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Disaster preparedness and mitigation in informal settlements: community and municipal roles in the case of Stjwetla in Alexandra, Johannesburg

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Disaster preparedness and mitigation in informal settlements: community and municipal roles in the case of Stjwetla in Alexandra, Johannesburg.

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A research report submitted to the Faculty of Engineering and the Built Environment, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Masters of Built Environment in the field of Housing.

Johannesburg, June 2020

School of Architecture and Planning

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DECLARATION

I declare that this research report is my own unaided work. It is being submitted for the degree of Masters of Built Environment in the field of Housing to the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination to any other University.



.....

(Signature of candidate)

.....09.....day of.....JULY 2020.....

Abstract

This study looked into the extent of coordination between municipalities and communities in preparing for and mitigating disasters. Using qualitative methods in key informant interviews, it compiled a case study of Stjwetla informal settlement in Alexandra, Johannesburg. The study was motivated by the fact that despite South Africa having been one of the first countries in Africa to adopt legislation on Disaster Risk Management (DRM), and despite the legislation having been praised as significant and progressive, the response to disasters on the ground has been characterised by reactionary rather that proactive measures. As such, the study identified the gap between what the DRM legislation sought to achieve and what transpires on the ground. The findings of this study suggest that collaboration between communities, municipal officials and non-governmental organisation plays a huge role in disaster and risk management in Informal settlements.

Key words

Informal Settlements, Disaster, Mitigation, Disaster Risk Management, Upgrading of Informal Settlements.

Dedication

I would like to dedicate this research to my Great Grandfather Hosi Dick Khambani who allowed formal education to be introduced within his Tribe. I would also like to honour the wish of my Grandfather Hosi July Gija Ngobe who was extremely passionate about education within his Tribe and who for the first was insistent that even females must attend formal education because in him development had no gender. Special dedication to my father who accelerated the construction of many schools in our community in order to carry forward the legacy of his forebears about formal education. Lastly, I dedicate this research to my late sister Princess Queen N'wa_Yingwani Ngobe who suffered a sudden death at the college of Education and most importantly my living mother Ndlovukazi Tsatsawani Nwa' Green Ngobe, for her role in steering the ship and educating the rest of the family after my father re-joined his ancestors.

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4.1 Roles played by different stakeholders after the Alexandra 2016 Flood Incident 37

ACRONYMS

BNG	Breaking New Ground
DRM	Disaster Risk Management
DHS	Department of Human Settlements
HDA	Housing Development Agency
HSDG	Human Settlements Development Grant
NGOs	Non-Governmental Organisations
NUSP	National Upgrading Support Programme
UNCHS	United Nations Centre for Human Settlements
UISP	Upgrading of Informal settlement Programme
Stats SA	Statistics South Africa
CoJ	City of Johannesburg

1.INTRODUCTION

Informal settlement development across the globe is largely attributed to the process of urbanisation and failure by governments to meet the ever-growing housing needs of people in urban areas (Hermanson, 2016). In South Africa, the sprawling of informal settlements has also been closely associated with urban poverty (Moagi, undated). As defined by UN-Habitat (2003: 109),

> ''urban poverty in relation to housing is the inability by an individual or households to access safe, secure and healthy shelter with basic infrastructure such as piped water and adequate provision for sanitation, drainage and the removal of household wastes''.

Urban poverty in relation to housing in South Africa is increasing despite the Constitution having stipulated that everyone in this country has the right to access adequate housing (Constitution of South African 1996 Act No. 108).

In their quest to access the city or economic opportunities in urban centres, poor people resort to living in open spaces near riverbanks, under electricity pylons and sometimes in areas with poor drainage systems. It is in these areas that they are exposed to risks such as those related to floods, fires and disease outbreaks. These risks have a strong connection to health issues. According to WHO (2008), they can contribute to an increased prevalence of common diseases such as tuberculosis (TB), malaria, respiratory infections, cholera and diarrhoea. These risks are referred to as hazards when they expose informal dwellers to dangers and can also lead to disasters, which are defined as an unexpected event that adversely impact on the normal functioning of a society or community (International Federation of Red Cross Societies, 2019). Despite this reality, informal settlement dwellers are rational and active thinkers who may implement different strategies to protect themselves from these risks and disasters. In cases of emergencies, induced by disasters, informal dwellers, with the help of other stakeholders, implement measures to mitigate these risks. Following from this, the study sought to critically unpack the state of preparedness, and mitigation strategies employed, by informal settlers living in disaster prone areas.

1.2 Background

There has been an unprecedented increase in the occurrence of natural disasters around the world. In South Africa, these are mostly human induced (World Health Organisation, 2018). Internationally, according to International Federation of Red Cross and Red Crescent Societies (IFRCRCS, 2012), the increase in disasters over the years has seen an increase in spending by countries with the aim of reducing the loss of lives. The urban poor particularly in the Global South are vulnerable to risks and disasters because of different underlying factors which may be spatial, political and social (IFRCRCS, 2012). In as much as the South African government has made efforts through different housing frameworks over the years to reduce the challenges faced by the urban poor in relation to risks and disasters, these gains should not be overstated. According to SPII (2017), South Africa continues to face systemic challenges which hinder the enjoyment of the right to adequate housing. Napier (2011) observes that approximately 1.4 million households or 3.6 million people resided in informal settlements as of 2011. Ironically, this figure is increasing, due to factors such as insecure tenure arrangement and the fluidity of residence in these settlements.

Over the years, informal settlements in South Africa have been prone to episodes of disaster which are either induced by floods or by fires. Alexandra is a township in Johannesburg that is one such settlement. Alex was home to 179 624 people according to the 2011 census (Stas SA, 2012). Many families in this location reside informally and due to a number of factors, the settlement is exposed to tragedy in the form of disasters. For instance, the low-lying part of the township, primarily Stjwetla informal settlement, which is the case study area of this study, experienced a flood event on the 9th of November 2016 (Eye Witness News, 9 Nov 2016). Recently, on March 5, 2019, over a hundred families in Alexandra, were affected by a fire from a City Power pylon, bringing live overhead cables down with it; the households were moved to the Marlboro community hall which functioned as an overnight shelter (Eye Witness News, 6 May 2018). This incident followed another fire that broke out on 6 December 2018 in the same settlement and destroyed about 500 shacks (Eye Witness News, 6 Dec 2019). With all these cases of disaster occurring in Stjwetla informal settlement in Alexandra, it was important to assess the extent of disaster preparedness by both the communities and the authorities, the coordination between the two, and in particular the mitigation and prevention strategies that are put in place after the occurrence of disasters.

1.3 Problem statement and rationale

According to van Niekerk (2011), South Africa has become one of the pioneers to implement legislation on Disaster Risk Management in Africa. The South Africa Disaster Risk Management (DRM) legislation is considered significant and progressive due to its emphasis on promoting proactive rather than reactive approaches when dealing with disasters and risks (Holloway, 2003). However, a closer introspection into the National Disaster Risk Management policy of 2005 suggests that there is a disjuncture between the intention of this policy and what transpires on the ground. In as much as the DRM policy clearly gives the different arrangements needed from municipal, provincial and national levels, there seems to be a lack of important institutional structures at these different levels (Van Niekerk, 2011). This is despite the fact that more of these structures seem to be in existence at municipal level (ibid). According to Holloway (2003), in as much as the South Africa DRM speaks to a proactive approach, currently the DRM practice has often been reactionary and narrowly focused on the provision of disaster relief and technical solutions. I hoped to establish through my literature review whether this has shifted, and it was relevant to complement this with an empirical study into this area. I proposed to do this by paying particular attention to cases of disasters that have been experienced in Stjwetla informal settlement in Alexandra.

1.4 Aims

The study hoped to contribute to urgent efforts to reduce the occurrence and severity of disasters in informal settlements.

1.4.1 Main objective

- The main objective of this study was to understand the disjuncture between policy and practice through assessing the roles of municipalities and communities in preparedness and mitigation measures against disasters in informal settlements.

1.4.2 Sub aims

- To understand the state of informal settlement disaster preparedness by the City of Johannesburg through the case of Stjwetla.

- To understand the state of informal settlement disaster preparedness among informal settlements by residents in Stjwetla.
- To understand the relationship between municipalities and communities in preparing and mitigating for disasters in informal settlements.
    - To assess policy intentions on disaster preparedness in relation to what transpires on the ground.
    - To identify the disjuncture between policy and practice in mitigating disasters in informal settlements.

1.5 Main Research question

- What is the role of a municipality and the community in disaster preparedness and mitigation in informal settlements?

1.5.1 Sub questions

- To what extent is the City of Johannesburg prepared for and mitigating against disasters in informal settlements?
- To what extent is the community of Stjwetla informal settlement prepared for and mitigating disasters?
- What is the relationship between municipalities and communities in preparing for and mitigating against disasters in informal settlements?
- How are policy intentions on disaster preparedness and mitigation related to what transpires on the ground?

1.6 Expected findings

This study envisaged that the residents are being more proactive on the ground, than the municipality, in terms of preparing and mitigation disasters in informal settlements. Hence, there are more reactionary than proactive approaches by the municipality to the incidents of disasters or risks in informal settlements. The study also expected that there is currently no close relationship between municipalities and communities in preparing for and mitigating against disasters in informal settlements.

1.7 Methodology

This study employed a qualitative research methodology. The choice of this method is based on the assumption that this enables an understanding of a given research topic or problem from the perspective of communities and other populations involved (Denzin and Lincoln 2000). Additionally,

> "qualitative research is especially effective in obtaining culturally specific information about the values, opinions, behaviours, and social contexts of particular populations" (Nkwi, et al, 2001:06).

Different methods of data gathering, in-depth interviews, and transect walks were employed.

In this research, qualitative methodology was the most preferred as compared to quantitative methodology because it enabled me to engage with respondents in their natural settings. This was more important in that it gave me a more realistic feel of the site that I was researching rather than having to rely on numerical data and statistical analysis used in quantitative research. Having carried out the research, I can confirm that qualitative methods provided me with flexible ways of collecting, analysing, and interpreting data and information. For instance, I was able to adjust interview appointments with respondents depending on their availability something that I feel strongly that it enriched the data that I gathered as I took all the necessary precautions to ensure that respondents had enough time to respond to my questions. I was also able to respond to some of the research question comprehensively through observations and transect walks that I took in the case study area. In this way, I was also able to adjust some of my interview questions based on what I was witnessing on the ground. Face to face interviews also came in handy and were quite useful in enabling me to probe further especially in instances where I needed more clarity. The interviews were also important in that they enabled me to identify some of the relevant people who ended up participating in this research through interview processes.

The case of Stjwetla was quite unique in that, as an informal settlement located near Jukskei river, flooding related incidents experienced prior to this research ended up enriching my findings chapter thereby enabling me to respond adequately to research questions that guided this research. This uniqueness can also contribute immensely in giving an example that can be used to fill in the gaps in existing studies on disaster management in informal settlements.

Transect Walk involves a walk through the settlement, usually with a key informant, e.g. community leader (Denzin and Lincoln, 2000). It allows for observations and points of discussion to be recorded in a notebook and photographs to be taken (but never with a person recognisable). In depth interviews also formed part of this research because they enable the capturing of participant's experiences, histories and perspectives (ibid), in relation to disaster preparedness and mitigation.

The study sought to interview at least 8 residents, 5 Officials - (city official, Regional Office, Housing official, official from the disaster department of the City of Johannesburg, City Power official), one informal settlement manager, one councillor and 1 activist (South African National Civic Orgnisation). Purposive sampling was utilised to select residents who have been affected by floods/disasters (equal number of men and women) and officials with knowledge on disaster management hence a choice of their respective departments. Community leaders were asked to assist in identifying participants such as residents, NGOs/SANCO. For the officials, those were identified through snowball sampling as one official recommended that I speak to another. All participants were above the age of 18 years.

Officials were asked to sign a consent form before the beginning of each interview while residents had an option of either signing the consent form or agreeing to participate through providing verbal consent. In cases where verbal consent was obtained, this was recorded on an audio device reading out the informal consent form. Interviews were recorded and later on transcribed although one official refused to be recorded citing that he is not tasked to speak on behalf of the department. Coding during transcription was be done thematically.

Secondary sources of data such as document analysis, policy review and desktop literature

review were also utilised. Secondary sources formed an integral part of this research because they helped in understanding the topic under study in greater depth. Policies such as the Disaster Management Policy of South Africa was reviewed with the purpose of understanding how this document has fared in as far as preparing and mitigating disasters in the informal settlements concerned.

1.8 Ethical considerations

Ethics of conducting research were observed in this study. Before embarking on the empirical part of the study, I ensured that I obtained an ethics clearance certificate from the school's Ethics committee. I also ensured that interviewees understood the intentions of this research by explaining it to them before they signed a consent form to participate. Considering that I might have spoken to traumatised people, I ensured that I was very careful not to ask questions that will make them relive the trauma. I also explained to them that in case they relived their trauma in the interviews, they were free to end the interview and visit a counselling centre at a nearby clinic (social workers). This is why this research falls under medium risks. In terms of accessing the area of study, I went through a former councillor of the area who in turn introduced me to the current gate keepers. The gate keepers later on gave me permission to conduct research in their area.

1.9 Limitations of the study

I was cognisant of the fact that I had to submit this research by end of February 2020. Due to time constrains, I could not solicit as much information as I might ideally require from the participants. In terms of ensuring confidentiality, I ensured that my interviews were one-to-one in an enclosed setting to ensure privacy. But this was difficult in an informal settlement, and family members, friends and passers-by came in and out of the room whilst conducting the interview. In some cases, the former councillor also insisted on being present during the interviews. As a result, this made ensuring confidentiality difficult. However, the data that I sought to obtain was not of such a nature that such confidentiality is needed. In terms of anonymity, I ensured that the names of the participants particularly residents do not appear in the reporting of findings. However, the same could not be done for officials as the information they gave out can easily reveal which office deals which such things. I explained this to the officials in the Participant Information Sheet before recruiting them to participate in this study.

1.10 Outline of the Research Report

In chapter one, the research report attempts to problematise the challenge of informal settlements in relation to disasters. This is done precisely in close introspection of the disaster and risk management policy of South Africa which was thought to be misaligned leading to reactive measures than proactive measures against disasters in the country. This leads to chapter two which engages critically with literature on disaster management and mitigation from a global perspective. The chapter sets out the tone of the importance of preparing and mitigating disasters not only as a technical solution but as a way of explaining how societies recover from disasters and the importance of collaboration between different actors in those processes. Chapter three then contextualises this research by giving much background information on Alexandra Township and ultimately, Stjwetla Informal Settlement. Cases of disasters in the settlement are discussed to offset an engagement which the findings of this study which are presented in chapter four. Chapter four responds to the main research questions by focusing primarily on presenting data that was gathered through

face to face interviews with residents, officials and politicians from Stjwetla informal settlement; and through analysing reports on disasters in the settlement. This is then followed by chapter 5 which discusses and analyses research findings. The report concludes by giving a summary of the study and making recommendations.

2. PERSPECTIVES ON THE LINK BETWEEN INFORMAL SETTLEMENTS AND DISASTERS

2.1 Introduction

This chapter attempts to place this study in its scholarly context. As such, it delves into an interrogation of literature on disaster management and mitigation in settlements around the world. The section also discusses literature on flooding in several informal settlements in South Africa. This review is conducted to identify gaps in literature that warrant this research and to establish the existing knowledge on which this research is built. Thus, the literature review is also conducted to answer some of the questions that are raised in this study. The chapter begins by giving different definitions that relate to this study and progresses by presenting different factors that contribute to the development of normal settlements. It also discusses informal settlements approaches from an international perspective and conclude by offering a discussion on disaster risk management both from around the world and in relation to South Africa.

2.2 INFORMAL SETTLEMENTS

According to the World Health organisation (2018), the definition of informal settlements is context specific. However, organisations such as the United Nations Habitat (2017) see informal settlements as irregular settlements. In South Africa, institutions such as the Housing Development Agency and the City of Johannesburg define an informal settlement as an unplanned settlement that is developed on land that has not been surveyed and consists mainly of housing units that are made of shacks (illegal structures). The growth of informal settlements in developing countries is strongly linked to a critical shortage of affordable housing to accommodate many poor and low-income families (UN Committee on Economic, Social and Cultural Rights CESCR, 2017). According to Part 3 of the Housing Code 2009 (DoH, 2009), "informal settlements are characterised by informality, illegality, restricted private and public sector investment, vulnerability, social stress and poverty".

