UNIVERSITY OF KWAZULU-NATAL

ENHANCING DISASTER RISK REDUCTION PROCESSES THROUGH THE NEXUS OF INDIGENOUS KNOWLEDGE AND COMMUNITY PARTICIPATION: A CASE STUDY OF UMSHWATHI LOCAL MUNICIPALITY

BY

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DECLARATION

I, Nkanyiso Weathington Nxumalo, declare that:

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_____ Date_____

Nkanyiso Weathington Nxumalo

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DEDICATION

This dissertation is dedicated to my late friend and brother, Kanyisa Clive Buxeka. I wish he was alive to see and celebrate this accomplishment. In his physical absence, I leave this in the hands of his son, Milani. May God bless his soul.

ACRONYMS

AIKS	African Indigenous Knowledge Systems
AU	African Union
CBO	Community Based Organisation
CBD	Convention on Biological Diversity
DDMO	District Disaster Management Officer
DM	Disaster Management
DMA	Disaster Management Act
DMAF	Disaster Management Advisory Forum
DMO	Disaster Management Officer
DMP	Disaster Management Plan
DMU	Disaster Management Unit
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DMC	Disaster Management Centre
DST	Department of Science and Technology
EU	European Union
HFA	Hyogo Framework for Action
IDP	Integrated Development Plan/Planning
IK	Indigenous Knowledge
IKS	Indigenous Knowledge Systems
IPR	Intellectual Property Rights
KZN	KwaZulu-Natal
LDMO	Local Disaster Management Officer
LMM	Local Municipal Manager
MDGs	Millennium Development Goals
MDMC	Municipal Disaster Management Centre
MDMP	Municipal Disaster Management Plan
NDP	National Development Plan
NDMC	National Disaster Management Centre
NGO	Non-governmental Organisation
NPC	National Planning Commission

PDMC	Provincial Disaster Management Centre
PGDS	Provincial Growth Development Strategy
SADC	Southern African Development Community
SALGA	South African Local Government Association
SDGs	Sustainable Development Goals
STL	Swayimane Traditional Leaders
UN	United Nations
UNISDR	United Nations International Strategy for Disaster Reduction
UTL	UMshwathi Traditional Leaders
WB	World Bank

ABSTRACT

Indigenous knowledge systems (IKS) are recognised by such global organisations as the United Nations (UN) and the World Bank (WB) and nationally by governments including South Africa. However, African indigenous knowledge systems (AIKS) for disaster risk reduction (DRR) have received insufficient research attention in South Africa. This study investigated how DRR processes could be enhanced through the nexus between AIKS and community participation. The focus was upon pinpointing principles, strategies, procedures and best practices to include AIKS in DRR practices. The study sought to document the AIKS that seem well suited for DRR public use.

This qualitative research design was executed through a case study strategy and driven by a conceptual framework that intersected DRR, AIKS and public participation. The study sites were the two indigenous communities of uMshwathi (Ward 2) and Swayimane (Ward 6) in uMshwathi Local Municipality, KwaZulu-Natal. Data were collected through interviews, focus groups, observation and documentary evidence. Respondents included municipal officials, traditional leaders, community elders and other community members. Data were analysed through a combination of content, matrix and thematic analysis.

The findings show that the uMshwathi Disaster Management Unit (DMU) recognises and supports the use of community participation systems to engage indigenous people in DRR. AIKS for DRR strategies is documented, largely through the participation of the ageing population, as key knowledge holders seek to transfer knowledge before they pass on. The study concluded that there is indeed a nexus between DRR, AIKS and community participation, yet one of the themes at the heart of that nexus is conflict, as stakeholder segments disagree as to who should take responsibility for DRR. UMshwati municipality could make better use of the AIKS at its disposal; in comparison to other relevant DRR stakeholders, traditional leaders seem less involved in DRR, which detracts from heightened participation of communities under traditional leadership.

Recommendations are made regarding conflict management, DRR/AIKS strategy implementation and enhanced cooperation among and between the stakeholder segments. Suggestions for future research are likewise presented.

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CHAPTER 1

ORIENTATION TO THE STUDY

1.1. Introduction

In 2017, the Republic of South Africa marked 15 years since the implementation of the Disaster Management Act No. 57 of 2002, but to date DRR has not been discussed in integration with Indigenous knowledge (IK) and community participation. Furthermore, disaster management (DM) approaches are still rarely proactively approached, while there is still slow growth in terms of promoting community resilience as one vital approach to DM. While the use of Eurocentric and westernised ways of knowing, the use of AIKS emerges as another way of knowing of which reflects the African context and also puts local people at the forefront of DRR processes.

This chapter outlines the content of the dissertation and the structure of this report. For the purpose of this study, the chapter begins by providing a background to the study, which is then followed by the research problem statement. It then details the research questions and objectives. The chapter also discusses the significance of the research, which is then followed by a summary of the literature review, the conceptual framework, the research methodology that entails data collection methods, a discussion of study limitations, a provision of key terms and definitions, and an outline of the chapter inventory.

1.2. Background of the study

Over the centuries, disasters have had a negative impact on humankind, which continues to date. Disasters impact on people's lives, property, environment, infrastructure, and economic and social activities. Hostile weather conditions not only affect third world or poor countries - even first world or developed countries are affected. In recent decades, the global cost of disasters has increased substantially. There are several trends in society and nature which suggest that this pattern may continue, with more frequent mega-disasters occurring in the future. In particular, risk perception that is at odds with the "real" risk underlies the process of risk transference, which encourages development that increases long-term vulnerability (Bazarragchaa, 2012:18).

The UN, the WB, the African Union (AU), the European Union (EU) and the Southern African Development Community (SADC), as well as other global and regional governance organisations, have a role to play in terms of ensuring and improving community involvement strategies, because community members hold IK and are directly affected by disasters. The Hyogo Framework of Action 2005 to 2015 (HFA), adopted in Japan, provides a global strategic roadmap

to DRR. The HFA framework offers guiding principles, priorities for action, and practical means for achieving disaster resilience for vulnerable communities (World Bank 2010:10). The HFA (2005-2015 (UN, 2005:3) not only emphasises the importance of DRR, but also stipulates that DRR must be set as a priority with the collaboration of affected role players, using local community knowledge as a critical aspect. Likewise, the objectives of the African Regional Strategy for Disaster Risk Reduction (ARSDRR) calls for the involvement of local community knowledge and public participation in DRR.

The results of disasters are human suffering and damage to the infrastructure upon which humans rely for survival. After any disaster, it is critical to determine the nature of the impacts, what will be required to restore the situation, and how to improve the situation by reducing vulnerability to future impacts. For this reason, global governance organisations, governments, researchers and other stakeholders have been seeking ways to overcome the impact of disasters, and the concept of disaster risk management (DRM) emerged.

Over time, dealing with disasters transitioned from DM to DRM, before the onset of DRR. DM can be seen as the entire process of planning and intervention to deal with disasters, including the development of response and recovery measures, with less focus on reducing the causes of disasters (Raungratanaamporn, Kamiko & Denpaiboon, 2014: 659). DRM, on the other hand, is a mechanism or tool to ensure that disasters are managed in terms of understanding the pattern and frequency of occurrences. Birkmann, Jörn, Chang Seng, Denis, Suarez and Dora-Catalina (2011:11) argue that "DRM in the context of natural hazards has been an important issue in academic, institutional, political and practical spheres for some decades, and is evidence of the environmental conflicts which are affecting susceptible communities around the world". However, in practice, even DRM has been known to focus more on the aftermath of disasters than on their prevention and mitigation. Unlike DRM, DRR has been found to be a more suitable proactive approach to disasters. Louw and Van Wyk (2011:16) state that proactive DRR strategies can be more effective in lessening the impact of disasters than a focus on DRM alone. For disasters to be reduced, relevant stakeholders and affected people must be knowledgeable.

Knowledge is acquired, produced and disseminated from a variety of perspectives. For example, IK and IKS could be integrated with enhanced community participation to design and implement DRR mechanisms. IK is seen as the knowledge that is held by indigenous people of a particular geographical area, which has been in their possession for centuries (Maferethlane, 2012:140). Holders of IK and IKS transmit this knowledge across generations and often orally. Owuor (2007:21) views IKS from an African perspective by arguing that AIKS are multi-faceted bodies

of knowledge, practices, and representations that are maintained and developed by indigenous African people with long histories of seamless interaction with the African natural environment. On the one hand, the importance of IKS has been recognised by international organisations, such as the UN and WB, yet the role of AIK and AIKS in DRR has not received the attention it deserves in South Africa to date (Maferetlhane, 2012:5). The author also argues that little is known about how South Africa's indigenous communities use AIK and AIKS to avoid, prevent and deal with disasters. While public participation in government has been the subject of research, insufficient research links citizen participation in public governance through the provision of IK for local governmental DRR strategies.

1.3. Research problem statement

Louw and VanWyyk (2011:16) contend that it is generally accepted that disasters are having an increasing impact on our lives, property, environment, infrastructure, and economic and social activities. Severe weather and other natural phenomena, as well as human activities, are exacting a heavy toll on society and the environment upon which members of society depend. Much has been conceptually written about DRM and its impact, for example Lukamba-Muhiya (2010:478) drew upon secondary statistical data that cumulatively spanned 30 years to explore natural disasters across the African continent. That study showed increasing frequency of such disasters, especially in East Africa, yet the topic remains understudied in the developing world which is more concerned with sustainable development.

In South Africa, DRM is now regarded as 'everybody's business', emphasising the responsibilities of all role-players, and is especially not limited to those historically associated with DM and DRM (Louw & Van Wyk, 2011:17). Disaster risk management has proven to be useful to the sustainable livelihood of communities; however, the literature shows that DRM tends to be more of a reactive approach to the extent that it focusses upon the aftermath of disasters. Furthermore, scholars argue that socio-economic and cultural approaches, as well as community-based experiences, advance the importance of reducing vulnerability to reduce the risk of disasters. This means a shift to DRR.

The issue of public participation has only recently started to receive attention in South Africa from both government and civil society sectors, despite the fact that the relevant legislation was passed nearly a decade ago (Buccus, Hemson, & Piper, 2007:4). Hartog (2014:4) states that the lack of local community involvement in providing IK for DRR is a current challenge that is faced by many countries, especially developing countries. The failure to discover and highlight AIKS as a tool of contemporary governance is problematic. Older people's life experience and

traditional or IK can provide vital information on past climatic events, hazards and disaster impacts. It can also provide key insights to support the analysis of a community's vulnerabilities and capacities, or social-environmental relationships. Such information is vital in understanding the nature of disaster vulnerability and central to developing good DRR initiatives (Hartog, 2014:5). The implicit loss of knowledge in rural communities in particular is likely to result in people experiencing natural disasters, where the situation could have been avoided through obtaining knowledge from local communities for DRR strategic purposes. The failure to study and understand the role of community participation in providing IK about DRR may continue to lead to the loss of lives, damage of infrastructure, reduction in agricultural activities and delayed public service delivery and sustainable development. Whilst public participation has received attention from different organs of state and societies at large, it is seldom discussed in the literature in relation to DRR and IK.

In view of this research problem, this dissertation is concerned with AIK and AIKS specifically possessed by the people of uMshwathi Local Municipality in the province of KwaZulu-Natal in South Africa. It is questioned how that knowledge can be collected and utilised by local government to reduce disaster risks. One way of accessing AIK and AIKS for DRR strategies may be through community participation avenues in a democratic society.

1.4. Research questions

In view of the research problem, the research questions for this dissertation are:

Main research question:

- How can IK be obtained through community participation in planning and implementing DRR strategies in uMshwathi Local Municipality?

Research sub-questions:

- In what ways do local community members of uMshwathi contribute to governmental strategies toward DRR?
- How can IK held by citizens of uMshwathi be best collected for planning and implementing DRR strategies?
- How can IK held by citizens of uMshwathi be best utilised by local government for planning and implementing DRR strategies?

1.5. Research objectives

Given the research problem and the research questions, the research objectives for this study are to:

- Understand the relationship between the nexus of IK, community participation, and planning and implementation of DRR strategies in uMshwathi Local Municipality;
- Determine the nature of IK held and contributed by uMshwathi citizens that relate to DRR; and
- Identify methods for the uMshwathi local government to engage citizens in collecting and utilising IK for DRR.

1.6. Significance of the study

The importance and the role of IK on DRR has been recognised as an important yet neglected area of study, according to many researchers and DM practitioners, governments and the global community. However, community involvement by offering their knowledge on how disaster risks can be reduced is rarely discussed, especially within the context of IK. Indigenous communities are in possession of valuable knowledge that has been used for many generations within their communities, but this knowledge can end up being lost because it is not documented and stored in a systematic effort to reduce disaster risks. The Department of Science and Technology (DST) has formulated a policy framework to compile and disseminate IK as a sustainable development mechanism. For example, the IK and IKS policy encourages the recognition and protection of IK and IKS in South Africa for cultural reasons. In addition, the policy also seeks to creatively advance the course of IKS within the context of complex economic, social and cultural rights. (DST, 2004:3) Yet without community involvement in the processes of reducing disaster risks, DRR strategies determined by the government alone may be less effective. The significance of this study thus lies in its design to discover and understand whether there is a nexus between planning DRR strategies by acquiring AIK through community participation. If so, a model could be formulated to ensure mechanisms for collecting AIK and applying it to DRR strategies.

1.7. Literature review

When conducting a study of this nature, it is vital to ascertain what is known about the concepts and the overall study area, thus a review of the sources related to the study was undertaken. The literature review was embarked upon to get an extensive understanding of the different IK

strategies that indigenous communities use to improve DRR. Furthermore, different types of secondary data were utilised for this investigation, including books, dissertations, regulatory and legislative documents, journal articles, newspaper articles and other sources that were relevant to the completion of this study. The literature review led to a conceptual framework that revolves around DRR, community participation and IK, as will be discussed in Chapter 3.

1.8. Research design and methods

1.8.1. Research design

Of the three research approaches, that is qualitative, quantitative and mixed-method, the qualitative research approach was utilised for the purpose of this research study. This is further discussed in Chapter 4.

1.8.2. Research strategy

For the purpose of this research study, a single case study research strategy was adopted, selecting uMshwathi Municipality for case context. Embedded in a case study strategy are multiple units of analysis, which in this case were the DMUs), *Amakhosi* and *Izinduna* which represented a traditional house of leadership, the areas under the jurisdiction of Ingonyama trust, and the KwaSwayimane and New Hanover community elders. *Amakhosi* is an isiZulu term that is used to refer to traditional leaders in a plural sense. *inkosi* is an isiZulu word for one traditional leader. The term *izindunda* is an isiZulu term that refers to more than one headmen who work under the auspices of *amakhosi*. The singular term for *izinduna* is induna. (Beall & Ngonyama, 2009:12)

1.8.3. Study site, case and participants

Both the study site and the case context is uMshwathi municipality, which is a local municipality located within uMgungundlovu District Municipality that is comprised of both urban and rural areas. The rural sub-areas that provided the research site were KwaSwayimane and New Hanover. As the case context for the study, the focus in the municipality was on the DMUs. Study participants included the DRM managers at the district and local municipalities, as well as *amakhosi* and community elders who were selected based on the knowledge they hold about the subject matter.

1.8.4. Target population

The general population of uMshwathi Local Municipality is approximately 106 374 (uMshwathi Municipality, 2011). The target population for the study entails community elders in the research

site, DRM managers at the uMgungundlovu District and uMshwathi Local Municipality DMUs, and all traditional leaders within the research site. This breakdown is further shown in Table 4-2.

1.8.5. Sample size

The sample, which was drawn from the target population, included two DMU officials from uMgungundlovu District Municipality and two from uMshhwathi Local Municipality. Two *amakhosi* were part of the sample size - one from KwaSwayimane and one from New Hanover – the sub-areas that provided the research site. Lastly, five community elders from KwaSwayimane and five from New Hanover participated in the focus groups. Along with the target population, the sampling population is depicted in Table 4-2.

1.8.6. Sampling strategy

To collect data from the sample size, purposive sampling, also known as judgmental sampling, was employed, which is a type of non-probability sampling technique. Municipal officials and the people of uMshwathi Local Municipality were selected based on their ability to provide knowledge on AIK and AIKS, citizen engagement by government, and strategies that are used or could be used to reduce disaster risks.

1.8.7. Data collection methods

Data were collected using in-depth semi-structured interviews, focus groups and document collection. Individual interviews of government officials and traditional leaders (*amakhosi* and *izinduna*) were undertaken with respect to the participants' ability to respond to the presented questions pertaining to governance and the management of disaster risks and AIK and AIKS. Focus groups of community members were utilised to get a deep understanding of the phenomenon, as new ideas and themes emerge during discussions. The use of documents assisted with providing information on historical data with regard to the governance of DRR in uMshwati local municipality.

1.8.8. Data quality control

According to Shenton (2004:63), "trustworthiness of qualitative research generally is often questioned by positivists, perhaps because their concepts of validity and reliability cannot be addressed in the same way in naturalistic work". A number of strategies were thus employed to ensure the trustworthiness of data and interpretation in this qualitative study. These included

credibility, dependability, confirmability and transferability (Lietz & Zayas, 2010:191; Houghton, Casey, Shaw & Murphy 2013:12; Zhang 2013:16).

According to Lietz and Zayas (2010:191), credibility refers to the adequate representation of the construction of the social world under study, while dependability means "the coherence of the internal process and the way the researcher accounts for changing conditions in the phenomena" (Zhang, 2013: 16). Confirmability is the extent to which the characteristics of the data, as posited by the researcher, can be confirmed by others who read or reviews the research results (Lietz & Zayas, 2010:197). Finally, transferability of research findings to a similar context is a decision to be taken by the person who wishes to make the transfer. However, "it is the responsibility of the investigator to ensure that sufficient contextual information about the fieldwork sites is provided to enable the reader to make such a transfer" (Houghton, *et al*., 2013:12; Lincoln & Guba, 1985).

1.8.9. Data analysis

Data were analysed using a combination of content, thematic and matrix analyses. The sets of data were subdivided into subsets of data, based on patterns of themes cropping up. Various coding techniques were utilised (Creswell & Clark, 2007:131) and the patterns of themes formed strategic concepts. Peculiar features in themes were explored, after which different subsets of data were explored. The resultant themes were then examined and compared to the relevant literature (Lacey & Luff, 2009:6). Constant comparison analysis was also applied to focus group data (Onwuegbuzie, Dickinson, Leech, & Zoran, 2009:5). The stages of data analysis are explained in chapter 4.

1.8.10. Ethical considerations

Apart from instrumentation and procedural concerns, collecting data from people raises ethical concerns. These include taking care to avoid harming people, having due regard for their privacy, respecting them as individuals, and not subjecting them to unnecessary research (Goddard, 2001:49). First, gatekeeper's letters were obtained from uMshwathi Local Municipality and uMgungundlovu District Municipality, after which the researcher obtained ethical clearance for the study from the University of KwaZulu-Natal's Research Ethics Committee. Thirdly, the human dignity of the study participants was upheld by addressing important ethical factors such as informed consent, privacy and confidentiality, as well as anonymity (Grix, 2010:142).

1.9. Limitations of the study

Among a number of limitations of the study, hostile weather conditions played a huge role in delaying the process of data collection. In addition, because the researcher was investigating the

study for which he had reviewed the literature, there was a possibility of bias as he had an understanding of what the participants were likely to say in response to the questions presented. Over and above this, the researcher is also a resident of the rural community of the municipality under investigation, which likewise opened up the likelihood for bias. However, the researcher followed methodical scientific procedures to overcome such biases.

1.10. Key terms and definitions

Certain key terms and definitions utilised in the study are shown below in Table 1-1.

Table 1-1: Key terms and definitions

Key Term	Definition
Community Participation	The involvement and engagement arrangements that take place in community projects to solve societal and community challenges. (Bazarragchaa, 2012:20).
Disaster	A disaster is a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources (UNISDR, 2009:4).
Disaster Management	The entire process of planning and intervention to deal with disasters, including the development of response and recovery measures. However disaster reduction tends to be a neglected element in development planning (Raungratanaamporn, Kamiko & Denpaiboon, 2014:659).
Disaster Risk Governance	Disaster risk governance refers to the way in which the public authorities, civil servants, media, private sector, and civil society coordinate at community, national and regional levels in order to manage and reduce disaster risks (Rao, 2013:3).
Disaster Risk Management	This refers to all processes and activities which address the implementation of policies and capacity of a society's abilities to recover from the impacts of hazards, both pre- and post-occurrence, in either structural and or non-structural manners, with a primary focus on prevention and mitigation disaster risks (UNISDR, 2004:24).
Disaster Risk Reduction	Van Niekerk (2011:13) defines DRR as the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse effects.
Governance	The exercise of political, economic and administrative authority in the management of a country's affairs at all levels, that comprises the complex mechanisms, processes and institutions through which citizens and groups articulate their interests, mediate their differences and exercise their legal rights and obligations. (Siggiqi, Masuda, Nishtarb, Peters, Sabria, Bile, Jamaa, 2009:4).
Indigenous Knowledge	Kelman and Velasquez (2008:7) define IK as methods and practices developed by a group of people from an advanced understanding of the local environment, which has formed over numerous generations of habitation.
Indigenous Knowledge Systems	IKS can be defined as bodies of knowledge of the indigenous people of particular geographical areas where they have survived for a very long time, and can be interpreted as traditional knowledge, indigenous technical knowledge, rural knowledge as well as ethno-science (or people's science) (Mapara, 2009:140).
Vulnerability	The conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards. For positive factors, which increase the ability of people to cope with hazards, (ISDR, 2009:12).

1.11. Chapter inventory

This study begins with Chapter 1 as an introductory chapter. In Chapter 2 of this study, a comprehensive literature review on DRR, its definition as well as an in-depth discussion on disaster risk governance, basic DRR strategies, and participatory DRR, is provided. DRR is also discussed in conjunction with sustainable development. A literature review pertaining to DRR in a different context is discussed and the global, subnational and local context of DRR is provided. The chapter concludes with a discussion on the different institutional capacities that are required for the improvement of DRR processes.

Chapter 3 is the second section of the literature review, which further discusses IK and reviews the literature on the indigenous practices that different communities adopt for DRR purposes. The chapter also discusses the link between IKS and community participation. In this chapter, the summary and connection of the study is discussed through a detailed conceptual framework.

Chapter 4 concerns itself with the philosophical worldview, research design and methodology used in this study, together with discussions on the research strategy, sampling strategy, data collection method, administration of the interviews, focus groups and data preparation. The data analysis methods used in the study are also discussed within this chapter.

Chapter 5 presents the results of the empirical study, interviews and focus groups. In this chapter, the results emanating from the data are analysed, interpreted and evaluated. Furthermore, through thematic, content and matrix analysis, the data are reduced to develop themes related to the research.

Chapter 6 offers a final outline of the entire study and presents the conclusions drawn from the research. Recommendations are made and the significance of the study and suggestions for future research are also discussed.

1.12. Chapter summary

This chapter briefly touched on research in general as well as the characteristics of a research publication, and denoted the, significance of the study, problem statement, objectives, and research questions of the study. The chapter discussed the limitations that the researcher encountered as well as the databases used to collect the data, and gave a brief introduction to the literature review and research method used. This was followed by definition of terms, a chapter inventory and a summary of the whole chapter.

CHAPTER 2

EXPLORATION OF DISASTER RISK REDUCTION

2.1. Introduction

From first to third world countries such as South Africa, government institutions are continuously putting more of their focus on DRR strategies, combining them with knowledge from local communities and in conjunction with sound community participation. Governments of the world have used their most trusted and sophisticated resources to seek ways of reducing disaster risks. The IDSR (UN, 2003:3) states that climatic changes such as earthquakes, floods, tornadoes, droughts and other phenomena such as "El Niño" and "La Niña" are a part of nature, just like the sun and the rain. However, such phenomena are not necessarily disasters if they have not affected lives and other living beings. These types of climatic changes turn into disasters when they negatively affect lots of people in every corner of the planet where a culture of prevention has not yet taken root (UN, 2003:3). Rottach (2010:6) contends that any adverse natural event only becomes a disaster, when and where people are vulnerable to such events. Nevertheless, the main question then is how to prevent disasters despite climatic changes and vulnerability to disasters. Disaster risk reduction has to be a priority in every government's planning and budgeting, especially in developing countries, and is best accomplished through practical, grassroots-oriented and bottom-up approaches. This chapter starts with the definition of key concepts such as disaster, DM, DRM, and DRR, and points out the transition from DM and DRM to DRR. Disaster risk reduction is discussed from a global and national perspective, including global policy frameworks and national and sub-national legislative imperatives.

The chapter follows with an overview of DM as a reactive and a proactive model. It also highlights disaster risk governance and DRR strategies, which through good governance systems and enhanced institutional capacity, DRR strategies could be developed. The chapter goes on to discuss DRR in a different context, introduces the politico-administrative dichotomy and the relationship between DRR and sustainable development, and explores participatory DRR before concluding with a chapter summary.

2.2. Definitions of key concepts

"Disaster is a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources" (UNISDR, 2009:4).

Disaster management has been classified in different categories and is also seen from different perspectives. According to Baumwoll (2008:12), DM is a general term that incorporates all the actions related to disasters. Raungratanaamporn, Kamiko and Denpaiboon (2014: 659) state that DM can be defined as the entire process of planning and intervention to reduce disaster, as well as the response and recovery measures. Ways to reduce disasters tend to be a neglected element in development planning. Traditional emergency management encompasses the function of law enforcement and agencies as a temporary job, such as the fire department, however emergency management of disasters gradually changes to a more coordinated variety of resources, techniques and skills for a fast response and recovery process. There is a reactive approach and a proactive approach to DM; the reactive approach is the one that deals with response, recovery, and rehabilitation in the aftermath of hazards, while the proactive approach focuses on preparing and preventing disaster in advance so as to mitigate the effects of disasters.

As defined by UNISDR (2004:24), DRM refers to all the processes and activities that address the implementation of policies and capacity of a society's abilities to recover from the impacts of hazards, both pre- and post-occurrence, in either structural and or non-structural manners, with a primary focus on prevention and mitigation disaster risks. The term 'disaster risk management' refers to integrated multi-sectoral and multi-disciplinary administrative, organisational and operational planning processes and capacities aimed at lessening the impacts of natural hazards and related environmental, technological and biological disasters. These broad definitions encompass the definition of 'disaster management' as it is used in the Disaster Management Act No 57 of 2002 (RSA, 2002). However, where appropriate, the more updated term DRM is preferred in this framework because it is consistent with the use of the term internationally. Disaster risk management's key components of "prevention, mitigation, preparedness, response and recovery and rehabilitation" are the 'action clusters' for the cycle's flow of activities (Holloway, 2010:35).

The total disaster risk management (TDRM) approach is a holistic approach to DM (de Guzman, 2003:25). Although a few countries have adopted risk management concepts and principles in DM, most countries, especially developing countries, remain unfamiliar with this approach. The prevailing practices, particularly in Asia, are more inclined towards managing responses to disasters than towards managing risks and the underlying conditions that lead to disasters, which requires, among others, risk assessment, vulnerability reduction, and capacity enhancement (de Guzman, 2003:25). The purpose of TDRM is to reduce the underlying factors of risk and to prepare for and initiate an immediate response should disaster occur. This is similar to DRR.

Disaster risk reduction is an ongoing, and currently the most scrutinised, perspective in the reduction, prevention and mitigation of natural disasters (Holloway; 2010:35). Van Niekerk (2011:13) defines DRR as the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse effects. Disaster reduction strategies include, primarily, vulnerability and risk assessment, as well as a number of institutional capacities and operational abilities. This definition considers different perspectives of DRR and also identifies that human beings should take responsibility in terms of avoiding and minimising disaster risks to humankind.

Gerald and Dorothy (2010:6) define DRR from the developmental perspective, which is the conceptual framework of elements considered with the possibilities of minimising vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development. These definitions have a common terms and focus - prevention, mitigation, preparedness and vulnerability reduction, which set the notion of keeping disasters from happening or reducing the risk of disasters. Many authors have defined the concept, most of whom come to a similar conclusion that DRR is about seeking ways to reduce vulnerability and risk within communities. For the purpose of this research, DRR will be defined as actions taken to reduce the risk of disasters and the adverse impacts of natural hazards, through systematic efforts to analyse and manage the causes of disasters, including through avoidance of hazards, reduced social and economic vulnerability to hazards, and improved preparedness for adverse events (Rottach, 2010:9).

2.3. From disaster management to disaster risk reduction

There has been a noticeable shift in discourse from DM to DRM and finally to DRR. In terms of DM, Pasteur (2011:1) argues that approaches to disasters have tended to focus on response, recovery and reconstruction, typically the domain of humanitarian agencies or divisions. Furthermore, the author attests that shifts towards disaster prevention and preparedness emphasise hazard-specific structural and organisational measures, which could include emergency plans in anticipation of frequent natural disasters in a given locale. Such a movement toward DRM can be viewed as a mechanism or tool to ensure that disasters are managed in terms of understanding the pattern and frequency of occurrences.

Becker, Abrahamsson and Hagelsteen (2013:1) conducted a study on the relationship between DRM and DRR. The terms are often used interchangeably instead of being viewed as parallel concepts and practices. The research methodology for that study was a comparative case study and data were collected through interviews with key informants, focus groups and content analysis of documentary sources. These scholars found that there is nothing new about proactive strategies through DRR in that these were already part of the early definitions of emergency or DM, together with response and recovery. Louw and van Wyk (2011:16) are of the same view as Becker et al. (2013:1) stating that DRM can be defined as a reactive approach, but it is not only reactive because disasters do not always happen with a sudden onset. For disasters that take place with a slow onset, the DRM approach can plan in advance. The traditional approaches to DM and DRM start from the point of rescue, move on to the phase of relief, and then to the phase of rehabilitation and construction. Yet, as a new approach, DRR concentrates primarily on early warnings, preparedness, mitigation and prevention as top strategic priorities to reduce the vulnerability of communities and infrastructure from disasters. Before comparing DM and DRM with DRR, Figure 2-1 depicts the cycles, components and relationships within DM and DRM processes.

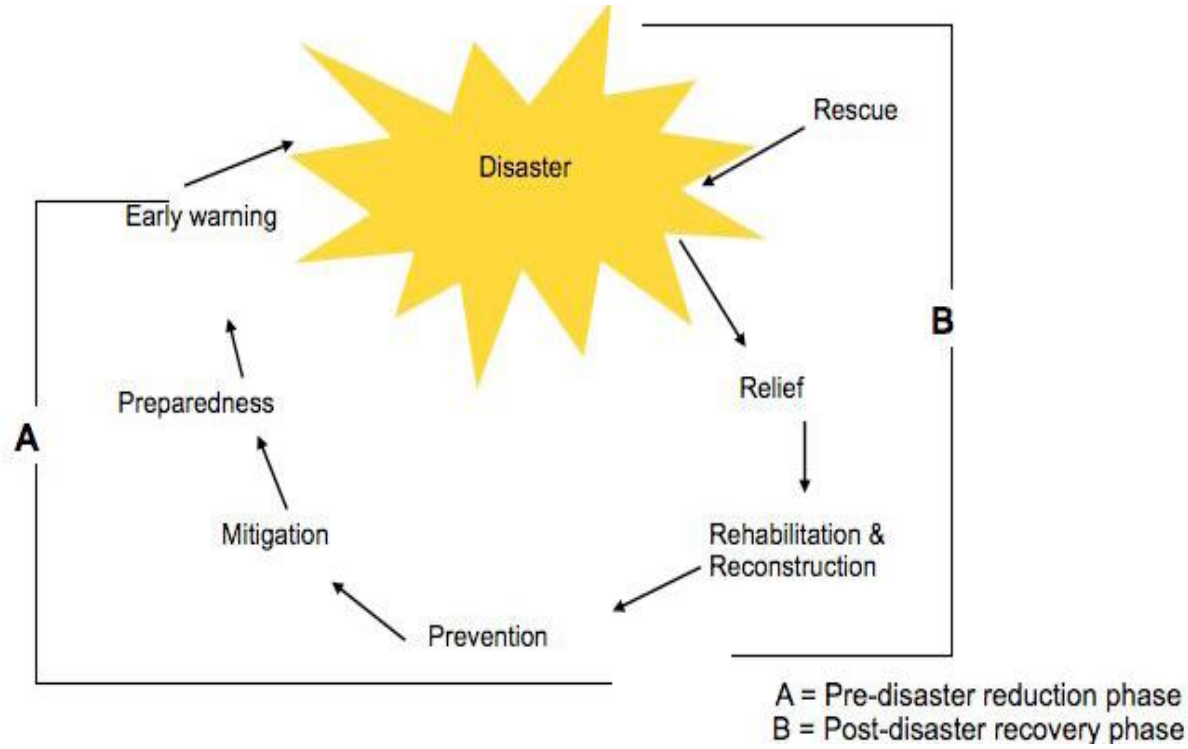

Figure 2-1: Traditional Disaster Management Cycles
Source: Van Niekerk (2011:38)

As Figure 2-1 shows, DM and DRM can be seen from a DRR perspective, but they are less focused on assessing the vulnerability of communities, human beings and the natural environment than DRR. Unlike DM and DRM, as a new and widely adopted approach, DRR advances the idea that in some cases certain disasters should not happen. In Figure 2-1, early warnings, preparedness, mitigation and prevention are incorporated. These are likewise the phases of DRR that cover the concept of reducing disaster risk in a proactive manner (van Niekerk: 2010:38). While DRM is somewhat aligned with DRR, there are notable distinctions between DM and DRR. Table 2-1 depicts a comparison of characteristics of traditional DM and DRR.

Table 2-1: Traditional disaster management compared with disaster risk reduction

Disaster management (traditional)	Disaster risk reduction (contemporary)
• Primary focus on hazards • Single, event-based scenarios • Basic responsibility to respond to an event • Often fixed, location-specific conditions • Responsibility in a single authority or agency • Command-and-control directed operations • Established hierarchical relationships • Urgent, immediate to short time frames in outlook, planning, attention and returns • Rapidly changing, dynamic use of information; often conflicting or 'sensitive' • Primary, 'authorised' or singular sources • Need for definitive 'facts' • Operational, or public information-based use of communications	• Major focus on vulnerability • Dynamic, multiple-risk issues • Fundamental need to assess and update • Extended, shared or regional locales • Multiple interests, actors and responsibilities • Situation-specific functions and free association • Shifting, fluid and tangential relationships • Comparative, moderate to long time frames in outlook, planning and return values • Accumulated, historical, layered, updated and comparative information; open or public • Multiple and diverse or changing sources • Differing perspectives and points of view • Multiple-use, shared exchange, inter-sectoral information, matrixes, nodal and lateral flows in communication

Source: Vermaak and van Niekerk (2010:558)

Table 2-1 helps identify the nature of the shift to DRR. In keeping with international thinking and initiatives geared toward DRR, this dissertation will focus on DRR while exploring whether there is a nexus between DRR, IK and community participation in public affairs. The next section examines disaster risk governance as it pertains to DRR.

2.4. Disaster risk governance

In recent decades, the global cost of disasters has increased substantially. Several trends in society and nature suggest that this pattern may continue, with more frequent mega-disasters occurring in the future. Disaster risk reduction can also be discussed in conjunction with governance. Governance generally and disaster risk governance in particular are subject to a number of

definitions. On the one hand, King (2008:499) sees governance as a concept that extends management and which describes structures and processes for collective decision-making that involves governmental and non-governmental actors. On the other hand, Siggiqi et al. (2009:14) define governance as the exercise of political, economic and administrative authority in the management of a country's affairs at all levels. Furthermore, governance comprises the complex mechanisms, processes and institutions through which citizens and groups articulate their interests, mediate their differences and exercise their legal rights and obligations. Good governance is a political and technocratic term without normative aspirations and which suggests that governance should be "good" and not "bad" (Ladi, 2008:11).

Taken as a whole, disaster risk governance refers to the way in which the public authorities, civil servants, media, private sector, and civil society coordinate at community, national and regional levels to manage and reduce disaster risks (Rao, 2013:3). Tierney (2012:341) argues that disaster governance is an emerging concept in the disaster research literature that is distinct from, but closely related to, risk governance as well as environmental governance. In particular, Tierney (2012:343) notes that disaster risk governance arrangements are shaped by forces such as globalisation, world-system dynamics, social inequality, and socio-demographic trends, nested within and influenced by overarching societal governance systems. Tierney (2012:341) further points out that "governance is a more inclusive concept in that DM and risk-reduction activities take place in the context of and are enabled or thwarted by both societal and disaster specific governance frameworks". Governance is policy-driven and DRR should be a policy priority at all levels of government - national, provincial and local (Twigg, 2009: 28).

The principles of good governance provide the key to sustainable development, and by implication, effective DRR. Satterthwaite (2011:342) states that good governance creates a conducive environment for effective DRR through mobilising political will and facilitating broad participation and partnerships. Such broad participation should ensure that political, social and economic priorities are based on broad consensus in society and that the voices of the poorest and most vulnerable people are heard in the decision-making processes. Gaston *et al.* (2012:14) conducted a survey to inquire into good DRR governance. Their findings show three core headings relating to good governance indicators. First, indicators of inclusion and participation pertain to partnerships, volunteers, children and youth, and gender; second, indicators of local capacity and capability include policies, indigenous capacities, planning, financial resources, decentralisation, training, expertise, governmental coordination, and information management; and third, as to indicators of good DRR governance, accountability and transparency are highlighted. These include performance baselines, monitoring, participatory monitoring,

complaints procedures, information gathering and information dissemination (Gaston *et al.*, 2012:6-7).

