal Settlements on Water Sources

Pollution, whether water or land based, results in the accumulation of waste either on water sources or on the physical environment. The development of "informal settlements is one of the major causes of the pollution of water sources in Zanzibar" (Ali and Sulaiman, 2006:26). Waste management is one of the largest problems experienced in Zanzibar's informal settlements and impacts mostly on its water sources. There is no sewage system in informal settlements and therefore "liquid waste which include water from washing laundry, kitchen, bath and other domestic uses is haphazardly discharged on-site" (Ali and Sulaiman, 2006:26). These practices pollute rivers and groundwater as well as "marine environments and is a major cause of water borne diseases" (Ali and Sulaiman, 2006:26)..

The establishment and development of informal settlements has impacted largely on water bodies. Loss of vegetation around water sources reduces water flow, while poor disposal of liquid and solid wastes causes water pollution (COLE in Napier, 2007:25). Residents dispose of their waste in rivers; they use rivers for sanitation purposes and also wash their clothing in rivers. "There have been outbreaks of water born disease such as cholera and dysentery particularly during high rainfall seasons" (Napier, 2007:25). Apart from water being polluted the people drinking that polluted water also get affected, thus not only the physical environment is impacted but also the environmental health.

The use of pit latrines and open defecation contribute to water losing its biological make-up quality (Pearson, 1999:21). In addition, lack of adequate sanitation could result in groundwater and surface water pollution (Hill in Mahlakoana, 2010:17). People pollute their own surrounding water sources through open defecation, thus the water they consume is polluted and not of good quality for drinking.

International Case study: Mumbai, India

Mumbai, formerly Bombay, is an island city located on India's west coast connected to the mainland through a series of bridges. With a population of 16 million people, it is the largest city in India and one of the largest in the world (Swaminathan, 2003: 81).

The city's economy, particularly the southwest area of Nariman Point, has increasingly globalised since the economic liberalisation reforms in 1985 and 1991. The city is responsible for over half of India's foreign trade (Wagh, 2004: 41), and has become a centre for India's global dealings in financial and producer services (Grant and Nijman, 2004:331). Mumbai represents a vast number of economic activities, which draws immigrants into the city, leading to growing populations which in turn demands housing that is unavailable. Urban sprawl in this city is the main drive of the development of informal settlements. With such a large population, the city is bound to consist of housing challenges and the city represents great qualities for a case study based on the negative impacts informal settlements have on the environment.

"Despite the city's impressive economic statistics, one influential report argues that Mumbai is in 'reverse gear' in terms of economic growth and quality of life, noting a drop of 7% to 2.4% in the city's GDP per annum between 1994 and 2002, and highlighting the increasing number of people residing in informal settlements, alongside growing anxieties over congestion and pollution", (Bombay First, 2003:12).

Over half of the city's population resides in informal settlements of varying infrastructure, income, economy, ethnicity and religion, overpopulated into whatever space from bridges and railways to pavements and shantytowns. The growth in informal settlements reflects both the spectacular rise in real estate prices during the 1990s driven by the city's economic growth (Appadurai, 2000:64), and the inadequacy of the state's social housing commitment.

Sanitation in Mumbai's informal settlements In Bhabrekar Nagar, in the northwest suburb of Malad, consists of 3 small toilet blocks of 10 seats each providing for 4000 people. Local community members are frustrated at the lack of maintenance (McFarlane, 2009:80). This represents the rigidity of service delivery when it comes to informal settlements. As a result

of such settlements being unplanned, there is no structure for developing or servicing of such areas. With 30 toilet blocks to be shared by 4000 people, there is bound to be environmental health issues and as well as social conflict.

Characteristics of poor environmental conditions include inadequate access to safe water and sanitation, poor quality of housing, overcrowding, and insecure residential status, (Osrin et al, 2011:17). Similar to the Jika Joe informal settlement case study, one of the main concerns is the access to basic services which is the primary cause of the existing environmental impacts of informal settlements. To name a few, access to sanitation leads to defecation in rivers thus polluting water bodies. Furthermore, defecation on land leads to health issues. Moreover, there are issues of overcrowding which are characteristic of informal settlements and have detrimental effects on the environment, such as land degradation and soil erosion over time.

4.3 Literature Review: Local Context

4.3.1 Introduction: The Challenge of Informal Settlements in South Africa

One of the main reasons why people develop informal settlements is due to “the poor people who lack access to the financial resources needed to buy houses as existing housing finance systems are not accessible to them and subsidies for housing are not properly targeted” (Gilbert, 2002:31). The disadvantaged remain disadvantaged, because they are unable to receive housing finance and subsidies. This is one of South Africa’s biggest challenges leading to the establishment and development of informal settlements.

The previously disadvantaged being the ‘Black’ Africans are still highly disadvantaged when it comes to job opportunities and access to housing. “Regardless of their political conflicts all major protagonists have agreed that there is an enormous shortage of affordable housing for the working classes” (Hendler in Napier, 2007:21). A number of people migrate to the city from rural areas in search of better job opportunities. Housing becomes an issue for the immigrant, which in turn leads to the establishment and development of informal settlements. According to (Housing Development Agency, 2013:14) between 2001 and 2011, 20% of the KwaZulu Natal population lived in informal settlements.

Access to land and housing in urban areas for the poor is one of the main challenges facing policy makers in South Africa. According to Chetty (2012), “estimates suggest that 26% of households in the 6 metropolitan areas in our country live in informal settlements, often ‘illegally’ and with limited access to services”, (Chetty, 2012:01). The challenge of informal settlements does not only stem from immigration but also from “escalating housing prices, limited access to land and housing finance, land regulations which govern sub-division of land, highly regressive land taxation, and low supply elasticity of subsidised housing” (Chetty, 2012:01). As a result of their financial status, the poor are forced to resort to other means of shelter. Informal settlements are the result of a failed system regarding the formal housing sector.

There are challenges in the process of setting aside land suitable for housing. The challenge mainly is “pressure from high-income groups who wish to avoid perceived devaluation of their properties from being in close proximity with housing for the poor as well as the perceived tax revenue losses when compared to other uses – in particular, up-market gated communities” (Chetty, 2012:01). Upgrading of informal settlements and developing low cost housing is a challenge, as the people currently occupying the land need to be consulted and if they do not approve of the project, the project comes to a halt, therefore, there are more people residing in informal settlements and in turn impacting negatively on the environment.

4.3.2 Environmental Challenges in South Africa

There are a number of environmental challenges South Africa faces. Such challenges range from poor land use, insufficient water, waste, air pollution, and global warming. “Overgrazing is a common problem in South Africa that began in the era of apartheid” (Daniel, 2013:15). During Apartheid, black people did not have access to most government benefits such as fertilizers, which makes overgrazing an issue even to this day. Informal settlements have also contributed to the issue of poor land use, as “settlement patterns have contributed to the degradation of land through congestion and deforestation” (Daniel, 2013:15).

Regarding insufficient water, this is “linked to other issues such as the loss of forests, natural habitats and also climate change” (Daniel, 2013:15). In terms of housing and the development of informal settlements, trees are cut down and forests are lost during the construction of the above mentioned. Through such processes, water bodies are impacted on

which in turn leads to insufficient water. “South Africa is water stressed (i.e. there are 1000-1699m³ of water per person per year) and is predicted to be short by 2050” (Clarke and King, 2004:28). Water is a non-renewable resource and can be easily polluted through human practices, such as those which take place in informal settlements (i.e. washing, bathing and even defecating in freshwater water bodies).

Waste is an environmental challenge of concern in South Africa as, “sewage systems in various provinces are failing resulting in water pollution and potentially causing health problems” (Clarke and King, 2004:28). “Handling of waste from informal settlements is a particular problem owing to the lack of infrastructure and possible the location of the settlement” (Clarke and King, 2004:28). There is a lack of infrastructure and basic services in informal settlements which in turn has an impact on the environment in terms of the disposal of waste. Waste is disposed of along rivers and on settlements banks causing land and water pollution, also, “weekly (at least) waste collection is available to only 55% of South Africans” (Clarke and King, 2004:28), which is problematic.

In 2005, it was noted that “South Africa generated 50% of the air pollution on the African continent” (CNdv, 2005:05). Such pollution comes from vehicular transport and the generation of electricity which are the main contributors to air pollution. Today air pollution in South Africa “kills 20 000 people per year, making it a deadly health risk and cost to development and the state” (Kings, 2016:20). Cars emit harmful gases which impact highly on the environment, also with the generation of electricity, coal is burnt which too releases harmful gases into the atmosphere when burnt.

In terms of global warming, it is caused by most of the above mentioned issues and is probably the major environmental challenge South Africa and the world at large is faced with. Global warming is “the general increase of temperatures as a result of greenhouse gases” (Al Gore, 2002:01). Through human activities such as pollution and burning of waste, hazardous gases are emitted into the atmosphere and impact on the ozone layer which protects humans from UV Rays. “The potential impacts of global warming are likely to exacerbate existing issues such as the shortage of water and biodiversity, and need to be considered in planning for the future” (Erasmus et al., 2002:37). If humans continue mistreating the natural environment, global warming will continue being a problem.

Planning and certain measures need to be put into place in order to reduce or combat global warming and its impacts.

4.3.3 Characteristics of Informal Settlements

“Informal settlements are a shameful feature of poverty and inherited inequalities” (Huchzermeyer and Karam, 2006, vii). However, government provides shelter to millions of poor urban dwellers in developing South Africa. There are a number of factors which characterise informal settlements. Those range from “illegality and informality, inappropriate locations, restricted public and private sector investment, poverty and vulnerability; and social stress” (Hindson and McCarthy, 1994:106). Apart from the above mentioned, there are also the following factors: “lack of adequate basic services (e.g. potable water, sanitation etc.), lack of formal tenure (title) by residents, density (moderate to high but definitely not as per the typical sparse rural settlement pattern in rural KwaZulu Natal), access to / connection with a nearby town / city / urban centre (e.g. people access work opportunities there)” (Project Preparation Trust, 2011:6-7).

“There usually is no electric power, no piped water in the house, but perhaps a stand pipe serving an area. No roads, no sanitation, no drainage” (Nabutola, 2004:16), mainly because informal settlements are illegal and informal. These settlements are also considered illegal and informal as they are developed on land which does not belong to the settler.

4.3.3.1 Physical Characteristics of Informal Settlements

Informal settlements are unplanned and developed in inappropriate locations. “Lack of planning causes random patterns of built-up environment, inefficiency and congestion, which itself contributes to more problems. Cadastral data is often non-existent, which can lead to land disputes between neighbours”, (Hurskainen, 2004:70). Permanent and legal occupants of the land which informal settlers have settled on may have a challenge adjusting to living with people who have taken over their land without the necessary legal rights. These settlements also hold characteristics of being congested as most informal settlements consist of densely populated structures.

The fact that informal settlements are physically characterised by disorganisation suggest that “open spaces necessary for essential infrastructure developments are difficult to find without removal of structures. Squatter houses block spaces reserved for roads, toilets, drainages, schools etc.” (Hurskainen, 2004:70). This is also one of the main reasons as to why such settlements lack basic services and infrastructure.

Other physical characteristics of informal settlements include poor environmental conditions, meaning “diminishing vegetation cover, soil erosion, polluted soil, water and air” (Republic of Kenya & GTZ, 1996:02). “Raw waste from nearby factories cause pollution of rivers as well as flooding during heavy rains” (Republic of Kenya & GTZ, 1996:02), and in some cases, settlements situated in close proximity with factories and industrial areas suffer from flooding and extreme pollution apart from the settlers own pollution load.

These problems, which are connected to the other issues mentioned above, cause settlements to be further uninhabitable, “contributing to bad sanitation, spreading of diseases and preventing substantial agriculture in an semi-arid setting which is already environmentally vulnerable”(Hurskainen, 2004:70). These problems no longer only lead to the vulnerability of the natural environment (environmental degradation), but also impact the state of the environment which people occupy.

Furthermore, houses in informal settlements are built of temporary or semi-temporary materials, such as “mud, wattle, cardboard and scrap metal” (Hurskainen, 2004:70). “Inhabitants that might be financially able to improve their structures decide not to risk their money for fear of eviction. Landlords are unwilling to improve structures, since the demand is high and they will lose money”, (Hurskainen, 2004:70). The materials in which informal settlements are built are physical characteristics of such. Occupants may have the money and determination of constructing more permanent structures, however they fail to do so as the plot and structure which they have illegally occupied belongs to someone else.

4.3.3.2 Social Characteristics of Informal Settlements

One of the main social characteristics of informal settlements is conflict. “Conflict is inherent in the relationship between the general community and outside agencies, such as the authorities and surrounding residents, and in the relationships between different groups in the settlement itself”, (Rüther, 2005:45). Conflict is bound to occur in such settlements as they are illegal, and war is bound to occur based on communities searching to be reinstated with what was theirs. “A number of individuals who live in a shack not in a backyard are likely to have suffered from an illness or injury in” (Housing Development Agency, 2012:09). As a result of the environment in which informal settlers live under, poor health and sickness is a social characteristic which they deal with on a daily basis. The lack of basic services is attached to this characteristic, as people in informal settlements do not have access to basic health care and thus suffer and go through illnesses with little to no medical assistance.

“More affluent individuals living in formal dwellings who are generally in good health may have a lower ‘sickness threshold’; the symptoms they experience when they report being ill may not warrant a mention by an individual whose immunity is generally compromised” (Housing Development Agency, 2012:09). Medical issues may not be much of an issue to the people who can afford it (those living in informal settlements), as there are people who reside in such areas who can afford certain needs.

The lack of development is seen as a social characteristic of informal settlements as a result of “constant fear of eviction, which hinders all development and maintenance of structures and infrastructure, depressing and frustrating people even more”, (Hurskainen, 2004:69). As a result of living in fear of eviction, life becomes stagnant for the dwellers as they cannot do as they wish with their informal settlements.

“Schism occurs as different groups and individuals in a settlement compete for power, land, and resources. Solidarity may be critical in closing off a deal with external agents or perhaps pressuring government to do something that will benefit a settlement”, (Rüther, 2005:45). According to Webster (2015), schism can be defined as “a division among the members of a group that occurs because they disagree on something”, (Webster, 2015:20). Conflict is bound to occur as a result of the fight for power, land and resources as stated above. Informal settlement occupants may struggle to share the little which they have among them all.