Despite all these characteristics, it should be noted that informal settlements around the world in general and South Africa in particular are also defined in various ways. These definitions differ at various government levels. However, they might carry some of the characteristics stipulated above. Imperative to this study is a consideration of these different characteristics and how they impact on communities in informal settlements in South Africa, or Johannesburg in particular, and authorities tasked to deal with informal settlements. What this suggests is that residents of informal settlements are likely to be vulnerable to disasters given their economic status which might not enable them to use durable materials when constructing their units. In South Africa, they are also not permitted to build with permanent materials because they might be relocated in future. This often contributes to them not building structures that can withhold disasters (for instance flooding or fire), although in my case study area there are important exceptions, as will be evident below.

2.3 Informal Settlements from a global perspective

While more than half of the world's population (approximately 4 billion people) resides in urban areas, about 1 billion people live in informal settlements (Hermanson, 2016). The United Nations (2005) characterised the places of informality according to five deprivations and these are lack of clean water, insufficient living space, lack of tenure security, lack of

durable houses and poor sanitation. Rapid urban migration and natural population growth have also had an impact in the urban development process. The accelerated urban growth is also witnessed in the fast growth of informal settlements. This particular growth raises concerns not only for people living in informal settlements but even for those living in decent accommodation (ibid). What this therefore suggests is that different countries and the world at large should take issues of informal settlements seriously because poor housing, and the fact that households have to resort to informal ways of living exacerbates societal challenges. However, there is more to this point than one can imagine. Despite looking at informal settlement with a negative connotation there is also need to acknowledge that informal settlements play an important role in filling the gap where governments are failing to facilitate urban accommodation and that they give space to individual initiatives in solving aspects of the housing problem (Huchzermeyer, 2013).

It is also important to highlight that there are different reasons why residents choose to reside in informal settlements. According to UN Habitat's World Cities Report (2016), many people around the world opt to reside in informal settlements as a temporary measure. For instance, as people migrate from rural to urban areas, they might look for somewhere to live so that they can establish themselves only for them to move away after that due to various reasons. Burra (2005) observes that in areas such as Dharavi in Mumbai India, some informal dwellers live in informal settlements out of choice. In cases of Ghana, there is proof that a strong urban rural cultural connection plays a big role in influencing one's decision to stay in an informal settlement. In this instance, informal dwellers will require only a place to stay and not a permanent home as they would be regarding their rural homes as their places of permanent residence (Owusu-Ansah et al, 2016). However, in countries such as South Africa and other places of the world, a distinctive characteristic of informal settlements is an inter-generational poverty trap. In this case, as numbers of dwellers of informal settlements increase, so does the levels of poverty (ibid). Given such a context of poverty and deprivation, it would be important to unpack how those informal dwellers that are located permanently respond or deal with disasters such as fires or floods which from a distance appears to be secondary than issues to do with access to food.

While informal settlements have been studied extensively around the world (e.g. Cronin and Guthrie 2011, UN Habitat 2016) in general and in South Africa (e.g. Huchzermeyer, 2010, 2009, 2003) in particular, less attention is given to the state of disaster preparedness and mitigation by residents, different stakeholders and officials in these settlements. Given that in many rapidly growing cities, including those in sub-Saharan Africa (Hendrick-Wong, et. al., 2014), the proliferation of informal settlements beyond the boundaries of the formally recognized city has become the norm, there is no doubt that these types of settlements are not going to disappear anytime soon. These are sprawling outward from the city, usually settled in a haphazard fashion, and are densely inhabited with limited internal infrastructure and services. According to the UN Habitat *World Cities Report* (2016) during the period between 1995 and 2015, low income countries experienced an average 3.68% annual rate of urban population growth while high income countries experienced in contrast 0.88% urban population growth during that same period. These rising figures for the case of developing countries which include South Africa further buttress the point that informal settlements are not going to disappear anytime soon.

However, countries such as South Africa as noted by Huchzermeyer (2011) have witnessed a shift towards promoting in situ upgrading of informal settlements. This commitment is contained within both the national housing programme Breaking New Ground (BNG) and in

the introduction of the National Housing Code in 2004. However, in practice, the state pursued an informal settlement eradication drive (ibid).

> "Even BNG's flagship N2 Gateway Project fell into this trap, despite the Minister of Housing Lindiwe Sisulu providing at least seven reasons why in situ upgrading was not feasible after all" (Huchzyermeyer,2011:151).

Even the recently adopted Upgrading of Informal Settlement Programme has faced criticism for being more appealing on paper but has since failed to take off in relation to implementation (ibid). What this suggests therefore is that due to a number of factors including lack of political will, conditions in informal settlements are not likely to improve soon. It therefore is relevant to carry out a study on informal settlements although with a scope and focus on preparedness and mitigation by municipalities and communities since informal settlement are a permanent part of the South African cities.

2.4 Informal settlements: A resemblance of land scarcity in Cities

There is growing understanding that there is inadequate data on the number of people living in informal settlements worldwide. According to UN-Habitat (1996), the major reason for this in the early 1990s was because there are no data collected in nations each year on 'slum' populations and the data on the specified indicators are inappropriate. However, an alternative way of understanding the populations of people living in informal settlements can be drawn from an approach that looks specifically at different housing markets through which low-income individuals and households buy, build, rent or otherwise occupy accommodation. This highlights the diverse forms of housing that poor urban dwellers occupy in terms of quality, size, price, location (especially with regard to labour markets) and extent of provision for infrastructure and services, and risk of eviction and the extent to which they are exposed to vulnerabilities. From this comes a much more detailed understanding of housing issues and a realization that majority of poor urban dwellers resort to living in informal settlements due to their position in the labour market. Further, this categorisation can also lead to the recognition that low income urban migrants heavily rely on informal settlements (ACHR 2014). For instance, migrants from rural areas, whose main aim is to save money and/ or remit it to their family often choose the cheapest and worst-quality accommodation to keep down costs which turn out to be informal settlements in most cases (ACHR 2014).

In the case of Africa in general, there is no doubt that cities have gone through intense processes of urbanisation over the years. This in turn has attracted movements of people from rural areas, and elsewhere as they search for employment opportunities, better living conditions and improved social services (Vearey, 2010). Ironically, high rates of migration have resulted in competition for land for housing and high living costs in cities. This in turn has led to an increase in the sprawling of informal settlements especially in the margins of cities where land is comparatively cheap or is occupied for free. Coupled with natural population increase, a sombre housing crisis has resulted affecting mostly poor families. While these families find it difficult to commute on a daily basis if they live in the periphery where land is cheap, they also cannot afford to pay for exorbitant rentals charged in the inner city. Consequently, some of them have resorted to residing in open spaces near city centres, in disaster prone areas in informal settlements, under bridges or even in the streets. Their condition of homelessness has made them vulnerable to risks or disasters (Ambert, 2010).

2.5 Disaster in settlements

A common interpretation of a disaster is an unexpected event that adversely impacts on the normal functioning of a society or community (IFRCRCS, 2003). A disaster can cause calamitous material, human, environmental and economic loss which might be beyond a community's ability to cope with, within its own resources (ibid). Informal settlements or irregular settlements, in which poor urban dwellers tend to find shelter are often affected by risk and disaster such as fires (Abunyewah, et al 2018). The extent of disasters in these settlements depend on a wide range of factors which include the levels of social, environmental, economic and physical vulnerability as well as the level of preparedness. Likewise, hazard or risk is a source of danger or potential harm, hence it is closely related to a disaster (ibid).

2.5.1 Disaster as an element of transformation in society

Studies on disaster management tend to focus on understanding disasters as a total collapse of a society or a breakdown of the normal functioning of a community (Musungu, et al, 2016, Drivdal, 2016, Douglas et al., 2008). These studies strongly recommend the adoption of interventions and policies that will quickly avert the impact of disasters once they strike. However, research on disaster management can also enable an understanding of how communities build relations after a disaster has struck. This is further supported by Hilhorst (2013) who argues that, even after a conflict or a disaster, there are both continuities and discontinuities between crisis and normality in a community. It is in unpacking these continuities and discontinuities that we can also understand how these process change societies and people's lives. Additionally, a study of disaster management enables us to understand how relations are shaped, how governance changes and how local power flows (bid). For Hilhorst (2013:12), a study into disaster, conflict and crisis helps us unravel how "people and institutions engage effectively (or not) to frame and overcome the challenges of survival and disasters".

2.3.2 Disaster preparedness

Disaster preparedness can be interpreted as "well researched action plans that can be taken as ways of ensuring that potential disasters are dealt with" (Kent, 1994:11). According to the UN (2013: unpaginated), disaster preparedness, involves "forecasting and taking precautionary measures prior to an imminent threat when advance warnings are possible". The plans of action can range from physical to mental preparedness. Physical preparedness is taking precautionary measures through constructing adaptable building, emergency evacuations and centres of food supplies. Mental preparedness, on the other hand, refers to precautionary measures in respect of training for emergency action and awareness of communities likely to be affected by a potential disaster (ibid).

2.3.3 Disaster mitigation

Disaster mitigation can be defined as a process of planning for disaster over a long term, through putting in place both non-structural and structural efforts (Quarentelli, 2009). Disaster mitigation is done to eliminate or lower the risk of disasters. Unlike preparedness which does not deal with larger causes of disaster, mitigation tries to address the causes of the disaster and therefore goes further. Additionally, mitigation of disasters is also used interchangeably with reconstruction where these terms imply rebuilding or repair with a view to reducing the future effects, should another disaster occur (ibid). It is this last definition, namely repairing in ways that lower the risks of disasters that this research seeks to adopt, through a case of how communities in informal settlements and municipalities respond after a disaster has struck.

2.4 Response and Recovery as reactionary components of Disaster Risk Management

This study emphasises the importance of preparedness and mitigation in the Disaster Risk Management process and these to measures have therefore been discussed above. Their importance to this study as proactive strategies have shaped the conceptual framework underpinning this study. However, it is also necessary to discuss the other two components that complete what is termed the' Disaster Risk Management Cycle' (Vermaak, and van Niekerk, 2004), which are response and recovery. These are presented here with the purpose of complimenting the findings chapter which discusses that reactionary activities that occurred in Stjwetla informal settlement following cases of fire and flooding.

Disaster response entails restoring physical facilities, rehabilitation of affected populations, restoration of lost livelihoods and reconstruction efforts to restore the infrastructure lost or damaged (Joshi, 2008). Disaster response offers inherent important lessons in that it opens flaws in efforts pertaining to policy and planning with respect to location and type of infrastructure and social schemes to improve the social positioning of the poor, particularly with respect to access to resources. As such, disaster response exposes weaknesses in administrative efficiency, logistics, expertise and speed (National Disaster Management Authority, 2006). Disaster response therefore enables the understanding of the administrative response to ensure effective policy interventions to avert future disasters. This will also feed into better institutional preparedness (proactive measures) and long term mitigation policy to counter vulnerabilities (ibid).

Disaster recovery involves implementation of actions to promote sustainable redevelopment (reconstruction, rehabilitation) following a disaster (Warfield, 2008). It covers long-term measures such as rebuilding of houses, assets, infrastructure, schools, hospitals and other public buildings. It is a process undertaken by a disaster-affected community to fully restore itself to pre-disaster level. Recovery is the activity that returns infrastructure systems to minimum operating standards and guides long-term efforts designed to return life to normal or improved levels after a disaster (IFCRCRS, 2003).

2.5 Reblocking as a mitigation strategy against disasters in informal settlements

Reblocking is a recent concept that emerged through collaboration between informal settlements residents and international agencies in Cape Town. The concept involves the enhancement of orderliness in informal settlements through rearranging shacks in clusters to avoid improvised order that happens as the settlement grows. According to City of Cape Town (2013:38), reblocking "essentially involves the realignment of structures in an informal settlement to enable basic services to be delivered, and more usable communal spaces and can also result in reduced fire risk". It is this last part on reducing the risk of fires that relates to disaster mitigation as the space created and material used to re-construct shacks prevent fire from spreading throughout the settlement.

The same key elements of reblocking are also emphasised by Perold and Devisch (2014) who affirmed that the approach is targeted at making dense informal settlements safe to live by reducing the spread of fires. Tomlinson (2017:4) added weight to this and went further to assert that reblocking is "a design and implementation process that is driven by the community and involves the reconfiguration of a settlement layout into one that is more rationalised allowing for the creation of demarcated pathways or roads, public and semi-public spaces all of which opens access for emergency vehicles, the provision of infrastructure and basic services which were not previously taken into account". In the process of reblocking, some shacks get dismantled and upgraded in-situ hence it can form a component of upgrad-

ing of informal settlements. From this discussion, it is safe therefore to maintain that according to proponents of reblocking, its purpose is to make provision for the installation of services, as well as to improve fire safety in informal settlements (Tomlinson, 2017). Once a settlement is easily accessible by emergency services, it also means that evacuation processes are easy to conduct even during periods of fires or floods. As such, reblocking should be thought of as a disaster management strategy.

2.6 Informal settlements as hot spots of disasters

Informal settlements are characterised by different factors that lead to them being vulnerable to different risks. These range from economic, political, social and environmental factors. For instance, in Cape Town, uncontrolled fires are a result of frequent strong winds coupled with the inability by communities to construct their shacks using fire resistant materials (Gibson, 2011). Hence, these fires sweep throughout many informal settlements in the Western Cape, South Africa. Additionally, disasters in informal settlements increase levels of dependence, vulnerability, poverty, hunger and devastation. This places a huge burden and strain on individuals, households, families, community leaders, local governments (Musungu, et al, 2016). In as much as there has been research on these situations, little attention has been placed on unpacking the applicability of disaster management frameworks in averting and reducing the vulnerability caused by disasters in informal settlements. There hasn't been much research on trying to understand the relationship between authorities and communities in preparing for and mitigation of disasters and this research seeks to delve into that analysis.

2.7 Disasters in informal settlements in Alexandra/Stjwetla

The fire incident in Alexandra, in September 2003, notwithstanding subsequent severe disasters, at the time this was understood to have went down into the history of disasters ever to engulf this settlement. Despite causalities that were experienced, the victims of this fire incident began to rebuild their shacks even before the embers had cooled down (Maphumulo, 2003). This signifies that homeless informal dwellers had nowhere to go. Sadly, Alexandra is not the only area with informal settlement affected by fires or disasters. According to Murray (2009), 37,604 fires were recorded in Johannesburg in 1997 alone. Most of these fire cases involved informal settlements. In the decade that followed that year, cases of fire have been at an annual rate of 25% (ibid). A decade later, Alexandra in general and Stjwetla the case study area for this study, continue to experience disasters. As already mentioned in Chapter 1, the area experienced a flood event on the 9th of November 2016 (Eye Witness News, 9 Nov 2016). This incident followed another fire that broke out on 6 December 2018 in the same settlement and destroyed about 500 shacks (Eye Witness News, 6 Dec 2018). It follows from this that previous incidents in Stjwetla that can help us understand how authorities, residents and officials coordinated, and in particular the mitigation and prevention strategies that they put in place after the incidents.

2.8 Disaster Risk Management: The role of collaboration

There has been an increase on the scholarship that sees the importance of collective action in reducing the effects of disasters (Van Niekerk, 2014). To this effect, van Niekerk (2014:862), UNISDR (2005) as well as research by UNISDR's Global Assessment Reports (UNISDR, 2011, 2013) argue that "communities should benefit from the decisions taken at a strategic level and that an incremental process of decentralising Disaster Risk Reduction may be the best way forward" (UNISDR, 2011). Similarly, Tierney (2012:247) notes that "large-scale disasters increasingly require cross-institutional and cross-border collaboration,

as well as complex governance arrangements made up of multiple actors and entities, in order to manage and address the related impacts". It is precisely in international relief arena that this form of decentralisation in involving many actors through collective action in order to achieve disaster risk reduction have been documented. An instance can be drawn from Kapucu's (2011:21) study which discovered that "international disaster relief is increasingly made up of independent actors responding to disasters individually, with their own individual capacities, but ultimately collaborating with each other in order to coordinate their activities and more effectively mobilise disaster relief".