Hence, in the context of DRR and using the aforementioned indicators, suitable governance structures can be crafted to strengthen capabilities and to create capacities of both public and private stakeholders. This is an unalterable prerequisite to reduce the economic risks associated with disasters and to sustainably improve management processes in the public sector and at the interface of the public and private spheres. The objective is to avoid disasters, but if this cannot be achieved, to significantly reduce personal, economic, and environmental losses during and after disastrous events (Ahens & Rudolph, 2006:207). Global governance organisations are likewise involved with DRR policy frameworks to facilitate good DRR governance. Disaster risk reduction across geographical scales and governance spheres is discussed next.

2.5. Disaster risk reduction in the global, national and sub-national contexts

Disasters are not contained within geographical borders; therefore, it is worth examining how multi-lateral governance organisations view DRR across geographical scales. This includes DRR in global, national and sub-national contexts.

2.5.1. Disaster risk reduction in a global context

The United Nations (UN), African Union (AU), the World Bank (WB) and other global and regional governance organisations have a role to play in DRR. These organisations are likewise concerned with ensuring and improving community involvement in DRR strategies, because local knowledge is held by community members who are directly affected by disasters. According to Ruffin and Reddy (2015:225), while DRR is a global phenomenon, it has a sub-national manifestation. Table 2.2 reveals the UN's policy frameworks regarding DRR.

Table 2-2: Global governance frameworks for disaster risk reduction

Global Frameworks	Purpose
International Decade for Natural Disaster Reduction of 1989 (UN, 1989)	To prevent different types of disasters from taking place on earth. To reduce, through concerted international action, especially in developing countries, the implicit loss of life, property damage and economic disruption caused by natural disasters.
Yokohama Strategy for a Safer World: Guidelines for Natural Disaster Prevention, Preparedness and Mitigation and its Plan of Action (UN, 1994)	To develop and strengthen national capacities and capabilities and, where appropriate, national legislation for natural and other disaster prevention, mitigation and preparedness, including the mobilisation of non-governmental organisation and participation of local communities.
UN International Strategy for Disaster Reduction (UN, 1999)	The main purpose is to facilitate, in an inter-agency effort, governments and communities in disaster-prone areas in integrating the management of risk into their development policies, programmes and projects. The long-term goal is to enable communities to become resilient to disasters, saving lives as well as social, economic and environmental assets.
Hyogo Framework for Action (HFA) 2005-2015: Building the Resilience of Nations and Communities to Disasters (UN, 2005)	To ensure that DRR is a national and a local priority with a strong institutional basis for implementation; to identify, assess and monitor disaster risks and enhance early warning; to use knowledge, innovation and education to build a culture of safety and resilience at all levels; to reduce the underlying risk factors; and to strengthen disaster preparedness for effective response at all levels.
Post-2015 Framework for Disaster Risk Reduction (HFA2): Report from 2013 Global Platform Consultations (UN, 2013)	To provide an opportunity for participants to contribute their thoughts and suggestions on the future of DRR post-2015.
Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR) (UN, 2015)	To understand disaster risk; strengthen disaster risk governance to manage disaster risk; invest in DRR for resilience; enhance disaster preparedness for effective response and "Build Back Better" in recovery, rehabilitation and reconstruction.
UN Plan of Action on DRR for Resilience (UN, 2016)	To execute the Sendai framework by coordinating, strategising, monitoring and reporting progress and communication, advocacy and partnerships towards DRR worldwide.

Source: (UN, 1989; UN, 1994; UN, 1999; UN, 2005; UN, 2013; UN, 2016)

These global policy frameworks call for communities at every level across the world to participate in advancing DRR, for example, the Hyogo Framework of Action 2005 to 20015 (HFA), adopted in Japan, provides a global strategic roadmap to DRR. The framework offers guiding principles,

priorities for action, and practical means for achieving disaster resilience for vulnerable communities (World Bank 2010:10). The Hyogo Framework for Action (UN 2005:3) not only emphasises the importance of DRR, but also stipulates that DRR must be prioritised with the collaboration of affected role players using local community knowledge as a critical aspect for DRR. The HFA 2005-2015 (UN, 2005:12) stipulates that countries must therefore develop or modify policies, laws, and organisational arrangements, as well as plans, programmes, and projects to integrate DRR. Recent global policy frameworks such as HFA2 (UN 2005:13) and the SFDRR (UN 2015:11) continue to advance community participation and the use of local knowledge in DRR, while deepening the role of national and sub-national governance.

The next section discusses the South African policy and legislative frameworks associated with DRR. However, it is worth noting that the South African government has established a developmental turnaround strategy. This strategy envisions how the public service will look by the year 2030, in the form of the National Development Plan: Vision 2030 (NDP) (RSA, 2011). The NDP sets priorities and provides direction on actions to be executed that will establish the way in which South Africa is envisaged to be in the year 2030. DRR does not appear to be delineated as a priority, however.

2.5.2. South African context of disaster risk reduction

On the African continent, the first decade of the 21st century saw a number of declarations, policies, strategies, plans and programmes being developed regarding DM, DRM and DRR, yet very little real implementation of the above is evident, despite a number of inter-regional and high-level discussions and forms of collaboration (Van Niekerk, 2011:5). The HFA (UN, 2005:1) suggests that strong national and local commitment is required to save lives and livelihoods threatened by natural hazards, which must be taken into account in public and private sector decision-making in the same way that environmental and social impact assessments are currently required to advance sustainable development. For this reason, many countries have legislative frameworks regarding the reduction of disasters, and South Africa is no exception. Table 2-3 shows a number of constitutional, legislative and policy frameworks for South Africa. The South African Constitution (RSA, 1996) provides a foundation for DRR and disaster risk governance as does the White Paper on Disaster Management (RSA, 1999).

Table 2-3: South African legislative and policy frameworks for disaster risk reduction

South African Law and Policy Frameworks	**Relevant Purpose**
The Constitution of the Republic of South Africa (RSA, 1996)	Environment (Section 24)
	Health care, Food and Social Security (Section 27)
	Language and culture (Section 30)
	Cultural, Religious and Linguistic Communities (Section 31)
	States of emergency (Section 37)
	Principles of co-operative government and intergovernmental relations (Section 41)
	Basic values and principles governing public administration (Section 195)
White Paper on Disaster Management (RSA, 1999)	The international trend (Section 2.1)
	The current situation in South Africa (Section 2.2)
	Key functions for the National Disaster Management Centre (Section 3.4)
	Funding DM (Section 4)
	National Disaster Management Act (Section 5)
	A Framework for Disaster Management Training and Community Awareness Programmed (Section 6.2)
Disaster Management Act 57 of 2002 (RSA, 2002)	National Disaster Management Advisory Forum (Section 5)
	The establishment of the National Disaster Management Centres (Section 8)
	The establishment of the Provincial Disaster Management Centres (Section 29)
	Municipal Disaster Management Framework (Section 42)
	The establishment of the Municipal Disaster Management Centres (Section 43)
	Municipal Disaster Management Advisory Forum (Section 51)
	Disaster Management for Municipal Areas (Section 53)
Policy Framework for Disaster Risk Management in South Africa (RSA, 2005)	Arrangements for the development and adoption of integrated DRM policy in South Africa. (Key Performance Area 1, Section 1.1)
	Arrangements for stakeholder participation and the engagement of technical advice in disaster risk management planning and operations (Section 1.3)
	Disaster risk assessment and risk reduction planning (Section 2.1)
	Inclusion of DRR efforts in other structures and processes (Section 3.4) Education, training, public awareness and research (Enabler 6)

	Providing 'a coherent, transparent and inclusive policy on DM appropriate for the Republic as a whole' (section 7(1)).
Disaster Management Amendment Act No. 16 of 2015 (RSA, 2015)	To amend the Disaster Management Act, 2002, so as to substitute and insert certain definitions (Amendment of section 1 of Act 57 of 2002)
	Traditional leaders as recommended by the National House of Traditional Leaders established by section 2 of the National House of Traditional Leaders Act, 2009 (Act No. 22 of 2009). (Amendment of section 5 of Act 57 of 2002)
	Representatives of national umbrella organisations for women, children, the elderly and people with disabilities (Amendment of Section 5(b))
	To align the functions of the National Disaster Management Advisory Forum. (Substitution of section 8 of Act 57 of 2002)

Source: (RSA, 1996; RSA, 1999; RSA, 2005; RSA, 2005; RSA, 2015)

As Table 2-3 indicates, section 28 of the Disaster Management Act No. 57 of 2002 (RSA, 2002) asserts that each province must establish and implement a framework for DM in the province aimed at ensuring an integrated and uniform approach to DM in the province by all provincial organs of state and statutory functionaries. Both non-governmental organisations and the private sector are expected to be involved in provincial and local DM activities. Section 42 (1) of the Disaster Management Act (RSA, 2002) provides that each metropolitan and district municipality must establish and implement a framework for DM, and district municipalities must establish DM frameworks after consultation with the local municipalities in their areas (RSA, 2002). These are mandates directed toward community participation in DRR. Whilst the DRM policy framework (RSA, 2005) advances an integrated approach to DRM and DRR, the 2015 amendment to the Disaster Management Act (RSA, 2002) broadens the participant base. For example, in the 2015 legislation, attention is directed to the institution of traditional leadership and to vulnerable populations.

Institutions and governments exist to provide a range of interlocking services and functions in an increasingly complex world which prioritises the role of civil society. Society is transforming as a consequence of technological change and social complexity, which is partially driven by processes of social change and globalisation that complicate both disaster impacts and crisis scenarios (King, 2008:498). Twigg (2009:28) notes characteristics of a disaster resilient community. These characteristics include all spheres of government demonstrating a holistic and integrated approach to DRR. The approach must be located within the wider development context and linked to development planning across different sectors. In other words, DRR should be

incorporated into or linked to other national development plans. It should also be incorporated into donor supported country-wide development programmes as a matter of sustainable development as discussed in Section 2.7.

According to Twigg (2009:27), the routine integration of DRR into development planning and sectoral policies should incorporate poverty eradication, social protection, sustainable development, climate change adaptation, desertification, natural resource management, health, and education. In Twigg's (2009:28) view "formal development planning and implementation processes are required to incorporate DRR elements such as hazard, vulnerability and risk analysis, mitigation plans. There must also be multi-sectoral institutional platforms for promoting DRR, and local planning policies, regulations and decision-making systems take disaster risk into account" (Twigg, 2009:29). As with other countries, the South African legislative and policy frameworks include prescriptions for local government. Ruffin and Reddy (2015:220) argue that local government has a significant role to play in DRR, adding that this can be accomplished in South Africa through solid intergovernmental relations. The next section considers the local government context of DRR and its relationship with other spheres of government.

2.5.3. Local government context of disaster risk reduction

Building resilience at the local level has become one of the mainstays of recent disaster reduction approaches (Hyogo Framework for Action 2005–15, UN, 2005); local government can be seen as the most important government sphere for the effective implementation of DRR. The South African Local Government Association (SALGA) (SALGA, 2011:24) states that local government is where most of the operational activities relating to DM will occur. The local sphere of government must ensure that the functional strategies, policies, programmes and projects are operational at community level (SALGA, 2011:24). Van Niekerk (2011:6) therefore argues that local government has an obligation and responsibility to ensure the safety of its citizens.

South African municipalities have different disaster risk profiles and they all face various threats of different magnitudes. Most South African municipalities are still focusing on a reactive approach towards disasters and risks, which are due in, part to a lack of political will (SALGA, 2011:24). According to Twigg (2009:10), local government DRR policies, strategies and implementation plans must always be in place; and officials must ensure that communities understand relevant legislation, regulations and procedures, and their importance to establish effective community awareness. In other words, local officials should not only understand DRR,

but must also exercise political will to determine how to implement DRR strategies and to actualise DRR practices.

Bang (2013:4) studied the governance of DRR in Cameroon with specific focus on the challenges local governments face in implementing DRR strategies. Bang's research incorporated policy recommendations that suggest ways in which DRR strategies can be mainstreamed into local governance. Some of the fundamental recommendations, according to Bang (2013:6), are that: (1) the central government should institute a policy on DRR that would decentralise responsibilities and resources to local governments; (2) local governments should be given autonomy to manage disasters with minimal interference; (3) DRR should be institutionalised and included in the development policies and plans of local governments; and (4) the central government should prioritise contemporary management of risks based on potential risk, frequency and intensity of hazards, rather than on political control of the local government area. The author also suggests that local governments should take all available measures to plan and regulate development in hazard prone areas, to enforce orders restricting settlements in risky zones, and to enable access to safe housing and well-situated land. Moreover, the outcome of Bang's (2013:8) study emphasises the importance of financial resources by stating that financial and material resources for DRR activities should be kept under the control of committees and not individuals. This is expected to minimise corruption and embezzlement. The last recommendation from the study was that local governments should ensure that disaster victims, survivors, beneficiaries, and vulnerable populations are incorporated into the DM planning and decision-making processes that concern them.

In South Africa, the recommendations from Bang's (2013) study would be applied in the domain of intergovernmental relations. As Table 2-3 reflects, the Disaster Management Act 57 of 2002 (RSA, 2002) establishes the interrelationships between national, provincial and local government. This is done through DM centres at each distinct sphere of government, which also allows the process to be interactive across government spheres. The South African DRM policy framework (RSA, 2005) is designed to prioritise the contemporary management of risks through integrated DRM, which includes "stakeholder participation" (Section 1.3) and "disaster risk assessment and risk reduction planning" (Section 2.1). Although local government has a central role to play in DRR, that role is only realised to the extent that the political will of local government is exercised toward the implementation of DRR strategies. The significance of political will is discussed next.

2.5.4. Politico-administration context of disaster risk reduction

The HFA2 stresses the importance of political will and also uses the term in conjunction with leadership. Political will rests primarily with political constituencies, but it must be consolidated, prioritised and articulated by leadership. That leadership, on the other hand, is paralysed if it is not grounded in the will of its constituency (HFA2, 2013:4). HFA2 continues by stating that there is a large gap between talking about, and actually investing in, DRR. Concerns of political will have been discussed by many authors and world organisations, such as the World Bank (2010:13), which emphasises that the commitment of national leaders is key to achieving visibility for DRR, creating a culture of DRR at all levels, and empowering those at risk to achieve protection against disaster impacts. Governments should thus demonstrate their commitment by improving their governance structures and processes.

Twigg (2009:10) attests that people should garner political consensus to emphasise the importance of DRR by ensuring the formulation of sustainable national DRR policies, strategies and implementation plans. These require a clear vision, priorities, targets and benchmarks. Twigg (2009:10) further contends that, from the national to the local level, the public must establish policies and strategies that support community-based DRR. To do so means that political leaders should generate political will, yet there seems to be a tension between traditional leadership and political or democratic leadership, especially in the rural communities, with regards to the ownership and management of land and knowledge (AU, 2004:25). The HFA2 (2013:12) introduced cultural factors as a potential new mechanism to involve communities, enhance the use of local knowledge and assist in building capacity and community resilience. Local governments and other local community leaders can take a leadership role in establishing programmes that ensure the importance of cultural sensitivity, which will also raise awareness amongst the communities in which they operate, therefore the language used to inform must respect people's cultural norms and practices as much as possible (HFA2, 2013:3).

Taken together, HFA2's (2013:4) strategies geared toward political will and Twigg's (2009:10) contention about the role of political will in DRR show the need for synergy between politicians and public administrators and managers charged with DRR responsibilities. Although an increase in political commitment is desired, in most cases, political will and commitment cannot be enforced. Political officials and their constituencies are protected by their national constitutions. However, if the willingness of political office-bearers to commit themselves to DRR programmes and to work hand-in-hand with public administrators is limited, DRR and this particular UN strategy projected by HFA2 (2013:4) cannot be achieved.

2.5.5. Institutional capacity for disaster risk reduction

There is a need to develop the missing elements of the institutional framework for DRR at the national and sub-regional levels, as well as to improve the quality of the policy frameworks (ISDR 2010:15). Development of the institutional framework can be facilitated through several means, including providing guidance; facilitating information, knowledge and experience sharing; and lobbying political leaders and legislators.

The meeting that was held in Switzerland for discussions on the post-2015 Hyogo Framework for Action (HFA2) noted that when documented, the information would be available in a convenient form to a wide range of audiences including government decision makers, environmental and DM practitioners, medical practitioners, academics, researchers, journalists, indigenous and local communities, as well as international development agents including AU and other stakeholders (HFA2, 2013:28). Furthermore, they articulated that the study would strengthen capacity-building in IK and help to integrate the knowledge with other knowledge systems and development processes, particularly for environmental conservation and natural DM.

Gaston *et al*. (2012:6), in their research findings, argue that accelerating the risk reduction process at local level in Cameroon required that necessary policies be put in place, IK be incorporated and effective planning undertaken, with adequate resources deployed. In the case of South African capacities to carry out DRR processes, all Disaster Management Centres (DMCs), such as the National Disaster Management Centre, the Provincial Disaster Management Centre (PDMC) and the Municipal Disaster Management Centres (MDMC), must be able to access and utilise documented IK. Through proper planning which incorporates effective accountability and transparency measures, DRM and DRR can be achieved. The responsibility lies with all spheres of government pursuant to the Disaster Management Act No. 57 of 2002 (RSA, 2002). In ensuring proper planning, according to Gaston *et al*. (2012:7), all spheres of government should partake in providing a proper plan and policies that will enhance the use of IK. The National Disaster Management Plan (NDMP), Provincial Disaster Management Plan (PDMP) and Municipal Disaster Management Plan (MDMP) are planning mechanisms used in South Africa, as referenced in Table 2-3. Municipal Disaster Management Plans incorporate strategies that are formulated within municipally organised structures, which form part of the municipal arrangements for disasters. Section 2.6 details various DRR strategies that are adopted by municipalities for resilience purposes. Among many strategies, preparedness, prevention, mitigation and vulnerability reduction are found to be commonly adopted for DRR processes.

2.6. Disaster risk reduction strategies

Disaster risk reduction governance includes the identification and execution of unique DRR strategies, which are adopted by different countries for different climatic environments. In the literature, prevention, mitigation, preparedness and vulnerability reduction are seen as the most common and effective strategies. First, prevention strategies provide outright avoidance of the impact of hazards and a means to minimise related environmental, technological and biological disasters. Considering social and technical feasibility, investing in preventive measures is justified in areas frequently affected by disasters (UNISDR, 2009:22). DRR is an important tool of humanitarian and development aid, and perhaps also reflects a spreading paradigm shift within humanitarian organisations such as Act Alliance, United States Agency for International Development (USAID), International Federation of Red Cross and United Nations International Children's Emergency Fund (Rottach, 2010:6).

Secondly, there should be a point of settlement after prevention that allows mitigation. Thywissen (2005:6) defines mitigation as structural and non-structural measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards, while Rottach (2010:6) argues that DRR implementation should be done before disasters occur. Thirdly, the impact of hazards should be anticipated from all possible angles, as must keeping early warnings in mind to reduce disaster risks. Ahlgreen and Ourti (2013:6) contend that a vital aspect of successful and effective DM is that all stakeholders get involved. The government, non-governmental organisations (NGOs), local organisations, the private sector and civil society must all work together and be coordinated in order to cope with disasters.

Finally, a reduction in the vulnerability of the environment from hostile weather conditions is a concept that is normally utilised in the fields of DRR, hazards, and DM, as well as in global climate change. Palliyaguru, Amaratunga and Baldry (2013:48) define vulnerability as "the conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of a community to the impacts of hazards". Vulnerability to hazards is expressed as the degree of exposure of the population, property and its capacity to prepare for and respond to the hazard. Vulnerability can also be expressed as the degree of loss resulting from a potentially damaging phenomenon or hazard (USAID 2011:8). There are different strategies for DRR, which are also adopted locally, sub-nationally, nationally and globally.

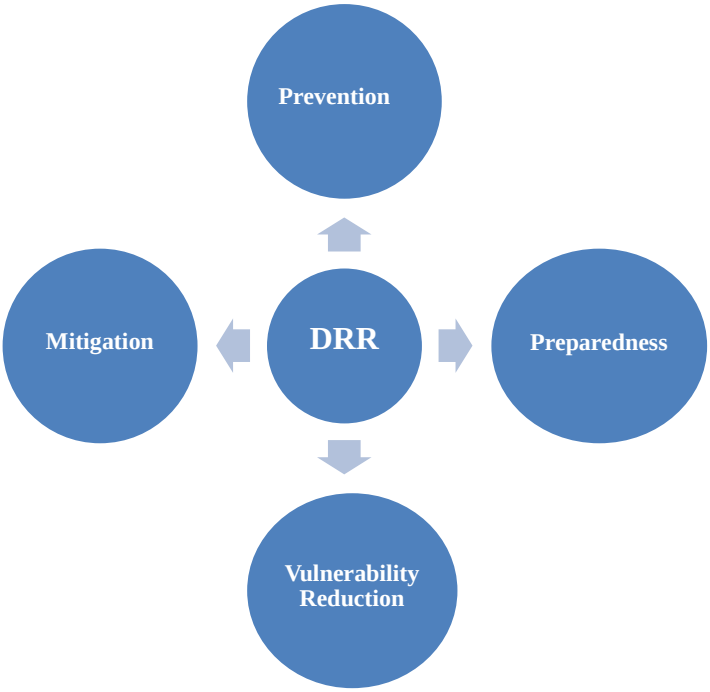

Figure 2-2: Disaster Risk Reduction Strategies
Source: Adapted from van Niekerk (2011) and UNISDR (2009)

Disaster risk reduction strategies should be designed with sustainable development in mind, and are discussed in the following section.

2.7. Disaster risk reduction and sustainable development

Global, continental, regional and national governance organisations are aware of the link between DRR and sustainable development. The World Bank (WB) and the Global Facility for Disaster Risk Reduction (GFDRR) (2010) provided a report on the state of DRR in the sub-Saharan African region, in which DRR is considered an integral pillar for sustainable development and an important part of the World Bank's activities. The report shows that the goal of the WB is focused on reducing human, social, economic, and environmental losses due to natural hazards and related environmental disasters (The World Bank and Global Facility for DRR 2010:10). As to the African continent, the African Regional Strategy for DRR (ARSDRR) highlights the main objective of the New Partnership for Africa's Development (NEPAD), which is to eradicate poverty and promote sustainable development. In their assessment of the implementation of the DRR policy by the Southern African Development Community (SADC), Vyas-Doorgapersad and Lukamba-Muhiya (2012:782) found that *inter alia*, there is a "lack of country-specific DRR planning", as well as an absence of SADC member countries' understanding of the SADC policy at the regional level.

Turning to national governments, a central government should mainstream disaster risks within the country's development plans, especially the provision of critical infrastructure such as roads and the telecommunication network in high-risk zones (Bang 2013:6). Benson's (2009:7) study of the Philippines (a county highly affected by hazards and major disasters) highlights the importance of awareness-raising in hazard-prone countries. This, Benson (2009:7) argues, would secure a solid appreciation and understanding of the relevance of DRR to sustainable development and poverty reduction.

According to Benson (2009:15), there should be a body of evidence on hazard mapping and physical exposure, disaster losses, the socio-economic impact of disasters at national and community levels, and the scope for enhanced resilience. Furthermore, this body of evidence should establish proactive DRR strategies and risk-sensitive development policies and initiatives. In South Africa, the Office of the Presidency established a planning commission which drafted a plan to carry out the country's vision. The National Planning Commission (NPC) was established to draft the National Development Plan (NDP) which envisions the year 2030 as a year by which South Africa will be poverty, unemployment, and corruption free. The NDP also considers the impact of disaster risks which may affect the plan. The NDP (RSA, 2011:197) provides that South Africa is working towards achieving environmental sustainability and an equitable transition to a low-carbon economy. Whilst the NDP discusses the challenges of climate change (pp 179 – 192); highlights the importance of early warning systems, adaptation and mitigation (pp 180 – 182); and examines the role of response to and relief from disasters (pp 183 – 189), very little is written about DRR strategies in particular (RSA, 2011) and the role of these strategies in sustainable development.

According to Pasteur (2011:1), sustainable development incorporates sustainable livelihoods. In addition, the author argues that approaches to sustainable livelihoods should be holistic and people-centred in order to understand and address the diverse factors that influence poverty and well-being. Within the context of sustainable development, reducing livelihood and development risks on the continent arising from disasters and other threats are one of the priorities of the ARSDRR. Of concern, however, is whether perceptions of risks are at odds with the "real" risk that underlies the process of risk transference. There must be sufficient risk assessment, hazard mapping and other DRR strategies to avoid development that increases long-term vulnerability (Bazarragchaa, 2012:18). Van Niekerk (2011: 9) argues that the effect of a hazard of a particular magnitude would affect distinct communities differently. For instance, poorer communities are more at risk than communities that have the financial capacity to cope. Furthermore, DRR can be

seen in the context of rural development rather than urban development. Particularly, synergy between DRR strategies and rural development could enhance the effectiveness of DRR strategies and also improve the sustainable livelihoods of rural communities. Developing countries are at risk due to a combination of geography and the intrinsic vulnerability of poor communities to environmental threats. Given that the effects of hostile weather conditions and environmental degradation fall most heavily on the poor, South Africa needs to strengthen the resilience of its society and economy to the effects of adverse weather conditions. Vulnerability assessments and other elements of DRR cannot be accomplished by government alone. Rather, participatory DRR is required, which is discussed next.

2.8. Participatory disaster risk reduction

Africa has come a long way since the global arena emphasised the need for multi-stakeholder DRR rather than continuing the unsustainable cycle of DM (USAID 2011:5). The involvement of communities, interest groups and the private sector is more of a participatory approach to DRR. Ahlgren and Oourti (2013:1) assert that there is wide international consensus that shared responsibility among many actors and stakeholders is needed to reduce risks and the impacts of disasters. UNISDR (2013:7) stipulates that Hyogo Framework for Action (HFA) has the ability to influence and guide diverse groups and generate partnerships amongst a wide variety of stakeholders, including local practitioners. These stakeholders have emerged as partners who work with and support national governments to reduce the risks and impacts of disasters and build the resilience of communities (UNISDR 2013:7). Promoting DRR must be targeted at the community level if it is to have a long-term and sustained impact. As a result, civil society organisations have increasingly become DRR practitioners (UNISDR 2013:9).

Similarly, Gaston *et al*. (2012:6-7) point out that a "participatory decision-making approach would include men and women, youth, civil society groups and the private sector". Therefore, a "culture of prevention" is necessary to advance "vulnerability reduction" and in this "multi-sector cooperation remains vital" (Ruffin & Reddy, 2015:224). Vyas-Doorgapersad and Lukamba-Muhiya (2012:782) contend that the inappropriate involvement of community members during the design of DRR programmes leaves a gap in the effective implementation of the DRR strategies. As the HFA2 (UN, 2013) and the SFDRR (UN, 2015) point out, the use of local knowledge to advance DRR strategies can amount to engaging community participation.

2.9. Chapter summary

This chapter highlighted that DRR should be paid greater attention and should also be set as a priority by every community, household, national government and regional and global governance organisation. Disaster risk reduction can be seen from both management and governance standpoints and also across all government spheres (for example, national, provincial and local). From the community resilience and vulnerability reduction perspectives, the literature suggests that DRR should be put at the centre of public service. Given the variety of communities, countries and continents, as well as weather conditions and environments, DRR strategies should be unique and relevant to the conditions of a particular location. For DRR to be effective, the use of local knowledge should also be encouraged. Before the use of external knowledge, local strategies should be tried and tested through the exercise of political will. This could be done in sync with sustainable development and community participation, as discussed in this chapter. The following chapter discusses the use of IK and community involvement in relation to DRR, which sets the direction for the theoretical framework.

CHAPTER 3

COMMUNITY PARTICIPATION AND INDIGENOUS KNOWLEDGE RELATIVE TO DISASTER RISK REDUCTION

3.1 Introduction

Indigenous people possess vast stores of information and knowledge, but for that information to be best utilised, the effective involvement of local level communities is necessary. Research on DRR has mostly focused on the integration of IK and DRR, however this chapter will look at community participation and IK. In addition to that, the chapter will also look at the effective use of IK through community participation to achieve community-based DRR. Factors that are also essential for the use of IK are impactful political and traditional leaders, the alliances between politicians and public officials in addressing DRR strategies, and the formulation of effective policies. At the end of this chapter, a conceptual framework will be provided that will guide the remainder of the study.

3.2. Community participation on disaster risk reduction

Bazarragchaa (2012:20) asserts that a community can be seen as a group that may share one or more things in common, such as living in the same environment, similar disaster risk exposure, or having been affected by a disaster. Community-based approaches to DRR are on the rise, particularly over the last two decades (Gero, Meheux & Howes, 2011:102), which has been noted by authors and practitioners alike. For example, Buccus, Hemson and Piper (2007:4) argue that the issue of public participation is receiving increasing attention in South Africa, from both government and civil society sectors, despite the fact that the relevant legislation was passed some years ago. A current problem is the dearth of information on how to use public administration community participation strategies to specifically involve local communities in providing IK for DRR. The implicit loss of IK as elders pass away is likely to result in people being adversely affected by avoidable disasters. The absence of studies that integrate IKS and community participation into DRR processes could lead to the loss of lives, damage to infrastructure, a reduction in agricultural activities and delayed public service delivery. Although public participation has received attention from different organs of state and society at large, it has not been best utilised in terms of contributing IK for DRR purposes.

Community participation for DRR is a major contributor to the processes of DM, because disaster risks directly affect local communities. Bazarragchaa (2012:22) also suggests that DRR programmes that involve community members may be crucial, because vulnerable people themselves will be involved in planning and implementing DRR measures along with local, provincial, and national entities through partnerships. When the timeframe for the Hyogo Framework for Action was expiring, the UN held a meeting in Switzerland to review the situation and to allow relevant stakeholders to make recommendations about the outgoing HFA. The meeting came up with HFA2, which looks at DRR beyond 2015. Some of the common suggestions included involving communities in the planning and implementation of DRR practices. HFA2 (2013:2) emphasises that community resilience is fundamental in DRR processes, and that HFA2 needs to be more people-centred by giving this top priority. Disaster risk reduction strategies must be implemented where people are most vulnerable and prone to any disaster type that may negatively affect their livelihood. This would allow people to participate in their own self-determination toward socio-economic development and come away from various types of vulnerability.

3.2.1. Community-based risk reduction

Bazarragchaa, (2012:25) lists four benefits of community-based approaches to disaster mitigation. First, community participation processes build confidence, generate pride that community members are able to make a difference, and increase capabilities to pursue disaster mitigation, preparedness and wider development responsibilities at the local level. Second, community involvement in risk assessment and risk reduction planning leads to ownership, commitment and individual and concerted actions in disaster mitigation, including resource mobilisation. Third, trusting and supporting the capacity building process results in a broad range of appropriate and doable mitigation solutions. Finally, community-based disaster mitigation is cost effective, demonstrates self-help, and can be sustainable even if it is time consuming.

Community resilience is the most important aspect of DRR, essentially because it has to do with communities being in charge of ensuring that disaster risks are prepared for. Based on their study, Krasny and Tidball (2009:469) found that civic ecology has the potential to address community resilience through community gardening. “Resilience thinking also draws from the adaptive cycle as a metaphor for how change occurs, with periods of rapid growth and stability alternating with decline followed by reorganization” (Krasny and Tidball, 2009:469). Reducing vulnerability and building resilience should engage a wide range of actors who are involved with activities that influence levels of direct and indirect risk, including national and local authorities, investment

and market activity, individual livelihoods and consumption patterns (Rottach, 2011:11). Only by recognising how these systems operate locally, can relief, rehabilitation and DRR ensure continued resilience while minimising unintended adverse outcomes. The collection and dissemination of IK is one method of advancing community-based DRR.

3.3. Indigenous knowledge background

Maferetlhane (2012:16) attests that the use of the term 'indigenous' began with Robert Chamber's group at the Institute of Development Studies, University of Sussex, in 1979, while Rao and Ramana, (2007:130) argue that the term has been challenging to define in many parts of the world. Moatlhaping (2007:26) posits that some scholars claim that it is difficult to determine the status of indigene, and as such they shun the use of the word 'indigenous', preferring the term 'traditional knowledge'. Gavin, MacCarter, Mead, Berkes, Stepp, Peterson and Ruifei (2015:24) argue that the general agreement in the Convention on Biological Diversity (CBD) is that the term 'indigenous' is used to apply to people who have historical continuity with pre-invasion and pre-colonial societies that have developed their own territories, and who consider themselves distinct from other sectors of society now prevailing in those territories. This knowledge is the sum of facts that are known or learned from experience or acquired through observation, study or handed down from generation to generation. AIKS can be summed up as the knowledge of an indigenous community accumulated over generations of living in the African environment (Owuor, 2007: 5). Maferethlane (2012:17) also explains that it is a broad concept that covers all forms of the African knowledge technologies, know-how, skills, practices and beliefs that enable African communities to achieve stable livelihoods in their environment. It is traditional cultural knowledge that includes intellectual, technological, ecological, and medical knowledge. The AIKS is still intact among indigenous (or local) communities in many parts of Africa. In this study, the terms 'local knowledge', 'indigenous knowledge' and 'traditional knowledge' are used interchangeably.

3.4. Indigenous knowledge

Broadly speaking, IK can be defined from two vantage points, namely the semantic and the conceptual. On the one hand, the semantic definition of IK views IK as 'native', originating and occurring naturally in a particular region, and it is sometimes associated with being simple, tribal, backward, traditional, static and inferior (Maferetlhane, 2012:21). On the other hand, the conceptual outlook perceives IK as originating and occurring naturally in a particular region, but also as a dynamic system used by local communities to sustain them, make a living in a particular environment and sustaining a shared culture and heritage. Kelman and Velasquez (2008:7) define

the conceptual outlook of IK as methods and practices developed by a group of people from an advanced understanding of the local environment, which has been formed over numerous generations of habitants. Kelman, Mercer and Gaillard (2012:17) also state that other phrases, sometimes seen as similar to IK, are 'traditional knowledge', 'indigenous technical knowledge', 'folk knowledge', 'local knowledge', 'vernacular knowledge' and 'traditional environmental knowledge'. Mercer and Gaillard (2012:18) contend that IK is relatively unique to, and embedded within, a specific community, culture or society, and thus is not usually transferable or immediately relevant to other locations. IKS are based mainly on local experience over a long time period. Indigenous knowledge is stable because it is relevant to a place and cultural context over generations. The great diversity of the African environment, therefore, makes it difficult to generalise about the specifics of IKS. Mercer and Gaillard (2012:18) further point out that IK and IKS are dynamic, because they change as youngsters learn from their elders and incorporate their own worldviews and any environmental or social changes that they experience as part of a longstanding community.

AU (2004:22) likewise shows that IK reflects many generations of experience and problem-solving by ethnic groups at the local level, and no experience of one country can exactly replicate another. For example, Dekens (2008:36) highlights that local people have knowledge about the history and nature of floods in their own locality through observation and experience of floods, based on daily observation of their local surroundings, close ties with their environment for survival, and an accumulated understanding of their environment through generations. The fundamental understanding to the concept is that IK develops in local contexts to solve local problems.

Local knowledge is often distinguished from Westernised knowledge with a growing desire to integrate the two. This integration of IK and Westernised could articulate together to most effectively assess community vulnerability and base reduction of disaster risks on such integrated knowledge. Questions arise however, as to which type of knowledge, if any, should take precedence over the other in any given situation (Mercer, Gaillard, Crowley, Shannon, Alexander, Day & Becker 2012:85). Culture could be utilized and integrated into conventional disaster science and these data can be outlined in such a way that it is easy for scientists working to reduce risk to understand (Mecer, *et al*., 2012:81). The HFA2 (2013:15) states that "in many parts of Africa, IK was considered to be primitive, outdated and inefficient". In addition to that participants in the meeting argued that IK is also being weakened and eroded and young people are increasingly unwilling to acquire, use and blend IK with contemporary knowledge. As a result,

IK has not been harnessed to fit into the current scientific framework for environmental conservation and natural DM. However, this situation can be changed by findings from rigorous research about the blending of IK and westernised knowledge. The next section further explores the meaning of AIK and AIKS.

3.5. African Indigenous Knowledge Systems

Generally, IKS can be defined as bodies of knowledge of the indigenous people of particular geographical areas where they have survived for a very long time, and can be interpreted as traditional knowledge, indigenous technical knowledge, rural knowledge, as well as ethno-science (or people's science) (Mapara, 2009:140). It is slowly becoming clear that IK is important and indigenous people hold a wealth of knowledge and experience that represent a significant resource in the implementation of DRR (Maferetlhane, 2012:21). On the one hand, according to Akenji (2009:42), a knowledge system is an assemblage or combination of things or parts (practices, beliefs, values, ways of knowing, and such) to create a complex or unitary whole. On the other hand, Ongugo and Kimani (2014:9) view traditional knowledge systems as functional entities and institutions that serve as custodians of specialised areas of traditional knowledge and indigenous innovations.

Other authors furthermore argue that traditional African farmers have used IK to understand weather patterns and to make decisions about crop and irrigation cycles. For example, Ngwezi (2014:7) posits that AIKS reflects the dynamic way in which the residents of an area have come to understand themselves in relationship to their environment and how they organise folk knowledge of flora and fauna, cultural beliefs, and history to enhance their lives.

African indigenous knowledge can be defined in different forms, differentiating from region to region. Maferetlhane (2012:26) gives a South African perspective of the definition, stating that "IKS in the South African context refer to bodies of knowledge embedded in African philosophical thinking, and social practices that have evolved over thousands of years". Kelman, Mercer and Gaillard (2012:13) refer to AIKS as a body of knowledge that holds African ways of knowing, being and doing, which is passed down through generations in a given locality and acquired through the accumulation of African experiences, relationships with the surrounding environment, and traditional community rituals, practices and institutions. African indigenous knowledge provides insight into how local people connect with the environment in which they live, as AIK is built upon people's day-to-day relationship with nature over generations and across centuries of working with the natural environment (AU, 2004 21). Yet AU (2004:28) raise

concerns of inaccessibility of IK to policy makers, researchers and development agents, because AIKS and AIKS have not been sufficiently collected, codified and disseminated. Disaster risk reduction is one development area where AIKS has often been downplayed, on the assumption that external, especially recent, knowledge is superior to communities' own traditions and approaches (Kelman, Mercer and Gaillard, 2012:13).