Unemployment and poverty are also social characteristics seen in informal settlements, which cause a number of human tragedies, forcing people to prostitution, substance abuse and criminal activities. “The majority of the people residing in informal settlements have to rely on informal activities to feed their families, as job opportunities are few and require education which most of the dwellers do not have”, (Hurskainen, 2004:70).

4.3.4 Access to Basic Services in Informal Settlements

Basic living conditions and access to services are a range of living standard indicators. “These indicators include access to key services such as water, sanitation and electricity. In some cases, they also include indicators relating to the conditions of dwelling structures themselves”, (Housing Development Agency, 2012:10). In informal settlements, there is little to no access to basic services. Because such structures are informal and unplanned, they cannot be catered for. Apart from water, sanitation and electricity, there also stands the issue of roads, health care services and schools, depending on the location of the settlement.

As a result of informal settlements being unplanned and unguided, there is the issue of coverage determining the need for water and sanitation. According to the (UN-HABITAT, 2003:06), “there are no data on water and sanitation provision for informal settlements and many low-income nations” (UN-HABITAT, 2003:06). Without the necessary data available for the provision of basic services to occur, government cannot detect which areas remain unserved and therefore, cannot provide those areas with such services.

“The provision of water is a serious issue within informal settlements, as water is only provided to a few through standpipes if not provided at all” (K’Akumu and Olima in Mahlakoana, 2010:51). Water is a scarce resource in informal settlements, and is accessed through standpipes if there are any, as well as any river in close proximity to the settlement. According to (Mahlakoana, 2010:51), water in informal settlements is usually collected from unreliable sources and stored in drums and other storage facilities for domestic purposes, particularly for drinking and cooking, (Mahlakoana, 2010:51).

As a result of poor water supply in informal settlements, there is no adequate sanitation, suggesting “the disposal of human waste in these settlements is mainly through pit latrines and other on-site methods” (Anan in Mahlakoana, 2010:52). A number of informal dwellers do not use the pit latrines provided for them, and instead “use open defecation as a sanitation

facility” (Mahlakoana, 2010:52). The above indicates that opportunities for dirt and disease rise, resulting in health risks and environmental degradation associated with the lack of basic services.

Electricity is also a basic service which informal settlements have little to none access to. Although there is a lack of electricity for some settlements, “virtually all informal sector households are connected to electricity lines” (Ferguson, 1996:28). The way in which these settlements are connected to electricity is by the “use of a pole of bamboo on which is placed a metal hook attached to wire over the electricity line” (Ferguson, 1996:28). This process is a high risk to the residents of informal settlements as this procedure can result in electrocution and adversely death.

4.3.5 Waste Management in Informal Settlements

In South Africa, the biggest waste collection backlogs exist in rural areas and informal settlements. Obstacles to providing a sustainable waste collection service include a limited road access and infrastructure: In certain areas, road infrastructure is limited and the collection vehicles cannot reach all the households. Where road infrastructure exists, the streets are often inaccessible to conventional waste collection vehicles due to steep slopes and narrow roads with sharp curves, deep potholes and dongas. (CSIR, 2011:01).

Waste is supposed to be collected once weekly on specific days in residential areas in South Africa, however “the actual frequency of collection varies from twice weekly in formal residential areas to never in some of the largest informal sector communities” (Ferguson, 1996:12). Waste accumulates and a waste backlog is created, leaving settlements filled with dirt and a high environmental health risk.

4.3.6 The Nature of Informal Settlements in relation to the environment

Informal settlements can be described in a number of ways, but generally they possess two or more of the following characteristics: “1) most houses are self-built by the family occupying them using temporary building materials, 2) the settlements are illegal in some way, 3) the settlements are unserviced, and 4) are mostly occupied by people living in situations of

poverty” (Gilbert and Gugler, 1992:74). The characteristics/nature of informal settlements clash with the environment.

Firstly, the notion of informal settlements being self-built by families, using temporary materials, (Gilbert and Gugler, 1983:75), has an impact on the environment. The types of materials used for building informal settlements can pose negative impacts on the environmental health of a settlement, such as using asbestos which is harmful when inhaled, thus causing respiratory diseases through the development of informal settlements. Second, informal settlements are illegal in, thus the “physical characteristics of the land do not allow for development” (Huchzermeyer, 2004:08). They are built on flood plains and land that is unstable, which both poses risks and negative impacts on the environment. Land is degraded through deforestation and erosion to make way for the development of informal settlements.

Thirdly, the settlements are unserviced, suggesting “bulk services cannot be made available as a result of the unplanned nature of informal settlements” (Huchzermeyer, 2004:08). If settlements are unserviced, residents resort to other means of gaining services. For instance, the community would resort to pollution through discarding of waste wherever it is suitable for them as a result of the lack of a waste management structure in place. Residents can also turn to using rivers for “washing, sanitation purposes and more waste ‘dumping’” (Gilbert and Gugler, 1992:74), resulting in more pollution (water pollution in this case) and impacting on water quality as a whole.

Lastly, “informal settlements are occupied by people living in situations of poverty” (Gilbert and Gugler, 1992:89). People who are poverty stricken look for means of survival in every way possible and do not consider any negative impact or damage caused on their behalf. “Poor people depend on the burning of fossil fuels, coal or logs for cooking” (City of Cape Town, 2007:16). This on a daily basis causes air pollution which in turn has an impact, that being climate change. Apart from the use of fossil fuels and coal for cooks, fires take place in informal settlements where an entire settlement burns out, on a yearly basis.

4.3.7 The Negative Impacts of Informal Settlements on the environment

People who live in informal settlements have a challenge of service delivery. This is due to the fact that they occupy land which does not belong to them. A lack of basic needs and

services leads to informal settlements having impacts on the environment, such as inadequate sanitation which leads occupants to pollution, the use of coal and biomass fuel for lighting, causing air pollution and in turn contributing to the emission of greenhouse gases (Napier, 2007:15). Informal settlers also have an issue with waste removal which impacts on the environment as the waste being deposited results in land pollution and “emerging and re-emerging infectious disease hazards” (Napier, 2007:15).

“Climate change is a key concern in South Africa” (Ziervogel et al., 2014:605). There is a need for intervention, as the more these impacts become prevalent in these settlements, the greater the problem becomes, and this in future could lead to bigger issues such as climate change. What should be the plan of action is that people settling informally should be aware of their surroundings and should be taking care of their environment as there is an environmental crisis. The way the above would be achieved is through introspection and educating community members on the impacts of informal settlements on the environment.

Apart from the above mentioned, there should be more intervention in the housing problem which would lead to less informal settlements. This would lead to less impacts on the environment. “The growth of informal settlements compounded the problem of meeting the demand for housing” (Sexwale, 2013:01). There is a demand for housing but the projects taking place are not meeting the needs.

What is happening is that people are coming into the city from rural areas in search of better economic and educational opportunities to better their livelihoods. This means “undesirable urbanisation driven less by economic growth and more by rural-urban migration of the poor and jobless” (Sexwale, 2013:01). They end up settling informally and impacting on the environment which they occupy by walking on grass as there are no demarcated foot paths, causing soil erosion and land degradation. Secondly, people wash in rivers and pollute rivers by throwing their waste in them. There is no waste management, so land pollution is bound to happen. They are not registered and do not pay for waste management services.

If this problem is not addressed, the environmental impacts will increase causing further damage and contributing to issues such as global warming and climate change which are already impacting the world at large. Ecosystems will be impacted on and in turn people’s livelihoods will be disrupted (Herero, 2008:30). The health of people residing in such areas

will be highly impacted on and without having the basic services, that in it will pose another problem.

4.3.8 The Importance of the Environment to Human Beings

“Clean air, water, plants, and food supplies are essential for our personal health and wellbeing. The relationship between the environment and humanity is one of interdependence” (The University of Minnesota, 2013:18). The environment is of utmost importance for the survival of mankind. The one cannot function without the other. However, it is the responsibility of the human being to take care of the environment as human beings need the environment as much as environment needs the humans.

“Health is a state of complete physical, mental and social wellbeing and not merely the absence of disease or illness” (United Nations Environmental Programme, 2007:25). Good health does not only mean feeling good and being strong, but it also means “freedom from avoidable disease, access to energy, safe water and clean air” (United Nations Environmental Programme, 2007:25). As human beings, we rely on the environment for survival and for the sustaining of our livelihoods, and this, human beings achieve through the existence of ecosystems.

“Ecosystem services include provisioning services, such as food and water; regulating services such as flood and disease control” (United Nations Environmental Programme, 2007:74), meaning that if a chain in one of the ecosystems were to be disturbed, human beings would suffer largely. Ecosystems provide us with the natural resources that we need to sustain our livelihoods. Through the daily activities humans partake in, resources are lost at a slow rate and will one day be depleted. Apart from providing natural resources, ecosystems also protect humans from floods and disease, However, if an informal dweller builds his house on a flood plain with materials which are likely to cause harm both to the individual’s health or well-being, the purpose of the ecosystem is defeated.

4.3.9 The Negative impact of Informal Settlements on soil and vegetation

According to Napier (2007), “natural forests are being invaded by the expanding human settlements” (Napier, 2007:14). The development of informal settlements means a loss of

vegetation and in turn a loss in biodiversity and impact on ecosystems which human beings depend on for survival. Trees are being cut off for the purpose of informal housing which in turn impacts on the soil quality and also leads to soil erosion. The eroded soil ends up in the bottom of rivers, impacting on water quality and rising the expenses of cleansing water bodies. Apart from deforestation and soil erosion, “this practice has reduced the amount of ground water and resulted in environmental degradation” (Napier, 2007:15).

4.3.10 Pollution as an Environmental Challenge resulting from Informal Settlements

“The use of coal and biomass fuel for lighting, is causing air pollution and in turn contributing to the emission of greenhouse gases” (Napier, 2007:15). The majority of informal settlers use coal or fossil fuel for cooking and heating, which has a negative impact on the environment through air pollution. Informal settlers also have an issue with waste removal which impacts on the environment as the waste ends up being deposited of and ends up causing land pollution and “emerging and re-emerging infectious disease hazards” (Napier, 2007:15).

Informal settlements are overcrowded and their population increases on a daily basis. With this, “there are problems that lead to the high generation of waste, making these areas highly polluted zone (Forsyth in Mahlakoana, 2010:57). Because there are too many people packed in one area, waste is disposed of anyhow, and there is too much waste which means more land pollution. Thus, informal settlements impact negatively on the environment this way.

4.3.11 Local Case Study: Durban, KwaZulu Natal- Kennedy Road

Urbanisation and its causes in South Africa is not different from those cases that have been analysed at an international level in the previous section. South Africa experienced urbanisation due to “racial integration, economic growth and education” (Edmonds, 2013:120). As the second largest city in the country after Johannesburg, Durban, in the province of KwaZulu Natal, has attracted migrant labour from different parts of South Africa, (Vartak, 2009:09). This suggests a possible increase in population, and a challenge for the availability of housing. By the 1980’s, Durban and the area around the city was home to hundreds of shack dwellers, (Vartak, 2009:09) due to the lack of adequate social housing strategies.

These settlements reflected a new mobility for many men and women from the countryside; many of whom had migrated from the Eastern Cape, rural KwaZulu Natal, and the Natal Midlands. While some were fleeing racial violence, others were attracted to these settlements by the promise of access to essential services and opportunities for improving living conditions. Today, Durban is home to almost 3.5 million people, (Vartak, 2009:10), suggesting that with a growing population, the demand for housing also increases.

In 2001, the newly established eThekweni Municipal Council for the Durban area launched its Slum Clearance Project. The project involved clearance of slums and the relocation of shack dwellers to houses constructed in Greenfield developments (developments on new sites invariably on the outskirts of the city) under the National Housing Subsidy Scheme, (Vartak, 2009:11).

In-situ upgrading of informal settlements was to be undertaken only in a few cases. The eThekweni Municipal Council also declared that by 2010 (later pushed forward to 2014), Durban would be a 'shack-free' city. In this context, although the Slum Clearance Project has been promoted as an opportunity to fast-track subsidised housing construction for Durban's shack dwellers, many shack dwellers are concerned that similar to slum clearance in the apartheid era, the slum clearance project too will result in pushing shack dwellers to the margins of the city, far away from basic services and job opportunities, (Vartak, 2009:11).

The Kennedy Road Informal Settlement is one of the numerous shack settlements in and around Durban and is home to 10,000 people. Most of Kennedy Road's residents are engaged in the informal sector and work in shops, markets, building construction sites and as domestic workers, (Vartak, 2009:12). Others run shebeen (liquor) or spaza (small convenience) shops in the settlement. Kennedy Road settlement is located within Clare Estate, a predominantly Indian middle class area complete with shopping centres and high-rise buildings. As pointed out by AbM activists from Kennedy Road, the location of the settlement is central to the lives and livelihoods of its residents, (Vartak, 2009:12). Basic necessities like schools, clinics and a railway station essential for commuting to places of work are a walking distance from the settlement.

At the time when Kennedy Road was formed, residents through their elected Kennedy Road Development Committee (KRDC), had been attempting to draw the attention of various

municipal authorities to their poor living conditions and lack of adequate services. Kennedy Road, as in several other shack settlements across South Africa, had poor living conditions with respect to overcrowding, water and sanitation, (Vartak, 2009:12). This is a clear example of the existence of negative impacts on the environment by informal dwelling.

For the 10,000 residents at Kennedy Road, there are five water standpipes providing portable water leading to long queues and many hours are spent in collecting water. As the responsibility for ensuring the adequate availability of water for family often rests with women, the lack of adequate sources of portable water is a huge burden on the women of the settlement, (Vartak, 2009:14). Men are focused on searching for job opportunities and securing employment, placing the issue of collecting water on women as their responsibility.

There is a lack of sanitation, as initially there were only 6 toilets for the entire settlement and it was only after ‘Abahlali basemjondolo’ (AbM) activists petitioned and fought for better services that as a result, more toilets were installed and the settlement now has 112 toilets. However, the toilets remain insufficient. “Many are forced to go out into the bush and women and children are sometimes attacked and even raped, (Vartak, 2009:15). Thus there is a sense of vulnerability and insecurity in that regard. The issue of sanitation is an environmental one as people may defecate in rivers and in turn pollute water bodies.