Interestingly, Tierney (2012) takes this discussion further, observing that global trends on disaster risk reduction have been characterised by a shift towards efforts to collaborated and coordinated action among different stakeholders. This observation was made in relation to issues of climate change and large scale disasters but perhaps can also be applied to a study on disaster preparedness and mitigation in informal settlements at a local level. The argument here is that while disasters can strike informal settlements at a local scale, their impacts can be felt regionally, continentally and in the world at large. As such, disasters with transnational effects will call for transnational solutions in order to deal and address them. To this end, Tierney (2012) argues that, given that there are no governments to deal with transnational effects of disasters at the global scale, institutions and processes should be set up at a global level to coordinate different actors and agencies in this area. Whereas transnationalism is not relevant to the Alex case, the point of crossing institutions is that lessons from this global approach can be put to practice at a local level such as in Stjwetla.

Tierney (2012) also puts forward a relevant argument as she purports that at the national level, there should be a shift aimed at achieving collaborative decision making. This shift should involve multi actor networks such as private-public partnerships as a way of responding to outsourcing and contracting (ibid). Perhaps, this line of thinking might achieve fruitful results if considered in the wake of dealing with disasters in informal settlements. Other studies though not related to disaster management, suggest a positive result emanating from shifts from bureaucratic ways of operation to decentralised ones. For instance, Lynn et al. (2001) noted that in the USA, the administration of public policies and programmes have shifted from the traditional centralised ones to place more emphasis on partnerships, collaboration and building networks with third parties such as those outside the government. According to Gupta et al. (2015a:17)

> "the rise of non-state actors in decision-making processes leads to increased public participation in these processes in the 1960s, and a growing emphasis on the decentralisation of government tasks in the 1970s-1980s".

This process has been witnessed in an improvement in subsidiarity and local authorities rather that national governments increasingly make decisions (ibid).

In the context of global South, countries such as South Africa have not been left behind in relation to decentralisation of services as this has become the world's best practice or expectation. However, the decentralisation of the Disaster Risk Management (DRM) has only been evident to a lesser extent although some critiques have noted an improvement in this regard. For instance, South Africa's disaster legislation, the Disaster Management Act No. 57 of 2002 and the National Disaster Management Policy Framework of 2005 are seen as progressive because they highlight and promote "proactive DRR thinking instead of traditionally reactive disaster response thinking, they integrate DRR into the government's hierarchical structure by decentralising responsibilities across the three tiers of South African

government (i.e., national, provincial, and municipal); and it emphasises the need to engage with communities, external actors, and across sectors" (Holloway, 2003; Pelling and Holloway, 2006; van Niekerk, 2006).

Critics, however, have highlighted that there has been failure to translate the South African legislation on disasters management into practice. In this case, the argument is that local municipalities have not been able to establish functioning DRM centres (van Riet and Diedricks, 2010). Additionally, local municipalities continue to lack authority and capacity to implement DRR activities (Van Niekerk, 2014). With all this having been said about DRM and ways of decentralising, it remains imperative to conduct an empirical study with the main purpose of unpacking the roles of both officials and communities in disaster preparedness and mitigation in informal settlements.

2.8 Conceptual Framework

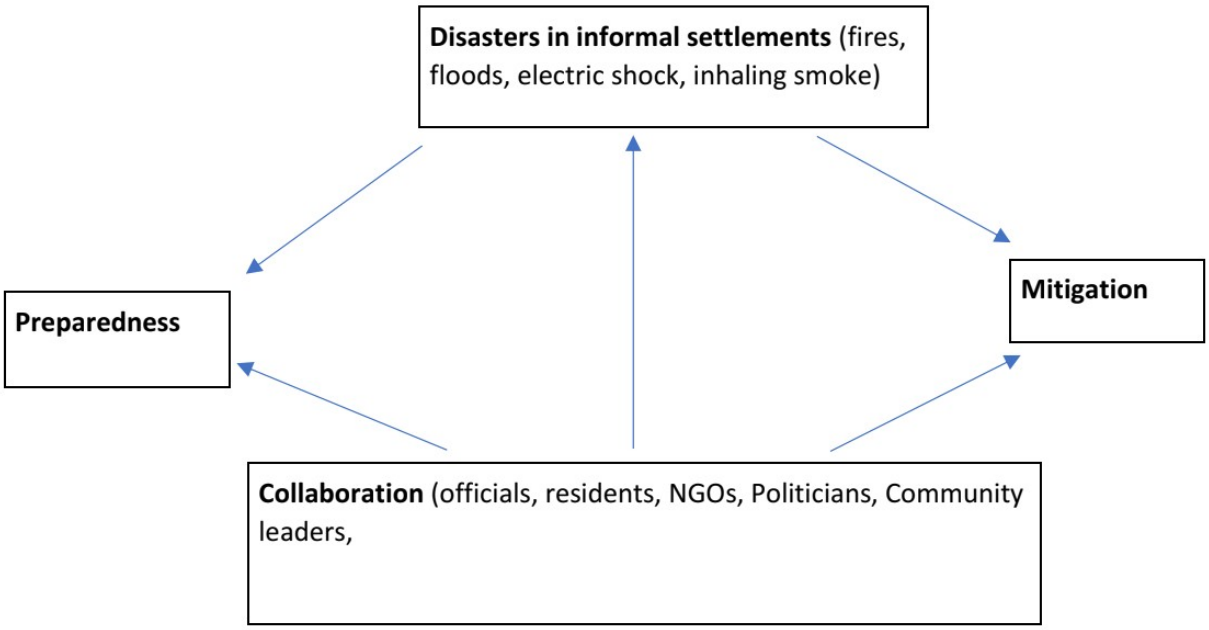

Figure 2.1 Author: Own Formulation

The framework in fig 2.1 above depicts processes that are necessary to respond to disaster in informal settlements. While disasters in informal settlement are likely to be in the form of fires and floods, there is also a possibly that incidents might be induced by inhaling dangerous gases such as that emitted by paraffin lamps and stoves. Suffocation can also be as a result of inhaling smoke from shack fires in informal settlements. As such, the conceptual framework presented here captures actors who should play an important role in mitigating or preparing for disasters. It is these actors who know the different forms of disasters that are likely to affect each settlement hence their collaborative roles are important in ensuring that disasters are averted or their impacts are reduced. The of collaboration also plays an important role through promoting social cohesion within a settlement as all actors are given an opportunity to participate in important activities such as mitigation or preparing for disasters.

2.9 Conclusion

This chapter placed this study within its scholarly context. The chapter began by clarifying the meaning of informal settlement in relation to this study and went further to explain different factors that contributes to the categorisation of informal settlements. Further, literature on disaster, preparedness and mitigation was presented with the purpose of responding to some research questions guiding this study. Particularly, the chapter made a case on the role of collaboration in settlements in order to deal with disasters. This kind of a discussion was important as it showed shifts in approaches to disaster management with the current approach placing more emphasis on collaboration between different actors. It follows from this therefore that the next chapter looks at context of this study and as such discusses cases of disaster management within the South African context.

CHAPTER 3: CONTEXTUALISING DISASTERS IN INFORMAL SETTLEMENTS IN SOUTH AFRICA

3.1 Introduction

This chapter presents the contextual background of this research. It begins by presenting on the South African Disaster Management Framework. This is followed by a statistical presentation of informal settlements in the country starting from the national up to the local level after which Stjwetla informal settlement is also going to be presented. The choice of this case study is based on the fact that the settlement has seen numerous occurrences of informal settlement disasters such as shack fires and floods over the years. In order to contextualise the Stjwetla informal settlement, the chapter begins with a review of informal settlements around South Africa from the national level. It then turns to informal settlements in Gauteng and those in Johannesburg with a view to provide an understanding of the nature in which disasters occurs in Alexandra and subsequently, in the Stjwetla informal settlement. The chapter then presents location maps of Alexandra and Stjwetla with the purpose of showing their location in relation to the Jaskei River which is responsible for many flooding events that have occurred in these areas. This leads to the next chapter which present on the findings of this research as directed and informed by the research questions.

3.2 Disaster Risk Management in South Africa

There are increasing levels of disaster and risks faced by South Africa. Apart from those that are experienced in informal settlements, some of these risks include drought, cyclones and severe storms that can trigger widespread hardship and devastation, and are experienced elsewhere in the country. Some of these risks are associated with South Africa's proximity to other neighbouring countries and can be considered to be both natural and human induced. South Africa came up with a Green and White Papers on Disaster and Management for the first time in 1994 following a period of severe floods in Cape Town Flats (. This paved way for the development of a draft legislation in 2000, which was consistent with emerging international trends in disaster risk reduction. These commitments in disaster and risk management were a result of numerous consultations by the government and different stakeholders.

The commitments were later reflected in the promulgation of the Disaster Management Act, 2002 (Act No. 57 of 2002) on 15 January 2003. The national disaster management framework is the legal instrument specified by the Act to address different provisions of the act such as the need for coordination between different stakeholder in order to reduce disaster and risks. In this context, the national disaster management framework recognises a diversity of risks and disasters that occur in southern Africa and gives priority to developmental measures that reduce the vulnerability of disaster-prone areas, communities and households. Also, in keeping with international best practice, the national disaster management framework places explicit emphasis on the disaster risk reduction concepts of disaster prevention and mitigation as the core principles to guide disaster risk management in South Africa (Vermark and Van Niekerk (2004:556). The national disaster management framework also informs the subsequent development of provincial and municipal disaster management frameworks and plans, which are required to guide action in all spheres of government.

However, a closer introspection into this act and framework suggests that it is reactive rather than proactive.

3.3 Informal Settlements in South Africa

The South Africa Cities Network (2006) observed that as of 2006, 40% of the SA population was residing in the urban areas. Currently, this figure is estimated to be at 60 % by the Stats SA, due to an influx of people to the urban areas particularly towards the 2010 world cup era. However, due to high unemployment coupled with housing challenges in the urban areas, many low income families have resorted to living in informal settlements (Human Development Agency, 2012). Stas SA (2018) also notes that much of the South African population resides in various informal settlement conditions. For instance, statistical distribution according to types of dwellings shows that in South Africa, 77.7 % people reside in formal housing, 7.9% in traditional dwellings, 13,6% in informal settlement and 0.8% in other forms of dwellings (Stas SA 2018). These statistics are also echoed by the Housing Development Agency's (2014) data which shows that the number of households leaving in informal settlement and backyard shacks increased drastically from 2001 to 2009. With this state of informal settlement at the national level, it is also important to present on the state of informal settlement in Gauteng, at a provincial level.

3.4 Informal Settlements in Gauteng Province and Johannesburg

South Africa is made up of nine provinces and this research is being conducted in the Gauteng Province. The province is home to major South African cities of administrative and economic activity such as Pretoria and Johannesburg respectively (Rogerson, 1996). Due to high economic activities in Gauteng, many people migrate to this province to access improved economic and employment opportunities. In 2016, the human population of the province stood at 12,272,263 people (Statistics South Africa, 2016). As a result of the increasing population, the province is grappling with housing challenges, and as such, quite a number of residents stay in informal settlements. Those residing in informal settlements face challenges that include the lack of basic services, infrastructure and sanitary facilities and exposure to risk. In 2012, it was estimated that Gauteng has 339,497 households living in informal settlements, mainly concentrated in Johannesburg, Pretoria and Ekurhuleni (Housing Development Agency, 2012). The distribution of households living in informal settlements in Gauteng Province shows that Ekurhuleni Municipality has the highest number while the City of Johannesburg is the second highest. However, Huchzermeyer et al. (2014) observe that data on households living in informal settlement particularly in Johannesburg is not conclusive.

In relation to informal settlements in Johannesburg, Huchzermeyer et al. (2014) argue that these have grown as part of the development of the city although sometimes displaced by formal development processes emerging elsewhere. After democracy in 1994, the South African government's approach to informal settlement was to provide land, houses and services through the Reconstruction and Development Plan (RDP) housing subsidy strategy (ibid). However, with the introduction of the Breaking New Ground policy, South Africa sought to promote the improvement of the lives of informal settlement dwellers in line with international pledges and declarations. Similarly, the City of Johannesburg drew inspiration from countries such as Brazil where processes of regularising informal settlements through incremental processes were encouraged (Huchzermeyer, 2011:175). However, this initiative was only considered as providing temporary relief while waiting for the provision of housing through the RDP scheme. The process of in situ upgrading informal settlement was only

adopted following the adoption of National Upgrading Support Programme in 2013 under the Upgrading of Informal Settlement Programme (Huchzermeyer et al, 2014:157). In terms of the distribution of informal settlements in Johannesburg, they continue to be concentrated on the Western side of the city with some of them developing in pockets of land near industrial sites. Most of these informal settlements are also located closer to or in old black townships with no informal settlement having been found in formerly white suburbs (Huchzermeyer, et al 2014).

Furthermore, most informal settlements are located near places of economic opportunities such as industrial sites, transport nodes of factory zones (Huchzermeyer et al., 2014). These conveniently located areas also attract both local and international migrants as they seek to search for employment opportunities. Just like the Gauteng province, Johannesburg is characterised by inequalities in respect of access to services, space and income. This scenario was largely caused by the apartheid planning system that was based on racial segregation and discrimination. On average, households made up of white South Africans have much higher incomes when compared to black South Africans (Stats SA, 2018). The same situation transcends into living conditions in the different residential areas. White households still predominantly own and reside in high affluent suburbs while black South Africans reside in township houses, backyard shacks and in informal settlements. This therefore shows that as per the National Planning Commission's 2012 National Development Plan (2030), the spatial dimensions of apartheid, which determine many other dimensions, have not been dismantled. Informal settlements where blacks reside are not well resourced compared to the affluent white suburbs while the population in the informal settlement is growing at an alarming rate.

Additionally, the geomorphology of provinces in South Africa shows that Gauteng is dominated by dolomite landscape. This signifies that informal settlements from this province including those from Johannesburg are vulnerable to disasters linked to dolomitic features such as sink holes. This is further exemplified in the map below.

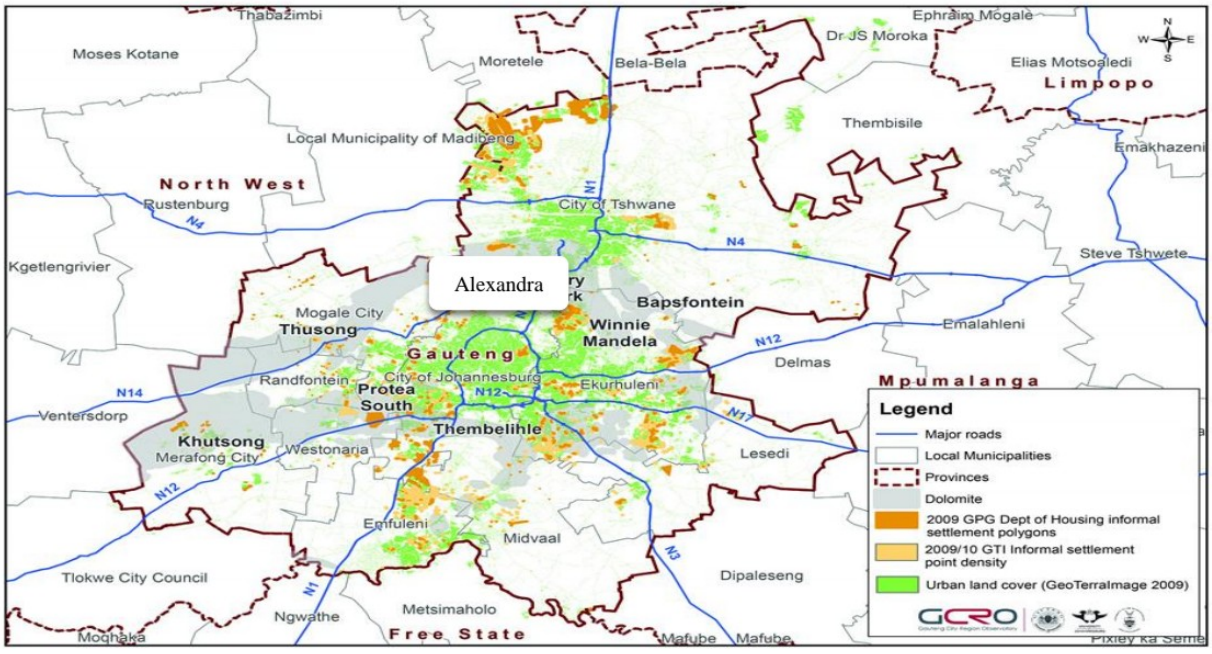

Fig 3.1 Urban land cover, informal settlements and dolomitic ground in Gauteng: Source, Reproduced from Gauteng City Region Observatory (GCRO): GIS geodatabase (2011).