3.5.1. Role and importance of African Indigenous Knowledge Systems for disaster risk reduction

Nijiraine *et al*. (2010:197) states that IK is gradually gaining greater research support because of its functions and importance. Gupta (2000:6) divides functions of AIKS for DRR and other societal issues into six categories. First, the semiotic category refers to the use of AIKS for communication such as symbols, art-forms and crafts. This is then followed by the second function which is institutional. This function deals with providing rules coded in rituals and/or other cultural and social sanctions. Some of these rituals and cultural sanctions institutionalise incentive measures for the use of traditional knowledge, similar to the way that such institutionalisation is accomplished through intellectual property rights and penalties for breaches can be assessed. These sanctions can be material, such as fines or penalties, or ethereal, such as the fear of God. Configurational is the third category; this is where the arrangement of various life processes and stages are performed according to traditional norms, leading to (more or less) predictable social outcomes. Fourth, the use of utilitarian knowledge about various plants or animal products for various food, nutritional or health needs is another category.

The fifth category is situational during which emergencies or any other contingencies may occur. This includes codes of conduct which may be specified to maintain social order and responsibility towards other life forms. This also includes wildlife concerns, religious and spiritual functions which may or may not involve material objects. Sixth, since society has to adapt to new trends from time to time, traditional systems of culture, technology and social exchange provide some scope for experimentation, deviance and variation, which is the final category. The same set of incentives may not help in nurturing each of these functions, and not all functions are utilised by every African community. Rather, there is differentiation from community to community as previously discussed. An extension of the functions of IK and AIK is expressed by the importance attached to such knowledge by the WB. The WB (2010:1) highlights that: "IK provides the basis for problem-solving strategies for local communities, especially the poor; it represents an important component of global knowledge on development issues".

3.5.2. Trust and self-help

According to Kelman *et al.* (2012:17), existing DRR knowledge and approaches of indigenous peoples may assist in the identification of entry points into communities. Community entry points should be attained to address disaster-related concerns that either have not been experienced for some time or are comparatively new. However, this may not be achieved without trust and respect for IK. This signals the importance of indigenous communities respecting and trusting both their own and external knowledge, as well as external contributors to DRR. This includes emergency managers and planners who likewise respect and trust IK (Kelman *et al*., 2012:18). It is worth accessing indigenous communities to obtain AIK from an ageing population and to address the vulnerability of that population, which is discussed next.

3.6. Ageing population, African Indigenous Knowledge Systems and disaster risk reduction

Hartog (2014:4) argues that older people are particularly vulnerable to, and face specific threats from, disasters, and that their needs are very different from other generations and population groups, such as children. Furthermore, HFA2 (2013:15) recognises that the older generations are the main custodians of IK and death remains an important factor in the loss of the information they hold, and as a result participants proposed the urgent documentation of IK in the communities.

In general, the ageing population brings reduced mobility and strength, impaired sight and hearing, and greater vulnerability to heat and cold. Minor conditions can quickly become major handicaps that overwhelm a person's ability to cope. Many people think of old people as only needing support and who no longer contribute to society, but this not always the case. While older people are highly vulnerable to disasters and other shocks and stresses, it is important to recognise their capacities and the contribution they can make to DRR (Hartog, 2014:4). The author also attests that older people's life experiences and traditional or IK can provide vital information on past climatic events, hazards and disaster impacts. It can also provide key insights to support the analysis of a community's vulnerabilities and capacities, or social-environmental relationships. Such information is vital in understanding the nature of disaster vulnerability and central to developing good DRR initiatives. Therefore, older people, amongst other vulnerable groups, must be consulted for planning, adaption and response programmes (Hartog, 2014:4).

The Sendai Framework for Disaster Risk Reduction 2015-2030 (UN, 2015) stipulates guiding principles which state that DRR requires an all-of-society engagement and partnership. This

guiding principle introduces the involvement and the contribution of civil society in the processes of reducing disaster risks. It also requires empowerment and inclusivity, accessible and non-discriminatory participation, and paying special attention to people disproportionately affected by disasters, especially the poor. A gender, age, disability and cultural perspective should be integrated in all policies and practices, and women and youth leadership should be promoted. In this context, special attention should be paid to the improvement of organised voluntary work of citizens.

3.7. Conceptual framework for the study

A conceptual framework is the basis of the research problem and concentrates on one section of the theoretical framework. The conceptual framework stems from the literature and shows a summary of the literature with regards to the use of community participation and IK in addressing DRR issues, and enhances the effectiveness of the utilisation of DRR strategies. Figure 3-1 below shows the relationship between these concepts with regards to the achievement of reducing community vulnerability to disaster risks. The proper governance of DRR is at the centre of improving the effectiveness of DRR, and the figure below shows a relationship between the use of community participation to collect and utilise IK for DRR. The integration of community participation and IK as DRR mechanisms brings about participatory DRR and community-based DRR, with an improved relationship between relevant stakeholders such as political office-bearers, public administrators and traditional leaders in the case of rural communities. Improved institutional capacity is one institutional arrangement to overcome the politico-administrative dichotomy. Improved capacity also allows sustainable politico-administration interface (Demir & Nyhan, 2008:81). These authors furthermore attest that this interface is therefore set to create initiative programmes that will help achieve the convergence of the IKS and westernised knowledge systems. As a result, community vulnerability reduction is achieved.

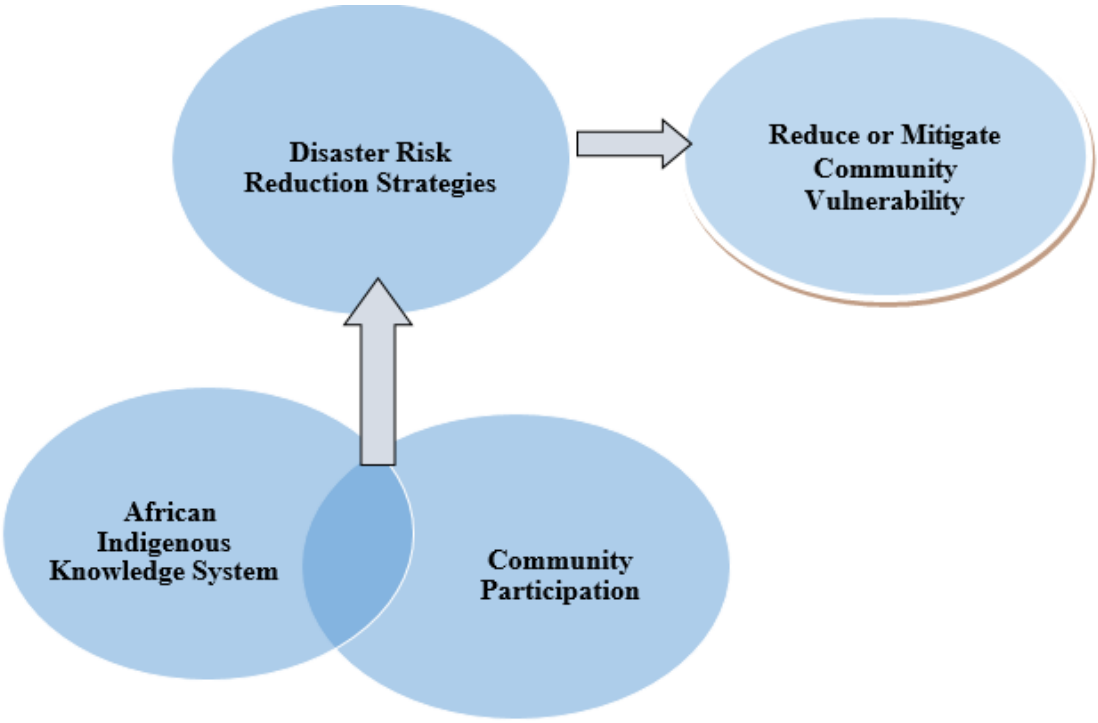

Figure 3-1: The Conceptual Framework for enhanced DRR through the nexus of indigenous knowledge and community participation.
Source: Adapted by researcher from (Van Viekerk 2011; Maferethlane 2012; Kelman et.al. 2012; Bazarragchaa 2012)

3.8. Chapter summary

This chapter reviewed the literature on IK, IKS, AIK and AIKS, community participation, DRR and the connection among all these fields. Community participation was discussed in the context of DRR, with a specific focus on community-based DRR processes. This was followed by a brief background on IK, and different definitions of IK, IKS and AIKS. Following was a discussion on the role of IK in DRR, and the role of community trust. The need to consider the vulnerability of an ageing population and acquiring AIKS from this population was also highlighted. Finally, a combined assessment of Chapters 2 and 3 opened the discussion for identification of the conceptual framework driving this study.

CHAPTER 4

RESEARCH DESIGN AND METHODS

4.1. Introduction

This chapter will discuss the research methodology that was used to conduct the study by starting with highlighting the research questions and objectives. This chapter points out the philosophical worldview adopted in the study. It shows that the research design was qualitative and goes on to identify a research strategy, a target population and sampling strategy, and the description of the sample. This chapter also discusses the location of the study, data collection methods, data analysis, data quality control, research schedule, ethical considerations, and limitations of the study. The researcher's justification for the research design decisions and research method choices is also assessed. Table 4-1 provides a reminder of the aims and key questions guiding research design and methods selection.

Table 4-1 Research objectives and research questions

Research objectives	Research questions
To understand the relationship between the nexus of IK and community participation, planning and implementation of DRR strategies in uMshwathi Local Municipality.	How can IK be obtained through community participation in planning and implementing DRR strategies in uMshwathi Local Municipality?
To determine the nature of IK held and contributed by uMshwathi citizens that relates to DRR.	In what ways do local community members of uMshwathi contribute to governmental strategies toward DRR?
To identify methods for the uMshwathi local government to engage citizens in collecting and utilising IK for DRR.	How can IK held by the citizens of uMshwathi best be collected for planning and implementing DRR strategies?
	How can IK held by the citizens of uMshwathi best be utilised by the local government for planning and implementing DRR strategies?

4.2. Philosophical worldview

According to Creswell (2009:8), social constructivism holds assumptions that individuals seek an understanding of the world in which they live and work, in that individuals develop subjective meanings of their experiences. These meanings are directed towards certain people, places or

objects. Andrews (2012:40) agrees with Creswell, stating that constructivists and interpretivists in general focus on the process by which meanings are created, negotiated, sustained and modified. Creswell (2009:8) argues that this approach relies on the participants' views of the phenomenon being studied, and that backgrounds and experiences have an impact on research. Constructionists view knowledge and truth as being created, not discovered, by the mind, and support the view that being a realist is not inconsistent with being a constructionist. One can believe that concepts are constructed rather than discovered, yet maintain that they correspond to something real in the world (Andrews, 2012:40). In addition, there is a concern among scholars and language practitioners about the nature and construction of knowledge, how it emerges, and how it comes to have significance for society (Werhane, Hartman, Moberg, Englehardt, Pritchard & Parmar, 2011: 106).

However, knowledge is viewed by Andrews (2012:41) as being created by the interactions of individuals within society, which is central to constructionism. In this study, the philosophical worldview adopted was social constructivism. This worldview was selected as the researcher sought to understand how municipal officials, traditional leaders and local communities construct knowledge about DRR, AIK, AIKS and community participation; and how these phenomena interact or interconnect. In light of the philosophical worldview as well as the research problem, research questions and research objectives, the researcher determined the research design, which is discussed next.

4.3. Research design

Hakim (2005:59) states that a research design provides a practical overview of central issues involved in the design of social and economic research, covering a theoretical research. A research design is a plan of action for getting from where one is to where they wish to go, where the initial point is the primary set of questions to be answered and the destination is the set of conclusions or answers (Yin, 2009:15). There are at least three well-known research designs, which are quantitative, qualitative and mixed-methods. Creswell (2009:18) defines quantitative research design as where the investigator primarily uses post-positivist claims for developing knowledge, that is cause and effect thinking; a reduction to specific variables, hypotheses and questions; the use of measurement and observation; the test of theories; the employ of strategies of inquiry such as experiments and surveys; and the collection of data on predetermined instruments that yield statistical data. If warranted by the research problem, objectives and questions, a qualitative research design may be employed. This design is appropriate when the inquirer makes knowledge claims based primarily on constructivist perspectives that reveal multiple meanings of individual

experiences that are socially and historically constructed. The intent here could be to develop a theory or pattern, or advocacy and participatory perspectives, which include political, issue-oriented, collaborative or change-oriented approaches. The qualitative research design also uses strategies of inquiry such as narratives, phenomenology, ethnographies, grounded theory studies, or case studies. The researcher uses open-ended questions for respondents and the primary intent of emerging data is to develop themes that help address the research problem (Creswell, 2009: 20).

The traditional research approach has been to choose either a quantitative or a qualitative research design; however, another approach that emerged from combining the two traditional approaches is a mixed method research design. This is the one in which the researcher tends to base knowledge claims on pragmatic grounds such as consequence-oriented, problem-centred, and pluralistic. It employs strategies of inquiry that involve collecting data either simultaneously or sequentially to best understand and address research problems. This research approach is regarded as less well known than either the quantitative or qualitative strategies, as it involves collecting and analysing both forms of data in a single study in cases where either qualitative or quantitative data alone would be insufficient. The knowledge claims, the strategies and the method all contribute to a research approach that tends to be more quantitative, qualitative, or mixed. For the purpose of this study a qualitative research design was utilised, as this allowed for an analysis of the research problem and provided guidelines for answering the overarching research question.

This research study is based on a literature review and on an overall understanding of the usefulness of IK through community participation in DRR. Mack (2005:1) argues that qualitative research is an approach that seeks to research a problem or topic from the perspectives of the local population it involves. In this way, a qualitative research design is suitable for showing how community participation in local government can contribute IK for the reduction of disasters within uMshwathi Local Municipality.

Qualitative research is a type of scientific research. In general terms, scientific research consists of an investigation that seeks answers to a question, systematically uses a predefined set of procedures to answer the question, collects evidence, and produces findings that were not determined in advance. Qualitative research also produces findings that are applicable beyond the immediate boundaries of the study (Mack 2005:1). Although findings from qualitative data can often be extended to people with characteristics similar to those in the study population, gaining a rich and complex understanding of a specific social context or phenomenon typically takes precedence over eliciting data that can be generalised to other geographical areas or populations

(Mack 2005:2). While the research design determines the nature of the study, the research strategy entails how a study is executed.

4.4. Research strategy

In answering the research questions and achieving the research objectives for this study, a case study research strategy was employed. Yin (2009:29) argues that the case study is a research strategy that can be likened to an experiment, a history, or a simulation, which may be considered alternative research strategies. Moreover, according to Campbell (1998), none of these other strategies is linked to a particular type of evidence or method of data collection. As a research strategy, the distinguishing characteristic of the case study is that it attempts to examine a contemporary phenomenon in its real-life context, especially when the boundaries between phenomenon and context are not clearly evident. Experiments differ from this in that they deliberately divorce a phenomenon from its context, and histories differ in that they are limited to phenomena of the past, where relevant informants may be unavailable for interviews and relevant events are unavailable for direct observation (Yin, 2009:19)

On the one hand, a case study is a strategy in which the researcher explores in depth a programme, an event, an activity, a process, or one or more individuals, and cases are bounded by time and activity, with researchers collecting detailed information using a variety of data collection procedures over a sustained period of time (Creswell, 2009:13). On the other hand, Eisenhardt (2010:534) defines this strategy as a research strategy or design which focuses on understanding the dynamics present within single settings. Baxter and Jack (2008:545) explain that "a case study design should be considered when: the focus of the study is to answer "how" and "why" questions; the researcher cannot manipulate the behaviour of those involved in the study; the researcher wants to cover contextual conditions because of the belief that they are relevant to the phenomenon under study, and/or the boundaries are not clear between the phenomenon and context". Becker (2013:2), citing Yin (1994:4–9), states that "the outline and modern context of the research question makes relative case study research a particularly appropriate methodology". Therefore, the fundamental question for this research study was a suitable question for the case study strategy. "One of the common pitfalls associated with case study is that there is a tendency for researchers to attempt to answer a question that is too broad or a topic that has too many objectives for one study" (Baxter & Jack, 2008: 546). Eisenhardt (2010:534) attests that "an initial definition of the research question, in at least broad terms, is important in building theory from case studies". In addition to that she argued that the selection of cases is an important aspect of building theory from case studies.

Case studies can involve either single or multiple cases, and numerous levels of analysis. Moreover, Eisenhardt (2010:534) opines that case studies can employ an embedded design, that is, multiple levels of analysis within a single study (Miles, Huberman & Saldana, 2013:486). Every study has an implicit, if not explicit, unit of analysis or assignment. The unit of analysis, although not necessarily the unit of data collection, holds a study together (Yin, 2009:42). Miles *et al*. (2013:487) define a unit of analysis as, "a phenomenon of some sort occurring in a bounded context and that the case is, in effect, your unit of analysis". Baxter and Jack (2008:545) posit that novice and seasoned researchers should consider the unit of analysis at the same time they are formulating their research question. According to Baxter and Jack (2008:550), the ability to look at sub-units that are situated within a larger case is powerful when one considers that data can be analysed within the sub-units separately, between the different sub-units, or across all of the sub-units, and the ability to engage in such rich analysis only serves to better illuminate the case.

This study adopted a single case study strategy, within which multiple units of analysis were embedded. The uMshwathi Local Municipality provided the case study context. The units of analysis embedded in the case context for this study were: (1) the DM units (DMUs) at both the uMshwathi local and uMgungundlovu District Municipality levels; (2) the *amakhosi* and *Izinduna* who represented a traditional house of leadership; and (3) community elders in the KwaSwayimane and New Hanover sub-areas. A selection of an embedded single case study was done in order to enable an effective cross-case analysis across the units of analysis and to understand the phenomena at different levels within the case context.

4.5. Data collection methods

Multiple data collection methods were used for this study. Secondary data were collected by conducting a literature review of the relevant factors and strategies adopted for community participation in contributing IK to reduce disaster risks. After conducting a literature review, primary data were then collected through a combination of semi-structured interviews and focus groups with purposefully selected individuals and key informants. Semi-structured interviews were conducted with officials from uMgungundlovu District Municipality and uMshwathi Local Municipality. There were two focus groups and participants were elders within communities of the study sites as well as traditional leaders. Qualitative data collected from the semi-structured interviews and focus groups were audio-recorded and documented.

4.5.1. Interviews

Interviews are subject to a number of definitions and classifications, and may be carried out in different ways. Thornhill (2009:674) defines interviews as a technique used to get reliable and valid information (usually verbal) from a respondent during a face-to-face conversation or telephonically, with regards to a specific topic that is required for research purposes. Thornhill (2009:674) also argues that interviews are a common technique for data collection among researchers in the humanities and social sciences. Grix (2010:126) classifies the different types of interviews that can be used to collect information as: structured; semi-structured; unstructured; and focus groups. The classification and range of these types of interview techniques are shown with various data collection instruments associated with other interviewing methods in the diagram below.

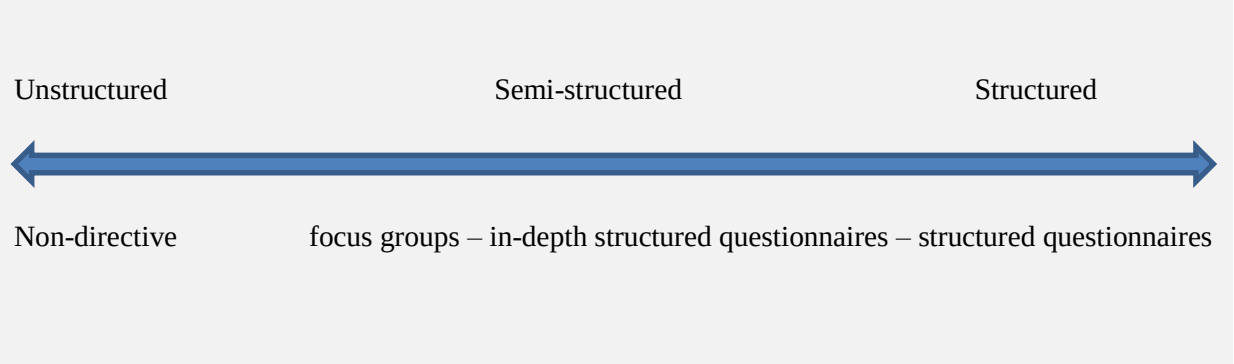

Figure 4-1: The interval of interview types
Source: Mack (2005:28)

Mack (2005:29) defines in-depth interviews as a technique designed to elicit a vivid picture of the participant's perspective on the research topic, adding that during in-depth interviews, the person being interviewed is considered the expert and the interviewer is considered the student. The author further attests that "the researcher's interviewing techniques are motivated by the desire to learn everything the participant can share about the research topic" (Mack, 2005:29).

Interviews differ from surveys by the level of structure placed on the interaction" (Harrel & Bradely, 2009:6). Qualitative research interviews seek to obtain data that describe meanings of central themes in the life world of the subjects. The main task during interviewing is to understand the meaning of interviewee responses, which amounts to letting the interviewees lead the dialogue in some respects (Valenzuela, 2009:2). The author continues by stating that interviews are particularly useful for getting the story behind a participant's experiences. However, there are a number of types of interviews that can also be utilised in a qualitative

research, such as in-person or face-to-face interviews. According to Sullivan (2009:7), these are a type of interview that allow researchers to obtain large amounts of data, perform in-depth probing, and ask more complicated or sensitive questions.

Sullivan (2009:8) notes that qualitative interviews have a greater probability of interviewer-introduced bias. A biased interview results to a biased response, which affects the findings of the study. It also affects and discredits the data collection method used. Since interviews involve a one-on-one verbal interaction between the researcher and a respondent, biased interviews are bound to happen as a result of human miscommunication or lack of clarity. Sitienei (2009:41), citing Goddard and Melville (2001), emphasised that the researcher must not direct the respondents' answers through his tone of voice or through the way he phrases the question. The one advantage of interviews, according to Goddard and Melville (2001:30), is that qualitative interviews allow the researcher to ask the respondent to clarify unclear answers and follow up on interesting answers.

For this study, semi-structured interview questions were designed for uMshwathi Local Municipality and uMgungundlovu District Municipality Unit officials. The questions covered previous disasters that had occurred within the municipality, the documentation of these disasters, and documentation about the level of vulnerability of communities within the uMshwathi Local Municipality. Questions were also asked about the mitigation and prevention strategies currently being employed by the municipality to reduce the vulnerability of the residents of uMshwathi. The interview questions that were designed for the municipal officials of uMshwathi Local Municipality are provided in Appendix 5 whilst the questions for uMgungundlovu District Municipality are shown as Appendix 6. The interview questions formulated for traditional leaders are attached as Appendix 7.

When the interviews were set up with the participants, the researcher ensured ethical considerations by explaining the purpose of the interview and the criteria for selecting the respondents. The duration of each interview was 20 to 35 minutes. In addition, the researcher also kept track of time and informed the respondents at the outset of the expected duration of the interviews.

Table 4-1 shows the date, time, and duration of the interviews. The respondents are identified by codes, which are also used in Chapter 5 for data presentation and analysis.

Table 4-1: Semi-structured interview dates, duration and location

Stakeholder segment	**Respondent code**	**Date**	**Duration**	**Location**
uMgungundlovu Municipality DM Unit Managers	DDMOA	13 October 2015	35	uMgungundlovu DMU office
	DDMOB	13 October 2015	30	uMgungundlovu DMU office
uMshwathi Municipality DM Unit Managers	LDMO	14 October 2015	25	uMshwathi Municipality DMU office
	LMM	14 October 2015	30	uMshwathi Municipality: office of the Municipal Manager
Inkosi from KwaSwayimane Area	STL	15 October 2015	30	Swayimane Local court
Induna from eMathulini Area	UTL	16 October 2015	35	uMshwathi Municipality council chambers

The selection of DMU managers was based on the intergovernmental relations of the district and local municipalities, and were used to inquire into the respective municipal capacities to understand and reduce the different types of disaster risks and to design and implement mitigation strategies. *Amakhosi* and *Izinduna* were selected based on their possession of historical and traditional knowledge of the phenomenon. Although KwaSwayimane and New Hanover were the study sites, New Hanover is a peri-urban area that is not solely under the jurisdiction of the institution of traditional leadership. Since the researcher sought the views of traditional leaders, he went to a town near uMshwati, eMathulini, which comprises Ward 5. The *inkosi* for eMathulini had recently passed away, therefore the researcher interviewed the induna serving the community at the time the study was conducted. Following the semi-structured interviews, the data were immediately summarised. Verification of the data with respondents was done if necessary. The data analysis is explained in Section 4.8. Another data collection method for this study was focus groups, which is discussed next.

4.5.2. Focus groups

A focus group is a small group of six to ten people, who are led through an open discussion by a skilled facilitator. The group needs to be large enough to generate rich discussion, but not so large that some participants are left out (Bristowe, Siassakos, Hambly, Angouri, Yelland, Draycott, & Fox, 2012:1385). One of the reasons qualitative researchers utilise focus groups for data collection

is for the purpose of generating the maximum number of different ideas and opinions from as many different participants as possible in a given time allocation. Ideally, participant comments will stimulate and influence the thinking and sharing of others; some people even find themselves changing their thoughts and opinions during the group. Bristowe *et al.* (2012:1383) differentiate focus groups from individual interviews by listing teamwork as one of the fundamental success factors of any constructed focus group. Mack *et al.* (2005:2), meanwhile, stated that focus groups are effective in eliciting data on the cultural norms of a group and in generating broad overviews of issues of concern to the cultural groups or sub-groups represented.

A focus group guide was designed (see Appendix 8) for local community members in alignment with the research questions and objectives of the study. Two focus groups, which included men and women from KwaSwayimane (Ward 6) and New Hanover (Ward 2), were conducted. The Ward 2 focus group took place at a community church as there were people attending church at the time, while the Ward 6 focus group was conducted in a municipal hall where municipal workers were present. The duration of the Ward 2 focus group was 55 minutes, while Ward 6 took a total of 60 minutes. As will be explained, the issues of confidentiality and consent were explained before each focus group commenced, which created a more relaxed environment for the participants in both groups. In terms of coding for focus group respondents, there were code prefixes used during data reduction and in the matrices for data analysis. For KwaSwayimane (Ward 6) the prefix code is SFG and for New Hanover (Ward 2) the prefix code is UFG. Any letters or numbers that come after the prefix codes indicate for the researcher yet protect participant identities. These are used throughout the matrices in Chapter 5.

The justification behind the adoption of focus groups for this study was to understand the knowledge that indigenous people in the uMshwathi Local Municipality possess regarding the reduction of disaster risk, including their resilience strategies, mitigation factors, and prevention methods, how they prepare for minor or major disasters, and how they reduce the vulnerability disaster risks. The justification for selecting community elders was based on the researcher's assumption that elders of the community would be better equipped to respond to the questions presented by the researcher, as they focused on historical information regarding disasters, indigenous disaster anticipation and mitigation strategies, and other traditional practices that were historically employed for community livelihoods.

4.5.3. Documentary evidence

"Extraction is the collection of data from documents, records, or other archival sources. This generally includes using an abstraction process to cull the information desired from the source"

(Harrel & Bradely, 2009:6). The documentary evidence that was used in this dissertation included reports from the DMAFs. These forums are held quarterly at uMshwathi Local Municipality and the reports generated shortly thereafter (uMshwathi Local Municipality, 2016). Other documentary evidence included literature, law and policy and well as other government reports.

4.6. Sampling process

According to Maferetlhane (2012:15), sampling is the selection of specific research participants from an entire population, which is done in different ways according to the type of study being conducted. Sampling involves decisions about which people, settings, events, behaviours, and/or social processes to observe. According to Babbie and Mouton (2001:173) and Thornhill (2009:658), a basic principle for probability sampling is that a sample is representative of the population from which it is selected, if all members of the population have an equal chance of being selected in the sample. However, probability sampling is the most suitable sampling method for quantitative and mixed method designs. Maferetlhane (2012:15) further argues that non-probability sampling is not based on determining the probability of an element being included in the sample. Mack (2005:5) comments that purposive sampling is one of the most common sampling strategies which group's participants according to preselected criteria that are relevant to a particular research question. In addition, she stated that sample sizes, which may or may not be fixed prior to data collection, depend on the resources and time available, as well as the study's objectives. Purposive sample sizes are often determined on the basis of theoretical saturation (the point in data collection when new data no longer bring additional insights to the research questions).

Creswell (2014:112) provides that purposeful sampling means researchers select participants who possess experience with the central phenomenon or the fundamental concept being investigated. This study utilised a judgemental purposive sampling strategy, which means selecting groups or categories to study on the basis of their relevance to the research questions, the theoretical position, the analytical framework, the analytical practice, and most importantly, the argument or explanation that is being developed (Maferetlhane, 2012:16). Figure 4-2 shows the depiction of the summary of the sampling process.

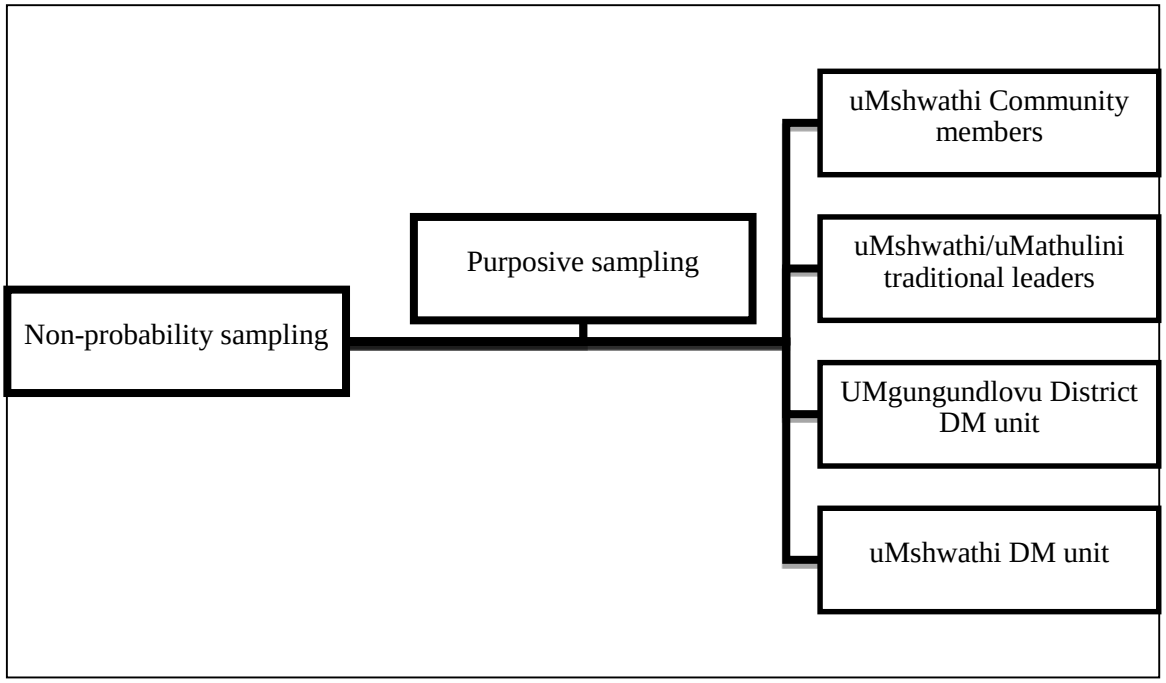

Figure 4-2: Sampling process
Source: Adapted from Creswell (2014:76)

4.6.1. Target population

Goddard and Melville (2001:35) defines a population as any group that is the subject of research interest. In addition, Sitienei (2009:42) viewes the target population of a study as a larger pool of cases or elements, such as people, businesses, commercials, and animals. The target population for this research study was made up of people residing within uMshwathi Local Municipality. The specifications of inclusion used in this study were:

- Elders residing within communities of the municipality;
- Traditional leaders who were amakhosi and izinduna;
- The Disaster Management Unit (DMU) from uMgungundlovu District Municipality; and
- The DMU of uMshwathi Local Municipality.

4.6.2. Sample size

Remler and van Rayzin (2011:165) points out the general rule for managing a sample size, which states that the larger the sample size, the more precise the sample estimate. The target population for this study comprised of participants who were municipal traditional leaders and community elders (local men and women) from the three selected residential villages within uMshwathi Local Municipality. Municipal officials responsible for the DM units from

uMgungundlovu District Municipality and uMshwathi Local Municipality were participants. The sample size is provided in Table 4-2.

Table 4-2: Target population and sample size

Stakeholder Segment	**Location**	**Data Collection Tools**	**Target Population**	**Sample Size**
uMgungundlovu Municipality DM Unit Managers	Pietermaritzburg (District Offices)	Interviews	12	2
uMshwathi Municipality DM Unit Managers	uMshwathi Municipal Offices	Interviews	2	2
Traditional Leaders	KwaSwayimane Area	Interviews	6 in local municipality	1
	uMathulini Area			1
Community Members	KwaSwayimane Area	Focus Groups	Community elders (number indiscernible)	5
	New Hanover Area			5
Total respondents				**16**

The sample for this study was comprised of ten community elders, five of whom were from the KwaSwayimane area and five of whom were from the New Hanover area, as well as four municipal officials responsible for DM units - two from uMgungundlovu District Municipality and two from uMshhwathi Local Municipality. In addition, there were two traditional leaders, one from KwaSwayimane and the other from New Hanover, as per Table 4-2. A purposive sampling technique was used to select these respondents.

It is not practical or possible to study an entire population. Therefore, certain decisions had to be taken to narrow the scope of participants. The study required respondents who were knowledgeable about and well equipped with strategies of reducing disaster risks. It was also appropriate to select local people. This is because of their better understanding of their environment and historical disaster events that have taken place in their area. Community elders and traditional leaders were found to be capable to respond to questions that were presented to them. Community elders are mostly good storytellers and possess valuable indigenous information, while traditional leaders also possess such information from a leadership or kingship role perspective. Traditional leaders and community elders were of paramount significance in gathering traditional strategies that communities adopt for DRR. Furthermore, traditional leaders are very resourceful in identifying appropriate respondents who are informative about the historical disaster occurrences. The traditional leaders also encouraged community participation in the study. The DMU employees provided the researcher with documentation of disasters that

have occurred within the jurisdiction of the municipalities, and also provided information on the community participation. Table 4-3 provides a summary of the research approach.

Table 4-3: Research summary

Worldview	**Ontology**	**Epistemology**	**Methodological approach**	**Research Strategy**	**Methods of Data Collection**
Social Constructivism	All theories and inventive thoughts are based on understanding the phenomenon	Knowledge is gathered from a natural environment and is inserted to a social environment It surfaces from socially gathered practices	Qualitative approach	Case Study embedded with multiple units of analysis	Semi-structured in-depth interviews and focus groups

Source: Adapted from Harrel and Bradely (2009:6), Creswell (2009:18), Grix (2010:126) and Andrews (2012:40)

The data collected were subject to data quality control which is explained next.

4.7. Data quality control

Lietz and Zayas (2010:191) referres to credibility as the adequate representation of the constructions of the social world under study, while Zhang and Wildemuth (2007:6) suggested a set of activities that would assist with improving the credibility of the research results, namely prolonged engagement in the field, persistent observation, triangulation, negative case analysis, checking interpretations against raw data, peer debriefing, and member checking. The credibility of the data was established using the techniques of persistent observation (recurring observations of respondents during and between interviews, and differences and similarities in the responses of respondents in similar categories); peer debriefing (presenting analyses and conceptual abstractions of the data to other expert qualitative researchers to explore inquirer biases and to clarify the meanings and the basis for interpretations); and member checks (presenting the analysis of the data to respondents for their confirmation and clarity with some of the components of the responses).

However, according to Shenton (2004:63), the “trustworthiness of qualitative research generally is often questioned by positivists, perhaps because their concepts of validity and reliability cannot be addressed in the same way in naturalistic work”. Nevertheless, he also argued that a number of writers on research techniques, such as Silverman (2009:15) reveals how qualitative researchers can slot in measures that deal with these issues. A number of other authors have also

come up with different terminologies to address the issue of trustworthiness in qualitative research. Shenton (2004:64) notes that Guba and other researchers proposed four criteria for evaluating interpretive research work in pursuit of a trustworthy study, namely credibility, dependability, confirmability and transferability. Zhang and Wildemuth (2007:6) opine that these four strategies are utilised by many researchers who utilise a qualitative research method, and these strategies are translated to meet the standard of the positivist strategies (see Figure 4-3).

Credibility is the first strategy, which according to Zhang and Wildemuth (2007:6) refers to the "adequate representation of the constructions of the social world under study". Credibility is used in preference of internal validity. Zhang and Wildemuth (2007:6) furthermore provide provisions to promote confidence in the researcher that they have accurately recorded the phenomena under scrutiny. These provisions also include the adoption of research methods that are well established both in qualitative research, and in information science, in particular. Moreover, before the first data collection dialogues take place, the researcher should develop familiarity with the culture and policies of participating organisations and communities (Lietz & Zayas, 2010:195).

Sullivan (2009:5) recommends a set of activities that help improve the credibility of research results, which starts with having a prolonged engagement in the field, persistent observation, triangulation, negative case analysis, checking interpretations against raw data, peer-debriefing, and member checking. To improve the credibility of qualitative content analysis, researchers not only need to design data collection strategies that are able to adequately solicit the representations of the data, but also need to design transparent processes for coding and drawing conclusions from the raw data.