Closely linked with water and sanitation is the issue of refuse collection and solid waste management. Although municipal authorities are required to collect garbage on a weekly basis, according to Kennedy Road residents, they rarely enter the settlement due to the lack of proper access roads, (Vartak, 2009:15). Therefore the waste which pollutes the settlement clogs a number of toilets resulting in a decrease in available toilets, pollutes water bodies and impacts on ecosystems and the availability of clean drinking water.

The absence of solid waste management not only results in increasing the incidence of disease in the settlement but has also led to the increase of rodents. This is an environmental impact resulting from informal settling. In 2008, three children were bitten by rats in the settlement and in January 2008, a four month old baby died due to rat bite, (Vartak, 2009:15). While the municipal authorities blamed this on the garbage dump in the vicinity, AbM activists pointed out that rats were a menace in all informal settlements and the problem arose

because municipal authorities did not collect domestic garbage from shack settlements, (Vartak, 2009:15).

In relation to the study, there are similarities between the case study of Kennedy Road and that of Jika Joe informal settlement. Similarities lie in the issues of the disposal of waste and the increase of rodents and diseases, inadequate water and sanitation leading to the pollution of land and water bodies, and overcrowding resulting from daily increases in population.

4.4 Policy and Legislative Framework on Informal Settlements and the Environment

Policy and legislative framework of the study involve policies which have been developed in South Africa in the efforts of combatting and eradicating informal settlements, having noted that informal settlements have an impact on the environment. Policy and legislation discussed below include acts from the constitution, the housing act, the breaking new ground policy, the national housing code, upgrading of informal settlements programme, the installation of interim services and the national environmental management act.

4.4.1 The Constitution of South Africa (*Act 108 of 1996*), *Section 26*

The state (meaning the National, Provincial and Local Governments) has the responsibility to take legislation and other measures, within its available resources, to achieve the progressive realisation of the right to have access to adequate housing. According to the constitution (Act 108 of 1996), “the national and provincial governments have concurrent legislative competence on housing, (a) to ensure the provision of services to communities in a sustainable manner; (b) To promote social and economic development; (c) To promote a safe and healthy environment”. Section 26 of the constitution states that it is the responsibility of the government is to ensure that every person has access to adequate housing and people are in an environment that encourages social and economic growth, as well as a safe and healthy environment. Section 26 also states that the government must take steps to provide housing “within its available resources”; this means the government has a duty to provide what it can afford.

However, in terms of implementation, the constitution has failed to exert the policies stated in its visions. “There are countless people on the streets with no access to basic needs or shelter, crime and disease are the order of the day in almost all communities and social and economic activities are developing at a minimal rate and are barely benefiting the poor” (Adlard, 2005:45).

Section 24 of the constitution highlights that everyone has the right to, an environment that is not harmful to their health or wellbeing and to have the environment protected for present and future generations. Informal settlements significantly diverge from this section of the constitution as they go against it completely by being associated with harmful health risks. They have no interest in the protecting of the environment, but instead, hold negative impacts towards the environment which have been stated in the paper (Du Plessis, 2015:20). Section 24 of the constitution also states that the government must pass laws that prevent pollution and damage to our natural resources, promote conservation, and make sure that natural resources are developed while in turn promoting the economic and social development of people. However the development of informal settlements goes against the constitution, as informal settlements are associated with pollution and deforestation which disregards the constitution (Du Plessis, 2015:20).

Section 153 of the constitution states that a municipality must “structure and manage its administration and budgeting and planning processes to give priority to the basic needs of the community and to promote the social and economic development of the community”(Adlard, 2005:48). This implies that if such legislation was implemented, and municipalities actually gave priority to the basic needs of communities, housing challenges would be minimal and the remaining informal settlers would be serviced and they would not resort to living in an environmentally harmful manner.

4.4.2 The Housing Act (*Act 107 of 1997*)

According to section 7 of the Housing Act No. 107 of 1997, (‘The Housing Act’), “The Provincial Government is to do everything in its power to promote and facilitate the provision of adequate housing in its province within the framework of national housing policy” (National Department of Housing, 2004:02). Together with section 9 of the Housing Act No. 107 of 1997, (‘The Housing Act’), “every municipality, as part of the municipality’s process

of integrated development planning, needs to take all reasonable and necessary steps within the framework of national and provincial legislation and policy, to ensure that its inhabitants have access to housing and related services”. The existing programmes on the issue of informal settlements have been based on such acts however implementation has always been a challenge.

Although housing delivery of 1.6million houses in 1994 was implemented (National Department of Housing, 2004:04), there is still a backlog and it continues to increase. The government thus opted for delivering housing on the basis of “priorities, fiscal constraints and achievable time frame” (National Department of Housing, 2004:05). This programme consisted of subsidised housing, where housing delivery through this programme has been a partial success as a backlog still exists in the housing sector.

4.4.3 Breaking New Ground Policy

According to the Breaking New Ground (BNG), “the nature of demand for government-assisted housing in South Africa has changed significantly”, there has been a growth in the South African population suggests that the demand for housing has increased, and urban populations have increased as a result of both urbanisation and natural population growth. One fifth of urban residents are relative newcomers to urban areas (i.e. first generation residents) and urban areas are expected to continue to grow at a rate of 2.7% per annum (Breaking New Ground, 2004:01).

As a result of the failure of the acts stipulated by the constitution and housing code, there was a need for change. This was as a result of the Housing Policy and Strategy of 1994 which focused on stabilizing the environment to transform the extremely fragmented, complex and racially-based financial and institutional framework inherited from the previous government, whilst simultaneously establishing new systems to ensure delivery to address the housing backlog” (Breaking New Ground, 2004:01). Therefore the BNG saw a need for change and a new policy was developed. The new human settlements plan reinforces the vision of the Department of Housing, to promote the achievement of a non-racial, integrated society through the development of sustainable human settlements and quality housing. Within this broader vision, the Department is committed to meeting the following specific objectives:

- Accelerating the delivery of housing as a key strategy for poverty alleviation

- Utilising provision of housing as a major job creation strategy
- Ensuring property can be accessed by all as an asset for wealth creation and empowerment
- Leveraging growth in the economy
- Combating crime, promoting social cohesion and improving quality of life for the poor
- Supporting the functioning of the entire single residential property market to reduce duality within the sector by breaking the barriers between the first economy residential property boom and the second economy slump.

(Breaking New Ground, 2004:01)

The BNG also saw the need for developing another strategy of dealing with housing backlogs and issues. The programme was the upgrading of informal settlements. The new human settlements plan adopts a phase called in-situ upgrading approach to informal settlements, in line with international best practise. Thus, “the plan supports the eradication of informal settlements through in-situ upgrading in desired locations, coupled to the relocation of households where development is not possible or desirable. This process is described in greater detail in the Informal Settlements Upgrading Programme Business Plan. “(Breaking New Ground, 2004:04).

4.4.4 The National Housing Code 2009

The National Housing Code was developed in 2009 as prescribed by section 4 of the Housing Act. The National Housing Code “sets the underlying policy principles, guidelines and norms and standards which apply to Government’s various housing assistance programmes introduced since 1994” (South African Government, 2013:01). The development of this code shifts the focus to improving the quality of housing and housing environments by integrating communities and settlements (South African Government, 2013:01).

The code consists of two volumes. “The first dealing with the background and policy context and the second containing the technical guidelines and details of the code” (Dambuza, 2009:20). The two volumes of the housing code comprise of a number of programmes, namely the Integrated Residential Development Programme (IRDP), the Upgrading of Informal Settlements Programme (UISP) and the Social Rental Housing Programme (SRHP) (Dambuza, 2009:20). The National Housing Code is aligned to the Comprehensive Plan for the Development of Sustainable Human Settlements (Breaking New Ground, 2004:05).

4.4.5 Upgrading of Informal Settlements Programme-UISP

The UISP was developed in line with and to address the United Nations Millennium Development Goals on “improving the lives of slum dwellers and included providing essential services such as water, sanitation and refuse collection, as well as emergency interventions, as a first step” (Dambuza, 2009:23). With the increase of informal settlements from 300 in 1994 to a staggering 2700 in 2013 (Stats SA, 2013:01), the government was forced to account for and intervene in the challenge of informal settlements. Concerning the UISP government became more creative in its response to the upgrading of informal settlements and more flexible regarding the efforts of the poor to plan, build and maintain the communities in which they live (South African Government, 2013:01).

The UISP worked in some areas and did not in others, thus resulting in the development of “National Upgrading Support Programme (NUSP) to support the National Department of Human Settlements (NDHS) in its implementation of the Upgrading Informal Settlements Programme (UISP) with the objective of eventually upgrading all informal settlements in the country” (Dambuza, 2009:24). Through this process, municipalities were required to act as developers for the UISP and the NUSP provides support, in partnership with the province, the NDHS and the Housing Development Agency (HDA), to assist them to do so effectively (Dambuza, 2009:24).

4.4.6 The Installation of Interim Services on Informal Settlements

According to Dambuza (2009), the priority of the installation of interim services in informal settlement is to provide roads and pathways which will enable emergency services to access these areas when required. Once the roads are completed, electricity connections may be installed, as part of the Electricity for All programme (Dambuza, 2009:24). The installation of interim services is aimed at temporarily assisting in the challenge of the lack of basic services in informal settlements.

Project teams are developed and “work closely with local councillors, community leaders and municipality personnel to ensure that the communities affected buy into the project” (Dambuza, 2009:25). If the community is involved, the interim services being installed are more likely to benefit the community. In every case, meetings are held with the community and their leaders. This ensures that the residents in the settlement are fully informed

regarding the project and aware of the benefits that will accrue to the community (Dambuza, 2009:25).

4.4.7 The National Environmental Management Act, No 107 of 1998

The National Environmental Management Act (NEMA), was established by the Republic of South Africa government “to provide for co-operative, environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state; and to provide for matters connected therewith” (Republic of South Africa, 1998:01). This Act has an objective of endorsing all citizens' rights to an environment, which is not harmful to their health and well-being. Furthermore, it obliges the state to protect, promote and fulfil the social, economic and environmental rights of everyone. The general environmental plan to be drawn up and implemented by all organs of state will have to be adhered to and taken into consideration in dealing with informal settlements.

The act states that it is “the State’s responsibility to respect, protect, promote and fulfil the social and economic rights in Chapter 2 sections 24 and 26 of the Constitution and in particular the basic needs of categories of persons disadvantaged by unfair discrimination” (Republic of South Africa, 1998:01). This suggests that as an environmental right, the government has a responsibility to its people, a responsibility of ensuring that people are not exposed to a harmful environment and that they are provided with safe and environmentally sustainable housing.

4.5 Conclusion

Informal settlements are dynamic, ever changing and are a perpetual challenge. The people who reside in such settlements act in ways which are harmful to the environment, and thus have a negative impact on it. Through literature and theories, research solutions to this challenge could arise. The housing challenge on its own needs to be addressed and in turn the issue of informal settlements would decrease, leading to the environment gaining stability again and less impacts through human settlements.

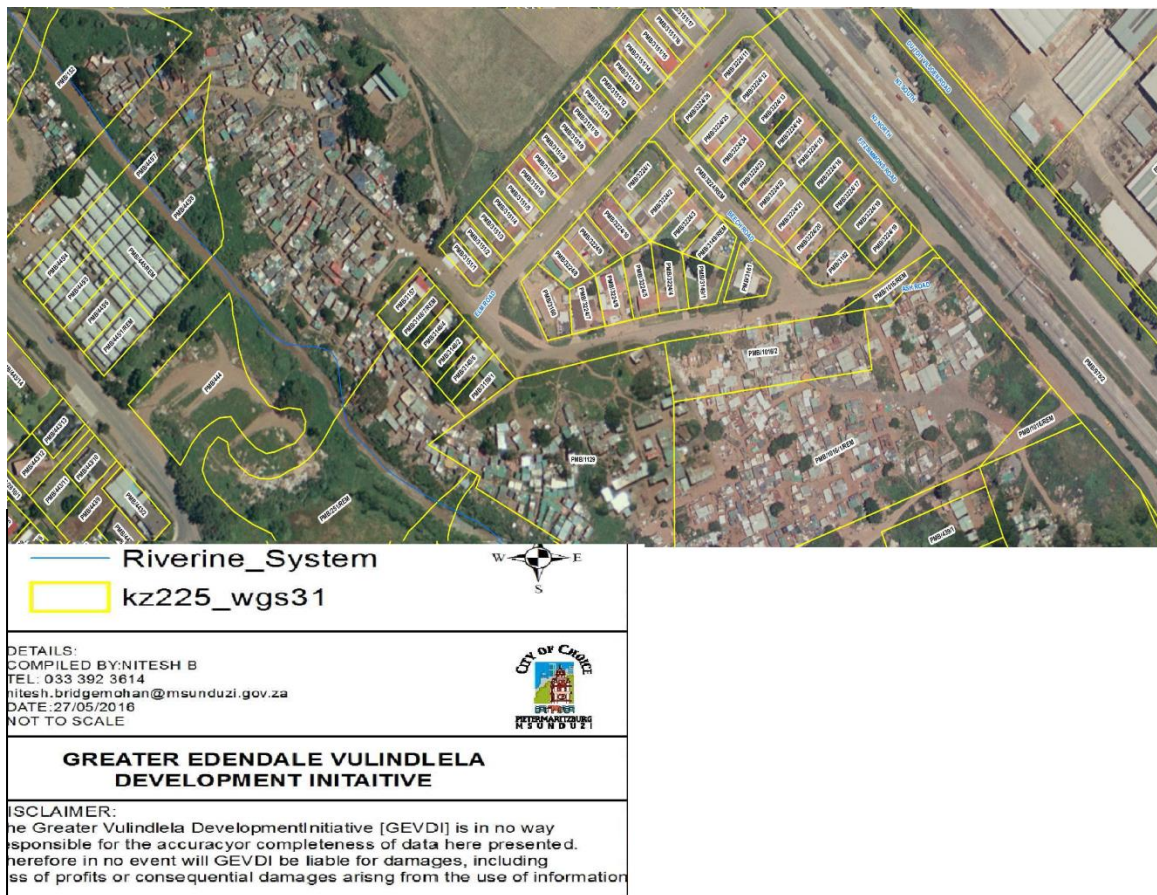
Chapter 5: Historical Background of the Study Area

5.1 Introduction

This chapter aims to discuss the area where the study was carried out in depth, its historical background, social and economic conditions. This will be conducted through the discussion of issues which include the rate of employment, education status, availability of amenities and facilities, as well as integration and sustainability within the area of study.