Johannesburg had a population of 3.9 million in 2016 (Stas SA, 2016). According to the Integrated Development Plan of CoJ (2018), in 2016, there were 2.06 million people in Johannesburg living in poverty, 46.36% higher than the 1.41 million in 2006. Similarly, the city has a Gini-coefficient of 0.63 (Stats SA, 2017). The Gini-coefficient is a statistical measure of income inequality. It varies from 0 to 1. If the Gini-coefficient is equal to 0 this means that income is distributed in a perfectly equal manner; if the Gini-coefficient is equal to 1, it means that income is distributed in an unequal manner. In Johannesburg, it has decreased over the period from 2006 to 2016, indicating that the gap between the rich and poor is slowly narrowing. However, collectively, the city together with the province which have a Gini coefficient of 0.63 and the country which has a Gini coefficient of 0.68 is still rated amongst the most unequal in the world (ibid:17). These conditions, according to the IDP (2018), leave 21.5% of all households in Johannesburg living in informal dwelling units where they experience poverty in multiple dimensions including a lack of education, poor healthcare, poor access to basic services such as water and electricity, low to no levels of income, disempowerment, and social exclusion. Examples of such areas include Alexandra Township which is characterised by a number of informal settlements including Stjwetla.

3.5 Alexandra township as a backdrop to the Stjwetla informal settlement

As already mentioned, the case study area of this research is Stjwetla informal settlement in Alexandra. Similarly, in Chapter 1 the focus of the research is to understand how residents and officials prepare or mitigate disasters such as floods and shack fires. Before getting into detail about Stjwetla informal settlement, it is important to give a background to the existence of Alexandra township. An overview of Alex township is presented here in brief and not in a comprehensive form. This is done to set out the historical background that exposed the area to be vulnerable to disasters against the present-day efforts to mitigate or prepare for disasters within the township.

Alexandra, popularly known by locals as 'Alex' or 'Gomora' is located on the north eastern part of Johannesburg. The township is located near the affluent suburb of Sandton and this reveals a glaring picture of the remnants of the apartheid system in terms of residential segregation (Morris, 2000). According to Statistics South Africa (Stats SA, 2017), Alex has a population of approximately 350 000 people occupying 800 hectares of land. This results in a high population density when compared to other parts of Johannesburg. Of the Alexandra population, more than 70% residents are assumed to be younger than 35 years old suggesting that this township is a young population (ibid).

The historical literature on Alexandra reveals that the township was once a white owned farm and was declared a Native Township in 1912 (Zack, 2001). The Native Township was named Alexandra after the erstwhile owner Papenfus' wife in 1904 (Morris, 2004). Unlike other areas in South Africa during this era (before the passing of the Native Land Act of 1913), Alex had witnessed black people purchasing residential land under freehold title. Because the area was located far away from the city centre, there were no tight restrictions (Morris, 2004). With the adoption of polices and laws that restricted the owning or use of property by those classified as black, rapid migration saw an increase in the black population in this area. In as much as this backdrop is the condition through which Alexandra developed, it is important to note that the township suffered huge negligence with regards to service delivery and management. According to Zack (2001), this was caused by the ineffectiveness of the Health Committee which ran the area up to 1958. The poor management negatively impacted on the living conditions and investment in the Township and to this end still reflects the conditions under which the people of Alexander continue to live under.

From the 1950s, Alexandra was characterised by overcrowding which led to the development of informal settlements. Even with efforts that saw forced relocation and resettlement of about 56 000 blacks to Soweto (Meadowlands and Diepkloof) between 1958 to 1973 and about 15 000 to Tembisa (Morris, 2000), informal settlements continued to grow in the area. Alexandra witnessed a further intensification of informal settlements due to the abolishment of influx controls Acts in 1986 as many families including those that came to look for work moved into the township. As observed by Morris (2000), from 1987 to 1991, the number of shacks in Alexandra increased from 7352 to 20 000. Morris (2000:21) notes that "people were so desperate for land and living space that shacks were sometimes erected overnight on roads being prepared for paving". Although it is difficult to account for the number of people living in informal settlements, let alone the number of shacks since some are erected overnight, an estimate of shacks in this township as of 2015 was approximately 34 000 (South African History Online, 2015).

Alexandra township is made up of three parts. The first part is the Greater Alexandra which consists mainly of informal settlements, blocks of flats and hostels. The other part is East Bank which is comprised of lower middle class houses, so-called RDP houses (fully subsidised) and housing units built during the 1996 all Africa Games popularly known as Tsutsumani Housing project (Isserow and Everatt, 1998). Stjwetla informal settlement which is the focus of this research lies on the western side adjacent to the Jukskei River.

According to the 2011 census statistics, the employment rate of Alexandra in 2011 stood at 32%. This figure is above that of the whole Gauteng province which stood at 29% in 2016 (Stats SA, 2016). However, it should also be considered that Alexandra is sustained by the informal economy and these figures represent a conservative definition of unemployment which focuses only on those that are actively looking for formal employment. As such, there are reports that suggest that if those that have even stopped looking for work and are absorbed into the informal economy are considered, the figures of unemployment in this community could be above 60%.

3.6 Housing and Environmental issues in Alexandra and their contribution to disasters

There is a variety of housing structures and stock in Alexandra township. These range from brick houses to informal houses. Stats SA (2016) noted that in 2016, there were about 41 605 units of different types in Alex. The main characteristic of dwelling units in Alexandra are backyard shacks or structures and informal settlement shacks constructed through materials such as plastics, zinc, timber, cud boards among others. Some of these materials such as plastic and wood are flammable and can easily catch fire. Even in situations of bad weather, these materials do little to protect against hazards. Similarly, these units are closely packed due to overcrowding and this facilitates the spread of fires from one shack to the other, allowing entire settlements to be destroyed by one fire. Alexandra is also characterised by very small rooms since most of the units are single rooms and one room is used for multiple functions. According to CASE (1998), this led to an increase in the number of deaths associated with inhaling smoke from paraffin stoves and other related substances.

Additionally, the geographical location of informal settlements in Alexandra on both sides of the Jukskei river has been a major concern to many development agencies such as the Johannesburg Development Agency. Stjwetla informal settlement, the case study area for this research is located adjacent to the Jukskei river with some units lying within the flood plain zone of this river. Some other parts, especially those units located to the periphery of Stjwetla and other related informal settlements are encroaching to the main roads and

waste disposal sites (Mgquba and Vogel 2004). All these scenarios raise potential risks to flooding, accidents and outbreaks of diseases within the settlement.

To take the unfolding argument further, since Alexandra is overcrowded, its infrastructures such as roads, water pipes and sewer pipes are overburdened. There are regular sewer or water bursts within the township. In some instances, the water pressure drops owing to these factors. Residents usually encounter sewage overflows, and this threaten their health and wellbeing (Greater Johannesburg Metropolitan Municipality, 2000). Moreover, many undesignated areas have been used as dumping sites in Alexandra. These areas include vacant spaces near roads and riverbanks. Informal settlements have formed in hazardous environment such as next to the riverbanks. As was noted by The Greater Johannesburg Metropolitan Council (2000:03), "poor waste disposal, coupled with the precarious location, leads to the outbreak of diseases, such as cholera".

However, in 2001, the Alexandra Urban Renewal Project (AURP) was implemented and one of its purpose was to de-densify the township. According to Huchzermeyer, (2003) through the AURP, about 6 000 households were evicted and relocated from the banks of the Jukskei River because the space was identified for the establishment of a park under the programme. The other reason for these evictions was on the grounds of risks of flooding and of cholera, both relating to the Jukskei River (ibid). It was reported that those that qualified for subsidised housing were to be relocated to Bramfisherville while those that did not qualify were to be relocated to Diepsloot, an un-serviced area near Roodepoort on the West Rand (Huchzermeyer 2003:90).

The AURP had also initially identified other challenges in Alexandra such as lack of investment coupled with inadequate planning, most shacks were not connected to the electricity grid with inhabitants resorting to tapping the main power lines, lack of access to piped water into households coupled with uneven distribution of water, poor road network and poor sanitation (Un Habitat, 2009). As such, all three spheres of government as well as the private sector, community organisations and NGOs set aside about R1,3 billion to deal with these myriad of issues. As of 2009, apart from relocation of informal dwellers along the Jukskei river, the project managed to lead to the upgrading of existing housing, development of new housing; transfer of publicly owned housing stock; redevelopment of the hostels; building and refurbishing of schools, libraries, heritage sites, upgrading of road network and improvement of health and social services points (ibid:08).

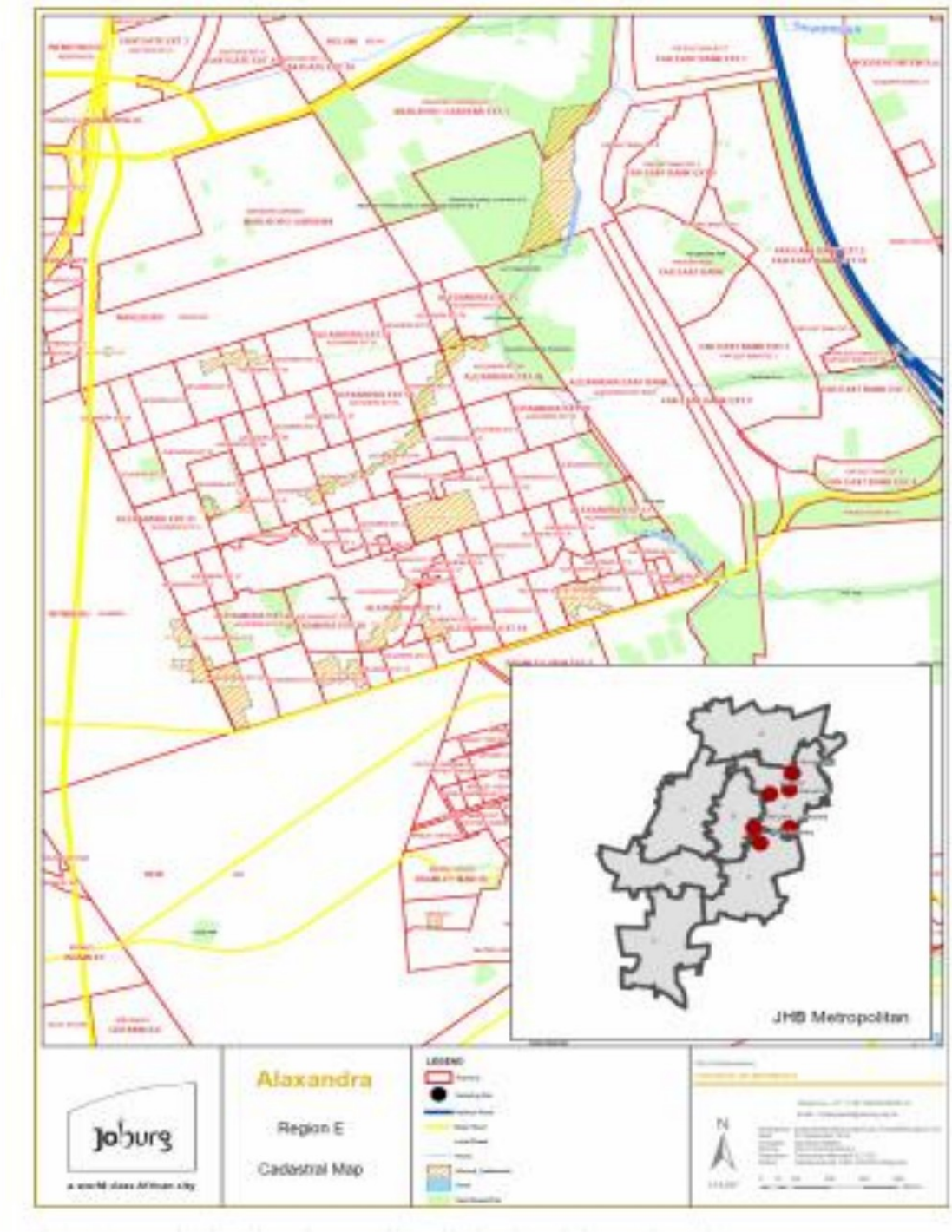

Fig 3.2 A map showing drainage pattern of Jukskei River in Alexandra Township. Source CoJ (2008).

3.7 Stjwetla informal settlement

Located between the Alexandra cemetery and Jukskei River in Alexandra township is the Stjwetla informal settlement, the case study area of this research. The choice of this study area, as was indicated earlier is because the place had witnessed an increase in the number of disasters ranging from fire outbreaks to flooding over the years. The map in 3.2 below shows the location of this settlement in Alexandra Township.

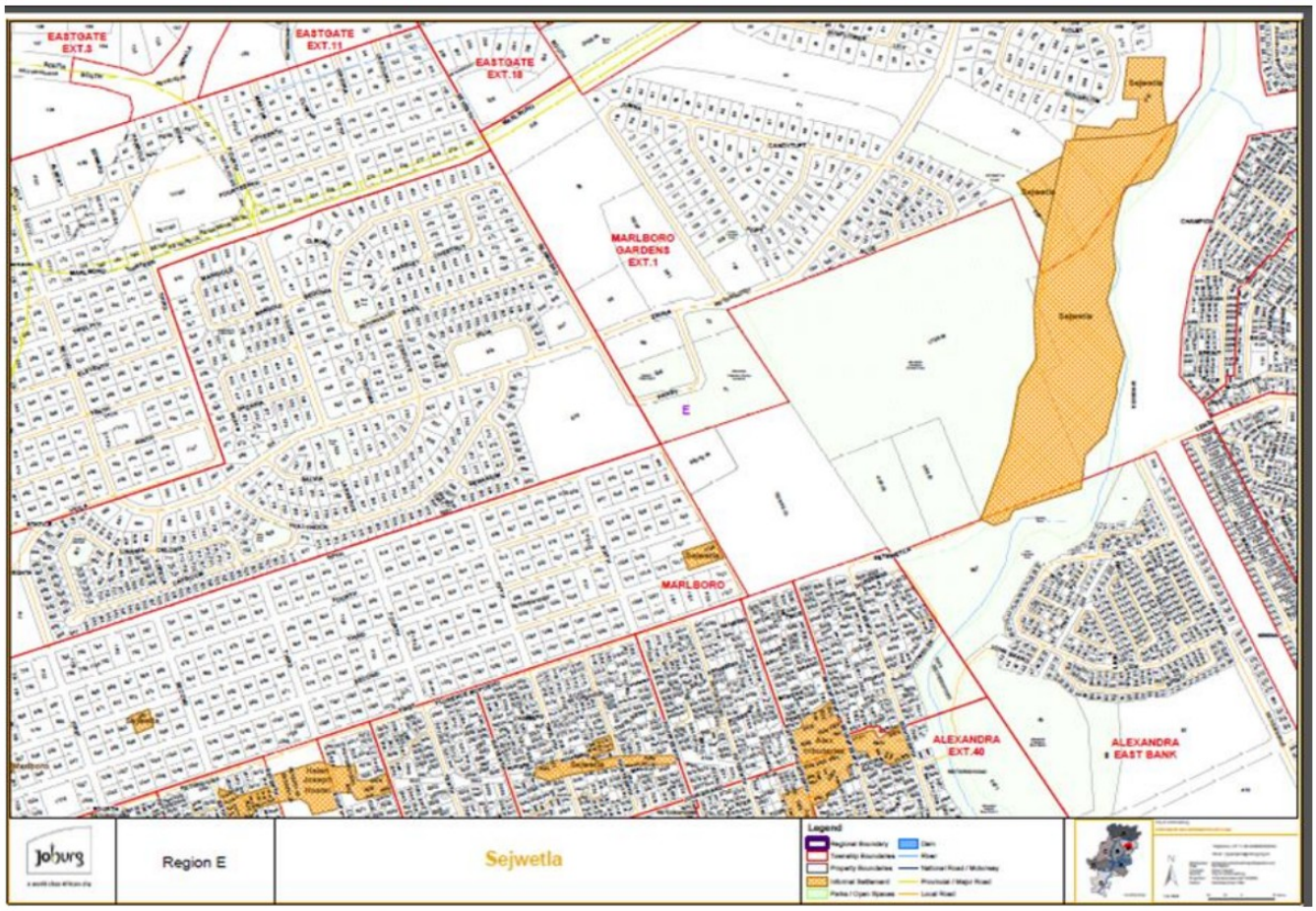

Fig 3.3 Location of Stjwetla Informal Settlement in Alexandra. Source: City of Johannesburg (2017).