Secondly, dependability refers to "the coherence of the internal process and the way the researcher accounts for changing conditions in the phenomena" (Zhang, 2013:16). Dependability is a criterion determined by checking the consistency of the study processes. Lietz and Zayas (2010:191) explain that the dependability of the research findings in the study must be established by a transparent coding process. To make sure that the distinctions between categories are clear to the coders, the categories are defined by a codebook developed by the researchers. To ensure coding consistency, every coder uses the same version of the scheme to code the raw interview data. Both the training and the experience of the coder are necessary for reliable coding (Neuendorf, 2002 56). In this study, the researcher used a dissertation journal which served the purpose of a codebook. Data collected by the researcher were subject to data quality control. Figure 4-3 captures the various strategies of trustworthiness now under discussion.

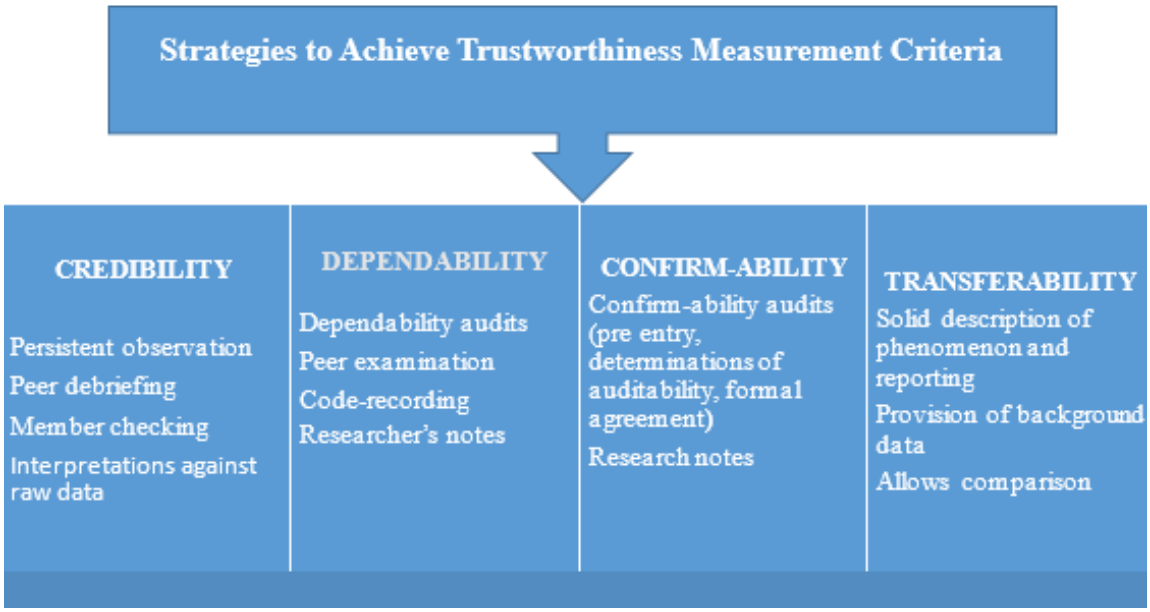

Figure 4-3: Trustworthiness measurement criteria
Source: Lietz and Zayas (2010:191); Houghton, Casey, Shaw and Murphy (2013:12) and Zhang (2013:16)

As Figure 4-3 indicates, the third criterion is confirmability, which, according Lietz and Zayas (2010:197), refers to the extent to which the characteristics of the data, as posited by the researcher, can be confirmed by others who read or review the research results. Confirmability is determined by checking the internal coherence of the research product, which is the data, the findings, the interpretations, and the recommendations. Lincoln and Guba (1985) stress the close ties between credibility and dependability, arguing that, in practice, a demonstration of the former goes some distance in ensuring the latter. This may be achieved through the use of "overlapping methods", such as focus groups and individual interviews (Houghton *et al.*, 2013:12). The major technique for establishing dependability and confirmability is through audits of the research processes and findings. The audit process has five stages, namely pre entry, determinations of auditability, formal agreement, determination of trustworthiness (dependability and confirmability), and closure. Houghton *et al.* (2013:12) state that dependability and confirmability are respectively used in preference of reliability and objectivity.

Loh (2013:3) associate objectivity in science with the use of instruments that are not dependent on human skill and perception. He recognised, however, the difficulty of ensuring real objectivity, since, as even tests and questionnaires are designed by humans, the intrusion of the researcher's

biases is inevitable. The concept of confirmability is the qualitative investigator's comparable concern to objectivity. Here steps must be taken to help ensure as far as possible that the work's findings are the result of the experiences and ideas of the informants, rather than the characteristics and preferences of the researcher (Lietz & Zayas, 2010:197).

The final criterion is transferability, which "refers to the extent to which the researcher's working hypothesis can be applied to another context" (Zhang, 2013:6). It is not the researcher's task to provide an index of transferability; rather, he or she is responsible for providing data sets and descriptions that are rich enough so that other researchers are able to make judgments about the findings' transferability to different settings or contexts. Transferability is used in preference to external validity. "Lincoln and Guba (1985) are among those who present a similar argument, and suggest that it is the responsibility of the investigator to ensure that sufficient contextual information about the fieldwork sites is provided to enable the reader to make such a transfer" (Houghton, Casey, Shaw & Murphy, 2013:12). The authors also maintained that since the researcher knows only the "sending context", he or she cannot make transferability inferences. Once the sampling process is determined, data collection is undertaken and data quality control strategies are applied, data must be analysed, which is highlighted next.

These four trustworthiness elements were utilised for the purpose of ensuring that the study is valid and reliable, however in a qualitative study, credibility, dependability, confirmability and transferability are utilised in place of internal validity, external validity and reliability. For this research study, credibility was ensured through utilising proper data collection strategies and appropriate systematic data reduction processes. Ensuring coherence and consistency was then informed by conceptualising the significance of dependability. The literature was also interrogated to ascertain the consistency between the literature and the raw data.

4.8. Data analysis

Qualitative research techniques generate a mass of words through interviews, focus groups or observational data, which needs to be described and summarised. The main question should require a researcher to seek relationships between various themes that have been identified, or to relate behaviour or ideas to biographical characteristics of respondents such as age or gender (Lacey & Luff, 2009:6).

Lietz and Zayas (2010:191) argue that "qualitative content analysis is a valuable alternative to more traditional quantitative content analysis, when the researcher is working in an interpretive paradigm and that the goal is to identify important themes or categories within a body of content,

and to provide a rich description of the social reality created by those themes and categories as they are lived out in a particular setting". Through careful data preparation, coding, and interpretation, the results of qualitative content analysis can support the development of new theories and models, as well as validate existing theories and provide thick descriptions of particular settings or phenomena.

For this research study, a combination of content, thematic and matrix analyses were utilised. All the interviews were audio taped and transcribed. Transcriptions of the interviews were analysed using the constant comparative method, and the data analysis was iterative with data collection. The data were analysed as it was collected through the process of coding. Interviews were coded by conceptualising fundamental configurations in the data. The initial data analysis was guided further, with a focused data collection, leading to further conceptualisation of the data and refinement of the coding schemes. As part of the analysis, similarities and differences about the compiled codes were grouped together to form categories. Through the process of open coding and thematic coding, DRR, which is the core variable, and the use of IK and community participation, were merged. Thematic notes were written throughout the coding process to track conceptual decisions and ideas as they occurred.

4.8.1. Interview data analysis stages

4.8.1.1 Transcription

Almost all qualitative research studies involve some degree of transcription. The data may include tape-recorded interviews, focus groups, video recordings, or handwritten field notes. It is usually not appropriate to write up summary notes from a tape recording, as unless the words are transcribed verbatim, the researcher is likely to bias the transcription by only including those sections that seem relevant or interesting to them (Lacey & Luff, 2009:20). For this study, all tape recordings of interviews and focus groups were transcribed using software called Pro Transcriber.

4.8.1.2 Stages of coding data

Coding is an analytical process of rearranging and reducing data, which begins by selecting coding units, such as words, sentences, paragraphs and themes. Creswell and Clark (2007:131) explaine that qualitative data analysis begins with coding the data, dividing the text into small units (phrases, sentences, and paragraphs), and assigning a label to each unit. The labels can come from the exact words of the participants, in a term composed by the researcher, of a concept in the social or human sciences. Through open coding, mutual themes of disasters were identified and studied in relation to the context of the study, meanings, and the hardship different

communities face in dealing with coming up with strategies to reduce disaster risk and keeping their IK through passing it on to different generations and communities. Coding, as the core feature of qualitative data analysis, is seen as a process of grouping evidence and labelling ideas so that they reflect increasingly broader perspectives. The stages of coding include open, axial and selective coding as depicted in Figure 4-4.

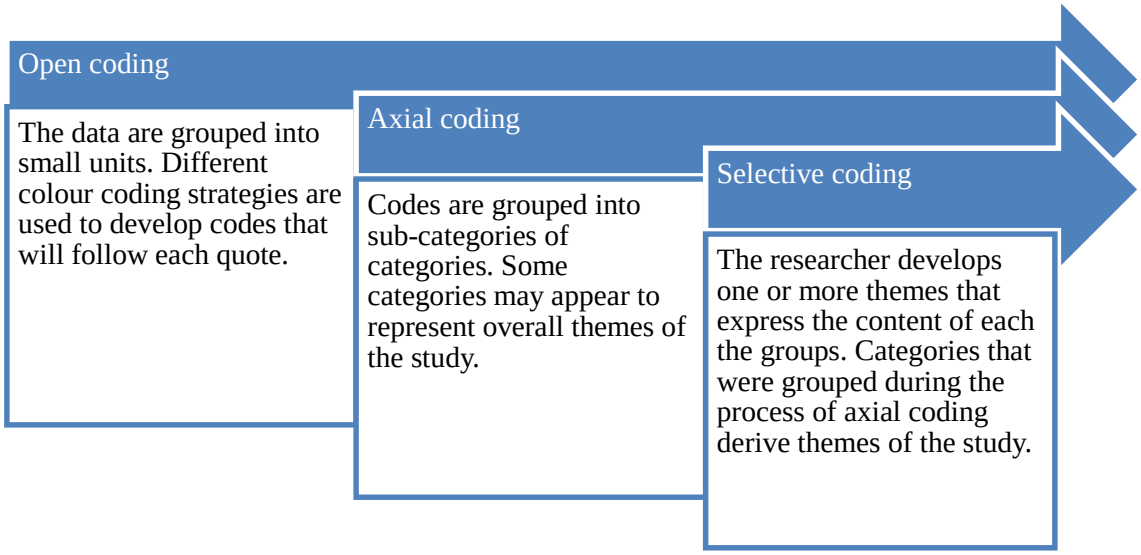

Figure 4-4: Stages of interview and focus group analysis
Source: Onwuegbuzie et al. (2009:5-6)

4.8.1.3 Colour coding

Another coding system used in analysing qualitative data is colour coding. Here, highlighters and felt tip pens are used in the process, using different colours for each code or category. The advantage of this method is that the text does not need to be cut up and removed from the original section, so text units remain in context. For relatively straightforward and pragmatic analyses, this may be the preferred method (Lacey & Luff, 2009:31). In this study, a table was designed to align the codes that were assigned to each participant with their responses to the questions that were presented to them. In addition, colour coding was applied to highlight those responses that seemed similar to one another. This process was done repeatedly to ensure that all the responses to each question by each respondent were highlighted to compare similarities in the content. This process of colour coding is done to find common themes in the participants' responses.

4.8.1.4 Categories and themes

The organisation of data included the grouping of codes into themes or categories. Additionally, data were also organised through the use of interrelated categories and also be abstracted and

reduced to smaller set of themes. This was done through designing matrices, which were useful in the process of data reduction and organising.

4.8.1.5 Matrix analysis

Miles and Huberman (1994:239) in Averill (2002:856) contend that in qualitative data analysis, a matrix involves the crossing of two or more main dimensions to see how they interact. “Matrix analysis as an ancillary strategy can aid in assessing the trustworthiness of a qualitative study” (Averil, 2002:856). Lambert and Loiselle (2008:231) citing Averill (2002), note that, “matrices can be valuable agents in the search for relationships between and among categories of data or phenomena of interest, in examining how categories relate to particular theoretical concepts, which can be group rituals, kinship patterns, perceived authority, and in the search for tentative propositions linking categories of information”.

Doody and Noonan (2013:30) opine that descriptive matrices allow the researcher to display categorised data in individual cells, just to observe what appears. Elo and Kyngäs (2008:111) outline the process by explaining that data that are generally entered into individual matrix cells reflect paraphrased, synthesised, or quoted content from participant responses. The authors also posited that matrices streamline the process of simultaneously and systematically noting similarities, differences, and trends in responses across groups of informants. In this study the matrix analysis was done through coding and categorising data according to their similarities and or the extent of their differences. The matrices in this study were also defined by the reflection of quoted content from the participants’ responses. The primary reason for adopting the matrix analysis as a data analysis method is to ascertain an effective data reduction process while achieving trustworthiness of the study. Matrix analyses were used to analyse both interview and focus group data.

Figure 4.5 shows the step-by-step process used by the researcher for the qualitative data analysis.

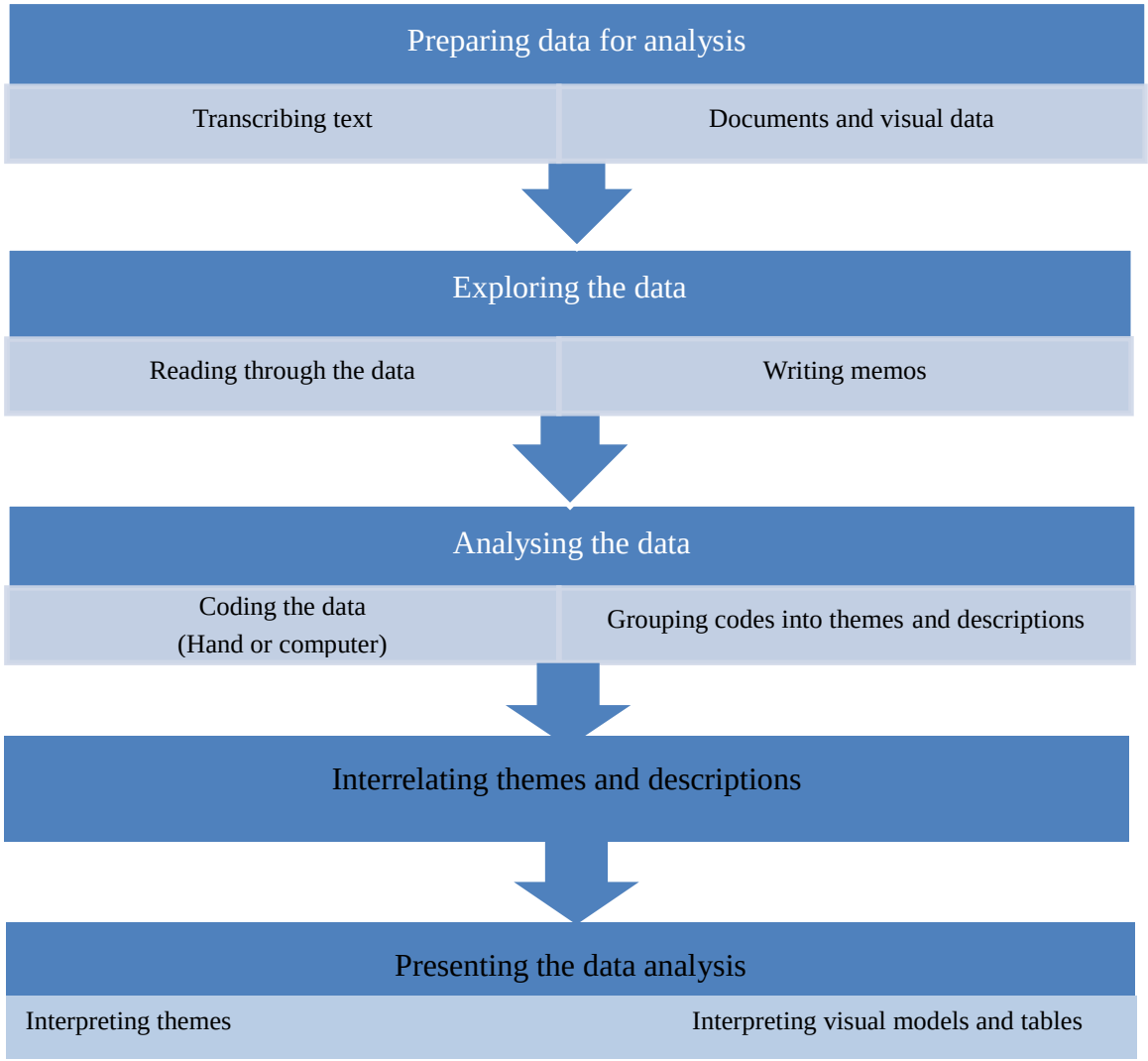

Figure 4-5: Data analysis process
Source: Adapted from Creswell (2009)

The steps shown in Figure 4-5 demonstrate the processes used by the researcher to make sense of chaotic data. Some steps were used for analysing both the interview and the focus group data. The next section more specifically reveals how the researcher handled the focus group data.

4.8.2. Focus group data analysis

"A focus group is a technique involving the use of in-depth group interviews in which participants are selected because they are a purposive, although not necessarily representative, sampling of a specific population, this group being 'focused' on a given topic" (Rabiee, 2004:655). In this method, participants are selected based on their understanding of the phenomena under study and based on their ability to respond to the questions presented to by the researcher. Harell and Bradly

(2009:6) posit that focus groups are a compilation of a number of different participants involved in a group discussion to get numerous responses. Focus groups have complex processes when it comes to data analysis, and thus should not be treated the same as interview data analysis. To date, no framework has been provided that delineates the types of qualitative analysis techniques that focus group researchers have at their disposal (Onwuegbuzie, Dickinson, Leech, & Zoran, 2009:5).

4.8.2.1. Constant comparison analysis

Onwuegbuzie *et a*l. (2009:5) outline different types of focus group analysis that researchers can adopt, especially when one wants to make a distinction between analysing interviews and focus groups. Additionally, the authors mentioned constant comparison analysis as one focus group strategy. The constant comparison analysis, also known as the method of constant comparison, is used in grounded theory, and can also be used to analyse other types of data sets such as focus groups. For this study, this method was adopted mostly for an efficient data reduction process. In light of the complexities of analysing focus group data, there are types and stages that may be adopted for proper analysis. Figure 4-5 depicts the three main stages that the researcher adopted for effective analysis through constant comparison using coding stages. These coding stages were used for the semi-structured interviews and focus groups. "Constant comparison data analysis is seen to be inefficient at completing a focus group data analysis, since it delineates information about the number of members who agreed and/or disagreed from each emerging category or theme" (Onwuegbuzie & Frels, 2015:167). Micro-interlocutor analysis can then follow to identify the number, agreements, disagreements and emotions that emerge regarding particular categories and themes.

4.8.2.2 Micro-interlocutor analysis

Rabiee (2004:659) noted that when researchers conduct a focus groups analysis, it is vital to consider the intensity of comments and also be able to take note of emotions that may be expressed in the comments. To attain a proper analysis of focus groups, Onwuegbuzie (2009:7) suggests making use of a method of analysing conversationalists. This method, termed "micro-interlocutor analysis", is resourceful in identifying members who appear to be part of consensus and those who represent dissenting views. Toland, White and Mills (2014: 227), cite Dickinson, Leech, and Zoran (2009:5), stating that, "only interpreting the text from a focus group interview can be "extremely problematic" and a study can be much more rigorous if researchers analyse non-verbal elements".

This study's qualitative-based focus group data framework involved the collection and analysis of three forms of focus group data, namely individual data, group data and interaction data. Since the constant comparison focussed more on group and individual data, a new fundamental component of this focus group data analysis process was the use of micro-interlocutor. According to Onwuegbuzie and Frels (2015:167), micro-interlocutor analysis is a new focus group data analysis technique for collecting, analysing, and interpreting nonverbal communication data. Essentially, for non-verbal communication purposes, micro-interlocutor analysis was utilised to identify different focus group interactions such as sarcasm, consensus, debate, and silent and most vocal focus group members. Application of this data analysis strategy is shown in Chapter 5, Section 5.5.6.

4.8.3. Documentary evidence

For this study, the researcher made use of different secondary data sources, such as government gazettes, legislation, DMPs and municipal reports. The study also utilised semi-structured interviews and focus group as data collection methods. Documentary evidence was included as another method to improve the credibility of the study. uMshwathi Local Municipality, as per the Disaster Management Amendment Act of 2015, has created a Disaster Management Advisory Forum (DMAF) which discusses DM issues. The forum sits quarterly and involves different community stakeholders such as *amakhosi*, ward councillors, ward committees, council members and all community service employees. For this study, the DMAF reports were utilised as documentary evidence. The use of these reports was to ensure that there was coherency and consistency between the collected data and the documented evidence.

4.9. Data triangulation

The concept of triangulation emerged within the realist paradigm that aimed to rid the research of subjective bias. The concept assumes a single reality (or point on the map) to be known (Tracy, 2010:843). Several authors have come up with different definitions and have led discussions on the concept of triangulation. Triangulation is a process of gathering and analysing data from more than one source to gain a fuller perspective on the situation under investigation. In addition, triangulated data should not be simply used to 'check' the conclusions from one data source against another. Furthermore, the data from one source will often contradict or question the findings from another (Lacey & Luff, 2009:27). Triangulation in qualitative research assumes that if two or more sources of data, theoretical frameworks, and types of data collected, or researchers converge on the same conclusion, then the conclusion is more credible (Tracy, 2010:843). Lauri

(2011:2) proposes that triangulation may include multiple methods of data collection as well as multiple methods of data analysis, and argued that the methods chosen in triangulation to test the validity and reliability of a study depend on the criterion of the research. However, Denzin (2012:82) argues that triangulation should not be regarded as an instrument to achieve validity, but rather as an alternative to achieve validity. The use of multiple sources of evidence in case studies allows an investigator to address a broader range of historical and behavioural issues, however the most important advantage presented by using multiple sources of evidence is the development of converging lines of enquiry (Yin, 2009:115).

Authors such as Denzin (2012:82) have only viewed triangulation as a technique for evaluating multiple methods of qualitative research; triangulation referred to the use of multiple forms of qualitative research methods, not the combination of quantitative and qualitative methods. It was also understood that each qualitative methodology life story, case study, interview, ethnography and participant observation rested on specific epistemological assumptions, and each method had a complex disciplinary history, hence these interpretive methods could not be easily combined with one another. Moreover, authors like Lauri (2011:2) recommends the use of triangulation in the pursuit of reliability and validity of qualitative studies. Furthermore, the author stated that triangulation strengthens a study by combining methods.

Yin (2009:116) attests that triangulation may include multiple methods of data collection as well as multiple methods of data analysis, adding that the methods chosen in triangulation to test the validity and reliability of a study depend on the criterion of the research. Lauri (2011:2) also discusses the use of triangulation in qualitative research, making reference to work by different authors who discuss strategies to maximise credibility and dependability in qualitative research. Four types of triangulation can be used for evaluation: data triangulation (the use of multiple data sources to help understand a phenomenon); methods triangulation (the use of multiple research methods to study a phenomenon); investigator triangulation (the use of multiple researchers to collect and interpret data); and theory triangulation (the use of multiple theories and perspectives to help interpret and explain the data).

4.10. Ethical considerations

Informed consent is the cornerstone of ethical research practice. A subject must be informed of the purpose of the research and any risks that may be incurred if he or she participates. Grix (2010:142) argues that a researcher has a responsibility to put in place a set of moral principles that guide him or her in the choice of how to conduct him or herself with regard to such topics as confidentiality, anonymity, legality, professionalism and privacy when dealing with people in

research. He added that researchers have a duty to respect the people they are studying and they also need to make sure that they ask their explicit permission first, and then make sure they explain how they intend to collect the information, and analyse and disseminate the data they have gathered, by talking to them. In the case of research that involves people, the decision on whether a subject is at risk is not made by the researcher alone; because of the researcher's commitment to their research and their educational, social, and professional background, they may assume that a study has minimal or no risk (Houghton, 2013:17).

Apart from instrumentation and procedural concerns, collecting data from people raises ethical concerns, which include taking care to avoid harming people, having due regard for their privacy, respecting them as individuals, and not subjecting them to unnecessary research (Goddard & Melville, 2001:49). In order to avoid harming people, physical or psychological harm should be guarded against by the researcher, people's privacy should be respected, and the researcher must keep data confidential, avoiding cases where the respondent may be identifiable to anyone reading the article.

In terms of ethical protocols, gatekeepers' letters were first obtained from uMshwathi Local Municipality and uMgungundlovu District Municipality. The gatekeeper's letter from uMgungundlovu District covered both the district municipality employees and all traditional leaders residing within the jurisdiction of uMgungundlovu District Municipality. Secondly, the researcher obtained ethical clearance for the study from the University of KwaZulu-Natal Research Ethics Committee. Thirdly, the human dignity of the study participants was upheld by addressing important ethical factors such as informed consent, privacy, confidentiality, and anonymity (Grix, 2010:142). All issues of informed consent were considered and explained to all the participants before interviews and focus group discussions. Furthermore, IsiZulu and English consent forms (see Appendices 1 and 2) were issued to all the participants of the study to ascertain that all ethical considerations were met. Informed consent forms were acquired for the interview, written and documented interviews. Furthermore, confidentiality was also explained to the respondents, such as explaining the plan to keep the information provided by the respondents confidential in order to protect and conform to the principles of research ethical considerations. There was also an explanation behind the use of a tape recorder, as most of the participants were based in a rural area. This was to ensure that participants understood all standard procedures and that transparency is ensured the researcher addressed all ethical issues for interview or focus group participation before proceeding with the study, and honoured the dignity of the participants throughout the study. In addition, the researcher has availed himself, and will continue to be

available to, the municipality, traditional leaders and the community in terms of reporting back on the results of this research.

4.11. Limitations of the study

UMshwathi Local Municipality is a rural community-based municipality, and as a result, the most common and challenging issue was that of access. This was as a result of the geographical location of those places, which lack proper infrastructure and public transportation. Transportation was challenging since the researcher is without private transportation and had to walk long distances to access the study sites. In addition, hostile weather conditions resulted to untarred roads becoming very wet and slippery when traversed. Although the researcher was limited by this issue of physically accessing participants across rough terrain, he endured. Another limitation was the issue of the language when it came to accessing Afrikaaner farmers who speak Afrikaans and prefer to avoid the English language. New Hanover is mostly populated by Afrikaans speaking people, and most of them cannot communicate in English or any of the South African official languages other than Afrikaans. Hence, this Afrikaaner farmers who may well have indigenous knowledge to share declined to participate using their second language, which is English. Another obstacle was the lack of availability of documented information about historically occurring disasters within uMshwathi Local Municipality. The researcher was sent back and forth between the district and local municipality with each entity indicating that the other entity was better suited to obtain the information sought about historical occurrences of disasters in the area.

In addition, qualitative research has its limitations as a research methodology of choice. These limitations include, amongst others, research quality being heavily dependent on the individual skills of the researcher, and can be more easily influenced by the researcher's personal biases and characteristics. Further, rigour is more difficult to maintain, assess and demonstrate; the volume of data makes analysis and interpretation time consuming; Rigor is sometimes not as well understood and accepted as quantitative research within the scientific community; the researcher's presence during data gathering, which is often unavoidable in qualitative research, may affect the subjects' responses; there may be issues of anonymity and confidentiality when presenting findings; and findings are more difficult and time consuming to characterise in a visual way. One of the limitations of data analysis could have been bias, as the researcher is also a resident of uMshwathi Local Municipality and a member of the municipal DMAF. There could further be bias in the interpretation of the data, which could be caused by the researcher’s knowledge of the study and the environment under study. To overcome this limitation, the researcher followed the

proper procedures of analysing data by ensuring the effective codification of data. In addition, through matrices, data quality control was achieved.

These limitations were overcome by ensuring that the research limitations were planned for in advance, and the strategies put in place were made relevant to the environment where the research study was undertaken. Properly following weather focus was very resourceful for the researcher to be able to collect data during days that provided conducive weather conditions

4.12. Chapter summary

This chapter has discussed the social constructivism worldview, as well as the qualitative research design and methodology of this study. It further showed the different techniques or methods that the researcher used in order to collect, interpret and analyse the data. Also discussed was how the research objectives and questions led to the research design and strategy. Finally, the researcher explained the research design, strategy, methods and techniques that were used in order to collect and analyse the data, consistent with the research problem under study. The next chapter will follow on data presentation, analysis and findings.

CHAPTER 5

DATA PRESENTATION, ANALYSIS AND FINDINGS

5.1. Introduction

Chapter 4 elaborated on the methodologies and procedures utilised to collect data. This chapter deliberates on the presentation, analysis and findings of the research that was undertaken through conducting individual interviews and focus group interviews at uMshwathi Local Municipality. The aim of this study is to understand the different indigenous strategies that the communities of uMshwathi use for DRR purposes. Furthermore, this study sought to achieve the following objectives and answer the following questions:

Table 5-1: Aligning the research objectives and research questions

Research objectives	**Research questions**
To understand the relationship between the nexus of IK and community participation, planning and implementation of DRR strategies in uMshwathi Local Municipality.	How can IK be obtained through community participation in planning and implementing DRR strategies in uMshwathi Local Municipality
To determine the nature of IK held and contributed by uMshwathi citizens that relates to DRR.	In what ways do local community members of uMshwathi contribute to governmental strategies toward DRR?
To identify methods for the uMshwathi local government to engage citizens in collecting and utilising IK for DRR.	How can IK held by the citizens of uMshwathi best be collected for planning and implementing DRR strategies?
	How can IK held by the citizens of uMshwathi best be utilised by the local government for planning and implementing DRR strategies?

This chapter focuses on the unfolding of the actual research, how the actual findings of this empirical research were acquired, and presents and interprets the outcomes of the study. Towards the conclusion of the chapter, a brief discussion of the findings will be made.

5.2. The context of uMshwathi Local Municipality

UMshwathi Local Municipality is a local municipality located within uMgungundlovu District Municipality, which was named after the Umshwathi River which flows across the municipality. It is situated to the west of Pietermaritzburg. New Hanover, Harburg, Kirchdorf, Schroeders,

Lillienthal, and Hermannsburg are mini towns that are found in uMshwathi Municipality (SALGA, 2010:12). Umshwathi Local Municipality is approximately 1 811 km^2, with a population of around 106 374 (uMshwathi Municipality, 2015). UMshwathi Local Municipality is made up of three main urban areas, namely Wartburg, Cool Air and New Hanover, and the rural settlements of iMpolweni, Ozwathini, Thokozani and Swayimane (uMshwathi Municipality, 2015). KwaSwayimane and Ozwathini are mostly residential places populated by rural communities, which are most prone to floods and lightning. New Hanover is an urban area that is populated by commercial farmers, which is a different setting from KwaSwayimane and Ozwathini. Choosing these three different places assisted in collecting reliable data. However, data were ultimately collected only from KwaSwayimane and New Hanover.

The political leadership of uMshwathi Local Municipality comprises 26 Councillors representing 13 Wards. The municipal administration is made up of five key departments, which is Municipal Manager, Finance, Technical Services, Community Services and Corporate. There are 174 administration staff. The local stakeholders incorporate the *amakhosi* and *Izinduna*, Agricultural Union, Fire Protection Services, and other associations. All these local partnerships, in conjunction with the District Municipality and the Provincial and National Governments, aim to provide essential services and development to everyone living in the uMshwathi Municipality.

Figure 5-1: UMshwathi Geographic Location
Source: UMshwathi Local Municipality (2016:56)

This section will discuss the institutional capacities and arrangements with regards to the use of IK and community participation for DRR. "In order to ensure that the Municipality has the right number of people, the right kind of people in the right places, at the right time doing things that are economically efficient, institutional capacity should be ensured by the municipality" (UMshwathi Municipality, 2015:95). The municipality is currently investing its time in reactive measures such as rehabilitation. Furthermore, human capital development is still done to capacitate DMU officers with recovery measures to DM. For proper implementation of DRR strategies, the Municipality will need to provide a professional support service which will be consistent with municipal development plans. Moreover, it has to have a well capacitated structure and personnel. Figure 5-2 shows a depiction of the organogram of uMshwathi Local Municipality, which is used as a tool to ensure institutional capacity within the municipality.

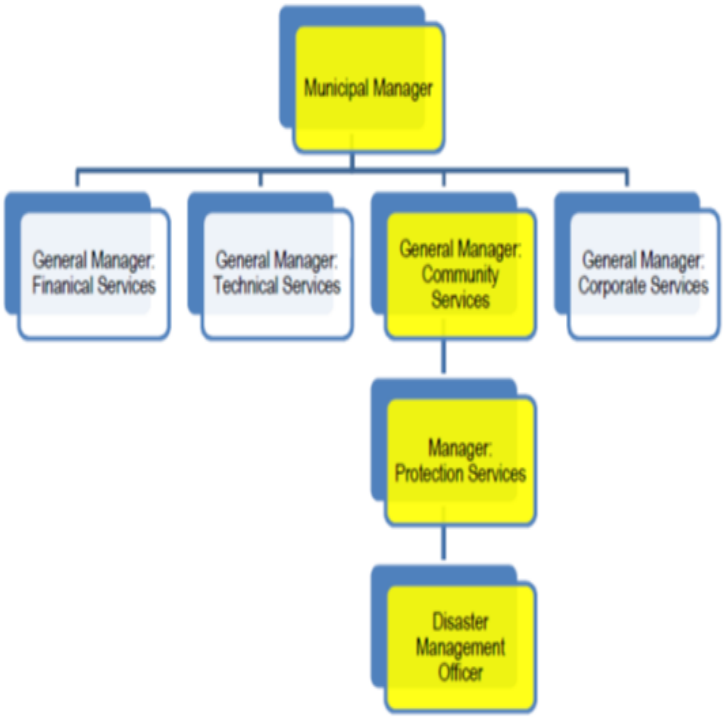

Figure 5-2: UMshwathi Local Municipality Organogram
Source: UMshwathi Municipality (2016:2)

UMshwathi Local Municipality DMU is the last unit in the municipal reporting line. The DMU has one officer who is dedicated to its functions, which entails field work and office work. The DMO reports to the Protection Service Manager, who in turn reports to the Municipal General Manager from Community Services. The Municipal Manager accounts for all matters of the municipality, and all units report to the office of the Municipal Manager.

UMshwathi Local Municipality has set their plans and targets in line with the long-term vision of the KZN Provincial Growth & Development Strategy (PGDS), as well as the National Development Plan (NDP). The municipality's long-term strategy is: "to promote social and economic development through sustainable, effective and efficient use of resources and dependable delivery of basic service in line with the Constitutional mandate and to continually strive to remain a green municipality".

In 2011, uMshwathi Local Municipality was named the greenest municipality within uMgungundlovu District Municipality. Thereafter, with an aim to reduce the impacts and effects of certain disasters (natural or human), in 2012 the municipality established the DMU. This Unit works closely with the Provincial and District DM teams to ensure that the relevant authorities tend to challenges during times of crisis. However, up until 2016, only one officer has been

responsible for the whole unit. This is as a result of not being budgeted for; there is no direct allocation for the DMU as yet (uMshwathi Municipality, 2015:80).

In 2013, the Municipality established the DMAF. The forum is made up of ward committees, councillors, traditional leaders and the municipal administrative structures. Among others, the forum has five roles and responsibilities. The first is to coordinate all relevant stakeholders; the second is to enable coordination between the provincial, district and local stakeholders; the third is to increase institutional capacity through improving the understanding of DM amongst key stakeholders; the fourth is to develop strategies that will allow resources to be shared, which includes emergency service delivery and effectively responding to disasters; and lastly, to report to the Municipal Council and the provincial and national government spheres, which also includes other stakeholders, on matters of DM.

UMshwathi Local Municipality (2015:79) states that the vulnerability of the Municipality's communities to natural diseases justifies the need for a local DM plan. However, it should be considered that currently, the local municipality depends on the Disaster Management Plan (DMP) of uMgungundlovu District Municipality. In order to develop and expand the DMU, the municipality took the initiative during the latter part of the 2015 financial year to draft the DMP, as the municipality had not been officially involving IKS in DRR practices. Indigenous practices to reduce disaster risk have now been included in the municipality's in-progress DMP. The integration of IK and DRR processes is still an emerging practice for uMshwathi Local Municipality. The municipality makes use of community disaster risk assessments and disaster awareness campaigns to collect local strategies for DRR, and also to educate communities about the importance of DRR.

UMshwathi Local Municipality recognises the adoption of indigenous practices, especially in medicine. There is a committee that looks at including traditional medicine and also involves the traditional healers in the municipality. However, using IK for DRR purposes is still an emerging practice for the municipality. Moreover, on the 1st of March, 2015 the municipality hired a contract researcher whose responsibility it is to conduct research on collecting the best practices that indigenous communities use to reduce and deal with disasters.

5.4. Documentary evidence

In the process of reviewing the literature, different documentary evidence was utilised to support the literature and the empirical findings of the study. Table 5-2 outlines the DMAF reports and how these documents support the literature and findings of the study.

Table 5-2: Disaster Management Advisory Forum reports

Months	**Disaster Management Advisory Forum 2016**		
	Risk Assessment	**Lightning Reduction**	**DMP**
First quarter (July- October 2015)	Report on risk assessments that were rolled out in Wards 1, 2, 3, and 4.	The distribution of lightning rods was discussed by the forum and the resolution was to distribute more to Wards 1 and 2 as they are more susceptible to lightning than other wards.	The first part of DMP was to conduct risk assessments and community visits.
Second quarter (March- June 2016)	Wards 1, 2, and 6 were reported as being most susceptible to lightning and drought.	Six lightning rods had been distributed to those wards and families that were affected. Other lightning rods were to be redistributed to Wards 5, 6, and 7 because they had been stolen by copper thieves.	The risk and IDP assessment was done which came with the resolution that IK should be included in the DMP and the IDP.
Third quarter (July-October 2016)	Full risk assessment report was given in line with the drafted DMP.	A total of four fatalities in Wards 1 and 2 were reported. In addition, five and three families were affected by lightning in Wards 1 and 2.	A full report was given on involving IK into DRR processes and the compilation of IK strategies was to take place thereafter.