5.2 Jika Joe Informal Settlement

Figure 5.1 Map Showing locality of Jika Joe informal settlement.



(Source: Msunduzi Municipality, 2015)

Figure 5.2 Showing Pictures of Jika Joe Informal Settlement



(Sources: Sarabji et (2013) and Bisnath (2014))

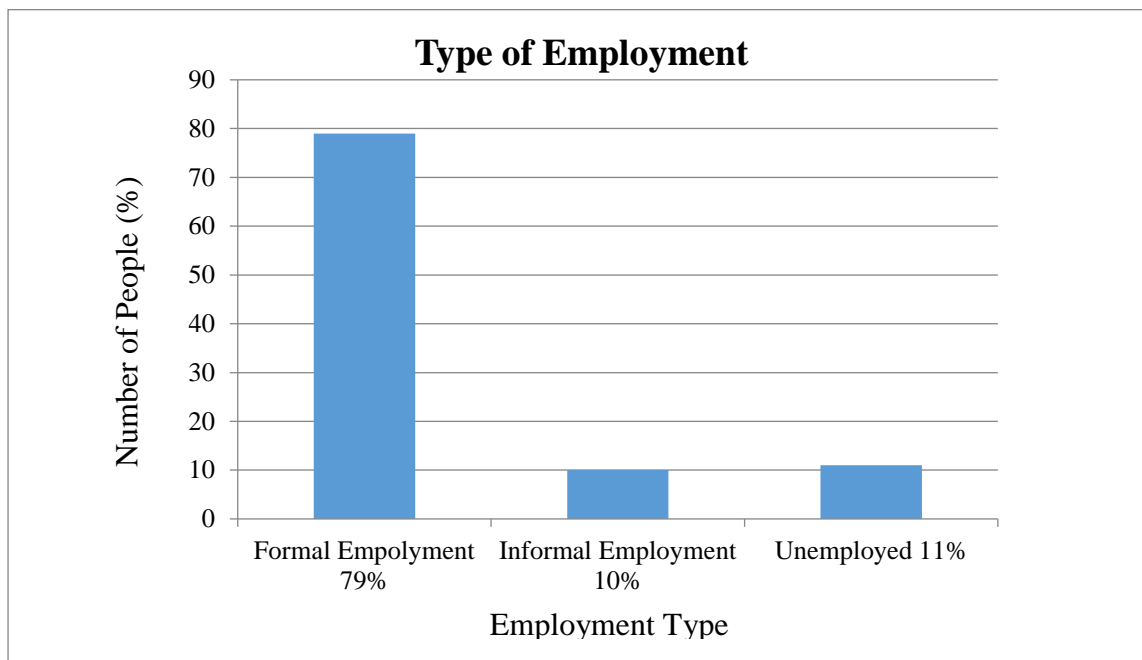
5.3 History of Jika Joe Informal Settlement

The map in Fig. 5.1 shows an image of Jika Joe informal settlement. The area is situated right adjacent to Pietermaritzburg's central business district (CBD) and bordered by the N3 highway south of the settlement (Msunduzi Municipality, 2015:02). This settlement is divided into four sections. The land was owned by a man named Jika Joe who later migrated overseas. In 1994, people searching for better job opportunities in the CBD of

Pietermaritzburg and a place far from the wars which were taking place during the time, came to settle there (Msunduzi Municipality, 2015:02).

5.4 Socio-Economic Conditions in Jika Joe

Figure 5.3 Graph Showing the Type of Employment of the Jika Joe Population.



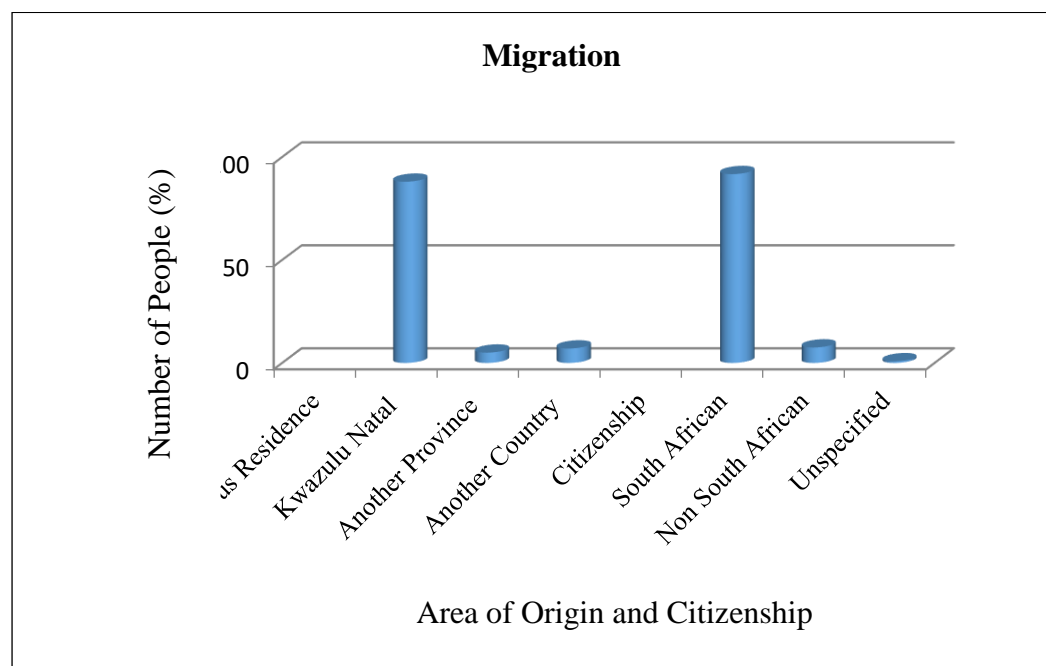
(Source: Msunduzi Municipality, 2015)

There are approximately 400 households in Jika Joe, which consist of 57% males and 43% females (Msunduzi Municipality, 2015:03). 79% of the Jika Joe population is employed; meaning only a few (11% of the population) is unemployed. The graph above (Figure 5.1) depicts that 79% of the employed population is formally employed, while 10% is informally employed and again 11% is still unemployed. A number of the population is employed under the formal sector. However, between both the formal and informal sectors, only “1% of the population fall into the ‘high income’ category, meaning 96% and 3% of the population earn between low and middle income respectively” (Msunduzi Municipality, 2015:03).

According to the Msunduzi Municipality (2015), in terms of livelihood, Jika Joe has a slightly exacerbated employment rate and thus the majority of the working class in the area is employed (Msunduzi Municipality, 2015:03). Settlers in this area are formally employed as domestic workers, gardeners, retail and factory workers. Apart from the formal sector, a

number of people in the settlement survive by collecting recyclable goods for resale, having and running spaza shops, and working as vendors, (Msunduzi Municipality, 2015:03). This is classified as the informal sector. Pensions and grants are other sources of income for the old, disabled and poor.

Figure 5.4 Graph Showing Migration Activities in Jika Joe.



(Source: Msunduzi Municipality, 2015)

The above graph (figure 5.4) depicts the place of previous residence and citizenship of Jika Joe residents, “88% of the Jika Joe population originates from KwaZulu Natal, 5% from another province(s) and 7% originate from other countries” (Msunduzi Municipality, 2015:03). Majority of the area’s population originates from KwaZulu Natal and a small percentage from other provinces and some even from other countries. In terms of legal citizenship, “91.7% of the population in Jika Joe are South African citizens, 7.5% are non-South African and 0.8% cannot be specified” (Msunduzi Municipality, 2015:03). Individuals residing in this settlement either have or do not have legal citizenship.

The skills which the people of Jika Joe possess consist of “carpentry, sewing, cooking and baking, and gardening” (Msunduzi Municipality, 2015:03), suggesting that these are the sectors which pose possible employment. There are possible business opportunities in the area which could create more job opportunities given the chance; nonetheless, there are also

challenges which come with such opportunities. In terms of business opportunities, “a car wash, butchery and braai area, salons, furniture store and clothing store/market” (Msunduzi Municipality, 2015:03) can be established to develop the area and create more job opportunities. However, there are challenges which could hinder the success of such projects. Challenges include “a lack of funding, no support once the projects have begun, or the unavailability of land” (Msunduzi Municipality, 2015:03). Support for a new project is of great importance, as the project first needs to develop and grow into something bigger. Having a project developed and having no support would be a disadvantage, as all the hard work on the project would have gone to waste.

In terms of community initiatives, projects and structure, the Jika Joe community has “a community garden for disadvantaged children, a community garden for women, support groups from the For Christ Church, a cleaning and rubbish forum, and an area committee” (Msunduzi Municipality, 2015:03). Jika Joe is an integrated community whereby people now respect each other and there is a great sense of community in the area. There are social structures which are in place will shall go hungry, as there is a community garden for children. The church supports the dwellers spiritually, and community members assist each other by developing forums for cleaning up rubbish. An area committee, which is responsible for all grievances, is raised in community meetings.

Infrastructure, the environment, health/illnesses and social behaviour pose threats and vulnerabilities in the livelihoods of the Jika Joe dwellers. “There is no electricity, no sanitation and no drainage system, meaning an overflow in communal taps” (Msunduzi Municipality, 2015:04). Electricity is a major challenge in this settlement as the majority of all dwellers use electricity which is illegally connected, thus causing electricity induced fires on a yearly basis. “Houses are located on a floodplain. There is illegal dumping, and air pollution” (Msunduzi Municipality, 2015:04). These are some of the environmental threats resulting from the establishment and growth of Jika Joe.

Apart from the physical and environmental vulnerabilities and threats, there are also threats related to human health and general social well-being. A number of people living in Jika Joe have “HIV/Aids, asthma, TB, and sinus” (Msunduzi Municipality, 2015:04). As a percentage of the settlements population is infected and has one or more of the above mentioned illnesses, the whole community is impacted upon and is affected by this. In terms of social

well-being, society suffers from “drug and alcohol abuse, crime, rape severe poverty and taverns which are open 24hrs a day” (Msunduzi Municipality, 2015:04). The area is regarded as ‘unsafe’ and holds a number of social issues which impact on the community at large. Drug and alcohol abuse lead to crime and even rape, crime and rape exist even without any substance abuse (Masiye and Ndhlovu, 2004:24). Taverns are open on a daily basis, every hour of the day, and this impact largely on the livelihoods of children and young adults as they are exposed to alcohol and are able to buy alcohol at a very young age.

5.5 The Rate of Education in Jika Joe

The Jika Joe informal settlement has a low education rate, meaning only a few of its residents are educated. There are no primary schools within the settlements; however there are five which are in close proximity. There are no secondary schools in the settlement either, (Msunduzi Municipality, 2015:04). “Educating children will, therefore, be challenging in this area due to the operation of taverns on a daily basis, 24hrs a day, schools being far from the settlement, meaning high transport costs, and poverty amongst resident in the settlement.” (Msunduzi Municipality, 2015:04). Taverns distract learners with noise or learners start consuming alcohol and drop out of school (Masiye and Ndhlovu, 2004:24), high transport costs and poverty may mean learners not being able to attend school, being left behind and dropping out.

5.6 The Availability of Facilities and Amenities in Jika Joe

Jika Joe has a number of facilities and amenities within its vicinity, but very minimal within the settlement. There are in total only three facilities within the settlement, which are a crèche, a community hall and a sports field (Msunduzi Municipality, 2015:05).

The facilities which are not available in the settlement, but which are a couple of meters away include, “healthcare facilities- a clinic and a hospital, and one primary school” (Msunduzi Municipality, 2015:05). There are a number of other facilities available to the settlement but are however a bit further than the others. Thus “residents need to travel between 1.33km and 2.76km to get to the specific facilities” (Msunduzi Municipality, 2015:05). Such facilities

include secondary schools, police stations, places of worship, libraries, fire stations, a post office, social grant pay point, municipal offices and retail facilities.

Although certain facilities are available on and off site, there are disadvantages to these facilities. The disadvantages are, in terms of schools, “a high school is needed closer to the settlement as transport costs are high” (Msunduzi Municipality, 2015:05). The healthcare facilities “have poor service; a shortage of doctors and nurses, and the ambulances are slow to respond” (Msunduzi Municipality, 2015:05). Fire stations’ response is slow even though the settlement is located in town. We need all the above so as to improve and also, there is a need for a park in the area and as well as a site for a market.

5.7 Integration and Sustainability

In terms of integration and sustainability, the settlement has been established in an area which is not suitable for residential purposes such like any other informal settlement. It is unsustainable and impacts largely negatively on the environment. The building materials are not of housing standard and there were no plans or environmental impact assessments done on the area before construction. This therefore created housing which is informal and of an unsustainable nature.

5.8 Conclusion

This chapter has discussed the historical background of Jika Joe informal settlement, while highlighting the socio-economic conditions of the area, education status, amenities and facilities available in the area and the areas integration and sustainability. A number of negative points have been raised in terms of the areas development status and as well as how unsuitable the area is for residential purposes, and the risk which this poses on the natural environment itself.

Chapter 6: Presentation of Research Findings, Data Analysis and Interpretation

6.1 Introduction

This chapter presents data which was collected during interviews with Msunduzi Municipality officials, questionnaires responded to by Jika Joe informal settlement residents and observations which took place in the settlement. A thematic form of data analysis has been used to analyse the data. Themes were focused around the negative impacts which informal settlements have on the environment. Themes are also associated with the research questions, in order for the data to correlate with research objectives. The chapter has furthermore provided a linkage between findings here and the theories depicted in the theoretical framework and literature review.