3.7.1 Profiling Stjwetla informal Settlement

According to the City of Joburg (2014), Stjwetla informal settlement was home to about 5 000 people in 2014. The city of Joburg had carried out a documentation process that saw about 4,317 people being registered as residents of this settlement in 2005. However, these figures are thought to be fluctuating considering that there are high rates of inward and outward migration within the settlement. Interestingly, and as part of the focus of this research, Stjwetla informal settlement experienced floods in 2016 (Alex New, 09 November 2016). It would therefore be important to engage with residents and officials as a follow up to this incident, unearthing how roles and activities were coordinated and identify some of the measures that were taken to mitigate the flooding event.

3.7.2 A brief Historical Background of Stjwetla informal settlement

According to the City of Joburg (2014), Stjwetla informal settlement was first formed in 1995. The settlement grew rapidly due to high rates of immigration from people looking for employment opportunities in the light industrial areas nearby. As the number of inhabitants

increased, so did the number of shacks within the area. The settlers used timber and plastic to construct their shacks.

In 2005, there was need to relocate Stjwetla informal settlement because it was found to be located on a landfill (CoJ,2014). The Alexandra Housing and Land Strategy was approved in 2005 by the City of Joburg to prioritise the relocation of the settlement. About 1584 households were relocated to the Far East Bank/ East Bank after the construction of RDP houses (ibid). However, this move did not result in the decongestion of the settlement instead there was an increase in the inward movement of people with many families expecting to be allocated new RDP houses just like their counterparts. The newcomers occupied the vacated portions, and this made the settlement extremely congested (City of Joburg, 2014). Following the flood incident of 2007, many families were affected. However, as part of upgrading informal settlements, temporary measures were taken to provide services within the settlement. These included the provision of chemical toilets and community taps within the settlement.

A part of the settlement was also electrified through a strategy popularly known as settlement 'reblocking'. Some residents of Stjwetla were moved to an upper Southern part of the settlement to create space for the erection of electricity poles (CoJ, 2014). With the motive to reduce disaster associated incidents and to decongest the settlement, the municipality constructed 750 new tin shacks to cater for the relocated residents (ibid). However, a section of Stjwetla informal settlement remained without being electrified as residents refused to move to pave was for the power lines to be put in place. As such, a revisit to this area was necessary as it enabled the evaluation of the role that the reblocking strategy played as a way of preparing or mitigating for any disaster within the settlement.

Lastly, this section might not be complete without discussing the role that non-governmental organisation plays in Alexandra township and Stjwetla informal settlement in dealing with vulnerability and disasters. One such organisation is the Gift of the Givers which has played a significant role in offering a number of donations in Alexandra. Most importantly, this organisation approached the City of Joburg and offered to build houses for elderly women and single mothers who were residing in Stjwetla informal settlement in 2013 (City of Joburg, 2014). This was after the realisation that more than men, women and the elderly were affected by floods and there was a need to assist this segment of the population in the settlement. This made the municipal council to justify its removal of units/shacks that were on the riverbanks. 70 housing units were constructed with the intention of reducing and withstanding disasters and these were built using prefabricated and fireproof materials.

3.8 Conclusion

This chapter presented the context of this research. The chapter managed to configure the development and existence of informal settlements in South Africa and narrowed this down to Gauteng province. Statistical information and the historical background to the development of Alexandra and Stjwetla informal settlement presented here revealed that even though the municipality has made efforts to decongest these settlements, the number of shacks in these areas continue to grow. This discussion was vital as a way of providing a context through with efforts to mitigate and prepare for disasters are happening both in Alexandra and Stjwetla informal settlement.

4. UNRAVELLING CASES OF DISASTERS IN SJWETLA INFORMAL SETTLEMENT

4.1 Introduction

While Stjwetla informal settlement has witnessed disasters particularly in the form of floods in recent years, efforts to respond to these incidents have seen an improvement in collaboration among different stakeholders. This chapter presents the findings of this research as was guided by the main research question and different sub-questions. As mentioned in the first chapter, the findings were derived through in-depth face to face interviews with municipal officials, residents, community leaders and NGOs and government reports. Different themes emerging from the analysis of the interviews are presented and direct quotations are used to adequately capture these themes. The main purpose of these findings chapter is to respond to the main research question which sought to understand the role of municipalities, communities and NGOs in disaster preparedness and mitigating in Stjwetla informal settlements. As such, this chapter begins with a brief background of administration or organisation of the Stjwetla informal settlement in order to give a perspective to the different plans and actions that are in place to prepare and mitigate disasters in the settlement. This is also useful as a way of giving context through which the findings were obtained. Thereafter, the chapter will present information on the subject under study by focusing mainly on the emerging themes.

4.2 Governance of Stjwetla informal settlement

While the main thrust of this research was to understand the roles of communities, NGOs, and municipalities in preparing and mitigating disasters, the state of community organisation and administrative issues were important as a first step towards understanding this topic under study. Through the interviews with different respondents which included key informants, it was clear that Stjwetla informal settlement has leadership structures in place. The structure is called Stjwetla Development Committee comprising of about seven committee members chosen by the residents after every two years. These are a Chairman, Vice chairman, Secretary, Treasurer, Housing Leader, Youth leader and Infrastructure and Development leader. The main purpose of the committee is to necessitate engagements and dialogue between the City of Johannesburg and the community of the Stjwetla informal settlement. The committee is also responsible for coordinating activities between the community and other service providers such as the Gift of the Givers, City power and Joburg water. Apart from that, the committee convenes meetings once a month to discuss development issues and welfare of the community. Important to my research is the role that the committee plays in enforcing some rules and regulations that can either decrease or increase the vulnerability of the community to disasters. For instance, one committee member revealed that:

> After having seen how fast this informal settlement was growing, we decided to have a unit that focuses on infrastructure and development in this settlement. This unit has a responsibility to ensure that people don't construct their shacks closer to Jukskei River so that they are safe from flooding. The unit also looks at issues that has to do with maintenance of roads, provision of services such as electricity and water (Interview with a respondent, 2 October 2019).

The Development Committee in Stjwetla informal settlement has another unit tasked with different responsibilities that are focused on developing the settlement. These responsibilities include ensuring that services such as water, sanitation and electricity are delivered to the settlement. However, interviews conducted with some residents from the settlement indicated that the effectiveness of the Development Committee is very limited. This was also confirmed by my observations made through a walk around the settlement of development processes happening around the area. For instance, while committee members claim that they try to restrict the construction of shacks in disaster prone areas, the flood plain of Jukskei River is fully occupied by shacks suggesting that many families are exposed to disasters such as floods especially during the rainy season. In relation to this, one community leader argued that:

> See my brother, issue here is not about us as leaders fighting with residents on where they should build their structures. While we try to ensure that the community is organized and no one builds their shacks in disaster prone areas, we must also understand that the challenge here is about land scarcity. These other issues you hear about Stjwetla are just but a trigger to the main problem (Interview with a respondent 3, October 2019).

These sentiments about the scarcity of land in Stjwetla were also echoed by other respondents who I engaged in this research through interviews including those from the CoJ. There seems to be consensus also that if the challenge of space or land to develop a settlement is resolved, all the other ills and struggles that resident in Stjwetla are facing in relation to infrastructure provision and disasters can be controlled.

Migration is a major contributor to land scarcity in Stjwetla informal settlement. The research unearthed that most of the community leaders have roots or links to the Limpopo province. This was observed during interview with residents as 6 out of 8 of them confirmed that Tsonga is their first language. Upon further probing on whether XiTsonga is the dominant language in the settlement, most of the respondents that were interviewed suggested so. However, the community also comprises of people from Mozambique, Zimbabwe, and those from other provinces in South Africa. Residents indicated also that most community members are fluent in XiTsonga even if they are not from Limpopo and the leadership usually addresses community meetings in this same language. Upon enquiring further why Tsonga speaking people seem to be the majority within this settlement, one respondent indicated that:

> See, the issue of home girls or home boys is every effective here. Most newcomers that arrive in the settlement know two or three families or friends that are already established within the settlement. It is these families that would have necessitated their coming in here. It is very rare to see someone coming to stay here for the first time when they don't know anyone. So, I can say, family or relationship links that can be traced back to people's rural areas are responsible for this kind of population distribution (Interview with a respondent 5, October 2019).

Another respondent also shared the same point though in relation migrants from Mozambique.

> I came from Mozambique ten years ago and at first, I resided in Tembisa with my Uncle. I was later on called to stay here by my friend whom I knew as we grew up together back home. At first, we stayed together in the same shack but as time went by, I managed to find my own space and currently I have a two roomed shack with my own family (Interview with Respondent 8, October 2019).

These revelations indicate that there is a strong linkage between one's family in the settlement and those that she/he left back. Arguably, this migration trend suggests that since Tsonga the dominant language and culture within the settlements, there is a strong migration link between the Limpopo Province and Stjwetla informal settlement. This movement form within South Africa to the settlement therefore lead to land scarcity.

Apart from this form of migration that has led to land scarcity, the other demographics also account for the continued competition for space to live within Stjwetla informal settlement. Other languages that are spoken within the settlement include Shona from Zimbabwe, Zulu, Sepedi and Venda among others. Even if some participants were not keen to share their background information and their migration patterns into the settlement, this is evidence enough that Stjwetla informal settlement receives people from within South Africa and other countries.

Interviews conducted with different respondents indicated that Stjwetla informal settlement has more women than men although this could not be verified by official reports. The enumeration process that was done by the CoJ in 2014 towards the electrification of part of Stjwetla informal settlement established that the settlement had about 5000 people. However, a breakdown of the demographic details of this population is not available.

4.3 Interactions between the community and government including different organisations

As was highlighted earlier, the Stjwetla Development Committee is the immediate point of contact between the municipality and the settlement. However, since the settlement falls under region E, the councillor of this ward also plays a fundamental role in linking the community to different government structures. From a political point of view, the Councillor is referred to as a 'foot soldier' as a he spent much of his/her time within the settlement assisting residents in different ways that include provision of services (Respondent 6, October 2019). A former councillor who was interviewed in this research had this to say about the role of a councillor:

> When I was a councillor here, I used to oversee development in these different informal settlements. By development I mean ensuring that the settlements have running tap water, electricity, movable toilets among other things. If there was an emergency within the settlement, I would quickly contact the relevant people within the municipality so as to get help. So, in other words, I can say that a councillor is the one who knows what is needed within the settlement (Interview with a former councillor, October 2019).

This role of the councillor resonates with what is stipulated in the Constitution of South Africa namely that the responsibility of local government is to provide basic services such as sanitation, water and electricity (Republic of South Africa 1996: Section 7). The councillor therefore plays an important role in coordinating different activities to ensure that these basic services are provided within the settlement. Through different local government departments, the municipality also provides institutional support to different settlements to ensure that the needs of communities such as housing are met. However, all residents of Stjwetla informal settlement interviewed in this study indicated that the Municipality is not doing enough for the settlement. All of these respondents were not aware of the government's policy on Upgrading of Informal Settlement Support Programme. Residents also noted some positive initiatives by the municipality and the Councillor in their settlement, such as the provision of chemical toilets with also an improvement in the emptying of these toilets on a daily basis, but were not aware that this is part of the UISP. It was however

disappointing to note that the community does not keep any form of documentation in relation to achievements and setbacks in as far as development is concerned within the settlement. It was difficult for me to verify facts of some of the things that respondents where alluding to.

4.4 Forms of disasters in Stjwetla informal settlement

From recent media reports, it was evident that the settlement has experienced several flood events over the past decade. While my respondents are not representative of the whole community of Stjwetla, it was interesting to note that the majority of the participants admitted that Stjwetla informal settlement is more prone to floods than any other form of disasters. A minority indicated that the settlement is affected primarily by fires. An official from an NGO which has been involved in this settlement from the early 2000s shared the view of most of my respondents:

> I can confirm that there have been more cases of flood incidents than fires within this settlement since time immemorial. Since my involvement in Stjwetla, we have responded to more cases of floods than fires (Interview with NGO official 1 15, October 2019).

Officials from the municipality also confirmed that Stjwetla informal settlement has experienced more flood incidents than fires. However, they added a different voice in relation to the magnitude of these floods when compared to fires. This is what one official had to say:

> There is no doubt that this settlement has experienced more flooding incidents than fires over the years. However, you also have to understand that these flood events are seasonal unlike fires that can happen at any time of the year. Floods usually affect families that are closer to the Jukskei River while fires are not selective (Interview with CoJ Official 11, October 2019).

There are also people who believe that Stjwetla experiences more fires than floods over the years. They base their argument on the fact that there is a tendency of not regarding all fires as threatening incidents. One of these respondents maintained that:

> The only issue is that some fire incidents which were experienced in this settlement did not get the attention of officials and media as floods do. I think there is a tendency by the public of thinking that if a fire affects three or four families, it should not be regarded as a life-threatening event. To me these small fires deserve attention because they also affect this informal settlement in one way or the other (Interview with respondent 8, October 2019).

From these two opposing opinions about the most prevalent form of disaster in Stjwetla informal settlement, one can pick out that the contestation lies within the impact of the two, fire and floods. While floods can be devastating, in terms of destroying people's property and lives, their impact cannot be compared to fires. Fires are potentially disastrous and can wipe out an entire settlement. After a flood has struck, people can still go back to their shacks while in the aftermath of a fire, chances of people to gather their belongings are slim as they would have been burnt by fires. This thought was also seconded by one of the non-governmental organisations that have worked in Stjwetla informal settlements:

> Yes, we have responded to many cases of floods here in Alexandra as a whole but if you look, for instance, the pylon fire that was experienced in 2018, the impact was

> so [much more] devastating than what we have seen before even in flooding events (Interview with a respondent 12, October 2019).

The pylon fire event in Swjetla informal settlement is also a contentious issue. On one hand, local people and media reports that one our pylons and the overhead lines from the pylon fell on the shacks resulting in them catching fire. In this regard the assumption was the falling of the overhead cables sparked the fires that spread throughout the settlement burning shacks. On the other hand, one city power official contacted for this research rebuked these claims. He claimed that the fire had started way before the falling of the pylon. In this case; the shack fire is being blamed for having weakened the pylon leading it to fall.

Nonetheless, various media reports highlighted that the 2018 Alexandra fire was declared a disaster by the CoJ. The declaration was made because the city was overwhelmed by the impact and could not cope with its own resources in assisting those that were affected by the fire. As it was highlighted during interviews with officials from the CoJ, the city had to engage the Province for assistance and in turn, many other organisations such as the Red Cross Society and Gift of the Givers came on board to assist in providing temporary shelter, food, clothes, and help residents rebuild their shacks.

Another form of disaster that has been experienced in Stjwetla informal settlement is death of minors due to inhaling dangerous smoke or gases. Residents confirmed during the interview that before electricity was supplied to the informal settlement, they relied heavily on paraffin as a form of energy. They used this both for cooking (paraffin stoves) and for lighting (paraffin lamps). Only a part of the settlement is electrified and while some of the residents who reside in the part that is not electrified rely on illegally connected electricity, there are those who still use paraffin as a source of energy. Inhaling problems are also experienced in cases of fire outbreaks due to smoke that is released. One participant confirmed this and went further to add that:

> During fires here in the informal settlement, our fear is not only about losing lives to heat from the fire but also the complications that come from inhaling smoke from these fires. Remember some residents use materials that emit dangerous gases when burn to construct their shacks. I am not a health expert, but I believe that the after effects of inhaling these smokes are quite serious to one's health than we can ever imagine (Interview with a respondent 8, October 2019).

4.4.1 Causes of floods in Stjwetla informal settlements

Floods are a natural phenomenon, but their impact can be triggered by human activities. This research sought to understand what kind of activities dwellers in Stjwetla engage in that have a negative impact of the occurrence of disasters with the settlement. Another response that emanated from residents is that the informal settlement is located near the Jukskei River hence its prone to flooding. Another view that was important to note is that Stjwetla informal settlement is located on a site that was once used as a dumping site. What this entails is that, materials that were long buried underground such as plastics prevent water from draining and therefore make the settlement damp. One community leader shared his sentiments in relation to this:

> This area is a danger zone on its own. We are living on top of a dump site and if you dig some centimetres metres into the ground, you will see plastic in there. As you can also see, this place is watery and chances of shacks to be washed away in cases of intense rainfall are very huge (Interview with respondent 1, October 2019).