Source: Disaster Management Advisory Form Reports, 2015 and 2016

UMshwathi Local Municipality established a DMAF that sits quarterly and discusses the local municipal DM issues. These issues entail different strategies to prepare, prevent or mitigate disasters, risks and rehabilitation arrangements. In addition, DMAF reports are also issued quarterly. In these reports the DMU incorporates different DM issues, which include risk assessments, awareness campaigns, and drafts of different outstanding DM plans. Lightning reduction strategies are also discussed and reported on. The reason for lightning being discussed separately is that the risk assessments revealed that most areas of the municipality are prone to lightning, which is supported by the number of fatalities due to lightning.

5.3. Aligning the research questions, research objectives and conceptual framework with the research tools

The overarching question for this study is how can IK be obtained through community participation in planning and implementing DRR strategies at uMshwathi Municipality? It was of

great importance to ensure that there was alignment between the research questions, research objectives, conceptual framework and research tools used, which will be discussed in this chapter. The interview questions were constructed to be resources in responding to the research questions, and consequently to fulfil the research objectives. Appendix 9 shows a tabulated link of the interview questions aligned with the research questions and objectives, while Appendix 10 shows the alignment of the conceptual framework with the interview questions.

5.4. Emerging themes of the study

This section discusses the major themes that emerged from an analysis of the study. These arose from the stories of the participants, which were grouped together to formulate a comprehensive picture of their combined experiences. The themes were developed at the end of the data analysis process; however, they have been discussed at the beginning of data analysis section. The participants were presented with questions regarding the use of IK and their participation in the DRR processes. After a thorough data reduction process some major themes emerged, amongst which were institutional arrangements for community participation; indigenous practices for DRR; indigenous knowledge barriers; traditional lifestyle; conflict at the nexus; and strategic planning issues.

Theme 1: Institutional arrangements for community coordination

Tongwa, Burnle and Zouh (2012:6-7) argue that for DRR processes to be effective, local communities should not be excluded in decision making is required. Furthermore, men and women should be at the core of decision making, without forgetting a specific focus on the youth and private sector. This constitutes a participatory decision-making approach. Matrix 5-1 shows the construction of this theme, while indicating the sources of the theme and the investigators' perspectives.

Matrix 5-1: Institutional arrangements for community engagement		
Thematic Response		
Local Government	**Traditional Leadership**	**Community**
IK has not been officially collected for DRR. (LMM4, LDMO4, LDMO4, LMM4, LMM5, DDMOB1)	Community leaders have not played a substantial part in giving IK for DRR. (STL2, UTL2, STL3, UTL4, UTL7)	The municipality has not engaged with communities for the collection of IK. (SFGA8, UFGA8, UFGB8, UFGB9, UFGD9)

Source: Researcher's fieldwork 2015

This indicates that the concept is still emerging at uMshwathi and that the proper compilation of local knowledge has not taken place, however the municipality has mechanisms with which to collect and store IK, as well as to involve the community in the matters of DM. Nevertheless, the municipality still needs a strategic and systematic way to compile and store this local knowledge. Traditional leaders have not officially played their part in collecting and utilising IK for DRR. This indicates that the traditional leadership also recognise the significance of IK and the impact of its absences.

Theme 2: Indigenous practices for disaster risk reduction

Dekens. *et al.* (2008:36) argue that local people have knowledge about the history and nature of floods in their own locality through observation and experience of floods. Their knowledge is based on daily observations of their local surroundings, close ties with their environment for survival, and an accumulated understanding of their environment through generations. Through the understanding and historic observation of their environment, local communities are able to predict disasters and disaster risks and also devise necessary strategies to reduce the risk. Matrix 5-2 shows a thematic summary of indigenous practices adopted by local communities of uMshwathi to mitigate disaster risks.

Matrix 5-2: Indigenous practices for mitigation and prevention		
Thematic Responses		
Local government	**Traditional leadership**	**Community**
Recognise, value and respect the use of IK strategies for DRR. (LDMO3, LMM4, LDMO5, LMM5, LDMO6, DDMOB1, DDMOA2, DDMOB3)	Local people have had their practices for many generations and have been passed on from generation to generation. (STL2, UTL2, UTL3, STL5, UTL5)	Strong lashing sun, dark clouds, *insingizi*, flock of birds, isikhonyane and fatigue on humans. (UFGA7, UFGB7, SFGD7, UFGC7)

Source: Researcher's fieldwork 2015

This means that African indigenous communities have survived for many years without adopting Eurocentric and or western approaches. For some participants, their resilience in dealing with disaster has been based upon application of IK and IKS. From anticipation strategies to risk reduction practices, the thematic outcome shows that the community also adopts indigenous approaches for DRR improvement.

Theme 3: Indigenous knowledge barriers

While IK was found to be useful for minimising disaster risks and improving the overall livelihoods of African communities, Maferetlhane (2012:40) posits that IK has its barriers and challenges, including marginalization; not being captured and stored in a systematic way with over-reliance on intergenerational oral transmission; over-reliance on intergenerational oral transmission; disappearance; management of IK; and reconciling IK and Western Knowledge.

Matrix 5-3: Indigenous knowledge barriers		
Thematic Responses		
Local government	**Traditional leadership**	**Community**
There is a lack of leadership roles, loss of trust and respect for nature and the wrong perceptions about indigenous holders. (LDMO2, LDMO4, LMM4, LMM5)	Civilisation, poor community leadership and passing on of IK holders. (STL3, UTL8, UTL2, STL2)	Communities do not share because of other people's perceptions about the use of IK for DRR and other aspects. (UFGE3, SFGA5, UFGA5, SFGD5, UFGD5, SFGB6, UFGB6)

Source: Researcher's fieldwork 2015

UMshwathi Local Municipality and the broader uMgungundlovu District Municipality are suffering from similar challenges when it comes to the management and utilisation of IKS for DRR. However, at uMshwathi Local Municipality, the most common problems are normally the lack of leadership roles when it comes to promoting the integration of IKS and community participation into DRR processes. In addition, most community elders are of the view that civilisation and modern education limit the use of IK. Community elders also state that modern education is the system that can also revive the use of IK for DRR, if it integrates indigenous ways of teaching into school systems and through curriculum development. Some pointed out the lack of political will and commitment to promote IKS and African ways of doing things.

Theme 4: Traditional lifestyle

While IK is getting research support as a result of its functions and significance; recognition and trust of contributors of local knowledge has to be at the centre of the process. In support of this statement, Kelman *et al*. (2012:18) contends that as much as using existing indigenous approaches may be of great use, without trust and respect for IK and institutional contributors to DRR, such as government or private emergency management teams and planning stakeholders, effective DRR may not be achieved.

Matrix 5-4 highlights the extent to which local people have lost their traditional values and how they sometimes tend to despise their own indigenous practices.

Matrix 5-4: Traditional lifestyle	
Thematic responses	
Traditional leaders	**Community**
People have lost the tradition and the use of local knowledge because of political influence and promotion of westernised polices over local policies. This results to traditional knowledge being marginalised while reducing trust, love and respect for IK. (STL2, UTL2, UTL3, UTL5, UTL8, STL9)	Indigenous communities have forgotten traditional practices and values, and have also lost their respect and love for nature. (SFGB1, SFGA2, UFGA5, UFGB2, UFGE2, UFGE3, SFGA6, UFGA2, SFGA3)

Source: Researcher's fieldwork 2015

Hence, as the data reduced into Matrix 5-4 suggests, the level of trust in traditional knowledge is very low. Kelman *et al.* (2012:13) view DRR as a development area in which AIKS has often been downplayed, as a result of general assumptions that foreign and modern ways of doing are superior to the traditional approaches of indigenous communities. This theme indicates that IK is still marginalised and that the knowledge holders are neglected, without consideration that they possess valuable knowledge that can contribute to DRR processes.

This thematic outcome also shows the absence of, or poor political interest in, promoting the use of local knowledge, while it indicates a silent marginalisation of local knowledge and practices. This furthermore shows that there is a poor balance between the traditional leadership and modern political leadership.

Theme 6: Conflict at the nexus

This themes cropped up to show the development of a conflict at the nexus of IK and community participation with regards to DRR. This conflict takes place among stakeholders such as community members, traditional leadership, municipal administration and council members. At uMshwathi Local Municipality, the municipal management and administrative staff understand

the importance of treating DRR as a municipal function that affect all units of the municipality. However, councillors are not well capacitated with such understanding and as a result the conflict between theses stakeholders develops. This conflict can be minimised or eradicated if according to Twigg (2009) people in politics, could formulate sustainable national DRR policies that will allow politician to be custodians of those policies. To achieve that, politicians could be capacitated with knowledge on the importance of DRR and how it is everyone's responsibility. Public administration officials should from the national level to the local level must ensure proper implementation of policies and strategies of support to all stakeholders. This includes politicians and community members for the improvement of community based approaches to DRR. Local government administrators point out that there is a lack of political commitment to DRR, as a result of the understanding that DRR is a district function and that councillors are not responsible for DRR. This conflict is perpetuated by the traditional leadership, who state that issues pertaining to DRR is normally handled by the municipality, and they have not had proper platforms to discuss DRR matters. In addition, the traditional leadership also accuses the political pillar of the municipality of neglecting the use of IK for DRR and other aspects of their livelihood. At the same, some community members are of the view that the municipality does not come to the community about DRR issues, but only come only when disasters have occurred. Community members emphasise the point of being neglected in the DRR matter as stakeholders that can play a vital role in the reduction of disasters. This shows that community member of uMshwathi are not well involved in DRR issues but only seen as people who needs to be taken care of in the aftermath of disasters. Matrix 5-5 is a demonstration of the conflict that exists among local government stakeholders.

Matrix 5-5: Conflict at the nexus		
Thematic responses		
Local Government	**Traditional Leadership**	**Community**
Conflict about who is responsible for DRR.	Politics deprives AIKS and African ways of knowing. (STL7, UTL7, UTL9)	The municipality and councillors only engage communities after disasters have occurred and during elections. (SFGB8, SFGE9, SFGC8, SFGE8)

Source: Researcher's fieldwork 2015

The development of this theme stems from the view that DRR is everyone's responsibility and that different structures of the community must work together to deal with DRR matters. This calls for proper education of the traditional leadership about the importance of involving

themselves into DRR matters, because they are much closer to the community and they have the power to influence the community into participating in disaster matters.

5.4. Interview data analysis

Since the study made use of interviews and focus groups, this section outlines the process taken to analyse the interviews. This section begins by explaining the indigenous DRR knowledge that is held by the residents of uMshwathi Local Municipality, before exploring the nexus between IK and community participation, and finally, assessing the municipal citizen engagement strategies of collecting and utilising IK for DRR. With the construction of data reduction matrices, thematic responses will be outlined.

5.4.2. Indigenous disaster risk reduction knowledge held by uMshwathi residents

This subsection is further divided into two subsections. The first covers indigenous strategies for DRR while the second discusses indigenous knowledge system barriers.

5.4.2.1. Indigenous strategies for disaster risk reduction

Indigenous peoples, the world over, have maintained very dynamic relations with their surroundings and natural resources through sustainable development approaches. “Their ways of lives have been shrouded in value systems and knowledge bases that often are protective of the environment and its contents, living and non-living” (Apusigah, 2008:5). Like other municipalities, uMshwathi Local Municipality has its own ways of reducing risks that may cause harm to its community. However, through risk assessment and other community engagement strategies, the municipal DMU has found out that the indigenous communities of uMshwathi Local Municipality are still relying on traditional knowledge and practices to reduce disaster risks. Matrix 5-6 shows the different indigenous practices that municipal DMU officers identified as being used by communities within the uMshwathi Local Municipality.

Matrix 5-6: Indigenous strategies for disaster risk reduction			
Indigenous Practices	**Local Disaster Management Unit**	**District Disaster Management Unit**	**Traditional Leadership**
Anticipation Strategies	They use *Insingizi* to predict thunderstorms and heavy rain and also use water levels to predict drought. (LDMO3)	Not hiding under the trees when there is a thunderstorm and lightning, and avoiding sweating or running during the thunderstorm. Colour of clouds to anticipate thunder storms. (DDMOB3) Sound of birds for anticipating drought. (DDMOA3)	We used to call the traditional healer to strengthen the house, the traditional healer always takes out *abafana* on the roof so that the storm and the lightning does not strike the household. Use of dark clouds. *Izinqolobane* when anticipating drought. (STL1, UTL1, STL5 & UTL3)
Risk Reduction Strategies	To protect themselves, they make use of *abafana* of which I am not sure about. Lightning poles. (LDMO3)	*Abafana* for lightning. Lightning poles. Traditional cropping systems. Consult *izangoma*. (DDMOA7 & DDMOB7)	A black man calls *Izangoma* and *Izinyanga* to strengthen the household. (STL3, and UTL3)
Knowledge Preservation Strategies	We make use of DMAF and we are still in a process of hiring someone who will do thorough research and we will then document this IK. Risk assessments and research. Document in the DMP. (LMM3, LDMO3, LMM4 & LDMO4)	Include IK in the DMP. Collect from Risk Assessments, Awareness Campaigns and DMAFs. (DDMOA3, DDMOB3, DDMOA4 & DDMOB4)	Indigenous knowledge strategies such as *Izinganekwane* (storytelling). (STL3 & UTL3)

Source: Researcher's fieldwork 2015

5.4.2.2. Indigenous knowledge systems barriers

The municipality values, respects and promotes the use of IK for human survival, however uMshwathi Local Municipality has not been focusing on promoting the use of indigenous strategies for DRR. The use of IK for the reduction of disasters is still an emerging concept for the municipality. In addition, the municipality has identified different challenges which hinder and serve as obstructions for IK at uMshwathi. Some of these barriers are a lack of leadership by community leaders and political leaders; the extinction of IK due to passing on of indigenous holders; and a lack of trust and respect for nature and indigenous practices. The DMU officers also pointed out that these IK barriers affect the confidence of IK holders and other IK custodians in utilising IK for DRR. Matrix 5-7 depicts the IKS barriers that municipal officials identified as being impactful in hindering the use of IKS for DRR.

Matrix 5-7: Indigenous knowledge barriers			
Barriers	**Local Disaster Management Unit**	**District Disaster Management Unit**	**Traditional Leadership**
Leadership role	Political leaders and traditional leaders with the view that DRR is not the municipal function. (LDMO2)	Councillors are not leading and supporting the process of reducing disasters. (DDMOB9)	Community leaders have set examples by passing the knowledge to the following generation. (STL3)
Indigenous knowledge holders	During Risk Assessments we engaging with community member who tell us their traditional practices. (LDMO4 & LMM4)	Without systematic documentation, IK holders pass on and they die with that knowledge. (DDMOB1 & DDMOA3)	Basically because there was indigenous medicine, for example when you want to heal a person with traditional medicine, you find out that there is no one to treat because the knowledge holder has passed on. (UTL8)
Trust and Respect for IK	UMshwathi Municipality normally consult *izangoma* for traditional medicine. (LMM5)	UMgundlovu District recognise, value and respect IK. (DDMOA3 & DDMOB3)	Compromising the usefulness of IK. We have stopped embracing our traditions. (UTL2, STL2)

Source: Researcher's fieldwork 2015

According to studies that were undertaken by Kapuire (2013:18) and Abdullah and Hassan (2015:1313) on the role of cultural values in preserving IK, if there is no central repository where younger community members can access this knowledge, communities can lose existing and significant knowledge if nothing is done to preserve it. In order for this body of knowledge to be preserved, the revitalisation of African cultural values could offer a solution for both current and future generations. The authors also agreed that perceptions on and of IK holders plays a vital impact in determining the sustainability of indigenous practices.

The municipality's traditional leadership also support, value and pride themselves on their IK. One of the participants at the local traditional house of leadership attested that traditional IK is the knowledge that they perceive as being the only knowledge that is suitable for rural communities such as uMshwathi. Other indigenous practices that traditional leaders and rural communities pride themselves on including virginity testing, which is still practiced across many cultures and tribes in South Africa. Specifically, at uMshwathi, all areas under Ingonyama are still practicing it. UMshwathi and KwaSwayimane traditional leaders both confirmed that the

tradition called Umhlanga is still practiced in the sub-areas of uMshwathi Local Municipality. However, indigenous practices are in danger of being lost, as on respondent put it:

> There are children who go for Umhlanga, when they come back from Umhlanga, some people see it and like it but are resistant to follow the same procedures, that is how people have lost their traditions, which may lead us from even saying we are bewitched but only find out that it is us who have lost the tradition and values. (STL2)

5.4.3. The nexus between indigenous knowledge and community participation

Chapter 2 introduced a participatory DRR as one strategy to curb disaster risk within communities, and the participants from uMshwathi Local Municipality revealed their strategies for engaging the community in all aspects of DRR. The Municipal DMU uses different strategies to ensure that the community is involved in the quest to reduce disaster risks, nevertheless, policy development issues have been found to be one of the obstacles that hinder the processes within DRR. Twigg (2009:10) posits that there should be high levels of political commitment which will be accompanied by the formulation of DRR policies that will allow the adoption of multi-level and multi-stakeholder approaches to DRR. In that, all stakeholder will have a common understanding with regards to the importance of DRR. Furthermore, there should be clearly defined roles and responsibilities of all stakeholders and those implemented policies should allow the involvement of every one who may or may not be affected by disasters. This subsection is further divided into two sections: Development and planning issues and the Politico-Administrative dichotomy.

5.4.3.1. Development and planning issues

Unclear DRR policies create tension and confusion among the relevant municipal stakeholders such as community members, council members, and the traditional leadership. Some DMU officials have identified gaps from the policy and development perspective. Among these are insufficient financial resources, inadequate infrastructural development, and traditional beliefs that hinder developmental progress.

Municipalities rely on national and provincial DRR policies. As a result, the role of municipalities ends up being only to implement these policies in spite of their relevance to their communities. Bang (2013: 6) proposes that all national governments must formulate policies that will allow local governments to be in control of DRR mattes. Furthermore, through sufficient funding of local government DRR functions and prioritisation of contemporary management of risk based

on potential risk, frequency and intensity of hazards rather than on political control of the local government area. Furthermore, the process should empower local government to be autonomous in managing disaster risks at reduced levels of interference. Matrix 5-8 shows views from stakeholder segments of the local and district municipal officials as well as traditional leadership.

Matrix 5-8: Policy Development and Planning Issues			
Policy Development Issues	**Local Disaster Management Unit**	**District Disaster Management Unit**	**Traditional Leadership**
Policy issues	Disaster Management issues should be included in the IDP and the municipal by-laws should be amended to accommodate DM issues. (LDMO1)	DM processes are guided by the Disaster Management Act No. 57 of 2002. Include DMU budget in the IDP so that Performance Management Systems (PMS) can be done. Municipal by-laws should be reviewed. (DDMOB1, DDMOB2, & DDMOA3)	Traditional policies are not seen as important in solving disaster challenges. Modern policymakers do not consider indigenous policy making systems. (STL9, UTL9 & UTL7)
Developmental Issues	Disaster Management Plan is under construction. Religion and beliefs sometimes hinder development progress. (LDMO5, LDMO1)	IK assessments for DRR Municipality does not benchmark the whole development plan. Link DMU processes with Infrastructural Development Units within the municipality. (DDMOB2 & DDMO)	There is no water and grass for livestock. We use old traditional hoes while the municipality uses tractors. (STL4 & UTL6)
Budgetary Issues	Insufficient financial support from the council. No specific or direct budget allocation of funds. (LDMO1 & LMM1)	No specific budget for DM issues. Insufficient funding from the Central and Provincial Government. Government does not prioritise DM issues. (DDMOB1 & DDMOA5)	UMshwathi Livestock Association and the Department of Corporate Governance Affairs support us. Our livestock is not catered for. (UTL4, STL6 & STL8)

Source: Researcher's fieldwork 2015

In a multi-level approach to DRR, the central government also has a crucial part to play through ensuring that economic development strategies are set in place. Such economic development strategies should include proper plans for infrastructural development. Central governments, according to Bang (2013:6) should mainstream disaster risks within development plans in the country. Moreover, the provision of critical infrastructure such as roads and the telecommunication network in high-risk zones should be prioritised. In the case of uMshwathi Local Municipality, municipal officials and traditional leaders pointed out inadequate

infrastructure as being a shortcoming and a fundamental cause of poor development and high vulnerability to disaster risks.

From a developmental and sustainability perspective, Van Niekerk (2011:9) suggests rural development as a policy mechanism that should be put in the context of DRR, which enhances the effectiveness of DRR strategies and also improves the standard of living of rural communities. This is also supported by Bang (2013:8), who views this from a financial resource perspective by emphasising the importance of keeping control for institutional resources, irrespective of whether they are financial or material. In addition, resources should be controlled by committees instead of individual groups. The author further concludes that corruption and maladministration could be reduced as a result. Both uMshwathi and uMgungundlovu Municipalities have signalled a shortage of funding as one issue in dealing with various DM issues. Different scholars have undertaken studies that seek to integrate IK into DRR processes. Gaston *et al.* (2012:6) argue that the acceleration of risk reduction processes was necessary at the Cameroonian local spheres, as they required policy arrangements to allow the incorporation of IK and efficient-proper planning systems, which were accompanied by the adequate deployment of resources. This answers the research question on the incorporation of IK into DRR processes for municipal planning and implementation.

5.4.3.2. Politico-Administrative dichotomy

Having discussed a number of barriers to IK, DMUO and TLs have identified political commitment, political interference and political instabilities as some of the elements that affect the use of IKS for DRR processes. Cameron (2010:676) opines that it is essential for public services to be politicised basically because of the negative impact that has caused by the involvement of political structures in service delivery. Traditional leaders and political personnel are of the same view that DM should not be discussed and is not a local municipality function and as a result should not be discussed among the matters of the municipality. On the other hand, the municipal officials are of the view that DM matters are everybody's business and that traditional leader and councillors lack a common understanding. AU (2004:25) identifies a tension between traditional leadership with political or democratic leadership, especially in the rural communities with regards to the ownership and management of land and knowledge. For uMshwathi Local Municipality, this tension also seems to exist since traditional leaders are of the view that traditional policies are oppressed by politicians, and that the municipality should not be looking at DRR because it is not a local municipal service. The local council also concur with the traditional leadership; hence the municipal administration is of the view that every stakeholder

should be involved in the processes of reducing disaster risks; a politico-administrative dichotomy exists and put decision making at the centre of all authorised parties. This complex process exists at uMshwathi because of the unclear jurisdictions of different stakeholder's decision making. On the one hand, traditional leadership, through Ingonyama Trust, own land and have power to rule. On the other hand, there are urban areas which the council and the municipality has decision making jurisdiction. Stakeholder views about the politico-administrative dichotomy are depicted in Matrix 5-9.

Matrix 5-9: Politico-Administrative dichotomy			
Elements	**Local Disaster Management Unit**	**District Disaster Management Unit**	**Traditional Leaders**
Political Commitment	Councillors would argue that DM issues should be handled by the district since it is a district service (LDMO1)	Councillors are not in good understanding ofthe process, there is a gap where councillors would say to the local municipalities, where they insist on saying the DM is a District Service and local municipalities are not allowed to deal with it (DDMOB9)	DM issues are the responsibility of the Municipality (STL7, UTL7)
Political Interference	Ward councillors are sometimes bias when it comes to reporting community disaster issues (LDMO3)	Now we engaging with the council and officials to fund and allocate us a budget (DDMOB1)	Marginalisation of IK by politicians Politics have suppressed traditional leadership and replaced it with modern (STL9)
Political Instabilities	Councillors would not want to report issues because they are reported by a person who is not from a certain political affiliation and sometimes the community themselves have a problem with the ward councillor. No common understanding between politicians and us administrators (LDMO3, LDMO9& LMM8)		Politicians have taken land and the justice system from blacks and given it to white people Politics deprives AIK and African ways of knowing. (UTL9)

Source: Researcher's fieldwork 2015

Cameron (2010:677) argues that political-administrative dichotomy exists when decision-making is vested on political civil servants who have powers to overrule decisions taken by public officials. Different authors have proposed different mechanisms to ensure that this tension between public officials and politicians is neutralised. Mercer (2009:19) is of the view that for effective DRR processes, a multi-stakeholder approach to DRR should be implemented. This tension that exists among stakeholders within DRR can be curbed through the promotion and

encouraging a multi-level and a multi-stakeholder approach to improving DRR. UMshwathi Local Municipality faces challenges in integrating different stakeholder's commitment to the cause of reducing disaster risks. In improving DRR processes; other authors like Gero, M´eheux, & Dominey-Howes, (2011:102) propose a multilevel-stakeholder approach to DRR. Authors cite Mercer (2010) who argues that "DRR activities are well established at the grassroots level as a method to reduce vulnerability to all hazards and can involve "hard solutions" such as building infrastructure to certain standards, or "soft solutions", for example education and awareness raising".

5.4.4. Municipal citizen engagement strategies of collecting and utilising indigenous knowledge for disaster risk reduction

The study revealed a number of citizen engagement strategies for IK and DRR. These include institutional arrangements for community engagement and corporate services. Each is discussed in turn. Having discussed the type of IK held by uMshwathi Local Municipality residents and the nexus of IK and community participation; discussions on how and to what extent does the municipality engage citizen in collection and utilising indigenous strategies for DRR emerge. Furthermore, community strategies to contribute in the collection and utilisation of IK for DRR play a vital role in improving institutional arrangements of the municipality. Matrix 5-10 shows municipal strategic institutional arrangements for collecting, preservation and disseminating IK for improving DRR processes.

Matrix 5-10: Institutional Arrangements for community engagement

Strategies	**Local Disaster Management Unit**	**District Disaster Management Unit**
Risk Assessment Workshops	During the time we did Risk Assessments, we were engaging with community members in order to get that local knowledge. Risk Assessments have been done in all 13 wards. (LMM4, LDMO4)	IK has not been officially collected Risk assessments to obtain IK from communities (DDMOA5 & DDMOB5)
Awareness Campaigns	Awareness campaigns also assist in collecting and alerting the community about their prevalence to disasters and also to get what they know about mitigation strategies. (LMM5& LDMO5)	Invite senior citizens, traditional leaders, and traditional healers because they have got this traditional knowledge or IK Over and above these awareness campaigns we need to have a systematic way of collecting this information (DDMOB2, DDMOB1)
Disaster Management Advisory Forums	We have functioning DMAF, we following the framework from the province because we not entitled to have a framework as yet, so we are ember in that colour. (LDMO1 & LMM1)	Through our DMAF, we ensure that we involve everyone, from ward committee member to the mayor himself, we also work close with the District Unit and other stakeholders such as Working on Fire and local NGOs and local farmers. (DDMOB4 & DDMOA4)

Source: Researcher's fieldwork 2015

Matrix 5-8 reveals that municipal officials at the local and district level have institutional arrangements in mind. Rottach (2010:10) explains that for proper institutional arrangements, vulnerability assessment of those people who are likely to be affected by disasters is important. Furthermore, it is essential to identify a community's resources, their ability to be resilient and the overall capacity of every community to curb disaster risks. Hence Twigg (2015:28) argues that organisation should institutionalise and DRR should be approached as a process. The author further explains the process of undertaking a multi-hazard risk assessment of a specific continent or country, with a specific focus on of which is looking at threats, susceptibilities and capacities, based on formed analyses, central governing bodies, and international agencies; make institutional arrangements for strategies on disaster resilience while developing and develop novel programmes and adapt existing programmes to support disaster resilience. Corporate service issues also bear upon citizen engagement for collecting and utilising IK for DRR. This is highlighted in Matrix 5-11.

Matrix 5-11: Corporate service issues

Corporate Service Issues	**Local Disaster Management Unit**	**District Disaster Management Unit**	**Traditional Leaders**
Disaster Management Personnel Issues	One full time DMUO. (LMM3 & LDMO1) We are looking to hire someone to officially collect and compile it for us. (LMM1)	still need to hire a person responsible for planning issues (DDMOA8 &DDMOA0)	N/A
Interdepartmental Relations	If it's out our jurisdiction, we invite the district and if the district fails then they invite the province. (LDMO7) Rely on the district only for post disaster assistance (LMM7)	Community Care Workers (CCWs), Community Development Workers (CDWs), Social Development (DSD) and Schools Infrastructural Development Unit Ward Councillors (DDMOA4 & DDMOB1)	Cogta works with all *amakhosi*, municipality and other organs of state. (STL8, UTL4, UTL7)
Multi-stakeholder Disaster Management	Consult *Izangoma*, *izinduna* and *amakhosi* for advise on traditional issues (LMM5 & LDMO5)	Working with NGOs, Traditional House of Leadership, Traditional healers and community elders (DDMOA6 & DDMOA0)	Local Government does not normally consult the traditional leadership (UTL4)

Source: Researcher's fieldwork 2015

Both DMUs and the house of traditional leadership have done less to capacitate communities with necessary information and resources to anticipate and reduce disaster risks. Moreover, the municipality has not officially collected IK for DRR and traditional leaders have not done enough to promote the utilisation of traditional practices for anticipating and mitigating risks. At uMshwathi Municipality there is only one DMUO who is dedicated to the whole DMU office. This officer does both field and office work. This is a result of institutional incapacities such as a shortage of staff members and poor interdepartmental relations. Matrix 5-11 shows these drivers of poor institutional arrangements.

5.4.5. Cross case analysis

The following matrices represent dissent and common views of stakeholders within uMgungundlovu district and uMshwathi Local Municipality. Participants were asked different questions that were designed for the purpose of achieving outlined objectives. One of the questions that were asked was about finding different strategies that the local government and the traditional house of leadership adopt to preserve IK for DRR. Matrix 5-12 shows different responses from local government and traditional leadership. The local government do not have any arrangement for the preservation of indigenous practices adopted by uMshwathi residents. On the other hand, the traditional leadership makes use of its traditional structures to keep and pass IK to the rest of the community. In a definition provided by Velasquez (2008:7) IK is found to be different strategies and approaches that are developed in a specific region by the locals from a progressive understanding their environment, which has formed over various generations of occupancy. Dekens (2008:36) escalates the discussion by postulating that local people are in possession of rich knowledge about their history and the frequency of disaster attacks such as floods. This folk knowledge is based on their understanding of their environment. Their observation has played a vital role in conjunction with their experiences of floods and other natural ills, hence they also have to keep their daily observation in close ties with environmental changes for their daily survival. The classical example is the one of planting and praying for the rain to *Unomkhubulwane.* This practice is known to be respected by areas within uMshwathi and there are necessary policy arrangements for those individual households who break the rules of this practice. The respect that uMshwathi indigenous communities have for their environment and indigenous practices is voluntarily because it is also informed by their cultural beliefs and strong values towards protection natural gifts. Ngwezi (2014:7) supports this local practice of planting and praying to *uNomkhubulwane* for the rain and to get rid of droughts by testifying that “IKS reflects the dynamic way in which the residents of that particular location or region demonstrate

that they understand themselves and their surroundings and also understand how they consolidate their traditional practices of vegetation and fauna, traditional beliefs, and history to enrich their livelihoods". Because traditional leadership practices are not documented, it is then noted that there are no documented practices and policies that deals with the preservation of IK for DRR.

Matrix 5-12 on overleaf depicts a cross-case analysis on preservation of IK as reflected across stakeholder segments of the local and district DMU as well as traditional leadership.

Matrix 5-12: The preservation of indigenous knowledge for disaster risk reduction		
Local Disaster Management Unit	**District Disaster Management Unit**	**Traditional Leadership**
The municipality does not have institutional arrangements for preserving IK for DRR, they only rely on sector plans. However, after the research has been done indigenous strategies will be documented and incorporated in the DMPt. (LDMO6, LMM6)	There has not been a systematic way of collecting and documenting IK for preservation purposes, but the municipality has arranged to include IK for DRR in the DMPs and Integrated Development plan of the municipality. (DDMOA7, DDMOB7)	Community leaders are expected to pass indigenous practices to their children and communities through story telling. In that the following generation passes it to tne next generation. (STL3, UTL3)

Source: Researcher's fieldwork 2015

As Matrix 5-12 indicates, uMshwathi Local Municipality is facing a challenge of being a non-integrated human resource institution, of which is caused by the absence of a multi-stakeholder approach. Ahlgren & Oourti (2013:1) posit that "There is a wide international consensus that shared responsibility among many actors and stakeholders is needed in order to reduce risks and the impacts of disasters" In the case of uMshwathi Local Municipality, on issues of involving different stakeholders in DRR and DM processes; very diverse responses across all stakeholders were noted. UMshwathi Local Municipality as a local municipality closely works with the district, while the district makes mention of different stakeholders and local municipalities. The traditional leadership makes mention of many stakeholders but not local government. This shows lack of coordination among relevant stakeholders, because there is insufficient evidence that all stakeholders are involved in dealing with disaster issues. This also answers the research question on how can local knowledge held by the locals of uMshwathi Local Municipality be best collected for DRR strategies. Poor stakeholder-coordination is found to be one of the obstacles which hinders efficient and effective collection and utilisation of IK for DRR. Nevertheless, the cross-case analysis presented in Matrix 5-13 on overleaf reveals participation of different actors, although these do not seem to be strategically coordinated.

Matrix 5-13: The involvement of different stakeholders in disaster risk reduction processes		
Local Disaster Management Unit	**District Disaster Management Unit**	**Traditional Leadership**
The local municipality works with the district municipality, specifically the DMU (LDMO7, LMM7).	The municipality makes use of DMAFs, involve NGOs, traditional leadership, CCWs, CDW, and ward committee (DDMOA4, DDMOB4).	Traditional leadership works with the Department of Corporate governance and Traditional Affairs and many stakeholders on different issues except DRR. (STL8, UTL8).

Source: Researcher's fieldwork 2015

Matrix 5-13 confirms Bazarragchaa's (2012:22) suggestion that DRR programs that involve community members may be of vital assistance because that means vulnerable poor communities will be the custodians of the process. Furthermore, they will lead the implementing and planning of DRR processes in partnerships with all spheres of government. In addition, this is supported by other authors such as Rottach (2011:11) who argues that "reducing vulnerability and building resilience need to engage a wide range of actors involved with activities that influence levels of direct and indirect risk, including national and local authorities, investment and market activity, individual livelihoods and consumption patterns". Matrix 5-14 shows that all stakeholders have common views about DM policy issues. When the question of policies to integrate IK and community participation into DRR processes was asked; all stakeholders were of the view that there are no policies that have been formulated. However, the traditional leadership opines that in the case of traditional policies, modern political agendas and the marginalisation of IK supresses the use of traditional policies. This level of conformity allows the researcher to conclude that there are no institutional policies implemented from both the traditional leadership and local government leadership together. This is suggested by the views adduced in Matrix 5-14.

Matrix 5-14: Policies to integrate indigenous knowledge, community participation and disaster risk reduction		
Local Disaster Management Unit	**District Disaster Management Unit**	**Traditional Leadership**
There are no policies that are implemented at a local municipality level which makes uMshwathi depend on the provincial and national government for DRR related legislations. (LDMO8, LMM8, LDMO9, LMM9)	There are no policies that address the issues of integrating IK into DRR processes and there is no one responsible for policy and planning issues. (DDMOA8, DDMOB8, DDMOA9, DDMOB9)	Traditional policies are suppressed by modern political agendas and traditional policies are seen as inferior and irrelevant to current societal issues. (STL9, UTL9)

Source: Researcher's fieldwork 2015

The absence of policies integrating DRR into development planning is a challenge highlighted by all stakeholder segment views captured in Matrix 5-14. Twig (2009:28) states that: there should be a routine integration of DRR into development planning and sectoral policies which incorporates poverty eradication, social protection, sustainable development, climate change adaptation, desertification, natural resource management, health, and education. This integrated policy development would assist institutions into developing policies that suites and accommodate a specific cultural setting. From a policy perspective; participant's responses provide that there is a conflict at the nexus which is caused by a general perception that modernised policies are superior to traditional policies. As a result, at uMshwathi Local Municipality, such conflict should be resolved by stakeholders reaching a consensus on which policies are more efficient and which should be prioritised. Twigg (2009:29) also provides a solution to this case, by stating that there must also be "multi-sectoral institutional platforms for promoting DRR, and local planning policies, regulations and decision-making systems take disaster risk into account". By this argument, the author calls for the utilisation of different institutional platforms that should be open which puts DRR as a priority. A variety of platforms for multi-stakeholder expression could help ease the conflict and tension regarding appropriate policies for integrating DRR into development planning as well as how to implement such policies at local level – with the involvement of traditional leadership.

The next section turns to focus group data analysis.

5.5. Focus group data analysis

Chapter 4, section 4.8.2 discusses focus group data analysis. The researcher conducted two focus groups, one in the KwaSwayimane sub-area and another in the New Hanover area. For this dissertation, focus group data were analysed by firstly aligning research questions and objectives with the focus group guide (Appendix 11); followed by aligning of the components of the conceptual framework with the focus group guide (Appendix11). Then, the researcher aligned the elements of social constructivism and the components of the conceptual framework with the responses from focus groups. This was done to show how data talk to both the elements of the constructivist worldview and components of the conceptual framework. This is shown in section 5.5.1 by Matrix 5-15. The third stage was to follow the constant comparison analysis and was used hand in hand with content analysis. This method starts with a process of chunking data into small units, which is also called open coding; secondly, assigning codes to each of the units (axial coding). The idea is to create meaning

and group these codes into categories. Lastly thematic outcomes emerging from earlier steps in the process were developed and discussed, in line with thematic analysis.