6.2 Data analysis and Interpretation

Interviews and questionnaires were conducted to collect the data. For this study, the researcher interviewed a total of two municipal officials (Department of Human Settlements and Msunduzi Municipality), and questionnaires were issued to 40 Jika Joe residents who accepted them. Both the municipal officials and residents were given a series of questions which were developed in line with the objectives of the study.

The interviews between the researcher and municipal officials took place at their offices i.e. the Department of Human Settlements and the office of the Jika Joe councillor. Both offices are in Pietermaritzburg. Responding of Jika Joe residents to questionnaires took place in Jika Joe informal settlement in Pietermaritzburg between the researcher and residents of the informal settlement. Interviews with municipal officials were recorded and jotted down at the same time. Each of the 40 respondents from Jika Joe were given a questionnaire to complete.

Hard copies, such as interview recordings and notes, questionnaires and the write-up were securely locked away in a locked filing cabinet that can only be accessed by the supervisor and researcher. Files such as the informed consent form that contain personal or identifiable data (such as names) were protected and only accessed by the researcher. Data will be kept

for a period of 5years and will be disposed of by the deleting of softcopies and by the shredding of hardcopies.

6.3 Research Findings

A total of 40 Jika Joe residents responded to the designed questionnaire. The residents' responses are shown below.

6.3.1 Profiles of Jika Joe Respondents

There is no specific profile for the respondents from the settlement, as they ranged from old and young males and females who were either employed, to job seekers or unemployed. Those who were willing to answer questions were selected and interviewed.

Table 6.1 Gender Distribution in Jika Joe Respondents.

Gender	Intervals	Percentage
Female	15	40%
Male	25	60%
Total	40	100%

The table above shows that 60% of the 40 respondents from Jika Joe are men and 40% of the 40 respondents are women. There are a number of reasons as to why there are more men than women living in informal settlements. Some of these reasons involve the role which men play in society. Men are expected to take care of women and children, and therefore they leave their homes in search of better opportunities and end up living in informal settlements as a result of a lack in housing. Women are expected to stay in rural areas back home and take care of children and their homes. Most of the women who live in informal settlements would have encountered problems where they live and moved to urban areas in the hope of experiencing changes in lifestyles.

Table 6.2 Marital Status of Jika Joe Respondents.

Marital Status	Intervals	Percentage
Single	17	42.5%
Married	23	57.5%
Total	40	100%

The above table depicts that 42.5% of the 40 respondents from Jika Joe are single and the other 57.5% are married. The single 42.5% of the respondents are single. There is a high cost of living with a partner, the possibility of having a child and creating more economic problems. There is also the desire to have the freedom of being with whomever they want to be with at any time. The 57.5% are married for social security where both partners survive on grants and are unemployed. On the other hand, some people are married to support each other and others came to the settlement together as married couples and some left their spouses back in rural areas and came to the urban areas for better opportunities and settled in Jika Joe.

Table 6.3 Employment Status of Jika Joe Respondents.

Employment	Intervals	Percentage
Employed	29	72.5%
Unemployed	11	27.5
Total	40	100%

The table above shows that 72.5% of the 40 respondents from Jika Joe informal settlement are employed, while the other 27.5% is unemployed. The employed 72.5% of the respondents engage in formal and informal types of employment. The formal sector involves domestic work, gardening, retail and factory work, while the informal sector involves the collection of recyclable goods for resale, running of spaza shops and as well as working as street vendors. The unemployed 27.5% depend on pensions and social grants, while others are still high school/varsity students and do not partake in any form of employment.

Table 6.4. Table showing main water source in Jika Joe.

Water type	Percentage access
Communal taps	97%
Self-connected piped water on stand	3%
Total	100%

(Source: Msunduzi Municipality, 2015).

The majority of the households access water from communal taps which are distributed well across the settlement. “Communal taps were installed at the beginning of 2013” (Msunduzi Municipality, 2015:04). In terms of toilet facilities, the whole settlement uses pit latrines. However, “pit latrines are causing congestion in the settlement because the holes become full and they build new ones” (Msunduzi Municipality, 2015:04).

Table 6.5 Table showing electrification in Jika Joe.

Electricity type	Percentage access
Prepaid meters	3%
Illegal connections	57%
No electricity	40%
Total	100%

(Source: Msunduzi Municipality,2015).

Illegal electricity connections are connected from adjacent retail stores and formal settlements. According the Msunduzi Municipality (2015), “illegal connections have led to a number of deaths in the community” (Msunduzi Municipality, 2015:04).

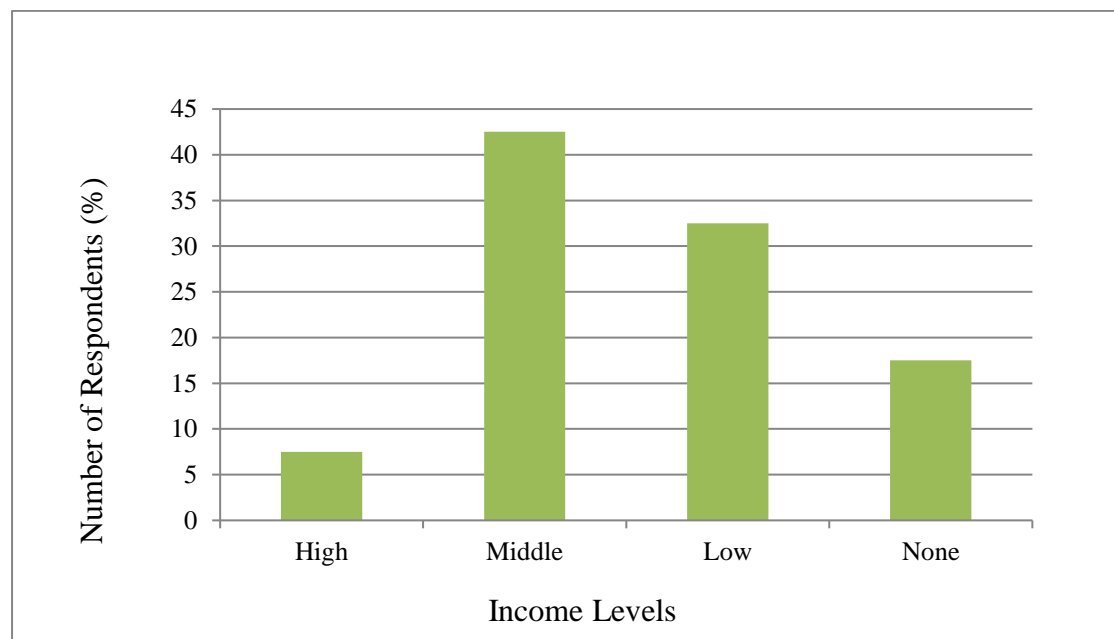
Table 6.6 Table showing roads and access in Jika Joe.

Road function	Surface type	Condition
Main access road	Paved	Good
Roads in settlement	Gravel	Moderate

(Source: Msunduzi Municipality, 2015).

The main access road is paved and in good condition. The residential roads are gravel and are in moderate condition, with a few potholes. Roads are very steep in this settlement. The public transport network operates with taxis; which are the only mode of transport used by residents. Public transport in the region consists of taxis, whereby residents can select a taxi which circulates within the Pietermaritzburg CBD. Taxis function “based on the distribution of people outside Jika Joe and operates outside Jika Joe” (Msunduzi Municipality, 2015:05).

Graph 6.1 Income levels of Jika Joe Respondents.



The graph above depicts the income levels of the 40 respondents from Jika Joe. It shows that 7.5% fall into the high income bracket, 42.5% in middle income, 32.5% are under low income and 17.5% have no source of income. The 7.5% of the population which fall under the high income bracket are those who came into urban areas seeking employment, then became successful but still opted to reside in the informal settlement. Reasons for the above

mentioned are the high cost of housing resulting in people preferring informal settlements, the sense of community which already exists among them, and having to pay little to no rent. The middle and low income bracket involves the part of the population which survives on social grants and still cannot afford low-cost or any other type of housing. The 17.5% of the population consists of those who do not have any source of income, which includes school/university students and job seekers.

According to data received on the income levels of Jika Joe based on the 40 participants response, it was noted that “slum dwellers are poor and face various forms of exclusion (Arimah, 1999:27). The poor informal settlement residents are excluded in such a way that only 7.5% of the respondents fall under the high income bracket, while the rest of the respondents are either in the middle or low income bracket or unemployed. The above suggests that although residents are employed, they are still not earning enough money to afford housing resulting in them still residing in informal settlements.

Table 6.7 The Suitability of Jika Joe Informal Settlement as a form of Housing.

Suitability	Intervals	Percentage
Yes	16	40%
No	24	60%
Total	40	100%

The table above depicts whether informal settlements are suitable for people to house themselves or not. 40% of the respondents were very happy with their current situation and answered yes to the question, meaning that they prefer residing in informal settlements and see nothing wrong with living there. On the other hand, 60% of the responded that informal settlements are neither desirable nor suitable for residential purposes. This majority believes that informal settlements are dirty and hold disease, and are also a temporary home for them, not a place where they would want to raise their children.

The data above suggests that informal settlements are not suitable for housing. This is as a result of the deplorable living and environmental conditions present in informal settlements (Arimah, 1999:28). Apart from the nature of informal settlements being unplanned,

overcrowded and imposing negative impacts on the environment, informal settlements are considered unsuitable for housing as they lack access to basic services such as water and sanitation, electricity, shack fires and a lack of waste collection (Arimah, 1999:28).

Table 6.8 Environmental Challenges present in Jika Joe Informal Settlement.

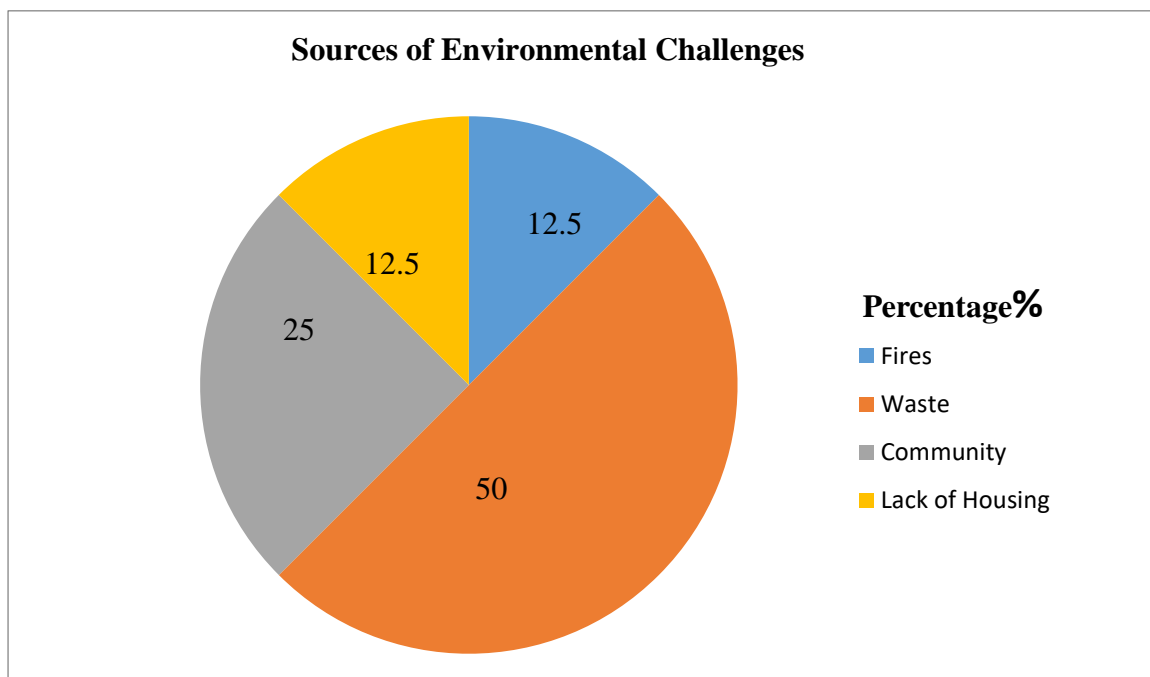
Environmental Challenge	Intervals	Percentage
Air Pollution	09	22.5%
Water Pollution	10	25%
Floods	05	12.5%
Erosion	02	5%
Deforestation	02	5%
Land Pollution (Waste)	12	30%
Total	40	100

The table above shows that pollution (air, water and land), floods, erosion and deforestation are the environmental challenges which are present and prevalent in their area. A total of 30% of the people who responded believe that land pollution is the most prevalent in their settlement, as waste is disposed incorrectly. 25% responded that water pollution was a challenge, due to the fact that the river, which is in close proximity to the settlement, is polluted with waste, or people wash in it and defecate in it. 22.5% of the respondents agreed that air pollution was more of an issue; this could be mainly as a result of people burning their waste, which is disposed of incorrectly and which produces a foul odour, or the fires which happen within the settlement. Other environmental challenges include floods, erosion and deforestation; these are all challenges which arise from the settlements being developed in unsuitable areas.

The above data suggests that informal settlements impact largely on the environment. Land pollution is the most prevalent type of pollution in Jika Joe according to the respondents. This is caused mainly because waste lingers around the settlement. Residents do not use the services provided by the municipality, services such as dumping bins within the settlement and the weekly waste collections. Instead, residents dispose of their waste out of the bins and do not leave their waste at the demarcated area for collection by municipality. Water and air

pollution were also ranked as major environmental challenges in Jika Joe. The lack of basic services such as sanitation and electricity are the main factors contributing to water and air pollution. Water is polluted by residents who defecate and do their laundry in any water bodies within the settlement whilst air is polluted through the use of illegal electricity which causes fires. Also, fires are used as a source of energy for cooking and as a heater.