A tour of the settlement through a transect walk also confirmed the sentiments presented above. Many sections within the settlement have water running on the surface even though this was done before the onset of rainy season in the area. The amount of the water flowing on the surface throughout the settlement is also increased by the leaking of communal taps suggesting that this contributes to the dampness and swampiness of the area. This is further explained in the picture taken from Stjwetla fig 4.1 below.



Fig 4.1 Layers of materials buried underground in Stjwetla informal settlement. Source: Own 2019

The significance of the image above in relation to this study is that these layers have rendered the ground less durable such that the whole area has become prone to erosion during incidents of flash floods. In some cases, the plastic buried underground prevent the water from infiltrating into the soil thereby increasing the chances of surface runoff which contributes to the occurrence of floods but in a minimal way since the floods are caused by the water collected upstream of the Jukskei River. The ground also affects the construction of housing or shack foundations thereby making the units to be constructed less durable and likely to be washed away by rains with heavy winds.

Flooding in Stjwetla informal settlement is also triggered by human activities such as dumping closer to the river therefore blocking the water way, building on top of waterways or drainage system and building shacks in the flood plains of Jukskei River. While most residents I interviewed expressed ignorance on how some of their own practices increase the impact and chances of flooding within the area, those that participated in this research were aware that staying closer to the Jukskei river increases their chances of being affected by floods. One resident could not mince her words when asked about how it is when staying near the river banks.

> I will never forget those years before coming to stay here at Green Village. I vividly remember one night when I was sleeping with my two children and all of a sudden,

> we saw water entering our shack starting from the floor up until it reached the side of my bed. Going out was not an option because it was raining heavily. We stood up the whole night and by this time water was reaching our knees. Luckily our shack was not taken away by the floods (Interview with respondent 7, 0ct0ber 2019).

Many respondent shared the same experience that during periods of rainfall, they sometimes could not stay inside their shacks with fears that if water in the river rises above the flood plain, they might be affected. Another respondent added to this:

> I stayed there near the foot bridge by the Juskei River from 2006 to 2013. The situation was bad, but we had to soldier on because we didn't have anywhere else to go. I remember our shack being washed away twice by floods during the time I stayed there. Luckily, we were offered this accommodation here at the Green village the second time my shack was swept away by water (Interview with respondent 8, October 2019).

This same experience was aired by another respondent in a separate interview:

> I arrived at Stjwetla in 2011 residing in a shack on the Jukskei River bank and it was not safe. They moved us to this place (Green Village) and our shacks were demolished. At one point during a disaster, we couldn't move out of the shack. We went for days without food until the flood was under control. My neighbour from Mozambique was swept away by flood till to date she was never found (Interview with respondent 6, October 2019).

Residents that reside in these structures are in danger of being affected by flooding anytime. However, the brick structure resembles how residents have adapted to living on the margins of banks of the river by constructing more durable structures than those constructed in plastics or wood as the one shown below in Fig 4.2.



Fig 4.2 Structures located in the flood plains of the Jukskei River in Stjwetla Informal Settlement Source: Own (2019).

The banks of the Juskei Rive are falling inside even when it's not a rainy season. This means that residents who reside on these banks are not only vulnerable to incidents of flooding, but their shacks can also be affected by the cutting down of the river's banks. This is further shown in the picture in fig 4.3 below.



Fig 4.3 The banks of the Jukskei River falling inside. Source: Own (2019)

Furthermore, there have been several attempts to relocate residents from the banks of the Juskei River in Stjwetla informal settlement to various places including the Green village constructed adjacent to Stjwetla by the Gift of the Givers, a non-governmental organisation which has been heavily involved in the informal settlement in assisting victims of flood and fire incidents. However, the vacant space left near the river after relocation was quickly occupied by other residents who expose themselves to the dangers of being affected by flooding. This is what one residents had to say in relation to this.

> Listen here, the challenge that we have is land. People are quick to occupy any land that is left vacant in this settlement because they don't have places to stay. Of course, there is also a reality that when someone exposes themselves to danger like

> settling in the flood plains near the Jukskei river, they are likely to catch the attention of government officials. The issue here is not to judge or blame those who settle in river banks, we need to probe further to understand why we got here in the first place (Interview with a respondent 6, October 2019).

Another respondent echoed these:

> This place is very congested, highly populated and this had made people to resort to living just on the bank of the river. The place on its own is not fit for settlement because even the provincial government Housing Department discourages people to settle on a dumping site and yet surprisingly, they have played a huge role in the electrification of some units in this area signifying that people are not going to be moved away (Interview with a ward committee member, October 2019).

Additionally, imperative to this section is an incident of flooding that occurred in the Stjwetla informal settlement on the 9th November 2016. All the participants involved in this research remembered this incident very well. While this incident shall be touched on in greater depth in the section on disaster preparedness and mitigation, it is important to present briefly what transpired here. One of the community leaders from the settlement narrated how the incident happened.

> The most devastating disaster event that was experienced here was in the form of a flash flood which occurred in November 2016 during the afternoon. The floods were caused by a heavy rainfall that was received in the area and including those that are surrounding this settlement. The whole settlement was affected, 200 shacks were swept away, 376 households and 889 people were affected. One casualty was also recorded, and the most affected families were those that reside along the Juskei Riverbanks (Interview with respondent 1, October 2019).

With this presentation on the causes and incidents of floods in Stjwetla informal settlement, it is necessary to also present findings on the causes of fires within the same settlement. Thereafter, the chapter will pay attention to measures in place to prepare or mitigate disasters in Stjwetla informal settlements both by residents, NGOs and officials.

4.4.2 Causes of fire in Stjwetla informal settlement

Most participants who were interviewed in this research indicated that fires are usually caused by informal connection of electricity within the settlement. An official from City Power complained that:

> There are electrical technicians in the settlements who are even hired by the residents to connect electricity in their shacks illegally (Interview with a City Power Official, October 2019).

However, one resident supported the informal connection of electricity as she went on to argue that:

> 'Izinyoka nyoka' meaning illegal connection of electricity, is the problem here that leads to most fires but what can people do because they cannot afford to connect electricity legally due unemployment. People are poor here (Interview with respondent 6, October 2019).

The above sentiments contradicted what I was told in the settlement. Even through there is a section of Stjwetla that was electrified legally through a programme to improve service delivery in the area by City Power and the Department of Housing (CoJ), one resident mentioned that people from this section are not paying for electricity. An expert from City Power explained that residents had since bridged electricity and the metered system doesn't work anymore. A former councillor also shed some light on this situation as he went on further to argue that:

> My brother, the issue here is that the whole of Alexandra is not paying for electricity. This made it difficult to enforce people from Stjwetla to pay when they are aware that their neighbours are not paying. What do you expect people to do under such circumstance? They end up doing the illegal thing which is to bridge or connect electricity illegal (Interview with a former councillor, October 2019).

I was interested in understanding the conditions through which an informal connection of electricity can cause a fire. An expert from City Power shed more light about the matter.

> You see, cables that are used in these illegal connections are not suited for that task. Much of them are overloaded by electricity and sometimes they spark. If that happens near plastic shacks the chances of the settlement to catch fire are very high (Interview with an official from City Power, October 2019).

The informal connection of electricity also meant that every shack in Stjwetla can now access electricity. Residents also indicated that the electric cables used for illegal connection are lying almost everywhere in the settlement such that they have not only become a risk in causing shack fires but can electrocute residents in the settlement. Even those that are not experts in electricity confirmed during an interview that these illegal connections are a danger particularly in period of rainfall as they can send electrons in the flowing water thereby affecting anyone around the vicinity touching that water.

One respondent spoke on how people connect electricity illegally in the settlement

> People who assist us in connecting electricity here are well known technicians. They charge us say R100 depending on the distance of where you are connecting your electricity from. They actually make a living out of it because what they only consider is your ability to pay them and the rest is theirs to ensure that electricity reaches your shack despite the state of your shack (Interview with Respondent 6, October 2019).

At the same time, I observed that some shacks in Stjwetla are constructed using materials that can easily catch fire. This is also worsened by the reality that due to lack of space, shacks in Stjwetla are very close to each other such that if a fire affects one shack, its chances of moving to the other shacks surrounding it are very high. A small fire has the ability to consume the whole settlement in little time. At the same time, some residents within the settlement noted the dangers of fire quickly spreading from one shack to the other and have resorted to constructing their shacks with bricks, block and zinc sheet.

Additionally, residents have proved to be rational actors by maximising their small spaces in Stjwetla even in the wake of disasters occurring at any time. For instance, in the picture below, fig 4.4, while the structure is constructed of wood materials which is highly flammable, it is also quite relevant to observe that the resident is trying to maximise the usage a space within the settlement. In relation to disaster especially floods, the resident can move

up to the first floor while waiting for help to arrive. However, it would also be I important to observe that the structure may not necessarily be strong enough to withhold a strong current in a flood. Many brick houses build double storey would more likely survive a strong flood hence there is need to safeguard residents of informal settlements against disasters.



Fig 4.4. A picture showing a double story shack constructed by a resident in Stjwetla informal settlement Source: Own (2019).

In addition to the informal connection of electricity, respondents also indicated that some fire within the settlement are caused by negligence. For example, people might forget to switch off their electric appliances thereby causing fire within the settlement. In such instances, putting out the fire might be difficult due to the materials used to build shacks, as was highlighted earlier. A respondent shared his thought about this practice:

> Believe it or not, all the shacks here have access to electricity. Some people use this electricity for different reasons, and could you believe that some actually use electricity to heat up a railway bar or shopping trolley to turn these into heaters during the winter season. These are practices that are likely to trigger the occurrence of fires here in Stjwetla (Interview with a former councillor, October 2019).

Another revelation from the interviews in relation to how fires are started in the settlement was that there are cases where residents take their personal grudges and fighting to another level. What this means is that when there is tension between two parties within the settlement, one party can decide to punish the other by setting their shack alight. This fire will not only consume the intended target but will quickly move across the entire settlement. A resident confirmed this by adding that:

> In 2017, we had a case here where some men had a fight while on a drinking spree. One of them rushed back to his place and hours later, someone set his shack alight while he was inside. The fire went on to consume other shacks which were nearby and fortunately no one died as a result of the incident (Interview with respondent 9, October 2019).

Additionally, officials also indicated that while there are fire hydrants in Stjwetla informal settlement, it is now very difficult to access or use them as they are already buried underground due construction of shacks in places residents should not have encroached. This has made it difficult for the firefighters to put out flames in the event that there is a blaze within the settlement (Interview with respondent 9. October 2019). This shall be expanded upon further in the section on challenges. The following section touches on the measure to prepare for or mitigate disaster by both the communities and officials from CoJ and other relevant stakeholders.

4.5 Measure to prepare for disasters in Stjwetla informal settlement

There have been numerous action plans implemented in Stjwetla to prepare for disaster both by the CoJ through the Department of Disaster and Risk Management and the Housing department, by residents and non-governmental organisation. Imperative to these measures is the initiative of reblocking a section of the settlement. A housing officials explained this process:

> Reblocking is a concept that was developed by Shack Dwellers International (SDI), a network of community-based organizations of the urban poor. The process entails activities where shacks are reconstructed and rearranged to maximise open space. It allows shacks, which often spring up organically and in unsystematic ways, to be realigned in clusters so that clear spaces can be used for the benefit of residents (Interview with respondent 11, October 2019).

Apart from understanding the definition of reblocking, I had to probe further to understand how this intervention worked in Stjwetla informal settlement. The official added:

> We as the City of Johannesburg played a crucial role in the re-blocking exercise in Stjwetla. Of course, this was after consultation with local leaders in relation to how

> they wanted their settlement to be reorganized. What we did then was to redesign the settlement and provided tin shacks. We also engaged Joburg water to provide water and city power to electrify the community (Interview with CoJ Officials, October 2019).

The revelations above suggest that there was community engagement to some level during the reblocking process. Further conversation with respondents also indicated that the Department of Housing from CoJ played a role in registering and allocating residents different shacks. Imperative to this was that the shacks that were constructed were strong and durable and they could withstand pressure from rainy winds or floods. Similarly, usage of blocks bricks and steel sheets to construct shacks meant that the units were no longer vulnerable to shack fires. The space that was created between shacks was also important in allowing emergency services to reach any part of the settlement in cases of disasters (Interview with CoJ Official, October 2019).

The official also indicated that:

> The shacks we constructed here were built on foundations that prevents water from pooling underneath homes and seeping into their interiors. This has significantly reduced flash floods and community members have also a greater chance of staying healthy (Interview with CoJ Officials, October 2019).

It is also quite important to understand that the process of reblocking plays a significant role in cementing relationships between communities and government officials. In the case of Stjwetla, the construction of roads and shacks was done through a collaborative role between residents and officials. While on one the hand the CoJ improved service delivery in the form of providing basic services within the settlement and preparing for disasters, it also created employment for the local people. This was also confirmed by one of the residents who provided manual labour in the construction of roads.

Additionally, The CoJ through the department of Disaster and Risk Management has also provided whistles to the residents that they can blow whenever a disaster is about to happen in the settlement. The department has also installed two weather stations in a park near Stjwetla informal settlement. The weather stations are monitored by the department of weather services and assist the community to get updates or monitor bad weather.

Furthermore, as was mentioned earlier, the Gift of the Givers provided temporary shelter that accommodated surplus population and families that were affected by floods including women and the elderly in Stjwetla informal settlement. This led to the construction of a transit camp called Green village which is shown in fig 4.5 below.



Fig 4.5 A part of Green Village transit camp constructed by the Gift of Givers. Source: Own (2019)

There are however, contestations surrounding the reblocking exercise in Stjwetla informal settlement. All the services and the work that was done was considered temporary including the relocation of some residents to the Green village. Green village is no longer used as a transit camp or temporary relocation are because those that are accommodated there have nowhere to go albeit the fact that they were promised houses. One respondent commented that:

> The temporal arrangement at the Green Village has taken too long and now we are forced to sleep in with our matured or old children in one room which is morally not acceptable. We can't even have our families visiting us because of the one room arrangement for over 7 years now (Interview with respondent 6, October 2019).

These sentiments were also echoed by another resident who added that:

> The situation in the transit camps affect mostly women because most of them have little kids (Interview with respondent 7, October 2019).

The unfolding revelations suggest that while government officials have put in place some measures to collaborate with communities with the purpose of preparing for disasters, these officials still lack a permanent solution to the current housing challenges that have a negative bearing on the occurrence of disasters within the settlement.

It is also important to note that other non-governmental organisation like The Red Cross of South Africa have played a significant role in collaborating with local communities to prepare for disasters. An interview with one official from this organisation revealed that they have embarked on training programmes where they teach the local residents how to conduct first aid in cases of disasters. The official also confirmed that they have assisted these residents with some first aid kits. They have also recruited volunteers from Stjwetla whom they taught fire drills and they believe that in cases of fires, these people can help the rest of the community by taking them to places of safety. The official had this to say:

> You came here at the right time my friend. We have set aside the month of October as Disaster Risk Management month. We have lined up many programmes which involve training the resident of different informal settlements around Alexandra which include Stjwetla and our goal is to have as many volunteers as possible who can assist residents in cases of disasters such as fires and floods (Interview with an official from DRM CoJ, October 2019).

The actions by the Red Cross of South Africa are also complemented by the effort from the Department of Disaster and Risk Management who alluded to various campaign programmes that they engage in to educate residents about disasters. The department has a calendar with different dates and events that they engage with the community be it at public gatherings, schools, community meetings and road shows with the sole purpose of making the community aware of how to respond or prepare for disasters. In these educational campaigns, the department teaches residents how to do common activities such as putting out fires using water from buckets. As such, they encourage communities to keep buckets full of water in their homes in anticipation of fires.

The other channels of communication that the department uses to send out messages on disaster include local newspapers, radio station and distribution of flyers. Additionally, unlike the Department of Fire and Safety that is located in Sandton and far away from the informal settlements, the Department of Disaster and Risk Management decided to have its offices closer to Stjwetla and other informal settlements in Alexandra. It is also important to note that for these different methods employed by officials to be effective, there is need for collaboration with residents. So, by locating themselves in the area of Alexandra, the department has high chances of building good relationships with the community.