However, in terms of application, the constant comparison data analysis technique alone was found somewhat inefficient for for focus group data analysis since it mainly just delineates evidence about members who agreed or and disagreed with each emerging category or theme (Onwuegbuzie & Frels, 2015:167). Therefore, the researcher also used micro-interlocutor analysis for focus group data analysis to identify not just the number of agreements and disagreements among and between focus group participants. Rather, micro-interlocutor analysis drew attention to participant emotions and underlying meanings of issues that emerged in the group setting. This technique helped give rise to particular categories and themes. As was the case with interview data, the researcher also used matrix analysis for focus group data. Following the various steps explained in Chapter 4, section 4.8.1.5, the researcher undertook a reiterative process using matrices to organise, present, analyse and ultimately reduce data in accordance with similar and dissimilar responses while preserving the meanings intended by the elders who participated in focus groups. These matrices are embedded in the various subheadings of this chapter.

This section is organised as follows. The way in which the link between the philosophical worldview underpinning the study and the conceptual framework guiding the study helped analyse focus group data. Then the profile of focus group participants is presented. This is followed by subheadings that cover (1) indigenous practices for DRR, (2) the nexus between IK and community participation in DRR, and (3) community perceptions about citizen engagement in collecting and utilising IK for DRR. The final two subsections of this section of Chapter 5 demonstrate the use of micro-interlocutor analysis and cross-case analysis of municipal and community stakeholders.5.5.1. Aligning the philosophical worldview and the conceptual framework

This section shows the link between the philosophical worldview and conceptual framework in terms of driving the study. Focus group data were reduced and placed in cells in a way that shows how the worldview and conceptual framework interacted during data analysis. As indicated earlier, social constructivism underpins this study. “In attempting to make sense of the social world, social constructionists view knowledge as constructed as opposed to being created” (Andrews, 2012:39). People of uMshwathi have broad and historic knowledge and experiences on the issues of disasters and have been keeping their traditional practices that are based on their understanding of their natural environment. The community also shows through Matrix 5-15, that

from that understanding and analysis of the environment they are able to construct meanings which enables the community to reduce vulnerabilities that come with disasters. In other words, the community creates meanings and constructs knowledge from their experiences in the environment to adapt to and plan for different climatic changes. The components of the conceptual framework help capture such meanings and knowledge construction.

In Matrix 5-15, the first column depicts elements of social constructivism which also serve as row headings. The components of the conceptual framework serve as column headings in Matrix 5-15.

Matrix 5-15: Elements of social constructivism and components of conceptual framework

Elements	**Conceptual Framework Components**			
	Community Participation	**Indigenous Knowledge**	**Disaster Risk Reduction Strategy**	**Community Vulnerability Reduction**
Understanding the environment	Plant, prayand ask for rain to *Unomkhubulwane* also known as I*nkosazane* (UFGA2, UFGB2)	Value, love and respect for surrounding is the first step of understanding our knowledge (UFGD2, SFGA2, SFGA3, LMM5, DDMOA3, DDMOB3, UTL2 & STL2)	Make use of animals and humans to anticipate disaster risks. (SFGB7, UFGC7, SFGA3, UFGA3, UTL2, LDMO1)	Use the understanding of nature, such as the lashing sun to anticipate thunderstorms (UFGB7)
Knowledge Construction	Hitting tins for awareness (UFGB3, UFGC3, SFGB3) Shouting at the hailstorm (SFGA3, UFGA3)	Teach IKS to the younger generation (SFGA4, UFGD4) Myths and legends and story-telling to convey and preserve knowledge (SFGB4, UFGB4)	Consult *Izangoma* and *Izinyanga* to prevent thunderstorms, lightning and hailstorms. (STL1, STL2, LDMO3, DDMOB1, DDMOA7 & DDMOB6)	Use of *Abafana* (small sticks to strengthen the household) (SFGA3, SFGD3, UFGD3) Plant cycad (UFGC3)

Source: Researcher's fieldwork 2015

5.5.2. Profile of focus group participants

The respondent profile shows age and gender of participants in the next two parts of this subsection.

5.5.2.1. Age group of focus group participants

Indigenous knowledge is held by indigenous people of different communities within uMshwathi Local Municipality; however, research findings stipulate that IK is generally held by the elders of the community and as a result the ageing population is found to be the preferred group to be selected as participants. Community elders were found to be more experienced and relevant for responding and answering research questions to achieve research objectives. The age group of participants in this study ranges between 45 and 80. Six participants were at their late 70s; hence 2 of participants were older than 55 and the final 2 were between 45 and 54; of which were all community members. This is in agreement with the HFA (2005-2015) (HFA, 2009:18) that community elders are the custodians of IK. Hartog (2014:4) attests that "older people's life experience, traditional, or IK can provide vital information on past climatic events, hazard and disaster impacts".

5.5.2.1. Gender of focus group participants

Because participants were selected based on their availability and willingness, women were found to be more interested and readily available to participate in the study. In most households, males could not be found because most of them are said to be at work while there is still a number of women who still pose as housewives. 8 out of 10 participants were females. This may be caused by the fact that the society is trying to balance the gap from leadership position that are held by males to those that are held by women in different sectors. And another cause could be because there is still a number of women who are still playing a role of staying home as house wives. The availability of male participants could be due to the fact that they have aged and most of the time they are expected to be home on pension; although is not always the case since most of them are found in local alcohol outlets.

Having discussed the portfolio of participants, different indigenous strategies and practices held by uMshwathi communities will be discussed in Section 5.5.3. This section will focus on identifying indigenous practices and knowledge that is still in possession of uMshwathi indigenous people and also how do communities utilise that knowledge for their daily survival purposes.

5.5.3. Community indigenous practices for disaster risk reduction

While the research at uMshwathi Local Municipality weaved out tangible evidence on how uMshwathi communities utilise IK to anticipate and predict disaster occurrences, there is still less evidence on how the municipality compiles and disseminates this knowledge.

According to Lukamba (2010:479) disasters create serious disruption and economic loss which impair the ability of communities (particularly the poorer) to recover, while government assistance in such situations is often limited due to the already grave financial burdens they face. Rukema and Simelane (2013:117) attest that many studies demonstrate that individuals and collective communities devise numerous indigenous strategies to prevent their livelihoods from being affected by external shocks. UMshwathi communities pose to value, respect and recognise the use of IK. The people of uMshwathi have been utilising this knowledge system for many years and they have been adopting indigenous practices for different aspects of life. Medicine has been one aspect of focus for uMshwathi indigenous communities. However, they are also driven by their enormous love and respect for nature and the environment they are living in. Investigating community's' disaster prediction strategies at uMshwathi, Matrix 5-16 shows different indigenous disaster occurrence indicators. There are natural, human and animal indicators.

Matrix 5-16: Natural Indigenous Disaster Occurrence Indicators: Non-human indicators	
Indicators	**Focus groups**
Hot Wind and Phony Fields	Hot wind and phony fields were some indicators that we will experience drought and as a result we would be expected to grow drought resistant crops. (UFGA7)
Dark Clouds	We use clouds to anticipate the hailstorm, thunderstorm and heavy rainfalls; there black and white clouds. (SFGB7, UFGD7)
Strong Sun	A very strong lashing sun is sometimes an indication that there might be thunderstorms followed by lightning. (UFGB7)

Source: Researcher's fieldwork 2015

Apart from natural indicators to predict climatic changes, humans and animal behaviours are also used to predict weather conditions and potential disaster risks. The study that was undertaken by Rukema and Simelane (2013:17) revealed different strategies that indigenous people of uMsinga use to predict weather conditions. All the signs come from the behaviour of animals and plants that have been studied over centuries and are integrated into the whole system of human survival and reproduction (Rukema & Simelane, 2013:17). Matrix 5-17 exhibits some indicators.

Matrix 5-17: Human and animal Indigenous Disaster Occurrence Indicators	
Indicators	**Focus Groups**
Human behaviour	When there would be a lightning, people in the house would feel fatigue and sleep, then attack the house on their sleep. (SFGD7)
Isikhonyane (cloud of locust)	Isikhonyane is one of the things that we know for sure that there will be a hailstorm. (UFGC7)
Flock of birds	Flock of birds flying to the same direction (SFGC7, SFGA7, UFGB7)
Insingizi / (Hornbill)	One other thing is the Horn bill, this type of bird tells us if there will be thunderstorms and if they are going to be severe or not. (UFGC7)
Types of birds' sounds	There are many types of birds that are used as indicators to predict weather conditions. Some birds only sing when there is going to be heavy rains and we end up coming up with ways to imitate and translate their way of telling us what to do, for example some will sing like "Phezukomkhono" there we know that the bird is encouraging us to go to our gardens and plant food and that there we must expect too much rain. (UFGE7)

Source: Researcher's fieldwork 2015

Just as certain indicators demonstrate indigenous ways of knowing, so does use of indigenous languages. In this context, indigenous ways of using language serve as a tool to preserve knowledge and also teach others about daily aspects of life. UMshwathi is mostly populated by isiZulu speaking people. The area is mostly rural, and in rural places, proverbs and sayings are mostly used as one way of conveying messages in an effective manner and also use as modes of giving life lessons. Some people use izinganekwane, myths and legends, or some prefer to simply teach. These indigenous ways of sustaining and transferring knowledge is very prevalent to uMshwathi Local Municipality. According to Ngara (2007) in Owusu-Ansah and Mji (2013:2) "The rich complexities of IK are found in the community ceremonies and rituals, namely; story-telling, proverbs, folktales, recitation, demonstration, sport, epic, poetry, reasoning, riddles, praise, songs, word games, puzzles, tongue-twisters, dance, music, and other education-centred activities". Matrix 5-18 gives the depiction of different IK preservation systems employed by uMshwathi communities.

Matrix 5-18: Indigenous knowledge preservation systems	
Preservation systems	**Focus Groups**
Traditional songs, prays and dance	Use traditional songs and prays are also used as effective ways of keeping and passing knowledge. (SFGC4) Most families and clans use different clan songs and dances to convey a message and also to remember their origins as tribes or clans. (UFGE4)
Myths and legends (Storytelling)	Use of *izinganekwane* or izinsumansumane to give lesson to the younger generation (SFGB4, UFGB4)
Proverbs and traditional sayings	Use isiZulu sayings and proverbs to convey, keep knowledge and instil the message (UFGA4, SFGD4)

Source: Researcher's fieldwork 2015

UMshwathi community recognises the role of storytelling in all aspects of life and also across all cultures. It is found to be one of the best ways of conveying a message. Most participants believe that *izinganekwane* can be very resourceful when dealing with disasters because there are stories that are related to disasters and which can teach or send a message about certain disasters. However, one participant suggested that other than telling old stories, one can simply teach one another about the dangers of disasters and about different strategies that one can adopt for DRR. Furthermore, the strongest emphasis by the participant was that of the involvement of the younger generation who needs to be taught by being involved in these practices. Furthermore, their affection, and respect for nature; community members have been able to show their appreciation to Mother Nature by developing certain beliefs which contributes to the conservation of natural resources. These beliefs have existed in the community for centuries and as a result they are treated as the knowledge which was passed on by community ancestors. One belief is that of growing food for the rain queen. Most members of both focus groups emphasised the importance of growing food for the rain queen and children wearing cabbage trees. These factors are grounded in historical beliefs as shown in Matrix 5-19.

Matrix 5-19: Historical Beliefs	
Ask for rain and plant for *Inkosazane*	Plant for *Inkosazane* to increase fresh and well natured produce. (UFGD3) Specifically, one of the elders would go to the mountain to ask for the rain. (UFGC1) Elders used insensitive songs to sing for *Unomkhubulwane* (UFGD2, UFGE2)
Call Traditional Healers (*Ukubethela*)	A black man calls a traditional healer for medical check or assistance. As for disasters, Inyanga would use *abafana* for lightning. When spring season approaches, all families of the community are calling traditional healers to strengthen the home to protect it from being vulnerable to the lightning and hailstorms. SFGA3) SFGD3, UFGD3, UFGE3)
Shout at the storm	For the hail storm, we used to shout at it and it is believed that if you shout at it will stop and people would shout and say "hhay hhay asihambe isichotho". (UFGA1, SFGA3)
Children wear cabbage tree leaves	Another way of preventing the hailstorm and ask for pure rain from the rain queen, we used to send children, mostly virgins to wear leaves of a cabbage tree and go to the river to sing for the rain queen to stop the hail storm and bring the rain. (UFGA3)

Source: Researcher's fieldwork 2015

These historical beliefs support the proposition that,"Indigenous Knowledge is the total sum of the knowledge and skills which people in a particular geographical area possess, and which enables them to get the most out of their natural environment. Such knowledge and skills are passed down from previous generations" (Maferetlhane, 2012:23). UMshwathi community as per definition given, has their historic practices that have been used to reduce disaster risks. Both focus groups have identified the use of salt and sea water to eliminate risks that comes with the hailstorm. Matrix 5-20 indicates traditional strategies for DRR.

Matrix 5-20: Traditional strategies for disaster risk reduction	
Strategies	**Focus Groups**
Spill salt and sea water in the gardens	To protect food from our gardens we use salt, or water from the sea, we use seawater with sea sand, and spill it in our gardens. (SFGA3, SFGC3, UFGA1)
Dig furrows	To protect our food and homes from floods, we normally dig huge furrows that surround either the house or gardens. In that way floods do not destroy our homes or our gardens. (SFGE3)
Plant cycad	We used to plant the cycad at the gate to protect the house from being vulnerable to the lightning and other natural ills. (UFGC3)

Source: Researcher's fieldwork 2015

This section has uncovered different strategies that uMshwathi community adopts for DRR. In addition, this section has also revealed that uMshwathi indigenous communities have vast of local knowledge that they utilise for their household's survival. Most importantly there is a mostly emphasised point, of which is their respect and love for their environment and the nature. From the findings of the study, it is clear that IK of predicting climatic changes are based on human,

animals and other living being's relationship with nature. The behaviour of animals and human beings serve as vital indicators for different disasters.

5.5.4. The nexus between indigenous knowledge and community participation in disaster risk reduction

Having discussed different indigenous methods adopted by uMshwathi indigenous communities for DRR, this section focuses on the connection between IK and community participation. It is evident that the citizens of uMshwathi are also very concerned with finding ways to keep their knowledge within the community. When they were asked about different ways of keeping IK, different strategies came up. These indigenous ways of preserving knowledge were clearly identified by both focus groups

Having understood the affection and respect the community has for the natural environment and their strong beliefs which form part of their worldview, some participants in both focus groups are of the view that the community has lost its sense of respect, values and culture. Some are not following indigenous practices anymore and some praise the western ways of knowing. The majority of participants agreed that witchcraft is one word that has been the barrier to sharing local practices among communities. For DRR, some participants stated that they are afraid to share their practices because they are normally accused of practicing witchcraft. The follow up statement is supported by one participant who stated that they do not share as a result of this insult.

Issues surrounding loss of traditional lifestyles are reflected in Matrix 5-21, on overleaf.

Matrix 5-21: Loss of traditional lifestyle	
Perceptions on Traditional Practices	We have forgotten our practices, currently there is a famous insult of which is witchcraft, you find it difficult to share and you end up on not sharing. (UFGA5, SFGB1, UFGB2, UFGE2, UFGE3, SFGA6)
Love and respect for nature	Respect and love for your surroundings is the first step to understanding IK. We respected the day of growing food for the rain queen. (UFGD2) (SFGA2, UFGA2, SFGA3)
Community trust and values	I have always used the knowledge that I have inherited from my parents and community elders of my time. Therefore, I think local knowledge can assist in reducing disaster risks and above. (SFGA2, SFGC2, SFGC2, SFGA2)

Source: Researcher's fieldwork 2015

The root cause of this loss of culture and community values is found to be civilisation and the so-called efficiency of westernised knowledge. Some participants pointed out that unlike westernised knowledge; IK has to be validated in order to be trusted and to be relied on. Yet the ways of validating and reasons for relying upon IK are very different from validity and reliability of

westernised knowledge. Furthermore, the issue of reliability of IK was brought out as one of the overarching issues because of the lack of proper documentation of IK. Owusu-Ansah and Mji (2013:2) state that traditional knowledge possesses an element of being oral which its reliability and existence is ensured by being passed on from one generation to the next in the context of community livelihood. In addition, authors cite Emeagwali (2003) who makes a counter argument by pointing out that because of its oral tradition; IKS is seen as an inferior knowledge system relative to the written tradition. Authors also attest that IKS is looked down upon because it is people-centred and sometimes not measurable. When discussing different ways of conserving the IK, one participant pointed the loss of this local knowledge as one factor that affects its effectiveness and its reliability. The participant went as far as comparing western stories with local stories and also stated that White people wrote and documented their history because they had the advantage of having resources at their disposal. In explaining perceptions of non-IK holders, Matrix 5-22, on the next page, shows different perceptions towards IK holders and IKS as a knowledge system.

Matrix 5-22: Perceptions on indigenous knowledge holders		
Validation of Indigenous knowledge	Indigenous Knowledge was documented by white people. Inferior and old fashioned knowledge system (SFGB2, SFGB4, SFGA4, SFGC4, SFGA5, SFGD6)	
Reliability of Indigenous knowledge system	Traditional practices are not traceable. Hahaha ey civilization have brainwashed our children. We are the only or the last generation to possess this knowledge. (SFGB5) Unfortunately, we do not have any way of proving that most of the western knowledge is ours and that it is just that they have polished and modified it so that it will look sophisticated. (SFGD6)	These young people do not listen they do not regard IK as something that exist and that is still relevant. (UFGA6)
Neglected community elders	We only share with our children because they are the ones who assist us. (SFGD6) The councillors only come during election campaign and have not had water since 2008 but we have a big dam in our community. The only thing we are told is that we should take care and protect it. (SFGE8) Here we have a problem of being neglected when we complain about floods, because we are always vulnerable to floods, the government doesn't want to take action or even remove some of the houses. (SFGE8)	But the municipality has not done enough to involve the community for disasters. (UFGA8) I personally think we do not matter anymore, we are a dead generation, our kids have been exposed to the knowledge that was sold to our forefathers and the mistake started there when we thought white people knowledge is better that ours. (UFGD9)

Source: Researcher's fieldwork 2015

As to neglect of community elders as mentioned in Matrix 5-22, Hartog (2014:4) points out that the modern society always thinks that community elders are not relevant to current societal issues and that they cannot be resourceful in terms of contributing knowledge to solve modern

challenges. However, the author opines that the ageing population is highly vulnerable to disasters and other shocks and stresses, it is important to recognise their capacities and the contribution they can make to DRR. This in agreement with the outcomes and setting of the collected data; the elder generation was seen as the most appropriate group to provide sufficient knowledge and strategies to reduce disaster risks within uMshwathi Municipality. "Community elders also provide key insights to support analysis of a community's vulnerabilities and capacities, or social-environmental relationships. Such information is also vital in understanding the nature of disaster vulnerability and central to developing good DRR initiatives" (Hartog, 2014:4). The SENDAI 2015-2030 (UN, 2015:10) also support this by stipulating that all states should adopt an inclusive and non-discriminatory approach which involves people with disability, women and all other relevant stakeholders which forms a multi-partnership approach to DRR.

Disaster risk reduction is about reducing the potential risk and also contributes to community vulnerability reduction. In this light, there are pre-DM strategies that deals with ensuring awareness and bring caution to communities that may be affected by a specific disaster. Nijiraine *et al*. (2010:197) divide functions of IK into categories and one of the functions is called semiotic; which most African communities use it for communication such as symbols, art-forms and crafts. Benson (2009:7) extends the argument by focusing on sustainable development and poverty which emphasises the importance of raising awareness to different countries, especially to the hazard-prone countries. This is done to ensure that solid appreciation is achieved while the relevance of DRR to sustainable development and poverty is understood. Like other knowledge systems, IKS also have indigenous awareness strategies that a community adopts after their historic weather assessment. People of uMshwathi employ different indigenous awareness strategies to ensure that other communities are protected.

Matrix 5-23: Indigenous awareness systems	
Awareness systems	**Focus Groups**
Hitting Tins	Sometimes use tins and any form of noise to make other people aware of the coming hailstorm (UFGB3, UFGC3, SFGB3)
Shout at the hailstorm	We also shout at the hailstorm for awareness (SFGA3, UFGA3)
Word of mouth	Talk to neighbours about ones' analysis of the weather and anticipation of any hazard (SFGE3)

Source: Researcher's fieldwork 2015

Chapter 3, Section 3.2.1 discussed community based DRR as a mechanism that puts communities to be in charge of all disaster matters. This section has elaborated on the linkages between community participation and the use of IK. The research revealed that there is a strong relationship between the uses of IK in conjunction with community participation. This suggests that the knowledge that community members have is ineffective if it is not shared among

households and other communities. Moreover, data presented and analysed thus far seems to indicate that there are opportunities for the municipality to take advantage community participation in providing IK and IKS that can enhance DRR. This is further discussed in the next section, from the view of community elders who participated in focus groups.

5.5.5. Community perceptions of municipal citizen engagement strategies of collecting and utilising indigenous knowledge for disaster risk reduction

According to Mubangizi and Dassah (2014:276) public participation is a means of enhancing development and service delivery, improving governance, and deepening democracy all participants attested that uMshwathi community is a rich hub of IK that they pride themselves with. However, there is a lacking element of not sharing and participating in community projects such as playing a vital role in DRR processes. As discussed in Chapter 2, Section 2.5.3 participatory DRR is viewed as one concept that allows a multi-stakeholder and multi-level DRR. Tongwa *et.al* (2012: 6-7) argue that for DRR processes to be effective; the inclusion of the local population in decision making is required and that; a participatory decision-making approach would include men and women, youth, civil society groups and the private sector. During focus group discussions it was evident that most participants were of the view that the local government should be the one that invites the community into DRR programmes. In addition, some participants pointed out that the councillors do not come to the community and that they only see councillors when they need community votes. In support to this statement, one focus group member articulated that there is confusion on who should be held liable for community services between the municipality and the councillor. Different fundamental areas and perceptions towards municipal community engagement strategies are tabulated in Matrix 5-24.

Matrix 5-24: Community role in disaster risk reduction		
	SFG	**UFG**
Community projects	There are community involvement programmes, but ward committees lack community coordination. No clear mechanisms and procedures for community engagement in DRR related projects. (SFGA8, SFGC8) No they don't, they always feed us with their western knowledge, even if they do come to us, and they normally come when they have to give us food parcel, tents and sponges. (SFGB8)	The municipality has not involved us in terms of contributing or giving us the platform to give this knowledge. (UFGB8) I don't really think we doing much because even if the government does not reach out to us, but we still have these kids that are still young. (UFGB9)
Access to information	The community wants the municipality to involve them hence they are also well off without the western practices (SFGE9)	I do not know who is responsible for this but the people who are responsible for providing water now is the municipality. (UFGC8)
Knowledge sharing	The community prefer storytelling, traditional songs, prays and *izinganekwane* (SFGA4, SFGB4, SFGC4)	Sometimes we make use of isiZulu sayings and proverbs to convey the message. (UFGA4)

Source: Researcher's fieldwork 2015

The voice of community elders is in line with global frameworks for DRR. For example, the first priority of the Sendai Framework for Disaster Risk Reduction 2015 (UN, 2015:15) outlines significant drivers for achieving a multi-stakeholder and multi-level DRR approach. Among many, the framework stipulates that to achieve this approach, it is of high significance to capacitate with knowledge, all government officials, volunteers and civil society and also ensure the inclusion of communities including the private sector. This can be done through knowledge sharing systems which will enable communities to share their experiences and strategies. Peer learning as another form of education and training can play a significant role. Secondly, to establish and improve platform of communication between and among scientific and technological communities is fundamental to DRR. Furthermore, the framework also encourages the involvement of different stakeholders, which can be policy-makers, for the purpose of intensifying science policy and improve decision making processes. And finally to "ensure the use of traditional, indigenous and local knowledge and practices, as appropriate, to complement scientific knowledge in disaster risk assessment and the development and implementation of policies, strategies, plans and programmes of specific sectors, with a cross-sectoral approach, which should be tailored to localities and to the context".

This section has outlined different perception of uMshwathi community members towards institutional capacities of the municipality. Some participants acknowledge that they, as the

community are not doing enough to engage with the local government and also they have made less or no effort to participate in community projects. Some community members are still reluctant to communicate with community established structures and also to play a role in ensuring that they share the knowledge that they have to contribute to DRR processes. Hence, both the municipality and the community seem to each have responsibilities toward engaging each other.

The next two sections reveal first examples of how micro-interlocutor analysis was used and secondly, cross-case analysis of the focus group data.

5.5.6. Micro-interlocutor analysis

Rabiee (2004:659) opines that when a researcher conducts focus groups analysis, it is vital to consider the intensity of comments and also be able to take note of emotions that may be expressed in the comments. In ascertaining proper analysis of focus groups Onwuegbuzie (2009:7) makes use of a method of analysing conservations. This method termed "micro-interlocutor analysis" is resourceful in identifying members who appear to be part of consensus and those who represent dissenting views. This type of focus group data analysis also allows the researcher to make use of emotions, conformity and actions those participants demonstrate within focus group discussions. Matrix 5-25 reveals some of the emotions exhibited during focus group discussions.

Matrix 5-25: Analysing actions and emotions during focus groups	
What do you understand about the use of indigenous knowledge to reduce disaster risks?	
Narratives	**Actions and Emotions**
We have planted and harvested without consulting the rain queen, that is why we are being blown by the wind and lashed by the sun. (UFGB2)	Criticism
I wish you could take to the community hall and listen to the fancy English that people will speak and not involving IK or traditional knowledge. (UFGB2)	Sarcasm
As they have said there isn't much we as elders can learn now, so the best way is to use what we have because we are quite old and nobody likes listening to us anymore. (SFGB2)	Agreeing

Source: Researcher's fieldwork 2015

On a specific question that was asked about participants' understanding about the use of IK for DRR; epistemological asymmetries such as emotions, criticising, use of sarcasm, and agreeing were identified. While there were many contradictions and debates within both focus groups; there were also agreements where most participants in the focus group agree on certain aspect. However, some used different wording and expression to agree with each other or sometimes

restate what has been said by fellow group members. At some point there were high levels of conformity within focus groups which could be interpreted as the development of group think.

5.5.7. Cross case analysis

"The principal use of cross-case analysis is the comparison of elements of one case, in other words, of nested elements, which is the breakdown within the principal unit of analysis" (Thomas, 2011:517). KwaSwayimane and New Hanover are areas within uMshwathi Local Municipality, which qualify as nested elements to the comparison within the case. The author further attests that a nested study is distinct from a straightforwardly multiple study in that it gains its integrity, its wholeness, from the wider case. Matrices in this section show a comparison between two focus groups which took place in two different areas of uMshwathi municipality. Two questions from the focus group guide were selected to show common and different views of participants within and between these two focus groups.

Matrix 5-26: Are there any government programmes for DRR? **Probe: If so, what efforts that have been put in place by the community to engage themselves into government programmes for DRR?**	
SFG	**UFG**
No they don't, they always feed us with their western knowledge, even if they do come to us, and they normally come when they have to give us food parcel, tents and sponges. (SFGB8, UFGB8, SFGE8)	There are programmes, it is just that they are given to us to implement and with that I blame ward committees for not discussing it with the community before implementing. We want to participate but there are no proper ways of participating and we are not sure of procedures that are followed for us to be heard. (SFGA8, UFGA8)

Source: Researcher's fieldwork 2015

Twigg (2010:10) suggests the local government should have DRR policies, and implementation strategies in place to efficiently deal with DM matters. Furthermore, local officials must also understand and show support for community vision, while ensuring community understanding of legislation, regulations, procedures and community projects. When both focus groups were asked to discuss whether there were any government programmes for DRR, there were diverging opinions between two focus groups. SALGA (2011:24) also stipulates that the local sphere of government should ensure the accessibility of programmes and projects to communities, while implementing functional strategies and policies. With regards to this question, participants from SFG were of the view that there are no government programmes specifically designed for the improvement of DRR, while UFG pointed out that there are. However, the community is only involved at an implementation stage. Commonly, both communities show less to no evidence that

they have any arrangements or community coordination strategies to engage themselves into the planning phases of government programmes for DRR.

While it is concluded that there is minimal evidence that uMshwathi Municipality has institutional arrangements in place to involve communities into DRR programmes, there is also insufficient evidence that community members of uMshwathi involve themselves into municipal programmes. Matrix 5-27 depicts diverging and converging responses about this between SFG and UFG.

Matrix 5-27: How does the community involve themselves into government programmes for the improvement of DRR strategies?	
Diverging responses	
SFG	**UFG**
Community members normally sit in the community war rooms and discuss issues that are affecting the community. (SFGA9, SFGC9)	There is no specific way that the community use to engage themselves into DRR processes but they make use of traditional ways of protecting themselves from all those natural ills. (UFGA9, UFGB9)
Converging Responses	
The community is not involved because the municipality is neglecting them and instead put more focus on involving young community members. (SFGB9, SFGD9)	The community feels that the ageing population is regarded as irrelevant to the society and that is why they are not involved in community issues. (UFGE9, UFGC9)

Source: Researcher's fieldwork 2015

The evidence from responses of both focus groups shows that there is also a lack of community coordination for communities to participate by contributing local knowledge for DRR processes. This is because the majority of community members are of the view that the government is the one who has to make the first contact and that communities should be responsive to the issues that the government has addressed. Van Niekerk, (2011:18) argues that government has an obligation and responsibility to ensure the safety of its citizens in case of a disaster as an important concept to consider. Over and above, the community also has a responsibility to meet the government half way and promote a resilient, and a self-sufficient community. In a research that was undertaken by Krasny and Tidball (2009: 466) on community resilience, they found that civic ecology can address community resilience through community gardening. In their study, Krasny and Tidball (2009:469) conclude that "resilience thinking draws from the adaptive cycle as a

metaphor for how change occurs, with periods of rapid growth and stability alternating with decline followed by reorganization". This is yet to be realised in uMshwati Local Municipality.

The final section of this chapter, before the chapter summary, explores triangulation of data.

5.6. Triangulation

As defined in Chapter 4; Section 4.9, triangulation can be viewed as a rationale for using multiple sources of evidence. "A major strength of case study data collection is the opportunity to use many different sources of evidence. Furthermore, the need to use multiple sources of evidence far exceeds that in other research methods, such as experiments, surveys, or histories" (Yin, 2009:115). Lauri (2011:2) discusses four types of triangulations of which are thoroughly explained in Chapter 4 Section 4.9; data triangulation; methods triangulation; investigator triangulation; and theory triangulation. This study utilised three data sources to conduct methods triangulation: individual interviews, focus groups and documentary evidence; which is discussed in Chapter 4, Section 4.9. Figure 5-3 is a diagrammatic representation of methods triangulation for this study.

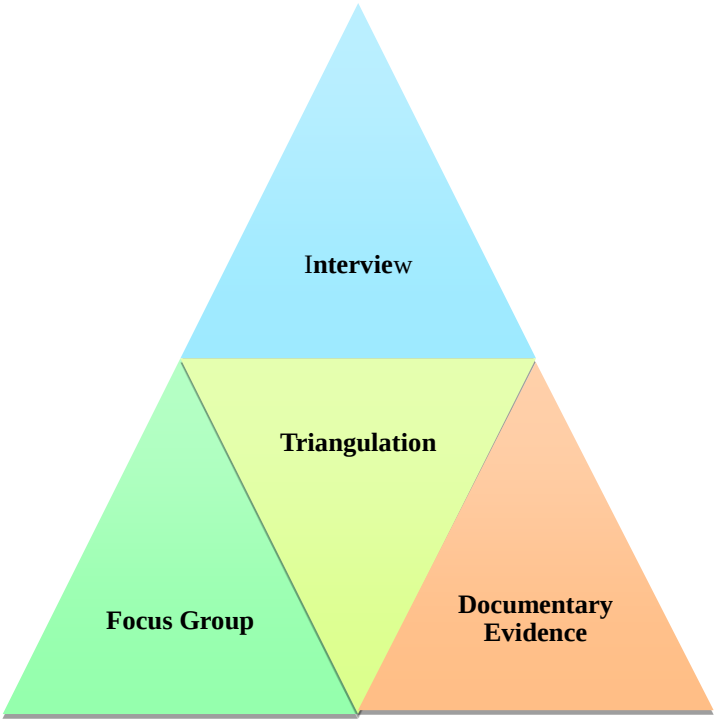

Figure 5-3: Triangulation of data
Source: Lauri (2011:2)

The emergence in the integration of IK and community participation for DRR at uMshwathi Local Municipality brings different views from research findings. Among the three discussed data sources, there are converging and diverging findings, which is as a result of using multiple data sources. Individual interviews, focus group findings and documentary evidence will be analysed in this section. Findings from interviews and documentary evidence will show a full depiction of institutional arrangements for the practice of IK and community participation for DRR purposes at uMshwathi Local Municipality. Hence, focus group findings will be showing the full understanding of the utilisation of IK and community participation by the residents of uMshwathi Local Municipality. The triangulation of all mentioned data sources will bring a clear understanding of how uMshwathi Local Municipality uses or does not use community participation through IK to reduce disaster risks.

Findings from the interview data provide evidence that the use of IK for DRR has just emerged. Both district and local DMUs are of the view that the municipalities recognise and respect the use of IK and that it is still an emerging concept. In addition, uMshwathi Local Municipality DMU posits that the community of uMshwathi have always relied on IK for survival. On the question of municipal strategies to collect IK for DRR, interviewees collectively perceive that inclusion of communities to contribute IK for DRR was still on the emerging phase and it had not been fully implemented. Municipal official's interview data outcomes point out that the municipality makes use of risk assessments and DMAFs to engage the community. However, traditional leaders believed themselves disengaged from such processes as did community elders. This divergence is shown in Matrix 5-28.

Matrix 5-28: Municipal strategies to engage community to collect IK for DRR	
Interviews	The municipality roll out risk assessments, awareness campaigns and DMAFs to engage communities on the issues of disaster (LDMO3, LMM3, DDMOB2)
	Traditional leaders are not closely involved in DRR processes and they do not have proper arrangements to engage and involve communities with regards to collecting IK for DRR. (STL3, UTL3)
Focus groups	The community is reluctant to contribute their traditional practices because of insults and because of being neglected and seen as irrelevant. (SFGA5, UFGA5, SFGB5, SFGD5, UFGD5)
Documentary evidence	Disaster Management plan has incorporated indigenous practices that community members of uMshwathi adopt for DRR (DMAF report 2015/16)

Source: Researcher's fieldwork 2015

In contrast to municipal officials, a number of both focus group members argue that the municipality does not engage the community into taking part in the implementation of DRR planning processes and the integration of IK into DRR processes. However, there is a

contradiction between the municipality unit and the traditional leadership as interviewees. The traditional leadership is in agreement with focus group data on the issue of community engagement. The traditional leadership and the few members of both focus groups are of the belief that the municipality does not recognise the use of IK as a system or way of knowing. Moreover, the argument is pushed to the extent that the municipality and the government as a whole are seen as the root cause of modernisation that encourages the society to use and rely on westernised ways of knowing instead of indigenous ways of knowing.

While there are diverging views about the involvement of the community into giving IK for DRR; a convergence is found when all participants from both interviews and focus group are in agreement, such as the relevance of IK for DRR. Furthermore, documentary evidence also shows this convergence. Findings revealed that uMshwathi Local Municipality is prone to quite a number of natural and man-made disasters. Among mentioned natural disasters, lightning was found to be the most common one. Findings from interviews, focus groups and documentary evidence as depicted in Matrix 5-29 show that is lightning is prevalent in the municipality.

Matrix 5-29: The nature of disasters that are likely to take place in the community	
Interviews	The local government identified lightning, hailstorm, and drought as the most common disaster types in the area. (LDMO2, LDMO3, LMM2, DDMOA3, DDMOB3, STL1, UTL1)
Focus groups	The community of uMshwathi is mostly affected by lightning and drought. (SFGA1, UFGA1, SFGB1, UFGC1, SFGE1)
Documentary evidence	8 families were affected by lightning in 2015 and 16. Out of 8 families, 4 fertilities were reported as a result of lightning. (DMAF report 2015/16)

Source: Researcher's fieldwork 2015

Documentary evidence also supports that the implementation of indigenous practices is still emerging at uMshwathi Local Municipality. It provides that in the municipality's integrated development plans, there is no evidence that shows that the municipality has implemented and adopted the use of IK for DRR. Documentary evidence also points out that the municipality has not been focusing on DM since the DMO was first appointed in 2012. The municipality has also not had a DMP as yet. They have only started drafting it in 2015. This evidence provided by the documentation shows that the implementation of the use of IK for DRR is still underway and has not fully emerged.

In the shortcomings pointed out by the focus group data set; and the outcome of interviews, in response, point to the insufficient support of financial resources. Municipalities argue that there is a shortage of funds for DM functions and that there is no direct allocation for the DMU. It is

evident that there is a tension between the administrative and the political side of the municipality when it comes to budget allocations for disaster related issues. Umshwathi Local Municipality DMU states that the council insists that issues relating to disasters are the responsibility of the district municipality, while the administrative side is of the view that the district should assist on the matters beyond their (uMshwathi Municipality) control and jurisdiction. In other words, the district municipality believes that certain responsibilities should be placed on the local municipality and the local municipality seeks to hold the district municipality accountable for the same matters. The traditional leaders and community elders seek to be involved in DRR but believe that the local or district municipality should take primary responsibility for DRR matters – including making the first step toward communities to engage communities in how to use IK and IKS in DRR planning process and implementation strategies.