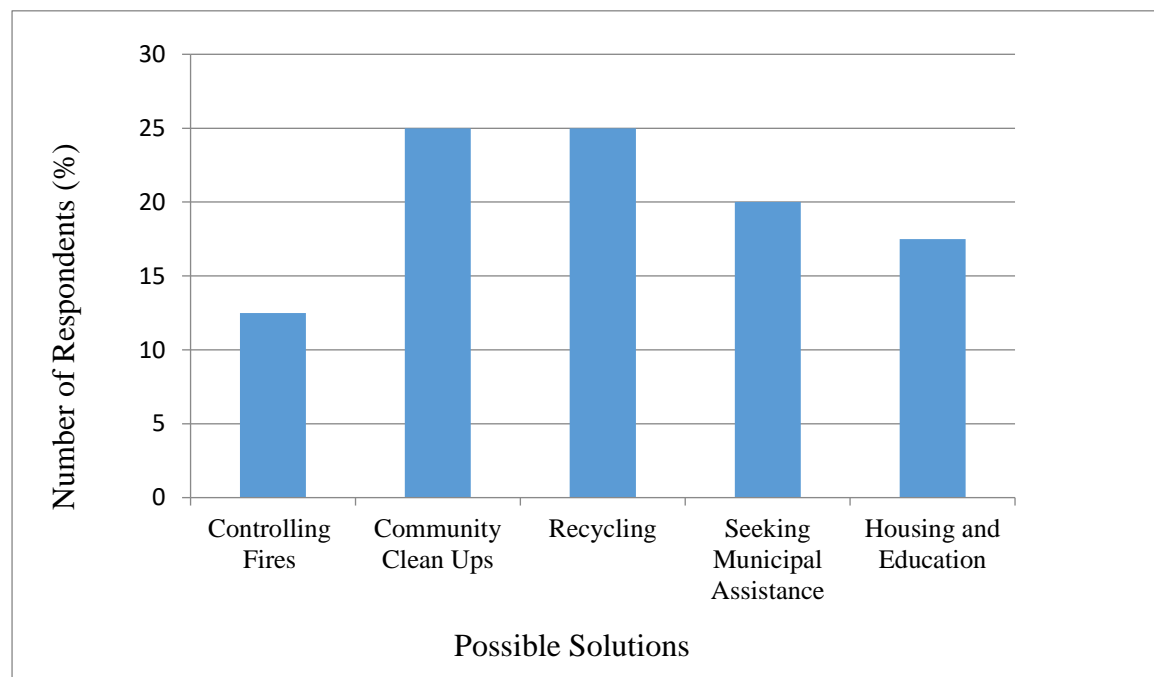
Graph 6.2 Sources of Environmental Challenges in Jika Joe Informal Settlement.



The graph above shows the sources of environmental challenges as described by the 40 respondents from Jika Joe. 50% of the respondents believe that waste is the source of environmental challenges in the area. As pollution is also a big problem, this could be as a result of how waste is disposed of in this settlement. 25% responded that the community is the source of environmental challenges; this could be a result of people littering and polluting the environment or the creation of footpaths which destroy the grass, cutting down of trees to create space or taking no responsibility in taking care of their environment. 12.5% believe that fires are the source of environmental challenges as there are fires which cause air pollution, ignited by people who burn their waste, who start fires for cooking or for house heating purposes. Another 12.5% responded that for them, a lack of housing was the source of these environmental challenges, this is because if there was housing available for every person, there would be no development of informal settlements.

The above suggests that the environmental challenges caused by informal settlements stem from fires, waste, the community being irresponsible in managing its environment, and the lack of housing. What this means for the residents is that they need to take responsibility, minimise fires and be attentive in the way in which they manage their waste.

Graph 6.3 Possible Solutions to the Negative Impacts present in Jika Joe Informal Settlement.



The above graph shows the possible solutions to the environmental challenges present in Jika Joe. 25% of the 40 respondents believe that the environmental challenges present in Jika Joe can be resolved through recycling, where bins are laid out around the settlement, labelled paper, plastics or bottles. Another 25% believe that the community should take the initiative and do clean ups at random or select days whereby they come together to clean within the settlement. 20% of the respondents said the community should seek for municipal assistance and ask the municipality to intervene. 17.5% believe that if housing and better education was made available to them, there would be less environmental challenges as there would be no or less informal settlements. 12.5% said that if there was a way to control or reduce fires, the environmental challenges would be solved.

Possible solutions to the issue of the negative impacts which informal settlements have on the environment are stated above. What this suggests for the residents is that they engage with the municipality officials for assistance, create a sense of community in an effort of improving the impacts which they pose as a community on the environment, and attend meetings regarding this issue.

Table 6.9 Health Risks associated with Environmental Challenges present in Jika Joe Informal Settlement.

Health Risk	Interval	Percentage
Diahorrea	20	50%
Respiratory Diseases (Asthma)	10	25%
Water Borne Diseases	3	7.5%
None	7	17.5%
Total	40	100%

The above table shows that 50% of the respondents believe that from the environmental challenges present in informal settlements, people become affected health wise with diahorrea. This could be as a result of the waste which is in and around the settlement. 25% believe it is respiratory conditions such as asthma which are prevalent in the settlement which could be from the fires experienced from time to time, that cause air pollution. 7.5% said water borne diseases are likely to rise from environmental impacts which could be resulting from the polluted water from the river that is in close proximity with the settlement. 17.5% of the respondents could not identify any health risks.

Diahorrea is more prevalent in informal settlements due to the consumption of polluted water by residents, especially children. Water borne diseases such like diahorrea, are also caused by the consumption of polluted water. Respiratory diseases are noted as a challenge in Jika Joe, such diseases could be a result of residing in a polluted area, and in instances of fires.

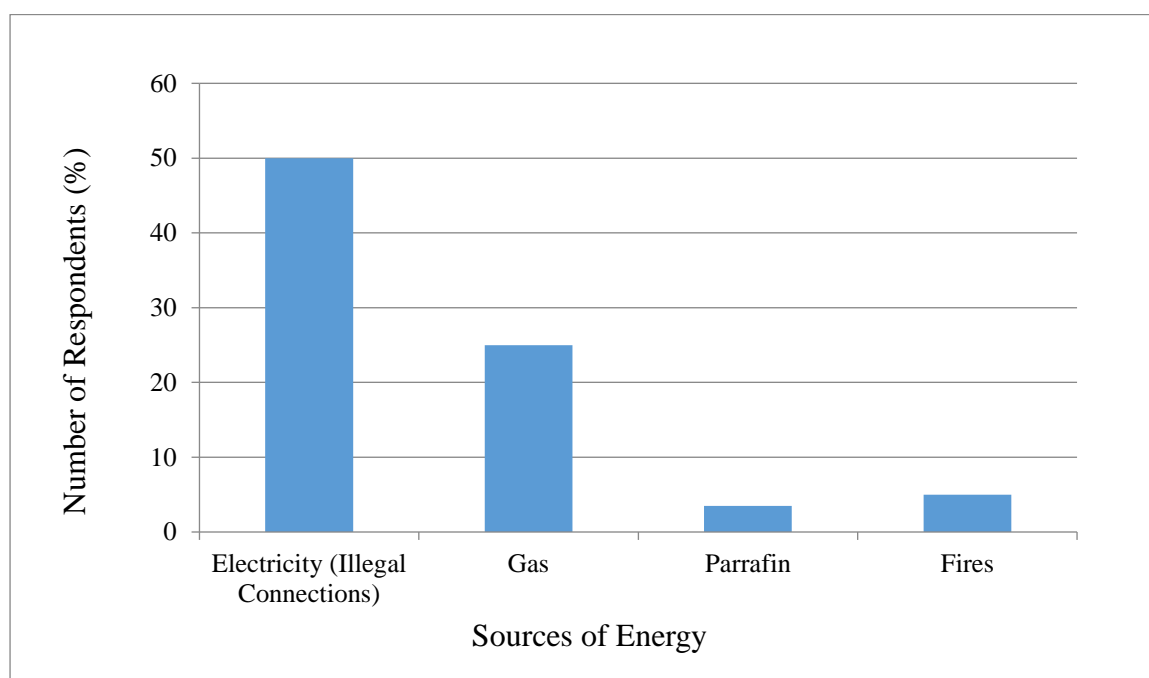
Table 6.10 Disposal of Waste in Jika Joe Informal Settlement.

Method of Disposal	Interval	Percentage
Municipal Collection	10	25%
Around Settlement	15	37.5%
Skip Provided by Municipality	5	12.5%
Burning of Waste	10	25%
Total	40	100%

The table above shows the way in which residents of the informal settlements dispose their waste. 25% of the respondents said that the municipality collects their waste which is done once every week. 37.5% of the respondents said that people dispose of their waste in and around the settlement. 12.5% believe that residents in the settlement dispose of their waste in the skip which they have in the centre of their settlement, which was provided by the municipality. Another 25% said that people in the settlement dispose of their waste through burning it.

The majority of the respondents said that waste in Jika Joe is disposed of around the settlement. What this insinuates is that residents are irresponsible in the sense that they do not utilise resources provided to them. There is a lack of basic services in informal settlements; however, there are interim services provided for residents, which residents choose not to make use of. Municipal collection of waste and skips placed around the settlement are the interim services provided for the residents which are not used.

Graph 6.4 Sources of Energy used for Cooking in Jika Joe Informal Settlement



The graph above shows the sources of energy which people in informal settlements use for cooking. 50% of the respondents said they use electricity for cooking, illegal electricity connections are used in this settlement. 25% of the respondents use gas, 3.5% use paraffin and 5% cook with fires whereby they dig holes in their informal settlement and start a fire each time they need to cook, causing health risks and the risks of settlement fires resulting in air pollution.

In Jika Joe, illegal electricity connections act as the multiple source of energy, for cooking, heating and lighting. There is an escalated livelihood risk associated with illegal connections, such as electrocution, fires which can cause deaths. A number of respondents use gas and paraffin for cooking. The reason behind the use of gas and paraffin is that even though they have to use money to have it, it is easily accessible and cheaper. However, the respondents complained about chest pains due to the inhalation of the smoke, and sore eyes due to the direct contact with the smoke. Therefore, the use of these sources of energy does not only have a negative impact on the environment but also affects the health of informal settlement residents.

6.4 Research Findings from Municipal Officials

Two municipal officials were interviewed and their responses are shown in this section.

6.4.1 Profiles of Municipal Officials

The first municipal official who was interviewed was a Housing Policy and Legislation Practitioner from the Department of Human Settlements in Pietermaritzburg. He worked with informal settlement research before and he was employed in policy and legislation; therefore he was most suitable to respond to the questions of this study. The second municipal official was the ward councillor of Jika Joe informal settlement, and she is employed under the Msunduzi Municipality. She was well informed on the settlement and had a vast amount of knowledge regarding the area, and was therefore suitable to respond to the questions provided by the study.

6.4.2 Suitability of Jika Joe as a form of Housing

Municipal officials agreed that Jika Joe is not suitable as a form of housing. The officials placed their own reasons as to why this should be. Reasons from the first municipal official include the unavailability of toilets, i.e. sanitation, the lack of basic services and amenities, the lack of social cohesion, as well as the illegal nature of informal settlements. The second official stated that Jika Joe was not suitable for housing as no planning had taken place in the development of the settlement. Thus the settlement does not conform to planning standards. The above suggests that Jika Joe is a spontaneous, unplanned, congested and overpopulated settlement which is not suitable for housing.

6.4.3 Environmental Challenges present in Jika Joe

Environmental challenges which were noted by the municipal officials include pollution, waste disposal, water pipe bursts, sanitation and the lack of open spaces within the settlement. Pollution was seen as an environmental challenge, as a result of residents disposing of waste anywhere and in some cases burning the waste, resulting in air pollution. One of the officials noted that the municipality once provided the settlement with waste

dumps called ‘skips’ but the community dumped around the skips and not inside, resulting in land pollution. In Jika Joe, residents lack sanitation facilities and therefore, in some cases, use their grounds as sewage systems, resulting in added pollution and exposure to health issues. The settlement has no open spaces, which one of the officials found to be an environmental challenge.

6.4.4 Sources of Environmental Challenges present in Jika Joe

One of the municipal officials believed that the sources of environmental challenges present in Jika Joe were the way in which waste is disposed of, and the burning of waste and the use of coal for cooking. On the other hand, the second official stated that it is the residents of Jika Joe, who do not want to take control of their environment, who are the source of environmental challenges in the settlement. Secondly, the employed members of the community being unavailable for meetings aimed at finding solutions for environmental challenges present in the settlement was seen as a source of these challenges. The reasons for the above stated are that the message is strayed and not every member of the settlement gains information on how they can make a difference in dealing with the environmental challenges present in the settlement.

6.4.5 Possible Solutions to the Negative Impacts of Jika Joe on the Environment

According to the municipal officials, possible solutions to the negative impacts of Jika Joe on the environment encompass awakening the community’s conscience by involving the social hierarchy to impose rules and regulations on how to make the settlement more environmentally friendly. The social hierarchy would include the political leaders who are the heads of the community as they are most respected by the Jika Joe community. Other solutions noted were the implementation of awareness campaigns to educate the community on the negative impacts which the settlement has on the environment. Recycling and the re-using of recyclable goods were also stated as a possible solution.

6.4.6 Health Risks Associated with Environmental Challenges present in Jika Joe

The health risks which are associated with the environmental challenges present in Jika Joe were listed by municipal officials as lung disease, water borne diseases and diahorrea. Lung diseases come from the burning of waste and the exposure to waste dumped in and around the settlement. Water borne diseases and diahorrea arise from water pollution where people consume the polluted water and expose themselves to such illnesses.

6.4.7 Disposal of Waste in Jika Joe

Both the municipal officials agreed that there is a set day for waste collection by the Msunduzi municipality once a week. The settlement was provided with waste dump facilities which were well distributed around the settlement. However, residents of Jika Joe still dispose their waste in and around the settlement. Some of the residents resort to burning their waste, resulting in more damage through air pollution.

6.4.8 Sources of Energy used for Cooking in Jika Joe

According to both municipal officials, the sources of energy used for cooking in Jika Joe are gas, paraffin and electricity (which is connected illegally). One of the officials mentioned that the residents were once supplied with gel stoves which are a more environmentally friendly option and less susceptible to fires compared to paraffin. The initiative was refused by the residents, and the community continues to use harmful sources of energy for cooking which impact negatively on the environment.

6.5 Research Findings through Observations

The checklist for observations to examine how much of a negative impact Jika Joe has on the environment was as follows:

- If waste was disposed of in a manner which impacted negatively on the environment.
- If there were any environmental challenges experienced in Jika Joe, and what those challenges were.

- The sources of environmental challenges found in Jika Joe.
- If there were any potential health risks associated with the environmental challenges present in the settlement.
- If the community or government had taken any interventions in trying to solve the environmental challenges experienced in Jika Joe.