Moreover, the Department hands out a kit to residents so that they are prepared for disasters. These items as shown in fig 4.6 below include a fire extinguisher, a solar lamp, a bucket, an extinguisher of a paraffin stove, a fire detector and a light that works with batteries. These elements are given to residents for free.



Fig 4.6 Some of the items that form part of the fire prevention kit given out to residents by the CoJ Department of Disaster Management. Source Own (2019).

The section below focus on mitigating disasters in informal settlement making more emphasis on the case of Stjwetla.

4.6 Mitigating disasters in Stjwetla informal settlement

This section focuses on the flood incident that occurred in November of 2016. The choice of this case is based on the fact that it provides rich information on how activities were coordinated after the occurrence of the flood and does not assume that fire incidents are being relegated to the margins. The case also shows plans of actions that were put in place to help those that were affected by the floods which might also apply in cases of fire disasters. The case is also important in that the task here is to provide a picture of how both communities, officials and non-governmental organisations respond after a disaster has struck.

As was indicated earlier, the 2016 flood event that occurred in Stjwetla informal settlement was caused by high rainfalls that were received within the area and neighbouring settlements. According to a community leader:

> After we noticed that the flash floods were getting out of hand and that the levels of water kept on rising, we immediately contacted the Department of Disaster and Risk management (Interview with respondent 1, October 2019).

There was a need to follow up on this action by the community with the department of Disaster and Risk management to which they responded that:

> We received a call from Stjwetla on the 9th of November 2016 around 17.00hrs that the settlement was hit by a flash flood incident. Immediately we mobilised the disaster management teams who were on standby to respond to the incident. We also activated the Sandton Disaster Management Centre Joint operation Centre (JOC). After that, we alerted all the City Stakeholders so that they could put measures in place with regards to mitigation plans (Interview with a respondent 12, October 2019).

The picture presented here suggests vehemently that responding to disasters is a role that brings together different stakeholder from government officials, communities and non-governmental organisations. This also suggests that effective collaboration is likely to yield more results than when players are pulling in different directions. The case provides revelation as to the roles that were played by different stakeholders, and this is presented in the following table which is an extract from a report that was compiled by the Public safety Committee on disaster management after the disaster.

Stakeholder	**Responsibilities**
CoJ Disaster Management	Stakeholder coordination and facilitation
CoJ Social Development/Social Dev Volunteers	Verification of those affected/counselling bereaved families or the traumatised
SASSA	Assisted with Blankets

Home Affairs	Identity Documents Application
SAPS	Continuous Patrol of the Area
Ward Councillors (109)	Provided with an update as and when required
CoJ Environmental Health	Food Inspection, Sampling of the stream for Chemical and Bacteriology analysis
Gift of Givers	Provision of two meals daily and coordinated food banks
Alex Community Members	Clothing
Joburg Market	Food Parcels
Red Cross Society	Emergency Services (on standby for emergency Services

Table 4.1 extracted from CoJ Public Safety Committee Disaster Management Report (2016).

4.7 Challenges faced in preparing for and mitigating against disasters in Stjwetla informal settlement

Residents and officials who were interviewed in this research confirmed that in cases of disasters, it is very difficult to coordinate activities or follow protocol due to interference from the formal media or journalists. While formal media or social media at large should not be seen with a negative as it can lead to positive outcomes when well organised, what the above sentiment meant was that before a message is passed from one department or organisation to the other, the information would be already awash on social media and other media platforms. Similarly, one official complained about political interference both in their attempts to prepare for a disaster or to mitigate disasters. This is what he had to say:

> You see, in as much as we try by all means to remove residents from disaster prone areas, politicians keep on telling them that it's their right to have housing and should occupy these dangerous space to get attention of officials. Even when a disaster has struck, politicians make our job very difficult because sometimes they hijack the whole programme especially if communities are to receive something like food or clothing (Interview with respondent 14, October 2019).

A politician who is also a community leader denied interfering with the processes of distributing food to residents after a disaster had struck but admitted that they also influence how resident construct shacks in the settlement. This is what he had to say:

> These issues are far much complicated than they appear. Like I said before, we have a huge challenge of land here. People need places to stay and the government must

> do something about it. We can't stop people from building shacks where there is an open space because we don't have anywhere to put them (Interview with a respondent 1, October 2019).

This suggests that there is tension between officials and community leaders. On one hand, officials feel that politicians aggravate the situation to gain political mileage while on the other hand, politicians feel that they represent the voiceless who don't have anywhere to stay. Such a conundrum can only be resolved if both parties accept that South Africa is faced with the challenge of housing and there is need to look for alternative ways of housing people in areas that are not prone to disasters.

Furthermore, while there have been some early warning systems installed in Stjwetla, officials reported that after the November 2016 floods, many residents became aggressive after the alarms went on but removing to be moved to safe zones with some undocumented migrants fearing that they will be deported. Some residents felt that they were now being targeted for eviction since they had constructed their shacks on land they were not officially allocated, hence they did not respond to the call of moving to safer zones. An official said that:

> Apart from the aggressiveness of residents, after the 2016 floods, trauma counselling was limited and not every family that was affected managed to receive the service (Interview with respondent 10, October 2019).

With this in mind, it would have made more sense to present here some of the possible solutions that were spelt out by residents and officials in relation to the challenges of preparing and mitigating disasters. However, doing so in this section might be pre-emptive since the research is still going to present a section on recommendations. As such, those different suggestions shall be reserved for that section.

4.8 Conclusion

This chapter presented on the findings of this research. The findings were presented in different thematic responses that dominated interviews with different respondents. These included the different forms of disaster that have been experienced in Stjwetla informal settlement, measure to prepare and mitigate these disasters and challenges that are faced in preparing for disasters. The whole chapter attempted to capture a picture of how officials, stakeholders and residents collaborate in different activities aimed at preparing or mitigating disasters. This was alluded to in detail in the section on mitigating disasters where a case of the 2016 flooding event in Stjwetla was used to demonstrate how different players coordinated events. It is also important to note from this chapter that different organisations such as The Red Cross of South Africa have created relationships with local people or volunteers as a way of taking the responsibility to tackle or prepare for disasters to those that are usually affected. The following chapter takes this forward by making sense of the findings presented here in relation to what other scholars have written about disaster preparedness and mitigation. As such, the next chapter discusses these findings in greater depth.

CHAPTER 5: MAKING SENSE OF INCIDENCES OF DISASTERS IN SJWETLA INFORMAL SETTLEMENT

5.1 Introduction

This chapter delves into an analysis and discussion of the findings that were presented in the previous chapter. The research aimed at investigating the state of disaster preparedness and mitigation between communities of informal settlements, municipalities and other stakeholders. The discussions shall dwell much on the main findings of the research which in this case shall be brought into perspective through using different literature which was also engaged with in chapter two. The idea here is to make sense of the findings beyond the description that was given earlier as a built up to the final part of this research which seeks to conclude by highlighting areas for future research. The chapter therefore begins by expanding empirical evidence on the state of disaster preparedness in Stjwetla informal settlements and link this with the literature. This shall also be followed by a section that looks into the level of disaster mitigation in informal settlements. The last sections of the chapter looks into the challenges and complexities faced in preparing and mitigating disasters.

5.2 Level of disaster Preparedness in Stjwetla informal settlement

Literature on disaster preparedness places emphasis on “well researched action plans that can be taken as ways of ensuring that potential disasters are dealt with” (Kent, 1994:11). This is also echoed by the United Nations (20013) which argues that disaster preparedness involves "forecasting and taking precautionary measures prior to an imminent threat when advance warnings are possible". In relation to this research, empirical findings demonstrated that in Stjwetla informal settlement, residents, together with municipal officials have put in place a number of measures to ensure that they protect themselves from disasters such as fires and floods. However, it is not enough to only consider plans of action that are put in place in relation to preparing for these types of disaster as the process is not an end in itself but a goal to an end. Here, the idea is that, despite there being measures to safeguard residents of informal settlements from disasters, it doesn’t always occur that when a disaster strikes, residents would be safe. Interviews with different officials and stakeholder also revealed that while there have been numerous attempts to prepare for disasters such as floods in Stjwetla and these including be to slow down the flow, by creating retention ponds, restoring wetlands, all of which help hold water in the case of heavy rains, cases or incidents of flooding events continue to be experienced within the settlement.

To argue that enough is not being done to prepare for disasters in this case might also be pre-emptive. Perhaps, one needs to look closely to an analysis provided by Hilhorst (2013) who argues that, even after a conflict or a disaster, there are both continuities and discontinuities between crisis and normality in a community. It was important to unpack these continuities and discontinuities in Stjwetla informal settlements as a way of understanding how these processes change societies and people’s lives. The point here being that, the process of preparing for disasters play a significant role in uniting residents and officials who come together to work towards a common goal. As was shown through interviews, communities feel a sense of belonging whenever they get engaged by officials such as those from the disaster management department. One can thus argue that the process of preparing for disasters in Stjwetla informal settlements has significantly enabled participation by

the local people who must benefit in these plans of actions. Additionally, a study of disaster prepared as argued by Hilhorst (2013) enables us to understand how relations are shaped, how governance changes and how local power flows (bid).

Another important finding that this research unearthed is the existence of a well-established leadership structure in Stjwetla informal settlement. This leadership committee has played an imperative role in helping the community to prepare for disasters. Elsewhere, while informal settlements are sometimes characterised as places of 'lack' or 'critical shortage' (Hermanson, 2016), in the case of Stjwetla, this might only apply to other fundamental needs such as water, shelter, electricity and sanitation and not leadership. As such, with such a vibrant community leadership structure in existence, one can argue that efforts to prepare for disasters from other stakeholders stand a high chance of being implemented successfully when they are people willing to lead the cause. These leaders don't only act as important in coordinating preparedness activities but are also a source of inspiration that can be held to account in cases were efforts are either successful or not successful. Therefore, long lasting solutions to the challenge of housing and informal settlements in South Africa should not take for granted the role community leadership structures can partake in tackling these challenges. Where such leadership structures don't exist a worthwhile social investment (by NGOs or a socially oriented municipality) would be to build and support community organisations.

5.3 Mitigating Disasters in Stjwetla informal settlement

This study adopted a definition of mitigation for disasters as a term used interchangeably with reconstruction where these terms imply rebuilding or repair with a view to reducing the future effects, should another disaster occur (Quarentelli, 2009). This particular definition was crucial in trying to understand the role of collaboration between residents of Stjwetla informal settlement, CoJ officials and NGOs in dealing with the aftermath of a disaster. The findings section showed how different stakeholders coordinate and collaborate in their attempt to mitigate disasters. This was well demonstrated by the use of cases where a disaster such as a flood would have struck the settlement. For instance, the example of December 2016 flooding incident that was experienced in Stjwetla helped trace how engagements between different parties were conducted. Notably, the study observed that the Disaster and Risk Management department from City of Joburg played an important role in bringing on board different players who offered different services in the aftermath of the 2016 disaster. This was important in that it gave an understanding of "how people and institutions engage effectively (or not) to frame and overcome the challenges of survival and disasters" (Hilhorst, 2013:12).

In addition, findings from this study about disaster mitigation in Stjwetla helped us move beyond the mundane way of seeing disaster management as a total collapse of a society or a breakdown of the normal functioning of a community which is quite popularised by scholars such as Ziervogel, et al, (2016), Musungu, et al, (2016), Drivdal, (2016), Douglas et al., (2008). These studies strongly recommend the adoption of interventions and policies that will quickly avert the impact of disasters once they strike. However, following findings from this study, one can maintain that, an introspection into disaster management enabled an understanding of how communities build relations after a disaster has struck. This study brought an understanding of how communities and people's lives are changed by mitigation processes. For instance, it was found out that through mitigation processes, the lives of the affected can be improved through different measures that are put in place by well-wishers. This is further supported by Hilhorst (2013) who argues that, even after a conflict or a

disaster, there are both continuities and discontinuities between crisis and normality in a community. It was in unpacking these continuities and discontinuities that the study enhanced our understanding of how these process change societies and people's lives.

5.4 Level of collaboration in dealing with disaster in Stjwetla informal l settlement

It is quite thought provoking to note that the UNISDR, (2011) argues that communities should benefit from the decisions taken at a strategic level and that an incremental process of decentralising Disaster Risk Reduction may be the best way forward. In this study, it was important to observe that the City of Johannesburg have strategically moved to establish a unit in the form of the Disaster and Risk Management office in Alexandra township and closer to Stjwetla informal settlement so that they are well informed about the state of disaster in the township, as was highlighted earlier. This is vital in that the unit can coordinate activities related to disasters from a well-informed position as it is in touch with the reality on the ground. Collaboration in this case between different institutions is made possible.

In the same sense, Tierney (2012:247) notes that

> "large-scale disasters increasingly require cross-institutional and cross-border collaboration, as well as complex governance arrangements made up of multiple actors and entities, in order to manage and address the related impacts".

While on one hand it can be argued that disasters or incidents that have been recorded in Stjwetla informal settlement were not on a large scale, on the other hand, their impact have also seen various actors and international donor organisations coming on board to offer assistance especially during the mitigation phase. To this end, this study confirmed vehemently a point by Kapucu's (2011:21) that

> "disaster relief is increasingly made up of independent actors responding to disasters individually, with their own individual capacities, but ultimately collaborating with each other in order to coordinate their activities and more effectively mobilise disaster relief".

Interestingly, Tierney (2012) takes this discussion further and goes on to observe that global trends on disaster risk reduction have been characterised by a shift towards efforts to collaborated and coordinate action among different stakeholders. This observation was made in relation to issues of climate change and large scale disasters but perhaps can also be applied to a study on disaster preparedness and mitigation in informal settlements at a local level. The argument here is that while disasters can strike informal settlements at a local scale, their impacts can be felt regionally, continentally and at the world at large. As such, disasters with transnational effects will call for transnational solutions in order to deal and address them. To this end, Tierney (2012) argues that, given that there are no governments to deal with transnational effects of disasters at the global scale, institutions and processes should be set up at the global levels to coordinate different actors and agencies in this area. Whereas transnationalism is not immediately relevant to the Alex case, the point of crossing

institutions is that, lessons from this global approach can be put to practice at local level such as in Stjwetla.

Furthermore, this study unearthed that collaboration and coordination in respect to disasters is not always an easy task as one might assume, but in fact much more complex. Participants revealed that sometimes there is political and media interference which hugely derail their efforts of ensuring smooth coordination of activities. To this effect, scholars such as Tierney (2012) put forward a relevant argument that, at the national level, there should be a shift aimed at achieving collaborative decision making. This shift should involve multi actor networks such as private-public as a way of responding to outsourcing and contracting (ibid). Perhaps, this line of thinking might achieve fruitful results if considered in the wake of dealing with disasters in informal settlements in that, rather than side-lining media and politicians, coordinators of disaster events should also consider these as relevant actors and important stakeholders. Other studies though not related to disaster management, suggest a positive result emanating from shifts from bureaucratic ways of operation to decentralised ones. For instance, Lynn et al (2001) noted that in the USA, the administration of public policies and programmes have shifted from the traditional centralised ones to place more emphasis on partnerships, collaboration and building networks with third parties such as those outside the government. While this was evident in the case of Stjwetla informal settlements where Non-Governmental Organisations such as Gift of the Givers and Muslim Community, the role of this collaboration must be emphasised. According to Gupta et al. (2015a:17) "the rise of non-state actors in decision-making processes leads to increased public participation in these processes of disaster management". As was obtained in this study, processes of collaboration has led to an improvement in subsidiarity and local authorities rather that national governments increasingly making decisions. This therefore assumes that unlike previous claims made about disaster management in South Africa that there has not been efforts to translate the legislation on Disaster and Risk Management into practice, findings from this research confirm that there has been a shift in this regard which has seen an improvement in the adoption of proactive measures.

5.5 Challenges in dealing with disasters in informal settlements

Scholars on informal settlements formation reveal that, informal settlements are places characterised by deprivations in that they lack clean water, sufficient living space, tenure security, durable houses and sanitation (UN, 2005). And yet, due to high demand for housing in cities, informal settlement continues to offer accommodation to the majority of poor urban dwellers. This is further supported by scholars such as Huchzermeyer (2013) who acknowledges that informal settlements play an important role in filling the gap where governments are failing to facilitate urban accommodation and that they give space to individual initiative in solving aspects of the housing problem (Huchzermeyer and Karam, 2006). In relation to the findings that were obtained for this research, it is in this wake that dwellers of informal settlement in their quest to find shelter in informal settlement, take issues of preparing and mitigating disasters as secondary and not a priority. For instance, while a group of people was moved from flood zone in the banks of the Jukskei River in Stjwetla informal settlement and housed at the Green Village, within a short space of time, that same area where they were moved was occupied by another group of residents. What this reflects is that, poor families in informal settlements may take measures that involve putting their lives at risk of flooding or fire outbreaks in order to have a place to stay. Understanding these complexities and dynamics is very important in efforts of preparing and mitigating disasters in informal settlements.