This section has eluded on triangulating between data sets that were discussed in Chapter 5. Both converging and diverging responses came out, however all data sets were not consistent. This is shown by diverging views between and within data sets. There are also diverging views about community participation within interviews and focus groups. On the one hand, the municipality states that there are community consultations and involvement strategies that the municipality uses to collect IK for DRR purposes. On the other hand, findings from focus groups reveal that the municipality does not consult and involve the community in the matters of collecting IK for DRR implementation. Moreover, there are contradictions between focus group data sets. Some members of the community testify that the municipality involves the community but most argue that the municipality does come to them for DRR prevention and mitigation matters; but only for recovery and rehabilitation matters or in search of votes for upcoming elections.

The following summary brings this chapter to a close.

5.6. Chapter summary

Through following data analysis blueprints that have been discussed in Chapter 4, Section 4.8, this chapter discussed the context of uMshwathi Local Municipality which was accompanied by relevant documentary evidence, including reports from the municipality. Links were shown between the philosophical worldview and conceptual framework in terms of how these drove the study. Furthermore, data were presented and analysed, and findings from interview data and focus group data were interpreted. Data results were interrogated in each section against relevant literature set forth in Chapter 2 and Chapter 3. With regard to interview and focus group data sets, a cross-case analysis was provided for each data set. This included interviewees from the

local and district municipalities as well as traditional leaders. Data from the two focus groups were similarly assessed through cross-case analysis. Matrices were used throughout all sections as a matter of data presentation and analysis. Lastly, the section on method triangulation determined convergence and divergence of findings that were adduced from interviews, focus groups and documentary evidence.

CHAPTER 6

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

6.1. Introduction

In South Africa, like most developing countries and some developed countries, service delivery and institutional capacity is a challenge. Disasters affect the livelihoods of communities especially those at the grassroots level. The local government sphere is much closer to those communities who are mostly vulnerable to many types of disasters. While the overarching issue of disasters that affect the consistency of service delivery, governance of DRR is vital. Furthermore, through proper institutional arrangements and specifically through good governance and proper public management frameworks; new DRR strategies can be formulated. This study has focused on demonstrating the idea that no single knowledge system is enough for the management, planning and implementation of DRR processes. IK is one knowledge system that has been left out for many years in the process of reducing disaster risks. The involvement of indigenous communities can also be used as one of the strategies to improve DRR processes. Essentially, the nexus between IK and community participation can be one solution to achieve improved DRR processes. Government at all levels, through proper disaster risk governance strategies that involve the use of IK and communities can use this nexus to find sustainable solution for improving DRR processes.

In this chapter, a recapitulation of the research objectives and research questions (Section 6.2) is presented. This chapter then provides a summary of all chapters (Section 6.3) and with regards to achieving research objectives and answering research questions. The summary of the main findings and conclusions on which Section 6.4 is based on is highlighted Furthermore, Chapter 6 entails recommendations based on the findings and conclusions (Section 6.5) and the significance of the study to IK practices and DRR (Section 6.6). This chapter concludes with suggestions for future research (Section 6.7) and a chapter summary that brings the dissertation to a close.

6.2. Recapitulation of research objectives and research questions

Based on the research problem, research objectives and questions as outlined in chapter 1 (Sections 1.5 and 1.6) are again tabulated for coherence purposes.

Table 6-1: Research objectives and research questions re-presented

Research Objectives	Research Questions
Understand the relationship between the nexus of IK and community participation and planning and implementation of DRR strategiesin uMshwathi Local Municipality.	How can IK be obtained through community-participation in planning and implementing DRR strategies in uMshwathi Local Municipality?
Determine the nature of IK held and contributed by uMshwathi citizens that relate to DRR.	In what ways do local community members of uMshwathi contribute to governmental strategies toward DRR?
Identify methods for uMshwathi local government to engage citizens in collecting and utilising IK for DRR.	How can IK held by citizens of uMshwathi be best collected for planning and implementing DRR strategies?
	How can IK held by citizens of uMshwathi be best utilised by local government for planning and implementing DRR strategies?

6.3. Summary of chapters

Chapter 1 introduced the overall purpose of the study. It further provided a brief background of the study (Section 1.2) and a summary of the research problem (Section 1.3), highlighting the need for conducting the study. This laid the foundation for explaining and answering the overarching research question on how IK can be obtained through community-participation for the implementation and planning of DRR strategies in uMshwathi Local Municipality. In addition, Chapter 1 presented the formulated objectives (Section 1.5). Essentially, this study looked at the nexus between IK and community participation for the reducing disaster risks. IK was discussed in the context of DRR to set the stage for how IK and community participation could enhance DRR planning and implementation processes. Chapter 1, Section 1.6 provided a brief summary of Chapter 2, 3, 4 and 5 in the form of chapter inventory. Furthermore, Chapter 1 also provided key terms and definition and concluding remarks which were foundational to the study.

Chapter 2 provided a thorough literature review in respect of the conceptual objectives that have been formulated in Chapter 1. In a quest to understand the nexus between community participation and the use of IKS for DRR processes; Chapter 2 was dedicated to elaborate on DRR only. Section 2.2 explained different definitions that different scholars have given to DRR as a concept. Secondly, legislative imperatives in Section 2.3 were tabulated to give an outlook of the global context of DRR. Legislative imperatives were also followed by the literature on TDM (Section 2.4) which elaborated on the transition from pre DM to recovery measures. Disaster risk

governance followed to give a brief understanding of how significant is governmental arrangements in the context of DRR. In this study, DM was viewed from a proactive approach rather than a reactive approach. Disaster risk reduction is a proactive approach to DM which focusses on pre-DM strategies. Based on the reviewed literature, least has been done to integrate IK and community participation into DRR processes. However, there are legislative frameworks such as Disaster Management Amendment Act of 2015, the Intellectual Property Rights and Disaster Management Frameworks. In addition to these legislative imperatives, there are other new initiatives which focus on involving communities such as DMAFs at a municipal level, the establishment of DMCs, and those that address planning issues which includes DMPs. The literature suggests that IK can be resourceful through effective community engagement strategies, institutional arrangements and sound political will and commitment. Furthermore, informed by the interpretivist approach, the literature in Chapter 2 helped reveal that that IK, through proper public management frameworks, can improve South African public service delivery relevant to DRR. This helped achieve the first research question.

Chapter 3 is a subsection of the literature review which deliberated on the nexus of IK and community participation. The literature set out the connection between community participation and DRR through uncovering the concept of community based DRR (Section 3.2.1), followed by the explanation of the background of IK, the distinction of IK and AIKS and the role of AIKS in the context of DRR. The ageing population was viewed as one of the significant aspect to focus on when understanding the knowledge and practices that local people hold for DRR and other aspects of livelihoods. Chapter 3 also provide the overall conceptual framework that is set to achieve research objectives that are outlined in Chapter 1. The summary of Chapter 3 was provided to give an overall coverage of the chapter. This chapter helped address the first and third research objectives and the first and third research questions.

Chapter 4 entailed a description of the methodology employed in this study. A social constructivist worldview and exploratory qualitative research design was utilised in this study. Through the use of this research design, research questions were answered and simultaneously, research objectives were achieved Qualitative research design also allowed conformability of data sets, findings and interpretations. Coherence and consistency of research processes were also checked for dependability purposes, hence meeting the first objective of identifying indigenous DRR strategies and practices held by the community of uMshwathi Local Municipality. Recorded interviews which were transcribed and reduced to smaller categories that were cropped to uncover developing themes of the study, allowed the researcher to provide descriptions and interpretations.

This data analysis identified the nexus and answered the overarching research question of how can IK be obtained through community-participation in the implementation and planning DRR strategies in uMshwathi Local Municipality? Taken as whole this chapter assisting with addressing all the research objectives and questions since it provided the structure of the research was undertaken and the meanings, justifications and applications of various research methodology decisions taken.

Chapter 5 dealt with data presentation and interpretation of the results. It also presented the raw data that was collected by the researcher which also incorporated broad reflective qualitative data. A comprehensive interrogation of literature was therefore adopted by the researcher with regards to DRR and the use of IK and community participation for DRR. The research was undertaken at uMshwathi Local Municipality. The outcome of conducting interviews and focus groups was demonstrated and documentary evidence integrated into the discussion. The process of analysing qualitative data started with the introduction of the context of uMshwathi Local Municipality, which was then followed by the presentation of thematic outcomes and documentary evidence. This chapter also presented different matrices that were constructed for data reduction purposes. The data were organised and put in to small sub-categories and categories which contributed in the development of overall themes of the study. To explore the convergence and divergence between data sets, cross-case analysis was used within data sets and method triangulation across data sets. This helped achieve trustworthiness of the study. This chapter addressed all the research objectives and research questions as shown by the various subheadings throughout the chapter.

Chapter 6 summarized the research and the conclusions to be drawn, and made recommendations for further research and, where applicable, future research on the integration of IK and community participation into DRR processes. The chapter presented the recapitulation of research objectives and questions, followed by the summary of chapters that highlights the role of each chapter in accomplishing the aims of the study. Under this chapter, a summary of the findings and conclusions show how the research objectives were achieved and research questions answered. The findings and conclusions lead to recommendations and significance of empirical evidence to the body of knowledge on the integration of IK and DRR through community participation. This chapter concluded the dissertation.

6.4. Summary of findings and conclusions

The central findings are set out accordingly with the research objectives. The linkage between research objectives and the findings is to ascertain the achievement of objectives.

6.4.1. The nexus of indigenous knowledge and community participation for planning and implementation of DRR strategies

The first conceptual objective set out in Chapter 1 was to understand the relationship between the nexus of IK and community participation and planning and implementation of DRR strategies. In terms of the nexus of community participation and IK, the study revealed that there is a conflict at the nexus; where there is a tension among stakeholders involved in DRR processes. On the one hand, some participants argue that the DRR is not a local municipality service and as a result should not be discussed in the sittings of the local municipal council and other sittings of the local municipality. On the other hand, the municipal administration is of the view that DM issues should be undertaken by all stakeholders within the municipality. *Amakhosi* are also of the view that DRR processes are not the local municipality's responsibility, but the district municipality's responsibility. The majority of community respondents pointed out that the municipality does not consult the community on the matters of DRR and as a result community participation is not achieved. Dimensionally, the municipal officials also indicate some shortcomings from the community, which is that the community does not support municipal initiatives. It can therefore be concluded that the conflict exists at the core of the nexus which is caused by the lack of understanding that DRR processes are everybody's business.

In addition, through the interrogation of the data, the literature revealed that a politico-administrative dichotomy exists when there is a tension among governmental stakeholders, which was confirmed by this study. This too is at the nexus of DRR strategies, IK and community participation. Regarding As to the first research question as to how IK can be obtained through community-participation in planning and implementing DRR strategies in uMshwathi Local Municipality, two conclusions are reached. First, there is a nexus that binds these three components. Second, the resolution of the conflict at the nexus could enhance the ability of the municipality and the community to gain from the nexus by using public participation strategies to incorporate IK and IKS into DRR planning and implementation strategies.

6.4.2. Identify governmental methods for engaging citizens in collecting and utilising indigenous knowledge for DRR.

The second research objective presented in chapter 1 sought to determine the nature of IK held and contributed by uMshwathi citizens that relate to DRR. UMshwathi Municipality recognises the use of IKS for traditional medicine. However, the study revealed that the use of IK and IKS for DRR is still an emerging concept for the municipality's staff. Empirical findings, shown

through matrices reveal that the municipality has done less about institutional arrangements and public management frameworks for engaging communities in collecting and utilising IK for DRR. The study has also found that existing institutional arrangements are ineffective since they have not been officially implemented to collect and codify IK for municipal DRR planning. Through data reduction that was done in chapter 5 and from the findings of the study, it is concluded that inadequate institutional arrangements, public management frameworks and unspecified community participation strategies for collection, codification and utilisation of IKS for DRR weaken DRR processes.

These findings and conclusions likewise help answer the second research question as to the ways in which local community members of uMshwathi contribute to governmental strategies toward DRR. On the one hand the municipality indicates that consultation opportunities exist during which community members could contribute IK to governmental DRR strategies. On the other hand, most traditional leaders and community elders indicate that this is not the case. It is therefore unclear how community members contribute since the inclusion of IK in DRR strategies is only recently and informally emerging in a few respects.

6.4.3. Indigenous knowledge held and contributed by citizens

Identifying methods for uMshwathi local government to engage citizens in collecting and utilising IK for DRR was the third research objective outlined in the introductory chapter of this study. From the findings of both interviews and focus group analysis of the study, it was uncovered that people of uMshwathi are still relying on indigenous practices for their livelihoods. It was also discovered that the local government and traditional leadership love, respect and value the use of IK. Chapter 5, section 5.4.2 depicts different indigenous practices that people of uMshwathi adopt for survival. Planting, and asking for the rain from *Unomkhubulwane*, also called *Inkosazane* and the use of *abafana* which is the use of small sticks to reduce the risk of lightning came out to be the most common strategies used at uMshwathi. The study also revealed that local government and traditional leadership have not officially made any efforts to promote the use of IKS for DRR purposes.

The study also uncovered that, while uMshwathi use IK to protect their livelihoods, IKS as a knowledge system has some barriers which emanates from the societal perceptions. These include lack of documentation of IK strategies for DRR, diminishing trust and respect of IK due to westernisation and modernisation, accusation of IK and IKS as sources of witchcraft, and passing on of IK holders without IK transfer to younger generations who are often disinterested. Some

participants pointed out lack of political and traditional leadership commitment as one of the barriers that also suppress IKS as a knowledge system. Findings demonstrate that the municipality does not take full advantage of accessing IK for DRR through community participation

These findings and conclusions also answer the third and fourth research questions. For example, IK held by citizens of uMshwathi can best be collected for planning and implementing DRR strategies by concentrated political will, improved institutional arrangements and acknowledgement of the role of IK in cultivating sustainable livelihoods in uMshwathi. Such IK held by citizens could be best utilised by local government for DRR planning and implementation strategies by both governments and citizens taking up mutual responsibility to engage in community-based initiatives that incorporate IK and IKS at early planning stages, during implementation stages and throughout monitoring and evaluation phases as established by government and the community working together – agreeing upon, setting and adhering to benchmarks that fit the dynamic IK context. Traditional leadership should play a unifying role in this given their influence in the jurisdiction.

6.5. Recommendations based on findings and conclusions

After methodical qualitative data collection and analysis and an in-depth review of literature, this study recommends that: through proper institutional capacities, uMshwathi Local Municipality undertake a systematic IK assessment to determine that which can be incorporated to improve DRR processes. Moreover, a thorough research has to be undertaken on IK practices for preparing and mitigating disaster risks and other community vulnerability reduction strategies. In addition, the municipality with other support structures may make necessary arrangements for collection, codification, documentation and dissemination of IK practices. Disaster management requires a multi stakeholder approach, where every community structure will play a crucial role in reducing disaster risks. Based on the findings of the study, DRR processes stand a chance to be effective if all processes involve communities. Therefore, this study also recommends that a multi-stakeholder and a multi-level approach to DRR be included in the municipal plans and implementations. Proper public management frameworks such as developing formal public participation strategies for DRR is recommended. In that communities will be the custodians of DRR processes; also, they will be given proper channels to contribute the local practices that they possess.

The study furthermore recommends that there should be a policy formulation process that will introduce a multi-stakeholder and a multi-level approach to DRR to policy-making. In

addition, the local government should also make use of existing institutional arrangements, such as DMAFs for community engagement purposes. Based on the empirical findings of this research, it can therefore be concluded that barriers to IK are, in part, a result of the lack of documentation of IK for DRR. From that conclusion, the study therefore recommends that there should be proper arrangements for the documentation of uMshwathi indigenous practices that specifically contribute to the reduction of community vulnerability.

Table 6-2: Recommendations of the study

Stakeholders	**Recommendations**
Local government DMUs	• IK assessment • Collect, codify, document and disseminate IK • Research on IK strategies for DRR • Multi-stakeholder DRR • Multi-level DRR
Indigenous community leadership	• Promote IKS for DRR • Establish community coordination strategies • Instil community values and IK practices

The traditional leadership at uMshwathi still respects and follows traditional practices. However, there is less evidence about how they contribute in the inclusion of this knowledge into DRR processes. Hence this study recommends that the traditional leadership promote the use of IK; not only to other aspects of life but to their livelihoods and community vulnerability reduction processes. It is also recommended that there should be efficient and effective community coordination strategies that are generated by the traditional leadership in support of institutional arrangements adopted by the local government. Furthermore, *amakhosi* should also play a crucial role in DRR by instilling community values and IK practices. In that communities will understand the significance of adopting traditional practices for DRR purposes, and ultimately improve the use of IK for DRR.

6.6. Significance of findings to the indigenous practices for disaster risk reduction

The literature review showed that there has been insufficient study about how indigenous communities such as uMshwathi have used their indigenous practices to reduce disaster risks. Furthermore, the study posited that there are no clear institutional arrangements to connect IK and community participation for improving DRR processes at uMshwathi Local Municipality. The lack of political and traditional leadership commitment was also found to be the root cause of the development of politico-administrative dichotomy within stakeholders of the municipality. Ultimately, the study discovered that uMshwathi Local Municipality have not officially collected, codded, documented and disseminated IK practices for DRR processes. In the light, the study

contributes by exploring the knowledge that the community has on indigenous DRR practices. With the documented indigenous practices, the local government will be equipped with understanding of knowledge that rests with the community and the knowledge that the community needs for the reduction of community vulnerabilities to disaster risks. In addition, the DMU of both uMshwathi and uMgungundlovu will benefit by improving their DRR strategies of which can be a collaboration of western practices and indigenous practices to curb disaster risks and ultimately reduce community vulnerability, and disaster fatalities.

6.7. Suggestions for further research

While the nexus of community participation and the use of IK have been found to be significant for the improvement of DRR processes, it is recommended that cultural beliefs and values and perceptions of IK holders be further researched. Due to research findings that revealed loss of traditional lifestyle as the root cause of the marginalisation of IK; it is recommended that the impact of cultural influences and perceptions of IK custodians in the context of DRR be further researched. The justification for that is that the literature shows that little has been researched about the impact of cultural values and traditional lifestyle of indigenous communities. The failure to study and understand different cultural and traditional lifestyles which can contribute in improving the resourcefulness of community participation and IK for DRR may lead to the simultaneous loss of cultural values and IK.

6.8. Chapter summary

The study attempted to explore and identify ways to enhance municipal capacities to obtain IK through community-participation in planning and implementing DRR strategies at uMshwathi Local Municipality. The main aim for the study was to understand the nexus of IK and community participation for the improvement of DRR processes- of two communities of KwaSwayimane and New Hanover. The overall findings of the study are that uMshwathi is a rich hub of IK. Communities at uMshwathi Local Municipality have different indigenous beliefs and strategies that they have inherited for their forefathers. These indigenous practices have been adopted and passed on from generation to generation, through the use of different African communication systems. Simultaneously, these indigenous practices are dynamic. This chapter presented a summary of the findings and conclusions, showed how the research objectives and research questions have been addressed, and offered recommendations based on the findings and conclusions. This chapter highlighted the significance of the study to the body of knowledge on

IK and DRR and suggested areas for future research before bringing the dissertation to a close with this chapter summary.

References

Abdullah, H.J. & Hassan, T.K. 2015. The use of indigenous knowledge in agriculture and its role in sustainable development. *International Journal of Science and Research*, 4(10), pp. 1312- 1317.

Ahrens, J. & Rudolph, P.M. 2006. The importance of governance in risk reduction and disaster management. *Journal of Contingencies and Crisis Management*, 14(4), pp. 207-220.

Ahlgren, P. & Ourti, J. 2013. *Expressions of responsibility for disasters within vulnerable communities: The case of Fisantekraal*. The division of Fire Safety Engineering. Available at: https://scholar.google.co.za/scholar?q=Ahlgren [09 March 2017].

Akenji, M.J. 2009. *The incorporation of indigenous knowledge in land reform projects: The Basotho Letjhabile and Moalosi Trust Agricultural Projects.* (Unpublished Master's Thesis) Bloemfontein: University of the Free State.

Andrews, T. 2012. What is social constructionism? The Grounded Theory Review, 1(1) pp. 39-46.

Apusiga, A.A. 2008. *Indigenous knowledge, cultural values and sustainable development in Africa*. 2nd Annual Ibadan Sustainable Development Summit, Nigeria. Available at: http://www.academia.edu/1067839/ [13 June 2016].

Averill, J.B. 2002. Matrix analysis as a complementary analytic strategy in qualitative inquiry. *Qualitative Health Research*, 12(6), pp. 855-866.

Babbie, E. & Mouton, J. 2007. *The Practice of Social Research*. Cape Town. Wardsworth Publishing Company.

Bang, H.N. 2013. Governance of disaster risk reduction in Cameroon: The need to empower local government, *Journal of Disaster Risk Studies*, 5(2), pp. 10.

Baumwoll, J. 2008. *The value of indigenous knowledge for disaster risk reduction: a unique assessment tool for reducing community vulnerability to natural disasters*. Master's theses. Vienna: Webster University.

Baxter, P. & Jack, S. 2008. Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report*, 13(4), pp. 544-559.

Bazarragchaa, S. 2012. Community participation in disaster risk mitigation: a comparative study of Mongolia and japan; Final Report. Available at: http://www.adrc.asia/aboutus/vrdata/finalreport/2011B_MNG_Final_Report [19 May 2014].

Becker, P., Abrahamsson, M. & Hagelsteen, M. 2013. Parallel structures for disaster risk reduction and climate change adaptation in Southern Africa. *Jàmbá: Journal of Disaster Risk Studies*, 5(2), pp. 1-5.

Benson. C. 2009. *Mainstreaming Disaster Risk Reduction into Development: Challenges and Experience in the Philippines*. Geneva: ProVention Consortium.

Birkmann, J., Seng, D.C. and Suarez, D.C., 2011. *German Committee for Disaster Reduction*. Adaptive disaster risk reduction. Enhancing methods and tools of disaster risk reduction in the light of climate change. Report 43.

Bradley, J. 1993. Methodological issues and practices in qualitative research. *Library Quarterly*, 63(4), pp. 431-449.

Bristowe, K., Siassakos, D., Hambly, H., Angouri, J., Yelland, A., Draycott, T.J. & Fox, R. 2012. Teamwork for clinical emergencies inter-professional focus group analysis and triangulation with simulation. *Qualitative Health Research*, 22(10), pp. 1383-1394.

Buccus, I., Hemson, D., Hicks, J. and Piper, L., 2007. Public participation and local governance. Durban: Centre for public participation, pp.415-433.

Creswell, J. 2009. *Research design, qualitative, quantitative and mixed method approaches* (2nd ed.). Thousand Oaks. Sage Publications.

Creswell, J.W. & Clark, V.L. 2007. *Designing and conducting mixed methods research*. Thousand Oaks. Sage Publications.

Creswell, J. & Clark, K. 2009. *Research design: qualitative, quantitative and mixed methods approaches*. Thousand Oaks. Sage Publications.

De Guzman, M. 2003. Towards total disaster risk management approach*: Asian Disaster Reduction Center and United Nations Office for the Coordination of Humanitarian Affairs-Asian Disaster Response Unit.* Available at: http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN009657 [05 May 2016].

Dekens, J. 2007. *Local knowledge for disaster preparedness: a literature review*. Kathmandu: International Centre for Integrated Mountain Development. Available at: http://condesan.org/mtnforum/sites/default/files/publication/files/1518 [22 October 2014].

Demir, T. and Nyhan, R.C., 2008. The politics–administration dichotomy: An empirical search for correspondence between theory and practice. *Public Administration Review*, 68(1) pp.81-96. Available at: http://onlinelibrary.wiley.com/doi/ [Accessed Date: 07 March 2017].

Denzin, N.K. 2012. Triangulation 2.0. *Journal of Mixed Methods Research*. 6(2) 80–88.2012. Available at: http://jmmr.sagepub.com [10 June 2015]

Doody, O. & Noonan, M. 2013. Preparing and conducting interviews to collect data. *Nurse Researcher*, 20(5), pp.28-32.

Eisenhardt, K.M., 2010. Building theories from case study research. Academy of management review, 14(4), pp.532-550.

Elo, S. & Kyngäs, H. 2008. The qualitative content analysis process. *Journal of Advanced Nursing*, 62(1), pp.107-115.

Gaston, B.W., Aka, F.T., Burnley, C. & Isabella, Z.T. 2012. Local governance in disaster risk reduction in Cameroon. *Jamba: Journal of Disaster Risk Studies*, 4(1), pp.56-65.

Gerald, J. & Dorothy, R. 2010. *Examining Linkages between Disaster Risk Reduction and Livelihoods*. Tufts University, Friedman School of Nutrition Science and Policy. Available at: http://fic.tufts.edu/assets/DRR-lit-review [22 February 2015].

Gero, A., Méheux, K. & Dominey-Howes, D. 2011. Integrating community based disaster risk reduction and climate change adaptation: examples from the Pacific. *Natural Hazards and Earth System Sciences*, 11(1), pp.101-113.

Grix, J. 2004. *Foundations of Research*, Basingstoke: Palgrave.

Grix, J. 2010. *Foundations of Research* (2nd Ed.), Basingstoke: Palgrave.

Goddard, C.V. 2001. *Essentials of Education Research*, New Jersey: Prentice Hall.

Gupta, A.K., 2000. Rewarding traditional knowledge and contemporary grassroots creativity: The role of intellectual property protection. In a seminar at Kennedy School, Harvard University, Boston. Available at: www.sustsci.harvard.edu/ists/TWAS_0202/gupta_0500 Date Accessed: [20 July 2016]

Hakim, C. 2005. *Research design: Successful designs for social and economic research.* Psychology Press: London. Oxford University Press.

Harrell G. & Bradley, M. 2009. *Data collection methods: semi-structured interviews and focus groups.* Santa Monica. Rand Co-orporation.

Holloway, A., 2003. Disaster risk reduction in southern Africa: *Hot rhetoric-cold reality*. *African Security Studies*, 12(1), pp.29-38.

International Strategy for Disaster Reduction. 2009. *Status report on disaster risk reduction in Sub-Saharan Africa. Preliminary Version*. Available at: https://www.unisdr.org/we/inform/publications/9413 [30 July 2014].

Jarbandhan, D.B. & De Wet, S. 2006. Using the survey procedure and interview data collection technique. *Journal of Public Administration*, 41(3.1), pp. 669-681.

Kapuire, G.K., 2013. An explorative action research study toward the design of a digital knowledge organisation as part of an indigenous knowledge management system with a Herero community (Doctoral dissertation, University of Cape Town).

King, D. 2008. Reducing hazards vulnerability through local government engagement and action. *Natural Hazards*, 47(3); 497- 508.

Kelman, I., Mercer, I. & Gaillard, J.C. 2012. Indigenous knowledge and disaster risk reduction. *Geography*, 97(1), pp. 12-21.

Krasny, M.E., Tidball, K.G. & Sriskandarajah, N. 2009. Education and resilience: Social and situated learning among university and secondary students. *Ecology and Society*, 14(2), pp. 38.

Kruger, R.A. 2012. *Designing and conducting focus group interviews.* University of Minnesota: Minnesota.

Lacey, A. and Luff, D. 2009. Qualitative research analysis. Sheffield: The University of Sheffield Available at: www.rds-eastmidlands.nihr.ac.uk [30 October 2014].

Ladi, S. 2008. Good governance and Public Administration Reform in the Black Sea Economic Cooperation member states. Being an International Centre for Black Sea Studies. *Xenophon Paper No. 6*, Available at: https://www.files.ethz.ch/isn/103641/XENOPHON_PAPER [28 May 2016].

Lambert, S.D. & Loiselle, C.G. 2008. Combining individual interviews and focus groups to enhance data richness. *Journal of Advanced Nursing*, 62(2), pp. 228-237.

Lauri, M.A. 2011. Triangulation of data analysis. Peer Reviewed Online Journal. Papers on Social Representations. (20), p 34.1-34.15. Available at: http://www.psych.lse.ac.uk/psr/ [21 March 2016].

Lietz, C.A. & Zayas, L.E. 2010. Evaluating qualitative research for Social Work practitioners. *Advances in Social Work*, 11(2), pp. 188-202.

Lincoln, Y.S. & Guba, E.G. 1985. *Naturalistic Inquiry*. Thousand Oaks. Sage Publications.

Loh, J. 2013. Inquiry into issues of trustworthiness and quality in narrative studies: A perspective. *The Qualitative Report*, 18(65), pp. 1-15.

Louw, E. & van Wyk, S. 2011. Disaster risk management: Planning for resilient and sustainable societies. *Civil Engineering: Magazine of the South African Institution of Civil Engineering*, 19(7), pp. 16-18.

Lukamba-Muhiya, T. 2010. Natural disaster in African countries what can we learn about them? *TD The Journal for Transdisciplinary Research in Southern Africa*, 6(2), pp. 478-495.

Lutabingwa, J. & Nethonzhe, T. 2006. Ethical issues in Research. *Journal of Public Administration*, 41(3.1), pp. 642-704.

Mack, N., Woodsong, C., Macqueen, K.M., Guest, G. & Namey, E. 2005. *Qualitative research methods: A Data Collector's Field Guide.* North Carolina. Family Health International.

Maferetlhane, O.I. 2012. *The role of indigenous knowledge in disaster risk reduction: a critical analysis.* North-West University: Potchefstroom.

Mapara, J. 2009. Indigenous knowledge system in Zimbabwe: Juxtaposing postcolonial theory. *The Journal of Pan African Studies*, 3(1), pp. 139-155.

Krasny, M.E. & Tidball, K.G. 2009. Applying a resilience systems framework to urban environmental education. *Environmental Education Research*, 15(4), pp. 465-482.

Mercer, L. 2010. Disaster risk reduction or climate change adaptation: Are we reinventing the wheel? *Journal of International Development*, 22(2), 247-264.

Mercer, J., Gaillard, J.C., Crowley, K., Shannon, R., Alexander, B., Day, S. & Becker, L. 2012. Culture and disaster risk reduction: Lessons and opportunities. *Environmental Hazards*, 11(2), pp. 74- 95.

Miles, M.B., Huberman, A.M. & Saldana, J. 2013. *Qualitative data analysis: A methods source book*. Thousan Oaks. Sage Publications.

Mji, G. 2009. *In doing disability research: A practical guide to disability research in Africa*. The Secretariat of the African Decade for Persons with Disabilities. Available at: http://www.dhrs.uct.ac.za/dhrs/divisions/disability/research [29 April 2015].

Moatlhaping, S.O. 2007. *The role of indigenous governance system(s) in sustainable development: case of Moshupa village, Botswana.* Mini-Dissertation. University of Stellenbosch.

Mubangizi, B.C. & Dassah, M.O. 2014. Public participation in South Africa: Is intervention by the courts the answer? *Journal of Social Science*, 39(3), pp. 275-284.

Neuendorf, K.A. 2002. *The Content analysis guidebook*. Thousand Oaks. Sage Publications.

Ngwezi, J. 2014. *Integrating indigenous knowledge systems into climate change.* Pretoria. People's Publishers.

Ongugo, R.A. & Kimani, S. 2014. *The Role of indigenous knowledge systems in climate change adaptation and mitigation: A case study of the Mijikenda community.* Pretoria. People's Publishers.

Onwuegbuzie, A.J., Dickinson, W.B., Leech, N.L., & Zoran, A.G. 2009. A qualitative framework for collecting and analysing data in focus group research. *International Journal of Qualitative Methods*, 8(3), pp. 1-21.

Onwuegbuzie, A.J. & Frels, R.K. 2015. A Framework for conducting critical dialectical pluralist focus group discussions using mixed research techniques. *Journal of Educational Issues*, 1(2), pp. 159-177.

Oughton, C., Casey, D., Shaw, D. & Murphy, K. 2013. Rigour in qualitative case-study research. *Nurse Researcher*, 20(4), pp. 12-17.

Owuor, A. 2007. Integrating African indigenous knowledge in Kenya's formal education system: The potential for sustainable development. *University of British Columbia Journal of Contemporary Issues in Education*, 2(2), pp. 21-37.

Owusu-Ansah, F.E. & Mji, G. 2013. African indigenous knowledge and research. *African Journal of Disability*, 2(1), pp. 1-5.

Palliyaguru, R., Amaratunga, D. & Baldry, D. 2014. Constructing a holistic approach to disaster risk reduction. *Disasters*, 38(1), pp. 45-61.

Pasteur, K. 2011. *Practice Briefing Integrating approaches: Sustainable livelihoods, disaster risk reduction and climate change adaptation.* Available at: http://www.eldis.org/vfile/upload/1/document/1005/ESRCBriefingPaper June 2015].

Rabiee, F. & Thompson, D. 2004. Focus group interview and data analysis, *Proceedings of the Nutrition Society*. University of Central England and Birmingham University. 63, pp. 655–660.

Rao, S. 2013. Disaster risk governance at national and sub-national levels. *Research Report 991*. Birmingham, University of Birmingham. Available at: http://www.gsdrc.orglgo/display&type=Helpdesk&id=991 [08 November 2015].

Rao, V. L., & G. Ramana. "Indigenous knowledge, conservation and management of natural resources among primitive tribal groups of Andhra Pradesh." Anthropol Spec 3 (2007): 129-134.

Bio-med Central. *2014. Bio-Med Central qualitative research review guidelines.* Available at: http://www.biomedcentral.comlinfo/ifora/rats [August 31, 2014]

Raungratanaamporna, I. & Kamikoa, D. 2014. Government-communities collaboration in disaster management Activity: Investigation in the current Flood Disaster Management Policy in Thailand. *Procedia Environmental Sciences*, 20, pp. 658–667.

Remler, D.K. & Van Ryzin, G.G. 2011. *Research methods in practice: strategies for description and causation.* London. Sage Publication.

Roth, A.S. & Becker, P. 2011. Challenges to disaster risk reduction: a Study of stakeholders' perspective in Imizamo Yethu, South Africa. *Jamba: Journal of Disaster Risk Studies*, 3(2), pp. 443-452.

Rottach, P. 2010. *Background and components of disaster risk reduction.* Available at: http://www.preventionweb.net/files/24122_24122backgroundcomponentsofdrractdi [17 September 2014].

Ruffin, F. & Reddy, M. 2015. Towards solid intergovernmental relations for disaster risk reduction. In Reddy, P.S. and De Vries, M. (eds). *Quo Vadis? Local governance and development in South Africa since 1994*. Brussels: Bruylandt. pp 221 – 236.

Rukema, J.R. & Simelane, H.S. 2013. Indigenous knowledge systems, drought and people's resilience and responses: The case of Msinga community in KwaZulu-Natal. *Indilinga: African Journal of Indigenous Knowledge Systems*, 12(1), pp. 108-125.

South African Local Government Association. 2011. Disaster Risk Management Status Assessment at Municipalities in South African. Research Report. African Centre for Disaster Studies, North West University. Available at: http://www.jamba.org.za/index.php/jamba [20 June 2014].

Satterthwaite, D., 2011. Editorial: Why is community action needed for disaster risk reduction and climate change adaptation? 339-349. Available at: www.ijsr.net/archive/v4i10/SUB159053

Shenton, A.K. 2004. Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, 22(2), pp.63-75.

Siddiqi, S., Masud, T.I., Nishtar, S., Peters, D.H., Sabri, B., Bile, K.M. & Jama, M.A. 2009. Framework for assessing governance of the health system in developing countries: gateway to good governance *Health policy*, 90(1), pp. 13-25.

Silverman, D. 2010. *Doing Qualitative Research* (3rd ed.). London. Sage Publications.

Sitienei, G.C. 2006. *A comparison of research and publication patterns and output among academic librarians in Eastern and Southern Africa between 1990 To 2006*. Master's Thesis, University of Zululand, School of Library and Information Science.

Statistics South Africa. 2011. *Census 2011 Statistical release P0301.4.* Available at: http://www.statssa.gov.za/publications/P03014/P030142011 [10 October 2016].

Sullivan, O. 2009. Changing gender relations, changing families: Tracing the pace of change. New York: Rowman and Littlefield.

Toland, S., White, J., & Mills, D. 2014. EFL instructors' perceptions of usefulness and ease of use of the Learning Management Systems. *The Jalt Call Journal*, 10(3), pp. 221–236.

Thornhill, A. 2009. *Collecting primary data using semi-structured, in-depth and group interviews. Research methods for business students* (5th ed.), Harlow. Pearson Education.

Thywissen, K., 2005. *Core terminology of disaster reduction. Measuring vulnerability to natural hazards: Towards disaster resilient societies*, United Nations University Press: Hong Kong.

Tierney, K. 2012. Disaster Governance: Social, political, and economic dimensions. *Annual Review of Environment and Resources*, 37, pp. 341-363.

Tracy, S.J. 2010. Qualitative quality: Eight "Big-tent" Criteria for excellent qualitative research. *Qualitative Inquiry*, 16(10), pp. 837–851. 2010.

Twigg, J. 2009. *Characteristics of a disaster resilience community*. Available at: www.abuhrc.orgiresearchldsm/Pages/project [15 August 2015].

Twigg, J. 2015. *Disaster risk reduction*. Humanitarian Practice Network, Overseas Development Institute. Available at. http://goodpracticereview.org/wp-content/uploads/2015/10/GPR-9-web-string [12 May 2015].

UMshwathi Municipality. 2014. *Integrated Development Plan 2013-14.* Available at: www.umshwathimunicipality.gov.za [10 November 2014].

UMshwathi Municipality. 2015. *Integrated Development Plan 2015-2016.* Available at: www.umshwathimunicipality.gov.za [02 May 2016].

UMshwathi Municipality. 2016. *Disaster Management Plan 2016.* Available at: www.umshwathimunicipality.gov.za [02 May 2016].