After observing Jika Joe informal settlement in terms of the way in which waste was disposed, it was noted that waste was disposed in and around the settlement and there were areas where some of the waste was burnt and ash was still visible. All the above show that the environment was impacted on negatively as the land and air in the area was polluted with waste.

In the aspect of environmental challenges experienced in Jika Joe, it was noted that the rate of land, air and water pollution in the area were challenges. Erosion was observed as a result of deforestation and the removal of any vegetation to create space for the development of shacks. As a result of the unplanned nature of the settlement, some shacks were developed along the Msunduzi River and that was observed as an environmental challenge.

In terms of the sources of environmental challenges present in Jika Joe, what was observed was the ignorance of the members of the community. The residents in the settlements were observed as the main source of the environmental challenges. Basic services such as water and sanitation were an environmental challenge.

Pertaining to the issue of health risks associated with the environmental challenges present in the settlement, what was noted was the potential of residents being exposed to diarrhoea from drinking contaminated water and lung diseases from the polluted air as a result of the waste in and around the settlement. Residents were also observed to be at risk of acquiring water borne diseases as a result of polluted water which they use for bathing and cooking.

Concerning initiatives taken by the government or the community in an attempt to resolve the negative impacts Jika Joe has on the environment, it was noted that little was done by the community in this respect. Initiatives by the residents involved the recycling of recyclable goods which were found in and around the settlement in an effort to reduce the amount of

pollution in the settlement. This also assists in job creation. Other efforts by the members of the community were organising clean-up groups and some church groups made a vegetable garden in an attempt to reduce erosion and poverty at the same time. There were a number of initiatives by government observed around the settlement, which the residents however refused to utilise. Some of these initiatives involve sanitation. There were toilets around the settlement but they were vandalised and no resident was seen using them during the time of observation. There were also waste bins around the entire settlement. However, waste was still found all around the settlement and even in front of the waste bins provided by the government.

6.6 Linking Findings with Literature

Theories of Development and Bronfenbrenner's Ecology of Human Development Theory were noted and further discussed in detail. After the data has being analysed it is noted that there is a linkage between the research findings and the above mentioned theories. In terms of the development theory, which is led by the notion that the housing problem has been perceived as a developmental problem as it is directly influenced by development (Hettne, 1995:72); there is a linkage between this notion and the research findings. The linkage is that there is no development in informal settlements, meaning that people continue living under such conditions because of the lack of housing and basic services. Therefore informal settlements and the way in which people treat their environment have been detrimental effects of modern economic growth (Hettne, 1995:72).

Bronfenbrenner's Ecology of Human Development Theory states that people treat the environment in which they reside out of their socioeconomic status and their need for housing (Bronfenbrenner, 1994:15). The immediate need for housing results in informal settling which in turn results in land degradation and deforestation. After the data has been analysed one finds that there are a number of environmental challenges present in informal settlements. As stated by the theory, these are caused by the people who occupy the land and because of their housing needs and socioeconomic situation, they have no desire to take care of the environment in which they reside on (Bronfenbrenner, 1994:15).

The hypothesis of the study, which concludes that the development of informal settlements may have environmental impacts that in future can lead to bigger environmental problems, health risks and an impact on livelihoods, has been proven to be true.

6.7 Conclusion

This chapter has analysed and interpreted data. There were linkages found between theories and research findings. The data depicts that there is a problem. The environmental challenges noted in this chapter are a reality and continue to impact on the livelihoods and surrounding environment of the people who live in informal settlements. The research findings also show that the environment and the impacts which informal settlements have on it are caused by people living in the area and only if they take an initiative in bettering the situation will they find the situation becoming less of a problem. Last, there is a need for government intervention in terms of more housing provision in order to reduce or eradicate informal settlements.

Chapter 7: Summary of Findings, Conclusion and Recommendations

7.1 Introduction

This chapter summarises the research findings based on the themes which were identified in chapter 4 and the pattern of the responses obtained. It also provides a conclusion based on the entire study, and lastly it provides a set of recommendations for challenges presented by the study.

7.2 Summary of the Key Findings

On the aspect of the suitability of Jika Joe informal settlement for housing, the study established Jika Joe as unsuitable for housing purposes. Jika Joe was “unplanned, unstructured, built on unsuitable areas and holds characteristics of illegality, disease and negative environmental impacts as with all informal settlements” (United Nations, 1996: 75). Even with such characteristics, the residents were comfortable residing in the informal settlement. The settlement has the potential of being upgraded, however relocations make more sense in the case of Jika Joe as its geographical location disables it from being upgraded.

With regard to environmental challenges present in Jika Joe, the study found that there are a number of environmental challenges which stemmed from the development of Jika Joe. These challenges include pollution, poor waste management practices and deforestation. These findings confirm the assertion made by Tsenkova (2009) in which it is mentioned that informal settlements are directly linked to environmental challenges like “landslides, flooding and poor drainage” (Tsenkova, 2009:32).

In terms of the sources of environmental challenges present in Jika Joe informal settlement, the environmental challenges which were present in Jika Joe were from fires in the settlement, waste, the perspective of the community on taking care of the environment and the lack of housing. “The way in which society treats the environment is the main issue, as the people themselves engage in practices which are unfriendly to the environment, dispose of waste haphazardly, construct informal settlements as they please, and pollute their

surrounding area without guilt” (Msunduzi Municipality, 2015:06). This is confirmed by the Msunduzi Municipality which states that the main sources of these challenges are the residents of Jika Joe.

Regarding the issue of possible solutions to the negative impact of Jika Joe informal settlement on the environment, possible solutions include, “the provision of low-cost housing, educating residents on the impact of their settlement on the environment and government intervention” (Govender et al., 2011:27). Other solutions include recycling, community initiatives, clean-up groups and the reduction or controlling of fires within the settlement.

Concerning the point of health risks associated with environmental challenges present in Jika Joe informal settlement, the study found that health risks associated with Jika Joe range from diarrhoea, water borne diseases and lung diseases such as asthma. “Diarrhoea and water borne diseases are common health risks in informal settlements, which are usually a result of consuming unclean water and the mere fact that informal settlements lack water and sanitation” (Mathee and Schimding, 2008:45). Lung diseases, on the other hand, stem from the air pollution present in Jika Joe and as well as some of the materials which has been used for the construction of the settlement. Such materials include asbestos and sheets of corrugated iron which are extreme pollutants when exposed to fire.

In terms of waste disposal in Jika Joe informal settlement, waste was disposed of in any manner. The Msunduzi municipality intervened in the Jika Joe settlement by providing a skip and placed it in the centre of the settlement; however it was not utilised correctly by the community. According to the Msunduzi Municipality (2015), “municipalities collect waste once every week” (Msunduzi Municipality, 2015: 06). Despite the availability of this waste management facility, residents refuse to utilise this service, therefore waste is accumulated in and around the settlement.

On the point of the sources of energy used for cooking in Jika Joe informal settlement, people use, electricity which is illegally connected, gas, paraffin, and some people make fires. These are the sources of energy used in Jika Joe for cooking which impact largely on the environment, through the release of harmful gases into the atmosphere.

7.3 Conclusion

This study has identified informal settlements as a perpetual challenge which has negative impacts on the environment. The root of this challenge stems from the issue of rural-urban migration. More development and opportunities need to be implemented in rural areas to avoid and decrease an influx in urban areas. Informal settlements are a challenge which needs to be addressed thoroughly. The South African government may be trying to solve the problem of housing delivery; however the housing backlog is still relatively high. The above may be due to the lack of adequate resources such as urban land, capital and that is combined with a high rate of urbanization and immigration, which compound the housing challenge. The housing challenge as a whole needs greater government intervention and implementation.

The environment is important to all who live in it and thus we all have the responsibility to take care of the space which we occupy. There is a real need for conservation. Climate change and global warming are becoming more and more of an issue as time goes by which means more needs to be done in terms of housing provision and environmental protection as a whole. There is a huge price to pay with the development of informal settlements with concern to the environment. In turn, informal settlement dwellers need to protect their environment and be involved in practices which are less harmful to the environment, such as good waste management practices, environmentally-friendly ways of cooking, and alleviation of all types of pollution present in such areas.

South Africa needs to be integrated, sustainable and grow in terms of development. There is a need for increased job opportunities and low-cost housing for the disadvantaged which may help steer the environment into the right direction. There is a need for assistance in rural areas where people emigrate seeking better opportunities in urban areas. If the issue of job opportunities, good health-care and educational facilities is tackled in rural areas, there is a chance of solving the housing challenge and in turn the environmental impacts of informal settlements. If opportunities come to where people are, (in this case rural areas), people will not have to go to urban areas for opportunities; therefore there will be no need for the development of informal settlements.

7.4 Recommendations

7.4.1 Recommendations on Policy

Environmental challenges caused by Jika Joe informal settlement in this study have included challenges of landslides, flooding, poor drainage, pollution, deforestation and erosion. It is therefore recommended that the housing challenge be resolved in Jika Joe to help reduce or completely end environmental challenges present in the settlement. The above can be achieved through the implementation of strong government leadership. “National governments must play a leading role in recognizing informal settlement/slum challenges” (UN-HABITAT, 2015:57). According to the UN-HABITAT (2015:57), “government can provide the enabling environment to develop and implement the appropriate policies for, and in partnership with, poor urban dwellers” (UN-HABITAT, 2015:58).

This recommendation was selected due to its ability to bring about change in the solutions to the environmental challenges caused by Jika Joe informal settlement. If the above is done through communication with the Msunduzi municipal government, it will have “the capacity to convene and connect key stakeholders, enact policies and plans and manage incremental infrastructure development” (UN-HABITAT, 2015:60). The recommendation is therefore policy based and also dependent on implementation and team managers. The possible benefit of this process is that the Msunduzi municipal government can develop and implement policies for and in partnership with Jika Joe settlers, as they have local understanding and knowledge of their area.

7.4.2 Recommendations on the Municipality

It is noted that the strategies and policies developed for housing still desire more to be done. Informal settlements upgrading is evidence of the above mentioned. “The problem lies with the execution of policies on the ground” (Tshikotshi, 2009:07). The upgrading of informal settlements is not recommended in this regard as it is noted with the Seraleng case study (a city in Rustenburg), that the process involves “corruption, dubious housing allocation and a lack of dispute resolution” (Tshikotshi, 2009:07). Other reasons as to why informal settlements upgrading is not recommended is as a result of the approach “inappropriately importing solutions from other places without adapting operations to the local context” (UN-

HABITAT, 2015:60). The above disables the upgrading process from being responsive to that specific city/area and would therefore not work for Jika Joe informal settlement.

Although informal settlement upgrading is not suitable for Jika Joe, what is recommended is upgrading in the form of relocation. Relocation is related to “physical characteristic of the land and designated land use where land may be deemed unsuitable for low income housing due to its geomorphology – steep slopes, high water table, situation below flood-line, instability due to dolomitic soil, refuse deposits or undermining” (Huchzermeyer, 2006:15). For Jika Joe, it is the settlement’s susceptibility to landslides and flooding which makes it unsuitable for upgrading and therefore relocation is recommended. Relocation has its own downfalls such as, “the insufficiency of budget to cover costs for housing and the associated land and infrastructure, and a lack of suitable relocation destination just to mention a few” (Huchzermeyer, 2006:15). However, with the downfalls of relocation, there are still benefits, as Jika Joe settlers will benefit from low-income housing which is built with the correct materials, have access to basic services that are planned and structured and the housing is highly unlikely to be susceptible to landslides and flooding.

With regard to investigating solutions to the negative impacts of Jika Joe on the environment, the study found that possible solutions include the provision of low-cost housing, educating residents on environmental impacts of their settlements, community initiatives and government intervention. Therefore, it is recommended that there is a “conflation of responsibilities across ministries, whereby environment related issues are spread across the Ministry of Lands, Housing, Planning and the Environment and the Ministry of Agriculture and Forestry” (Munro, 2009:43). With the shared responsibility concerning environmental issues, there is a potential of the development of great policies and a variety of shared ideas in finding solutions to the negative impact of Jika Joe on the environment.

Other recommendations include creating boundaries for vacant land and forests where people are most likely to settle illegally. Using the Peninsulas experience, “a Reserve Resettlement Commission could be established to evict communities that live within designated boundaries” (Munro, 2009:45). This will reduce the levels of informal settlements and in turn a less impact on the environment.

These recommendations were selected due to the fact that they have the ability to solve and reduce the negative impacts which Jika Joe informal settlement has on the environment. They have worked in the Peninsula and can therefore bring about success for Jika Joe. These recommendations are policy based and the benefits of using such recommendations are “the reduction of informal settlements through evictions, the reforestation of land which has been deforested and strong policy and implementation from stakeholders with a collective outcome in mind” (Munro, 2009:45). If Jika Joe was a protected area the settlers would have been easily evicted. Once evicted the land on which Jika Joe is developed can begin being reforested and this would solve the negative impacts which Jika Joe has had on the environment. Thus, this recommendation is beneficial on the above mentioned aspects and is dependent on the competence of the collective committee which would be developed, the policies which they develop and the way in which they implement such policies.

Regarding the health risks associated with the environmental challenges present in Jika Joe informal settlement, the study found the community is affected with health risks which include asthma, diarrhoea, cholera and water borne diseases such as protozoal infections. What is recommended is re-blocking, which is “a process where shacks are reconstructed and rearranged to maximise open space” (Pather, 2014:10). This process means that settlements which are unsystematic, such as Jika Joe, can be rearranged in such a manner that it is spacious and where, in the case of a fire, not all settlements will burn. Re-blocking also means that shacks are aligned in organised clusters that create more space so that municipalities can begin to build necessary infrastructure- such as water and sanitation pipelines, and electric lines to improve informal communities (Pather, 2014:10).