Additionally, as mentioned in Chapter 2, according to UN Habitat, World Cities Report (2016), many people around the world opt to reside in informal settlements as a temporary measure. For instance, as people migrate from rural to urban areas, they might look for somewhere where they live so that they can establish themselves only for them to move away after that. In this study, it was observed that in some cases, measures to prepare and mitigate disasters are mainly carried out by other stakeholders such as CoJ and NGOs while residents play a passive role. Perhaps, it is because these dwellers do not feel a sense of belonging to the settlement since they will be considering moving out as soon as they get better opportunities elsewhere. This is also supported by an example of informal settlements in Ghana where there is proof that a strong urban rural cultural connection plays a big role in influencing one's decision to stay in an informal settlement. In this instance, informal dwellers will require only a place to stay and not a permanent home as they would be regarding their rural homes as their places of permanent residence (Owusu-Ansah et al, 2016). This study observed that many people residing in Stjwetla informal settlement have their permanent homes back in areas such as Limpopo, Mozambique among others. As such, they are likely not to partake in activities that seek to prevent disasters in the long term, and these are rationalities that officials should attempt to understand for their efforts to prepare and mitigate disasters to be fruitful.

5.6 Conclusion

This chapter provided the discussion and analysis of the findings of this research. The chapter made a case of how dwellers of informal settlement can consider preparing for disasters as a secondary option than to having a place to stay. This case was further validated by empirical evidence gathered from Stjwetla informal settlements were residents continuously built shacks in the banks of the Jukskei River despite efforts to remove them from there. Literature on disaster management was useful in this chapter to shed more light not only on processes of preparing or mitigating disasters but on what these forms of collaboration can mean to a society. In this case, literature on disaster management help us understand how communities rebuild relationships even after a disasters have struck. It helped us assess the continuities and discontinuities that preparedness and mitigation processes bring about in affected communities. To this end, collaboration in preparing and mitigating disasters should be understood in the context of efforts to shift responsibilities from government to also include those that are outside of the government. This study noted that actors such as NGOs play an important role in helping the community of Stjwetla informal settlement prepare and mitigate disasters. The following chapter will delve into a conclusion and make recommendation for this research.

6. CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This research looked at the degree of collaboration between government, residents of informal settlements and NGOs in preparing for disasters. The call for this investigation came after the realisation that while poor residents struggle to have a roof over their heads or to have shelter, they end up residing in informal settlements under precarious living conditions. It is within these settlements that in their daily struggle to serving and have the right to the city, they are compounded by events or incidents such as fires, floods, lighting and inhaling dangerous smoke. The study thus embarked on an empirical observations with different stakeholders that have been involved in preparing and mitigating disasters in Stjwetla informal settlement located in Alexandra township. The study utilised cases of previous incidents of disasters to clearly understand how events were coordinated by the different actors. Through face to face interviews and through observation, this study managed to arrive at the following conclusions:

6.2 Summary of the Study

This study found that the growth of informal settlements in developing countries is strongly linked to a critical shortage of affordable housing to accommodate many poor and low-income families (UN Committee on Socio and Economic Rights, 2017). According to the Part 3 of the Housing Code 2009 (DoH, 2009:12), "informal settlements are characterised by informality, illegality, restricted private and public sector investment, vulnerability, social stress and poverty". Imperative to this study was a consideration of these different characteristics and how they impact on communities in informal settlements, and authorities tasked to dealing with informal settlements. What this suggested is that, residents of informal settlements are likely to be vulnerable to disasters given their economic status which might not enable them to use durable materials when constructing their units. They are also not permitted to build with permanent materials because they might be relocated in future. This contributes to them not building structure that can withhold disasters (for instance flooding or fire).

It was important to embark on this research because in as much as informal settlements have been research across and in SA, little focus is paid to the state of disaster preparedness and mitigation by residents, different stakeholders and officials in these settlements. Given that in many rapidly growing cities, including those in sub-Saharan Africa (Hendrick-Wong, et. al., 2014), the proliferation of informal settlements beyond the boundaries of the formally recognized city has become the norm, there is no doubt that these types of settlements are not going to disappear anytime soon. These are sprawling outward from the city, usually settled in a haphazard fashion, and are densely inhabited with limited internal infrastructure and services. According to the UN Habitat *World Cities Report* (2016) during the period between 1995 and 2015, low income countries experienced an average 3.68% annual rate of urban population growth while high income countries experienced in contract 0.88% urban population growth during that same period. These rising figures for the case of developing countries which include South Africa further buttress the point that informal settlements are not going to disappear anytime soon hence it is only through a robust study of them that we can bring our claim about their existence.

This study identified that the two main forms of disaster incidents in Stjwetla informal settlement are floods and shack fires. However, there are other incidents that have also been

recorded in this settlement and these include lightning or thunderstorms and death associated with inhaling smoke from fires or paraffin stoves. In relation to floods, while they are a naturally phenomenon, the study found out that their occurrence and impact in Stjwetla informal settlement have been triggered by human activities. These activities include blocking of drainages or waterways by residents who built their shacks encroaching areas were water should flow, building shacks along the Jukskei Riverbank, dumping and the leaking of taps. The study further observed that in terms of preparing for floods, residents, municipal officials and NGOs have come up with a number of measures such as relocating people from the banks of the Jukskei river and settling them in a transit camp called Green Village provided for by the Gift of the Givers, erections of weather stations that are used to forecast the weather, training of evacuating teams to teach locals evacuation drills, erection of flood lines along the Jukskei river and usage of sirens to warn residents about any impending danger as a result of flooding.

In relation to fires, the study found out that most of them are caused by carelessness were residents forget to switch off their electric appliances. They are also caused by usage of candles or paraffin stoves which are sometimes left unattended. The other cause of fires in Stjwetla is illegal connection of electricity which is commonly known by the local people as Izinyoka nyoka. There are also cases where residents have taken their grudges too personal such that they end up torching each other's shacks. These fires once they start from one shack, they easily consume the whole settlement. Efforts to reduce incidents of fires in Stjwetla including electrification and reblocking of a section of the settlement, providing the settlement with fire hydrant and encouraging resident to construct their shacks using bricks instead of plastic. The study revealed that residents tend to build their shacks on infrastructure aimed at preparing for or mitigating disasters such as the fire hydrants that the municipality had installed in the settlement. There have also been awareness programmes conducted in the settlement by the City of Joburg and other stakeholders.

The continued occurrence of disaster especially floods in Stjwetla informal settlement suggested that while government officials have put in place some measures to collaborate with communities with the purpose of preparing for disasters, there is still lack a permanent solution to the current housing challenges that have a negative bearing on the occurrence of disasters within the settlement. This research also confirmed that in cases of disasters, it is very difficult to coordinate activities or follow protocol due to interference from media or journalists. What this meant was that before a message is passed from one department or organisation to the other, the information would be already awash on social media and other media platforms. Similarly, there are also complains about political interference both in attempts to prepare for or to mitigate disasters. However, a discussion on these revelations pointed out that, at the national level, there should be a shift aimed at achieving collaborative decision making.

In relation to coordination and collaboration, responding to disasters (mitigation) is a role that brings together different stakeholder from government officials, communities and Non-governmental organisations. In this process, the study unearthed that residents usually play a passive role while non state actors play a significant role in providing different goods and services such as food and counselling. The state through local government departments usually are influential in coordinating these different activities. The study also discovered that effective collaboration into disaster management yields more results when players are pulling in one direction that when pulling in different directions. In relation to literature, studies on disaster strongly recommend the adoption of interventions and policies that will quickly avert the impact of disasters once they strike. However, speaking in relation to

collaboration, scholars such as Hilhorst (2013) argue that research on disaster management can also enable an understanding of how communities build relations after a disaster has struck. In addition, the study established on the onset that there has been failure to translate the South African legislation on disasters management into practice. In this case, the argument was that local municipalities have not been able to establish functioning DRM centres (van Riet and Diedricks, 2010). This study observed a shift in this regard. The CoJ Disaster Risk Management department have since localised some of its branches including establishing a centre in Alexandra township as a way of decentralising activities related to disasters management. While the centre is coupled with a number of challenges including lack of manpower, one would argue that the efforts that have been taken so far are in the right direction and should be complemented by the sourcing of adequate personnel.

6.3 Recommendations

Recommendations in this section are given in relation to the challenges that are faced in preparing and mitigation disasters in informal settlement. One big challenge that the research identified was in relation to collaboration particularly during the mitigation phase. In most cases, resident only play a passive role of being recipients of what the officials and well -wishers offer without them having a say over these ''gifts' or donation. This in most cases have led to the politicisation of the donations where those aligned to certain political parties tend to benefit at the expense of those that are not aligned. Considering that the Stjwetla informal settlement has a sound community forum in place, perhaps there is need to allow this forum to lead the mitigation process by distributing the proceeds or donations to their residents since they know each other. Of course, this task might not be theirs alone but considering that there has been complains that the most affected families tend to lose out by not receiving any donations while those that would not have been affected get to receive donations through political capital and coordination by the community members can bring some form of accountability.

In addition, there have also been suggestions that local municipalities continue to lack authority and capacity to implement Disaster Risk Management activities. In the case of Stjwetla informal settlement, it was interesting to observe that communities also have their own traditional ways of dealing with disasters. While officials should acquire more knowledge and expertise on dealing with disasters, they should not treat the local people as if they are not knowledgeable. Collaboration can be more successful if the knowledge of the local people is complemented by that of officials.

Lastly, the major challenge exposing many people to disasters and risks in informal settlement is the challenge of housing. This is a challenge that cannot be overcome at a local scale but requires radical measures and political will. Many participants in this study bemoaned lack of land to construct shacks hence they end up residing in riverbanks. However, while South Africa cannot recreate land that is scarce, there is need to rethink the spatial and planning systems to ensure that poor families have access to cities especially centres of economic attraction. This is a task that call for collaboration between different stakeholders, entities and government departments (What about the alignment in terms of rural development strategies e.g. the retail sector expanding to the rural areas by building shopping malls therefore creating economic opportunities etc.

6.4 Areas for further research

Due to the limited time frame required to complete this research, it was not possible to review all the relevant information with regards to disasters preparedness and mitigation in

informal settlements. Considering that there have been numerous efforts to upgrade informal settlements in South Africa through promoting *in situ* processes, this study would have benefited from an evaluation of the policies on upgrading chiefly the UISP in relation to what it says about disaster management in informal settlement and comparison of this to what has been transpiring in practice. This would have gone a long way in bringing to light not only the challenges of upgrading informal settlement or the success there of, but also the challenges and successes of aligning policies on informal settlements upgrading with disaster management efforts.

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8. Appendices

Appendix 1



Semi structured Interview Guide for Officials

Hi, my name is Pheni Ngove, currently studying for my masters at Wits University. As my Participant Informant Sheet explained, this is a purely an academic study. Thank you for agreeing to be interviewed. Please feel free to interrupt me anytime at any time and please let me know if you are uncomfortable with any of the questions l ask.

1. Stjwetla has been in the news quite often in recent years, and even this year about emergency events. Could you say a bit about these events and how you think they were caused?
2. What are the causes of risks and disasters in Stjwetla informal settlement?
3. What measures are in place by the community to prepare for, and mitigate disasters in Stjwetla informal settlements?
4. If we consider the different forms of disaster, which are the ones that the community is prepared for, and which is it less prepared for or not prepared for? Could you expand?
5. What is the relationship between municipality and communities in preparing and mitigating disasters in informal settlements?
6. In what ways do residents actively prepare for disasters, individually as well as collectively?
7. In what ways does the municipality get involved in these preparations?
8. What are the main constraints in preparing for such disasters?
9. What do you think could be done differently by residents, but the community forum, by the municipality?
10. Is there anything else you think I should know for this study? Or anyone else I should speak to?
11. Thank you for your time. Please let me know if you would like to receive a copy of my final report.
12. What should be done to improve the relations between communities, NGOs and municipalities in preparing and mitigating disasters in informal settlements?

Thank you for your time. Please let me know if you would like to receive a copy of my final report.

Appendix 2



Semi structured Interview Guide for Officials

Hi, my name is Pheni Ngove, currently studying for my masters at Wits University. As my Participant Informant Sheet explained, this is a purely an academic study. Thank you for agreeing to be interviewed. Please feel free to interrupt me anytime at any time and please let me know if you are uncomfortable with any of the questions l ask.

1. What are the causes of risks and disasters in Stjwetla informal settlement?

2. What measures are in place by NGOs to prepare for, and mitigate disasters in Stjwetla informal settlements?

3. What is the relationship between NGOs and communities in preparing and mitigating disasters in informal settlements?

4. What are the policy measures on disaster preparedness by NGOs?

5. How have these policy measures fared on the ground?

6. What has been the NGOs responses in relation to past disasters that has happened in Stjwetla informal settlement?

7. What should be done to improve the relations between communities, NGOs and municipalities in preparing and mitigating disasters in informal settlements?

Appendix 3



Semi structured Interview Guide for Officials

Hi, my name is Pheni Ngove, currently studying for my masters at Wits University. As my Participant Informant Sheet explained, this is a purely an academic study. Thank you for agreeing to be interviewed. Please feel free to interrupt me anytime at any time and please let me know if you are uncomfortable with any of the questions l ask.

1. What are the causes of risks and disasters in Stjwetla informal settlement?

2. What measures are in place by municipalities to prepare for, and mitigate disasters in Stjwetla informal settlements?

3. What is the relationship between municipalities and communities in preparing and mitigating disasters in informal settlements?

4. What are the policy measures on disaster preparedness by the municipality?

5. How have these policy measures fared on the ground?

6. What has been the municipality responses in relation to past disasters that has happened in Stjwetla informal settlement?

7. What should be done to improve the relations between communities and municipalities in preparing and mitigating disasters in informal settlements?

Appendix 4



Semi structured Interview Guide for Officials

Hi, my name is Pheni Ngove, currently studying for my masters at Wits University. As my Participant Informant Sheet explained, this is a purely an academic study. Thank you for agreeing to be interviewed. Please feel free to interrupt me anytime at any time and please let me know if you are uncomfortable with any of the questions l ask.

Stjwetla has been in the news quite often in recent years, and even this year about emergency events. Could you say a bit about these events and how you think they were caused?

What would you say are the different kinds of disasters that affect this community?

What would you say are disasters households are most afraid of? Could you explain why?

If we consider the different forms of disaster, which are the ones that the community is prepared for, and which is it less prepared for or not prepared for? Could you expand?

In what ways do residents actively prepare for disasters, individually as well as collectively?

In what ways does the municipality get involved in these preparations?

What are the main constraints in preparing for such disasters?

What do you think could be done differently by residents, but the community forum, by the municipality?

Is there anything else you think I should know for this study? Or anyone else I should speak to?

Thank you for your time. Please let me know if you would like to receive a copy of my final report.

Appendix 5

SCHOOL OF ARCHITECTURE AND PLANNING
HUMAN RESERCH ETHICS COMMITTEE

SCHOOL OF ARCHITECTURE AND PLANNING

CLEARANCE CERTIFICATE
PROTOCOL NUMBER: SOAP053/06/2019

PROJECT TITLE:	Disaster Preparedness and Mitigation in informal settlements. The case of Stjwetla in Alexandra, Johannesburg.
INVESTIGATOR/S:	Pheni Ngove (Student No: 1790403)
SCHOOL:	Architecture and Planning
DEGREE PROGRAMME:	Master of Built Environment (MBE)
DATE CONSIDERED	05 October 2019
EXPIRY DATE:	05 October 2020
DECISION OF THE COMMITTEE:	Approved

CHAIRPERSON B C Boshoff
(Dr Brian Boshoff)

DATE: 7/10/19

cc: Supervisor/s: Marie Huchzermeyer

DECLARATION OF INVESTIGATORS

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to endure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee.

Signature

07-10-2019
Date

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