This recommendation was selected due to its ability to bring about change for Jika Joe informal settlement. According to Pather (2014:11), the process of re-blocking has been successful in a number of informal settlements in South Africa and has been listed by urban planners as one way to help improve the living conditions in informal settlements (Pather, 2014:11). This recommendation is not policy based but is a method developed by a community based organisation with knowledge of conditions present in informal settlements. The benefits of this recommendation include the fact that the settlement will be spacious, and those spaces will reduce the probability of fires spreading, and enable government to provide basic services such as water and sanitation (Pather, 2014:12). In turn this will benefit the community in reducing the health risks associated with Jika Joe informal settlement through

reduction of spreading fires and in turn a reduction in people contracting asthma. Moreover, there will be less to no use of unclean water and sanitation practices, which in turn also reduces the number of cases of diarrhoea, cholera and other water borne diseases.

7.4.3 Recommendations on Beneficiaries

Concerning the sources of environmental challenges found in Jika Joe informal settlement, the study established that the environmental challenges present in Jika Joe were fires, waste, the community and its perspective on taking care of the environment, including the lack of housing itself. It is therefore recommended that residents of Jika Joe make it their responsibility to take care of the area in which they live in. The Msunduzi Municipality supplied standpipes, toilets and skips for the residents to dispose of their waste (Msunduzi Municipality, 2015:08). This is recommended to continue with more responsible use and respect from the members of the Jika Joe community.

Environmental education should be given to Jika Joe residents and they should be clear of the consequences of the impacts which they have on the environment. “Clean-up groups should be started by the community leaders and people should be encouraged to join in” (Msunduzi Municipality, 2015:08). Recycling and the importance of nature conservation should also be part of the environmental education given to residents.

These recommendations were selected as they have the ability to change the way in which the Jika Joe settlers impact on the environment by working on the sources of these challenges. They have been successful all over the world and can therefore bring about success for Jika Joe. These recommendations are not policy based but do however need policy development in order to function to their full potential. Policy is needed in creating legislation which hinders the Jika Joe settlers from engaging in practices which are sources of environmental challenges.

The environmental impacts which Jika Joe brings about affect the environment on a very large scale. Some of the environmental impacts of Jika Joe include deforestation, where it is recommended that “the area be reforested and 'illegal' structures eliminated” (Munro, 2009:44). During the process of developing Jika Joe, trees were cut off and vegetation was

removed, a possible solution for this is the removal of these settlements and planting more trees to make up for the destroyed ones.

On the point of examining how waste is disposed of in Jika Joe, the study found that waste was disposed of in any manner through dumping and littering within the settlement. The study also found that Jika Joe informal settlement had been provided waste facilities through large waste bins called skips, which the community refused to use. Therefore what is recommended in this respect is composting.

The process of composting involves “the recycling of organic materials into rich soil” (Sasol, 2014:47). Household organic waste can be turned into compost by the settlers, which in turn will make their soil rich and fertile. They can therefore create community gardens and have food for the community’s most needy which is an environmentally friendly practise in itself. Other recommendations include “recycling of recyclable waste such as paper and plastic, and environmental education for the community which includes the encouragement of the use of waste facilities provided to settlements and the need to take care of the environment” (Sasol, 2014: 48).

These recommendations were selected based on their success in other informal settlements and, with the right community mind-set, they are guaranteed to be beneficial to Jika Joe informal settlement. They have succeeded all over the world and with great success too (Sasol, 2014:48). These recommendations are not policy based but depend entirely on the effects and commitment of the community. These recommendations hold benefits of creating “an environmentally sustainable settlement and cost-effective solutions for managing waste” (Sasol, 2014:48). If implemented in Jika Joe and taken seriously by the community these recommendations are bound to make a difference.

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ANNEXURE 1

Letter for Permission to interview Jika Joe Residents and Municipal Officials



12 August 2015

To whom it may concern:

My name is Ziningi Msimang (9202201321083), student number 210531524. I am currently a Master of Housing Candidate at the University of KwaZulu Natal. I am currently carrying out a study on the negative impacts of informal settlements on the environment.

I have chosen to use Jika Joe informal settlement under the Msunduzi Municipality as the case study for this paper, as it holds the characteristics of the kind of settlement the study will be based on.

I will be asking 40 of the residents to respond to my questionnaire and also be interviewing one municipal official within the Msunduzi Municipality and one from the department of human settlements. Each interview is likely to take 30 minutes and response to the questionnaires will depend on the respondent. I therefore ask for your permission to continue with the above mentioned.

Your assistance in this matter will be highly appreciated.

Your support in this regard will be highly appreciated.

For more information regarding this request you can contact my research project supervisor as per contact details below:

.....

Supervisor

Mr Vincent Myeni

0312602128

myeniv@ukzn.ac.za

ANNEXURE 2

Informed consent Forms English and IsiZulu

INFORMED CONSENT FORM

Project title: Informal settlements and their negative impacts on the environment. A case study of Jika Joe informal settlement.

Specific location: Jika Joe informal settlement, Pietermaritzburg.

My name is Ziningi Msimang (student number 210531524). I am registered as a master's candidate at the University of KwaZulu Natal. My research topic is 'The Environmental Impacts of Informal Settlements'. You are being asked to take part in this research project. I will explain the project to you in detail. You should feel free to ask questions at any time. All potential interviewees are being asked to volunteer for participation in the research study.

My contact details are:

Email: ziningimsimang2@gmail.com

Cell: 0744697980

The contact details of my supervisor are:

Email: mnyeniv@ukzn.ac.za

Cell: 072497387

Specific enquiries (HSSRC Research Office contact details)

Ms Phumelele Ximba

Tel: 260 3587

Email: ximbap@ukzn.ac.za

Description of the project:

The main objective of this study is to investigate to which degree informal settlements impact negatively on the environment, using Jika Joe informal settlement in Pietermaritzburg as a case study.

The core research questions are:

- 1) What are the environmental challenges caused by informal settlements?
- 2) What are the sources of environmental challenges experienced in informal settlements?
- 3) What are the possible solutions to the negative impacts which informal settlements have on the environment?
- 4) Are there any health risks associated with the environmental impacts present in informal settlements?
- 5) How is waste disposed of in informal settlements?

ProceduresInterviews:

- 1) Will take place once you have been contacted, understood the whole process of the research, and have read and signed the informed consent form.
- 2) Interviews will be conducted and responses will either be recorded or jotted down on paper.
- 3) The time required will depend on how much time is taken up responding.

Focus groups:

- 1) Will take place once you have been contacted, understood the whole process of the research, and have read and signed the informed consent form.
- 2) Interviews will be conducted and responses will either be recorded or jotted down on paper.
- 3) The time required will depend on how much time is taken up responding.
- 4) Each individual will be given an opportunity to express their views.

Risk or discomfort:

There are no potential risks or discomfort associated with this research.

Benefits of this study:

There are no direct benefits to the study, only a contribution to existing knowledge.

Compensation:

There is no form of compensation for you.

Voluntary participation and withdrawal:

Participation in this study is completely voluntary; it is your right to stop participating at any moment if you feel uncomfortable. You have the right to skip questions, and whatever you decide is completely up to you.

Questions, rights and complaints:

If you have any questions or queries about your rights with regards to my study, please feel free to contact me (see contact information at the beginning of the document).

Confidentiality:

The study is based on the impacts of informal settlements on the environment, therefore there is no need for confidentiality as this is of public interest. However if a respondent wishes to be kept anonymous, it will be done with no problem.

Consent statement:

Do you give your consent for: *(please tick one of the options below)*

Your name, position and organisation, or	
Your position and organisation, or	
Your organisation or type of organisation (please specify), or	
None of the above	

to be used in the report?

I..... (full names of participant) hereby confirm that I understand the contents of this document and the nature of this research project, and I consent to participating in this research project. I understand that I am at liberty to withdraw from the project at any time, should I so desire.

SIGNATURE

OF

PARTICIPANT.....DATE.....

Please write your email address below if you wish to receive a copy of the final research report.....

IFOMU LOKUSEBENZA NGEMVUME

Isihloko: Imijondolo nemiphumela yayo engemihle kimvelo. Ucwangingo lwesigameko sase Jika Joe.

indawo: Umjondolo iJika Joe, Pietermaritzburg.

Igama lami lingu Ziningi Msimang (Inombolo Yomfundi 210531524). Ngibhalise enyuvesi yaKwa-Zulu Natal njongomfundi weMasters. Isihloko socwaningo sithi ‘Imijondolo nemiphumela yayo engemihle kimvelo’. Ngizocela ukuthi ube ingxenye yalolucwaningo. Ngizokuchazela kabanzi ngalolu cwanningo. Ungangibhuza imibuzo nganoma yisiphi iskhathi. Bonke laba abangakhona ukuxoxisana name bayacelwa ukuthi babambe iqhaza kulolucwaningo mahala.

Imininingwane yami:

Email: ziningimsimang2@gmail.com

Ucingo: 0744697980

Imininingwane yeNduna yami:

Email: mnyeniv@ukzn.ac.za

Ucingo: 072497387

Imibuzo (imininingwane yeHSSRC Research Office)

Ms Phumelele Ximba

Ucingo: (031) 260 3587

Email: ximbap@ukzn.ac.za

Incazelo yesifundo:

Inhloso yalolucwaningo ukuthola ukuthi imijondolo iyikhandlabeza ngayiphi indlela imvelo, kusetshenziswa ucwangingo lwesigameko saseJika Joe.

Imibuzo ebalulekile:

- 6) Iziphi izinsele zemvelo ezibangwa imijondolo?
- 7) Yini imbangela yezinsele zemvelo ezenzeka emijondolo?
- 8) Yiziphi izixazululo ezikhona ngokukhandlabezeka kwemvelo ngemijondolo?

- 9) Zikhona izingozi zezempilo ezibangwa ukukhandlebezeka kwemvelo ngemijondolo?
- 10) Ukulahlwa kwemfucuza kwenziwa ndlelani emijondolo?

izinqubo

Izinxoxo:

- 4) Izinxoxo zizoqala uma usuthintiwe ogcingweni, waqonda inqhubo yalolucwaningo, wafunda wangena ngemvume ifomu lokusebenza ngemvume.
- 5) Izinxoxo zizowenziwa, izimpendulo zibhalwa phansi ephepheni.
- 6) Isikhathi esidingekayo sizoya ngokuthi kuthatha iskhathi esingakanani ukuphendula imibizo.

Iqembu lenxoxo:

- 5) Izinxoxo zizoqala uma usuthintiwe ogcingweni, waqonda inqhubo yalolucwaningo, wafunda wangena ngemvume ifomu lokusebenza ngemvume.
- 6) Izinxoxo zizowenziwa, izimpendulo zibhalwa phansi ephepheni.
- 7) Isikhathi esidingekayo sizoya ngokuthi kuthatha iskhathi esingakanani ukuphendula imibizo.
- 8) Wonke umuntu uzonikwa ithuba lokudlilisa uvo lwakhe nemibono yakhe.

Incuphe noma ukungakhululeki :

Ayikho incuphe noma ukungakhululeki okungabangwa ulolucwaningo.

Izinzuzo zalesisfundo:

Ayikho inzuzo ephuma kukuba ingxenye yalolucwaningo ngaphandle kokunezelela kulwazi oselukhona.

Isinxephezelo:

Asikho isinxephezelo.

Iqhaza ngokuzikhethela nokuhoxisa:

Ukuthatha iqhaza kulolucwaningo kuwenzeka ngokuzikhethela kwakho; kuyilungelo lakho ukuyka noma yinini uma usuzizwa ungakhululekanga.

ANNEXURE 3

Questionnaire for Informal Settlements Residents

1) Gender

Male ☐

Female ☐

2) Employment Status

Employed ☐

Unemployed ☐

3) Marital Status

Single ☐

Married ☐

4) Level of Income

High ☐

Middle ☐

Low ☐

None ☐

5) What has your experience been like living in this informal settlement, especially with the lack of services?

6) Do you think that this area is suitable for residential purposes? If not please state your reasons.

7) Which environmental challenges do you think are more prevalent in this area?

8) Which of the following constitute the major environmental problems experienced in Jika Joe? Rank using a scale from 1-7, whereby 1 depicts the major problem and Seven the least Water Pollution----- Flooding----- Air Pollution----- Smoke----- Solid Wastes----- Fire hazards-----Pests and flies-----Other: -----

9) What are the sources of environmental challenges experienced in this settlement?

10) What do you think are the possible solutions to the negative impacts which this informal settlement has on the environment?

11) Are there any health risks associated with the environmental impacts present in this settlement?

12) How is waste disposed of in this settlement?

13) How can waste be minimized in this settlement?

14) How frequent do municipality collect garbage in your area?

15) How do you make sure your drinking water is good enough for you to consume?

16) What is the community's attitude towards environmental conservation?

17) Is there any need to protect the environment from pollution? How best do you think this could be done (a community based approach)?

18) Who is responsible in your area for addressing Pollution problems?

19) Do you find stagnant water a “serious” problem where you live?

20) What do you think the community should do about it?

21) What energy sources do people in your area use for cooking?

22) Are there any alternative sources you can use for cooking?

23) Do you know of any health problems associated with pollution (smoke, stagnant water, accumulation of wastes)? If yes, what are they?

24) With regards to these health problems, what do you suggest people should do to minimize them?

25) What is government doing about these health risks?

ANNEXURE 4

Interview Questions for Municipal Officials

- 1) Do you think that informal settlements are suitable for residential purposes? If not, why?
- 2) What are the environmental challenges do you think are more prevalent in informal settlements?
- 3) What are the sources of environmental challenges experienced in informal settlements?
- 4) What do you think are the possible solutions to the negative impacts which informal settlements have on the environment?
- 5) Are there any health risks associated with the environmental impacts present in informal settlements?
- 6) How is waste disposed of in informal settlements?
- 7) What measures have the local municipality taken to help reduce pollution in the Jika Joe informal settlement?
- 8) What are the perceptions of communities in informal settlements towards their responsibility in limiting pollution in their environment?
- 9) How is waste disposed of in informal settlements?
- 10) How can waste be minimized in informal settlements?
- 11) How frequent does municipality collect garbage in informal settlements?
- 12) Is there any need to protect the environment from pollution? How best do you think this could be done?
- 13) What energy sources do people in informal settlements use for cooking?
- 14) Are there any alternative sources you can use for cooking?
- 15) Do you know of any health problems associated with pollution (smoke, stagnant water, accumulation of wastes)? If yes, what are they?
- 16) With regards to these health problems, what do you suggest people should do to minimize them?
- 17) What is government doing about these health risks?