UNISDR. 2013. *Post-2015 Framework for Disaster Risk Reduction (HFA2)*. Report from 2013 Global Platform Consultations October 2013. Available at: http://www.unisdr.org/we/inform/publications/35070 [10 January 2017].

UNISDR. 2009. *UNISDR terminology on disaster risk reduction.* Geneva: UNISDR. Available at: http://www.preventionweb.net/files17817 [28 June 2014].

UNISDR. 2012. *UN System Task Team on the Post-2015 UN Development Agenda.* New York: United Nations Office for Disaster Risk Reduction. Available at: http://www.un.org/en/development/desa/policy/untaskteam [22 October 2014].

UNISDR. 2013. *Building resilience to disasters through partnerships.* Geneva: United Nations Office for Disaster Risk Reduction. Available at: https://www.unisdr.org/files/32918_drrintheun2013 [11 August 2014].

United Nations. 1994. *Yokohama strategy and plan of action for a safer world: Guidelines for disaster prevention, preparedness and mitigation.* World conference on natural disaster reduction. Yokohama, Japan. Available at: https://www.unisdr.org/we/inform/publications/8241 [10 January 2017].

United Nations. 1999. *United Nations International Strategy for Disaster Reduction.* Available at: https://www.unisdr.org/who-we-are/history [12 January 2017].

United Nations. 1989. *International Decade for Natural Disasters of 1989.* Available at: http://www.un.org/documents/ga/res/44/a44r236.htm [12 January 2017].

United Nations. 2004. Africa Regional Strategy for Disaster Risk Reduction. Disaster Risk Reduction for Sustainable Development in Africa. Available at: http://www.unisdr.org/files/13093. [20 January 2015]

United Nations. 2004. Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters. Available at: https://www.unisdr.org/we/coordinate/hfa [17 July 2015]

United Nations. 2015. *Sendai Framework for Disaster Risk Reduction 2015-2030.* Available at: http://www.preventionweb.net/files/43291_sendaiframeworkfordrren [27 October 2016].

Valenzuela, D. & Shrivastava, P. 2003. *Interviews as a method for qualitative research*. Available at:
http://www.gsrinternational.com/products nvivo.aspx [13 June 2014].

Van Niekerk, D. 2011. *Introduction to disaster risk reduction.* United States Agency for International Development. Available at:
http://www.preventionweb.net/files/26081_kp1concepdisasterrisk [20 August 2014].

Vermaak, J. & van Niekerk, D. 2010. Disaster risk reduction initiatives. *Development Southern Africa*, 21(3), pp. 555-574.

Werhane, P.H., Hartman, L.P., Moberg, D., Englehardt, E., Pritchard, M. and Parmar, B., 2011. Social constructivism, mental models, and problems of obedience. *Journal of business ethics*, 100(1), pp.103-118.

World Bank. 2010. *The World Bank and Global Facility for DRR.* Available at: http://www.worldbank.org/en/region/eca/brief/office-of-the-chief-economist-europe-and-central-asia [25 September 2014].

Vyas-Doorgapersad, S. & Lukamba-Muhiya, T. 2012. Disaster risk reduction policy for sustainable development in the Southern Africa Development Community: A policy perspective. *Journal of Public Administration*, 47(4), pp. 774-784.

Yin, R.K. 2009. *Case study research: Design and methods* (4th ed.). Thousand Oaks. Sage Publications.

Zhang, Y. & Wildemuth, B.M. 2009. Qualitative analysis of content. In B. Wildemuth (Ed.). *Applications of social research methods to questions in information and library science* (pp. 308-319). Libraries Unlimited: Westport.

Zhang, Y. 2011. College students' uses and perceptions of social networking sites for health and wellness information. *Information Research,* 17(3) p 1-20.

Legislative and Policy Documents

Republic of South Africa. 1996. *The Constitution of the Republic of South Africa Act. Of 1996 No. 106.* Pretoria: Government Printer.

Republic of South Africa. 1999. *White paper on disaster management notice 23 of 1999.* Pretoria: Government Printer.

Republic of South Africa. 2003. *Disaster Management Act No 57 of 2002.* Pretoria: Government Printer.

Republic of South Africa. 2005. *National Disaster Management Framework.* Government Notice 654 of 2005. Pretoria: Government Printer.

Republic of South Africa. 2011. *National Development Plan: Vision 2030.* Pretoria: Government Printer. Available at: http://www.gov.za/sites/www.gov.za/files/devplan

Republic of South Africa. 2015. *Disaster Management Amendment Act No. 57 of 2002*. Pretoria: Government Printer.

RSA. Department of Science & Technology. 2004. *Department of Science and Technology Indigenous Knowledge Systems*. Pretoria: Government Printer.

Appendices

Appendix 1

School of Management, IT and Governance

College of Law and Management Studies

School of Management, Information Technology and Governance

Master's in Public Administration

Researcher: Nkanyiso Weathington Nxumalo (073 8540 120)

Supervisor: Dr F.A. Ruffin (076 811 9595)

Research office: Ms. M Snyman (031 260 8350)

Dear Respondent

I, Nkanyiso Weathington Nxumalo, am a Public Administration master's student in the School of Management, Information Technology and Governance, Discipline of Public Governance, at the University of KwaZulu-Natal. You are invited to participate in a research project entitled:

'Enhancing Disaster Risk Reduction through the Nexus of Indigenous Knowledge and Community Participation: A Case Study of uMshwathi Local Municipality'

The aim of this study is to:

- Determine the nature of IK held and contributed by uMshwathi citizens that relate to DRR.
- Understand the relationship between the nexus of IK and community participation and planning and implementation of DRR strategies. In uMshwathi Local Municipality.
- Identify methods for uMshwathi local government to engage citizens in collecting and utilising IK for DRR.

Your participation in this project is voluntary. You may refuse to participate or withdraw from the project at any time with no negative consequence. There will be no monetary gain from

participating in this research project. However, uMshwathi Municipality and the community as a whole may benefit from the findings of this study.

Confidentiality and anonymity of records identifying you as a participant will be maintained by the School of Management, Information Technology and Governance, Discipline of Public Governance at UKZN. Your identity will not be revealed or your name used in connection with this study.

The interview will be recorded to allow you to listen to your responses after the interview and to assist the interviewer to capture your actual responses.

Kindly indicate on the consent form whether you agree or disagree to have your interview recorded or not by ticking your choice.

If you have any questions or concerns about participating in this study, please contact me or my supervisor at the numbers listed above.

It should take you about thirty minutes to complete the interview questionnaire with me. I hope you will take the time to participate in the interview.

Sincerely

Investigator's signature: _____ Date: _____

This page is to be retained by participant

UNIVERSITY OF KWAZULU-NATAL

School of Management, Information Technology and Governance

Master's in Public Administration

Researcher: Nkanyiso Weathington Nxumalo

Supervisor: Dr F.A. Ruffin (076 811 9595)

Research Office: Ms. M Snyman (031 260 8350)

CONSENT

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

☐ I agree to allow my interview recorded.

☐ I do not agree to allow my interview recorded.

_____ _____

Signature of Participant Date

Appendix 2

<u>School of Management, IT and Governance</u>

<u>College of Law and Management Studies</u>

School of Management, Information Technology and Governance

Master's in Public Administration

Researcher: Nkanyiso Nxumalo (073 8540 120)

Supervisor: Dr. F.A. Ruffin (076 811 9595)

Research Office: Ms. M Snyman (031 260 8350)

Dear Respondent

Mina, NkanyisoNxumalo, ongumfundi owenza izifundo zokuphatha (Public Administration) esigabeni se Master's eNyuvesiyakwaZulu-Natali ngaphansikwe- School of Management, Information Technology and Governance, emnyangweni we- Public Governance.Uyamenywaukubaubeyingxenyeyocwaningo olunesihloko esithi:

"Enhancing Disaster Risk Reduction through the Nexus of Indigenous Knowledge and Community Participation: A Case Study of uMshwathi Local Municipality"

Inhloso yalolucwaningo:

- Ukuthola uhlobo lolwazi lwendabuko olusetshenziswa umphakathi waseMshwathi ukulwa nokunciphisa ubungozi obuhambisana nokushintsha kwesimo sezulu.

- Ukuqonda ubudlelwano phakathi kokusetshenziswa kolwaz ilwendabuko nendima edlal-wwa wumphakathi waseMshwathi ekuqhamukeni nezinhlelo zokunciphisa ubungozi obulethwa ukushintsha kwesimo sezulu.

- Ukudalula izindlela ezingasetshenziswa wuhulumeni waseMshwathi ukubandakanya abahlali ekuqoqeni, ekulondolozeni nokusetshenziswa kolwazi lwendabuko ngenhloso yokugwema nokunciphisa izingozi ezifika nokuguquka kwesimo sezulu.

Ukubamba iqhaza kwakho kulolucwaningo akuyona impoqo.Unalo igunya lokunqaba noma uphume ukuzibandakanya ocwaningeni noma yinini, ngaphandle kwemibandela noma imiphumela engahambisani nawe. Ukuzibandakanya kwakho kulolucwaningo akunanzuzo yemali.

Umasipala waseMshwathi nomphakathi ngobuningi, bangahlomula ngeziphum ozocwaningo, zona ezingasiza ukuvikela nokuthuthukisa izimpilo zabo.

Ukubayingxenye yalolucwaningo kuzohlala kuyimfihlo phakathi kwakho nomcwaningi, kanti futhi konke okuqukethwe kuyogcinwa yisikole se- Management, Information Technology and Governance, emnyangwenii- Public Governance yaseNyuvesiyakwa Zulu Natali.

Uma uneminye imibuzo mayelana nokuba yingxenye yalolucwaningo, wamukelekile ukuxhumana name noma no-supervisor wami kulemininingwano enikeziwe ngenhla.

Kufanele ukukuthatha imizuzuengamashumi amathathu kuyakwi hora ukuqeda ingxoxo. Ngiyabonga ngokunikela ngesikhathi sakho kulolucwaningo.

Ozithobayo

I-signature yomcwaningi: _____

Usuku: _____

This page is to be retained by participant

School of Management, Information Technology and Governance

Master's in Public Administration

Researcher: Nkanyiso Nxumalo (073 8540 120)

Supervisor: Dr. F.A. Ruffin (076 811 9595)

Research Office: Ms. M Snyman (031 260 8350)

Isivumelwano

Mina, _____

(igamaeliphelele) ngiyakuqinisekisa ukuthi ngiyakuqonda okuqukethwe yileliphepha nohlobo locwaningo. Ngiyazibophezela ukuzibandakanya nocwaningo. Ngiyakuqonda futhi kusemandleni nasesinqumweni sami ukwephula ekubeni yingxenye yocwaningo, noma yingasiphi isikhathi engifisa ukwephula ngaso.

Ngyavuma ukuba lenkulumo iqoshwe. ☐

Angivumi ukuba ingxoxo iqoshwe. ☐

_____ _____

Signature of Participant Usuku

Appendix 3

School of Management, IT and Governance

College of Law and Management Studies

School of Management, Information Technology and Governance

Master's in Public Administration

Researcher: Nkanyiso Weathington Nxumalo (073 8540 120)

Supervisor: Dr F.A. Ruffin (076 811 9595)

Research office: Ms. M Snyman (031 260 8350)

Dear Respondent

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School of Management, Information Technology and Governance

Master's in Public Administration

Researcher: Nkanyiso Weathington Nxumalo

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Research Office: Ms. M Snyman (031 260 8350)

CONSENT

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

☐ I agree to allow this focus group recorded.

☐ I do not agree to allow this focus group recorded.

_____ _____

Signature

Appendix 4

School of Management, IT and Governance

College of Law and Management Studies

School of Management, Information Technology and Governance

Master's in Public Administration

Researcher: Nkanyiso Nxumalo (073 8540 120)

Supervisor: Dr. F.A. Ruffin (076 811 9595)

Research Office: Ms. M Snyman (031 260 8350)

Dear Respondent

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- Ukudalula izindlela ezingasetshenziswa wuhulumeni waseMshwathi ukubandakanya abahlali ekuqoqeni, ekulondolozeni nokusetshenziswa kolwazi lwendabuko ngenhloso yokugwema nokunciphisa izingozi ezifika nokuguquka kwesimo sezulu.

Ukubamba iqhaza kwakho kulolucwaningo akuyona impoqo.Unalo igunya lokunqaba noma uphume ukuzibandakanya ocwaningeni noma yinini, ngaphandle kwemibandela noma imiphumela engahambisani nawe. Ukuzibandakanya kwakho kulolucwaningo akunanzuzo yemali.

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Ukubayingxenye yalolucwaningo kuzohlala kuyimfihlo phakathi kwakho nomcwaningi, kanti futhi konke okuqukethwe kuyogcinwa yisikole se- Management, Information Technology and Governance, emnyangwenii- Public Governance yaseNyuvesiyakwa Zulu Natali.

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Kufanele ukukuthatha imizuzuengamashumi amathathu kuyakwi hora ukuqeda ingxoxo. Ngiyabonga ngokunikela ngesikhathi sakho kulolucwaningo.

Ozithobayo

I-signature yomcwaningi: _____

Usuku: _____

This page is to be retained by participant

School of Management, Information Technology and Governance

Master of Administration

Researcher: Nkanyiso Nxumalo (073 8540 120)

Supervisor: Dr. F.A. Ruffin (076 811 9595)

Research Office: Ms. M Snyman (031 260 8350)

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Mina, _____

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Ngyavuma ukuba lenkulumo yesigungu iqoshwe. ☐

Angivumi ukuba ingxoxo yesigungu iqoshwe. ☐

_____ _____

Signature of Participant Usuku

Apendix 5

UMshwathi Local Municipality interview questionnaire

1. What is the current status of DM within uMshwathi Local Municipality?
2. What is the nature of disasters that is likely to affect your area?
3. What strategies has the municipality put in place to engage citizens to collect IK for DRR?
4. How has the municipality been collecting local based information for DRR purposes?
5. What has the government done to promote the use of IK for planning and implementation of DRR strategies?
6. How does the municipality ensure the documentation of local based knowledge for DRR?
7. How do district services affect the implementation of DRR strategies?
8. Which policies that the local government has put in place to integrate DRR, IK and community participation?
9. How can DRR related policies be improved?
10. How does the municipality identify disaster prone areas within the municipality?

Appendix 6

UMgungundlovu District Municipality interview questionnaire

1. What is the current status of DM within uMgungundlovu District Municipality?
2. What is the nature of disasters that is likely to affect your area?
3. What strategies has the municipality put in place to engage citizens to collect IK for DRR?
4. As a district municipality, how does the municipality ensure sustainable relationship with relevant stakeholders?
5. How has the municipality been collecting local based information for DRR purposes?
6. What has the government done to promote the use of IK for planning and implementation of DRR strategies?
7. How does the municipality ensure the documentation of local based knowledge for DRR?
8. Which policies that the local government has put in place to integrate DRR, IK and community participation?
9. How can DRR related policies be improved?
10. How does the municipality identify disaster prone areas within the municipality?

Appendix 7

Amakhosi interview questionnaire

1. What knowledge does *inkosi* has on the concept of DRR?
2. To what extent does *inkosi* promote and encourage the use IK for DRR?
3. How does *inkosi* encourage the community into participating in government programmes to reduce disasters?
4. What historic local knowledge does *inkosi* possess on disasters and DRR?
5. How does your community use IK to anticipate and plan for disasters?
6. What efforts has the traditional leadership made to engage communities for DRR planning and implementation?
7. What discussions has the traditional leadership committee undertaken to improve DRR strategies?
8. How does the traditional leadership ensure the inclusion of relevant stakeholders in giving historic knowledge to reduce disaster risks?
9. How does the traditional leadership integrate DM policies with the indigenous ways of doing things?

Appendix 8

Focus group guide: Community members (Community Elders of New Hanover and Swayimane area)

1. What is the nature of disasters that have taken place within the community?
2. What do you understand about the use of IK to reduce disaster risks?
3. As a community, what historic knowledge have you been using to reduce disaster risks?
4. What methods have been used to keep the local knowledge within the community for DRR?
5. How do you ensure that you play a role in giving IK for DRR purposes?
6. How do you ensure that the youth understand and make use of this knowledge?
7. What indigenous indicators does the community use as instruments to anticipate certain and different disasters?
8. Are there any government programmes for DRR?
   Probe: If so, what efforts that have been put in place by the community to engage themselves into government programmes for DRR?
9. How does the community put in place involve themselves into government programmes for the improvement of DRR strategies?

Appendix 9

Aligning Research Questions and Objectives with Interview Questions

Research Questions	**Research Objectives**	**Interview Questions**
In what ways do local community members of uMshwathi contribute to governmental strategies toward DRR?	Determine the nature of IK held and contributed by uMshwathi citizens that relate to DRR.	What strategies has the municipality put in place to engage citizens to collect IK for DRR?
		What knowledge does *inkosi* has on the concept of DRR?
		What do you understand about the use of IK to reduce disaster risks?
		What historic local knowledge does *inkosi* possess on disasters and DRR?
How can IK held by citizens of uMshwathi be best collected for planning and implementing DRR strategies?	Understand the relationship between the nexus of IK, community participation, planning and implementation of DRR strategies. uMshwathi Local Municipality	What strategies has the municipality put in place to engage citizens to collect IK for DRR?
		What historic local knowledge does *inkosi* possess on disasters and DRR?
		What efforts has the traditional leadership made to engage communities for DRR planning and implementation?
		How does the traditional leadership ensure the inclusion of relevant stakeholders in giving historic knowledge to reduce disaster risks?
How can IK held by citizens of uMshwathi be best utilised by local government for planning and implementing DRR strategies?	Identify methods for uMshwathi local government to engage citizens in collecting and utilising IK for DRR.	How has the municipality been collecting local based information for DRR purposes?
		What knowledge does *inkosi* has on the concept of DRR?
		To what extent does *inkosi* promote and encourage the use IK for DRR?
		What discussions has the traditional leadership committee undertaken to improve DRR strategies?
		How does the traditional leadership integrate DM policies with the indigenous ways of doing things?

Appendix 10

Aligning the Conceptual Framework with Interview Questions

Indigenous Knowledge	**Community Participation**	**Disaster risk Reduction Strategies**	**Community Vulnerability Reduction**
What historic local knowledge does *inkosi* possess on disasters and DRR	As a district municipality, how does the municipality ensure sustainable relationships with relevant stakeholders?	What is the nature of disasters that are likely to affect your area?	How does your community use IK to anticipate and plan for disasters?
What do you understand about the use of IK to reduce disaster risks?	What strategies has the municipality put in place to engage citizens to collect IK for DRR?	What has the government done to promote the use of IK for planning and implementation of DRR strategies?	How does the municipality identify disaster prone areas within the municipality
	What efforts has the traditional leadership made to engage communities for DRR planning and implementation?	What has the government done to promote the use of IK for planning and implementation of DRR strategies?	To what extent does *inkosi* promote and encourage the use IK for DRR?
	How does the traditional leadership ensure the inclusion of relevant stakeholders in giving historic knowledge to reduce disaster risks?	How does the municipality ensure the documentation of local based knowledge for DRR?	How does the municipality identify disaster prone areas within the municipality
How has the municipality been collecting local based information for DRR purposes?	How does *inkosi* encourage the community into participating in government programmes to reduce disasters?	How does the traditional leadership integrate DM policies with the indigenous ways of doing things?	
	How does *inkosi* encourage the community into participating in government programmes to reduce disasters?	What discussions has the traditional leadership committee undertaken to improve DRR strategies?	
	Which policies that the local government has put in place to integrate DRR, IK and community participation?	How can DRR related policies be improved?	

Appendix 11

Aligning Research Questions, Objectives with Focus Group Questions

Research Questions	**Research Objectives**	**Focus Group Questions**
In what ways do local community members of uMshwathi contribute to governmental strategies toward DRR?	Determine the nature of IK held and contributed by uMshwathi citizens that related to DRR.	As a community member, what historic knowledge have you been using to reduce disaster risks?
		How effective have this knowledge been in reducing disaster risks?
		What methods have been used to keep the local knowledge within the community for DRR?
		6. What indigenous indicators does the community use as instruments to anticipate certain and different disasters?
How can IK, through community participation be best resourceful in planning and implementing DRR strategies in uMshwathi Munipality	Understand the relationship between the nexus of IK and community participation, planning and implementation of DRR strategies. In uMshwathi Local Municipality	2. What do you understand about the use of IK to reduce disaster risks?
		9. Are there any government programmes for DRR? Probe: If so, what efforts that have been put in place by the community to engage themselves into government programmes for DRR?
		11. How does the community put in place involve themselves into government programmes for the improvement of DRR strategies?
How can IK held by citizens of uMshwathi be best utilised by local government for planning and implementing DRR strategies?	Identity methods for uMshwathi local government to engage citizens in collecting and utilising IK for DRR.	**7.** How do you ensure that the youth understand and make use of this knowledge?
		10. How do you communicate with the local government for the collection and utilization of IK DRR purposes?
		11. How does the community put in place involve themselves into government programmes for DRR strategies?

Appendix 12

Aligning the Conceptual Framework with Focus Questions

Indigenous Knowledge	**Community Participation**	**Disaster risk Reduction Strategies**
What do you understand about the use of indigenous to reduce disaster risks?	How do you ensure that you play a role in giving IK for DRR purposes?	What is the nature of disasters that have taken place within the community?
As a community member, what historic knowledge have you been using to reduce disaster risks?	How do you ensure that the youth understand and make use of this knowledge?	As a community member, what historic knowledge have you been using to reduce disaster risks?
How effective have this knowledge been in reducing disaster risks?	Are there any government programmes for DRR?	What indigenous indicators does the community use as instruments to anticipate certain and different disasters?
How effective have this knowledge been in reducing disaster risks?	Probe: If so, what efforts that have been put in place by the community to engage themselves into government programmes for DRR? How do you communicate with the local government for the collection and utilization of IK DRR purposes?	
What indigenous indicators does the community use as instruments to anticipate certain and different disasters?	How does the community put in place involve themselves into government programmes for the improvement of DRR strategies?	

Appendix 13

Aligning Interview Questions with the DDMU responses

What is the current status of disaster management within uMshwathi Local Municipality**?**	
DDMOA	DDMOB
In terms of the Disaster Management framework 2005, we need to have the head of DM and make sure she has a job description; from there we need to have a call centre for receiving the information, storing and dissemination IK early warning information. So over and above that, the DM has to make sure that there is staff to cover all aspects of DM which is response, recovery, preparedness and reconstruction? so all those officials responsible for these four need to have response vehicles, remember we are dealing with natural and man-made disasters, that instance that can escalate to disasters, so people may be displaced because of such hazards, so we need to quickly respond to their needs, so currently we do have field officers attached to each local municipality, we have an officer attached to uMshwathi, uMkhambathini, with the exception of uMsunduzi, we will fill that in our post. so the long in short I'm saying we do have preparedness measures in place as we heading for summer, we know these hazards are seasonal so we do have a contingency in place for summer we are prepared, we do have the staff that will be on standby, jah we are prepared. We only lacking in terms of our call centres, say our call centres are not fully functioning. (DDMOA1)	eh we ensure that disasters, one strategy is that reactive measure are in place, at the same time to prevent disasters from not happening, or to reduce the risk we make sure that in our plans; be it we doing roads, houses or any infrastructural programmes, we make sure that part of the planning involves DM office so that if for example we build roads, and then in most cases when people are building roads, drainages and water from drainages flows to residences. And as a result when people have got conducive roads, but there are communities affected because the drainage spins right back to communities and becomes a DMO problem and call for our involvement in any infrastructural programmes, to avoid the possible risk. Another thing is that we are currently negotiating with the council and the provincial government to put more funding in DM issues, so that our measures to reduce disaster risk being more effective because we have discovered that disasters are more expensive and that DMO have no specific or direct allocation. Even if the municipality gets funding that money is for other programmes and as a result DMO is left without a budget. Now we engaging with the council and officials to fund and allocate us a budget. We also want that money or budget allocation to be included in the IDP so that we can easily do performance management. (DDMOB1)

What is the nature of disasters that is likely to affect your area?	
DDMOA	DDMOB
we are prone to quit a number of disasters, you will be amazed, on the 25th of October 2015 from ward nine of uMshwathi Local Municipality, a bedroom house was completely destroyed by structural fires, which is that is caused by the negligence of a person. We are affected by both man-made and natural disasters. Natural disasters will be the lightning, about three weeks ago in ward three of uMshwathi, which is Mount Elias area, we had three fatalities. In one family it was two sisters, who were in a two roomed house and were struck by lightning and passed on. About three of other members were injured. About few metres from that house three was another one fatality I Mount Elias. So lightning is a serious thing for us, over and above lightning we have heavy rainfall incidents, where sometimes they are companied by strong wind and severe storms (*isiphepho).* so if there are heavy rainfall is companied by strong winds, you will notice that most of our rural communities their houses are mud based, so those people are vulnerable to such hazards. At Mooi River we experience snow. (DDMOA2)	Here at uMgungundlovu, disasters that are prevalent and high are floods, strong wind and the northern part of the district we are normally prone to snow in winter, they are different, wind, floods and storms are at summer and snowing winter and because there are informal settlements and as a result we experience fires as a result of snow. When there is snow, telephone lines, houses, damage roads and bridges and results to man-made disasters. (DDMOB2)

What strategies has the municipality put in place to engage citizens to collect Indigenous Knowledge (IK) for Disaster Risk Reduction?	
DDMOA	DDMOB
When we talk about IK we talk about something that is mainly possessed by older people in the community, which means that this knowledge is in danger of becoming extinct when older people passes on. So now the IK has to be captured and stored in a very systematic way. All along it has been orally passed on from generation to generation. What we have been doing now we've been rolling out Awareness Campaigns, maybe Awareness Campaigns on severe storms, lightning. When we do that we come with the info broacher and on how you can keep your family safe from such hazards. during these Awareness Campaigns we make sure that we also invite senior citizens and traditional leaders so that we share information, because they have this got traditional or IK, so during these Awareness Campaigns we are able to say, contemporary this is how things are done to reduce the risks, but they are able also to tell us what they normally do when there is summer time, its summer season and we know there will be lightning, there' 11 be severe storms and all of that. So you will be amazed they are able to tell by the colour of a cloud that the storm will be very much severe and it will be accompanied by a strong wind, by listening to the birds singing, there will be drought and all of that. So I think somewhere somehow, over and above these Awareness Campaigns we need to find a systematic way collecting this information. The way to, as we speak, what we are doing now is in terms of DM a 2002, no. 57, we are obligated have the DMPs. To us DMPs it means that we do IK assessment and then from there we work on the risk reduction measures. We used to make use of consultants, so they simply do copy and paste, they take a plan from other places and then come scrap the name and put your name and then that is it and then find out that the whole plan cannot be implemented. I think the way that we are doing it now is that we are going to make sure that we identify risks together with elders and traditional people with this IK and then from there we sit down and say how can we best mitigate or reduce such risks? So from there we will be able to hear from them as to what they think should be done in their traditional approaches, and we need to document that in our DMPs so that it is black and white so it comes out clear. And again from there we need to make	We make use of Risk Assessments, there RAs that are desk top which are done in a scientific way. and then we have what we call ward base Risk Assessment, so we sit with the community from each ward and ask them to identify types of disasters that are affecting them and check the historical background of disasters and then from there we discover new knowledge on their practices and the knowledge that they have accumulated overtime. They even tell us that when there is a strong wind called *inkanyamba*, they say they use tins and noise to chase the wind away. But their belief is that it is a snake that carries disasters. We engage with them in DM a matter is the more we get knowledge from the community. So that is how we obtain IK. And it is not wise to overlook the IK when dealing with DRR matters because community members have a wealth of knowledge that can be useful. Right now we have about 20 fatal within the community of uMgungundlovu as a result of lightning. they say it is because they are not following historical knowledge that have been followed over time, Knowledge such as not hiding under the trees when there is thunder storm and lightning; and avoid sweating or running during the thunder storm and that is IK. Plans to collect and utilise To ensure that, even in the Act and the framework it is stipulated that the Local based knowledge must be emphasised, hence when we do disaster plans, we make sure that that knowledge we get from the community we put it in writing in our plans as part of DRRP, because we found out that IK is valuable to communities. (DDMOB3)

sure that our knowledge doesn't substitute their knowledge but somewhere somehow we link this in reducing the risk. (DDMOA3)	

As a district municipality, how does the municipality ensure sustainable relationship with relevant stakeholders?	
DDMOA	DDMOB
the Act requires us to involve the communities in DRR process, so if u look at our Disaster Management Framework 2005 KPAl which is about developing institutional capacity for DRR, so by IC for DRR means Having office space, moto vehicles, structures (internal committees for the municipality and as well as having the committees that are meant to encourage the participation of the public in DRM issues). so in each and every municipality we have established what we call DMAF, and we make sure that the composition of such Non-Governmental Organisations (NGOs), Traditional Leaders, Community care workers (CCWs), Community Development Workers (CDW) and ward committee members and so to ensure that people are well represented in substructures and then from there we are trying now to utilise the existing local structures which we call the war rooms. so in a war room, for example, remember I was saying there was a house that was destroyed by fire in ward nine, so now that issue can be dealt with in a war room in ward nine, because in a war room you find out that all units are represented, so the community there will be able to raise the issue with a person from human settlement, to say here is a Ndaba family that is misplaced, here are the possible risk of the displacement, if you displaced you are deprived of the shelter and you are exposed other risks of being in an environment that is not conducive to you, you may sure things such as marginalisation and all sorts of things. So now when we are beginning to mainstream DM in these local structure IK war rooms. (DDMOA4)	Through our DMAF, we ensure that we involve everyone, from ward committee member to the mayor himself, we also work close with the District Unit and other stakeholders such as Working on Fire and local NGOs and local farmers. (DDMOB4)

How has the municipality been collecting local based information for DRR purposes?	
DDMOA	DDMOB
You see rural community, in uMgungundlovu, including swayimane and other municipalities people do use IK to avoid, and prevent or deal with disasters. I think for us as local government we need to recognise the importance of IK because even our legislation does recognise the IK. So now we need to pay more attention to the role that IK can play in reducing disaster risk and look at the way of collecting and documenting it. However, I don't really think we have been formally or officially collecting local knowledge because what we have been doing is Risk Assessments, of which is something very different from collecting the local knowledge for DRR. But I wouldn't say we have not heard about local strategies to reduce disasters. The only obstacle is funding; we do not have enough financial support to deal with disasters to that extent. Nonetheless we have listening to people in communities during our visits for Risk Assessments and they have a lot to say about their knowledge and about what they do for survival. It is just a matter of calling them under one roof and asks them to tell us the challenges they face and how do they overcome them. (DDMOA5)	What I understand about this is that we have been collecting IK for DRR it is just that we were not aware that we are collecting it. I am saying this because when we do Risk Assessments, people do not only tell us about their prevalence to disasters but they also tell us about what do they normally do to cope with that particular disaster, some of them even give advice to those who are affected. The only thing that we have not done is to make it official and take note of everything they say. (DDMOB5)

What has the government done to promote the use of IK for planning and implementation of DRR strategies?	
DDMOA	DDMOB
We are aware of IK but little has been done to in terms of addressing that. Because we are aware and IK I said we have begun to say let there be People coming with the IK let us share their knowledge and let us make sure that everybody is aware of this knowledge. So I think in a near future we will pay more attention to it. (DDMOA6)	We have been working with traditional healers, basically because our focus has been on traditional medicine. But I would be lying if I say we have looked at that in terms of DRR. Nevertheless, we value IK and we respect its presence and resourcefulness, it is just that we need to open our eyes and act before we lose it fore ever. (DDMOB6)

How does the municipality ensure the documentation of local based knowledge for DRR?	
DDMOA	DDMOB
We will make sure that in compiling our DMP we will document what the people tell us. Let me tell u something, IK is practiced in all aspects of DM. Preparedness, prevention, response and recovery. But I know you interested in preparedness and prevention. IK contributes to food security. Use cow dung as fertiliser so we do want to discourage them from doing that. These places the cropping, they know that cropping is season sensitive. They know when to cultivate and harvesting. For example, in Swayimane they have good soil, but they do not know about climatic changes. We must educate them about the dangers of climate change because they know when to plant, cultivate and harvest. So that they won't be victims of climate change they, may affect everything that they plant. We need to conduct the study to educate them on what to expect in terms of weather patterns, so if we expect drought we need to bring in a specialist in crop science that will inform them on the types of crops that are tolerant to droughts. And again if we expect heavy rainfalls, people need to be told on types of crops that are good to planted and say we know you have been focusing Bambara, maize and potatoes, but if you look at the climate it says we may have lot of rain so we begin, through the use of these crop scientists. We begin to educate them on the crops that can tolerate water logging and those that can tolerate droughts. We do need scientific knowledge, to model some of these things with their knowledge they are not certain about the future weather conditions so scientific knowledge can come in to assistant to tell us that there will be droughts and then advise them on the types of crops to plant, even tell them on multi-cropping. Because of them plant certain types of plantation, because some of them may say here in Swayimane we plant sugar cane, Bambara and maize, but with scientific knowledge no we may say that here we can also plant beans and all that. So over and above you do find that these people have got livestock; cattle, goat and sheep, so if you go to their gardens you don't see vegetables that can save both human and animals. Because the climatic changes will tell you that there won't be grazing lands due to fires and overgrazing, so scientific knowledge will be needed. (DDMOA7)	Local knowledge has been recognised as the very important knowledge system for the survival of the community. However, there has not been a systematic way of collecting it and officially documenting it. Even with medicine, we have had *izangoma* and other traditional healers within the municipality. We have not found a proper way of getting them to give us an also store what they know about local medicine. Furthermore, in our DMP we will make sure that with regards to the strategies for reducing disasters; we include local knowledge and practices for reducing disaster risks. (DDMOB7)

Which policies that the local government has put in place to integrate DRR, Indigenous knowledge and community participation?	
DDMOB	DDMOA
What is happening now Mr. Nxumalo. is that we have realised that in our organisational structure that there are gaps, you can call it development gaps, you realised that in the structure that there are people who should be doing certain things, so we have realised that to our organisational structure we need to have a person who will be responsible policy and planning issues. We have established the post and the procedure are in motion. So it a matter of implementing that. (DDMOA8)	Unfortunately, there are no policies that that I know of which have been implemented by the local government to integrate DRR, IK and CP. however, SALGA, as one association for Local Government in South Africa has been instilling the fact that Local Governments should decentralise the functions of DM and ensure that we are in line with the slogan of ensuring that disaster is everybody's business. I think that part automatically involve indigenous communities including every stakeholder that may be involved in the processes. (DDMOB8)

How can DRR related policies be improved?	
DDMOA	DDMOB
The whole problem will be addressed after the post have been filled because what I have seen now is that there are huge gaps in DRR, Community Participation and the usage of IK. But with regards to DRR we are planning on the DMP. We make sure that in every response or preparedness measure that we put in place, the people themselves are there they participate in our workshops. Because we will do RA and RR workshops. because we working with many words, we will cluster wards maybe into three and then bring everybody and then say here are the risks that were identified, we identify risks and then rate it, we say here are low, medium, and high risks from there we be say ok together let's put RR measure as a collective not just as a municipality, which can be done in a top down approach. (DDMOA9)	policies are not enough in such a way that, if there are you find sometimes since we are at the Local sphere, even councillors are not in good understanding the process, there is a gap where councillors would say to the local municipalities, where they insist on saying the DM is a District Service and local municipalities are not allowed to deal with it. In fact, there is a Bill that is empowering local municipalities to be equal in terms of disasters to DMs. (DDMOB9)

How does the municipality identify disaster prone areas within the municipality	
DDMOA	DDMOB
To identify disaster prone areas, we look at many things which are sources of our information, for example we receive calls from the community, through their ward councillors and community representatives. So most of the incidents are reported to us and we use such records for historical data, then we go back and say what type of incidents were reported and recorded and then which ones are carrying a high risk of human life. The people that have called are helping us in knowing which areas are prone to what types of disasters. But now that we are working on the DMPs we are going around communities and convene meetings in community halls and bring in all stakeholders and identify risks. There are many methodology of identifying risks, the other one may be the problem tree where we j throw a tree that is perceived to be problematic and then from there we prioritise those risks so there is a way. Either they call or we go to those communities and conduct Risk Assessments workshop. (DDMOA0)	there are many ways, one, is to gather information, we go out as field officers, we go there and get the data from info holders, which are community members. We research on the prevalence and frequency of those certain disasters and the historical background of those disasters because that's how we rate the risk of disasters. And then, going out to people to engage with communities on how this knowledge be utilised for DM, it helps us to make sure that our plans are community based. (DDMOB0)

Appendix 14

Aligning interview questions with responses

What is the current status of disaster management within uMshwathi Local Municipality?	
LDMO	Firstly, we have a DMO who is on a full time basis. But there is only one officer who is dedicated to it, of which is me and I am reporting to Protection Service, Mark. The office is functioning on a daily basis, and we do have the budget as well of R250 000 per financial year. Then we have MM of course, then we have our General Manager, followed by my manager, of which is Protection Services, and at the end it's me, the DMO. We fall under Community Services Office. Our current status: we are using 2014-2016. but right now we have DMUs as I have told you, we have a practitioner appointed at a full time bases, we have functioning DMAF, we following the framework from the province because we not entitled to have a framework as yet, so we are ember in that colour. Our DMP is under construction, so we are done with risk assessments, that was our stage one according to Performance Management System (PMS) and we are going to go to stage 2 which is mapping. Disaster management unit we do have a budget which is R250 000. And it's divided into 2 section. We have 250; 170 is to support, request, if we received anything such as a situation where there is a damaged property, so in that case we buy emergency relief IK blankets. (LDMO1)
LMM	The current status is very well, although we don't have a plan as such, but we in a process of having a plan in place. Risk Assessments have been done in all 13 wards. We had a workshop where a draft report on the progress of Risk assessments that has taken place of the Risk Assessments that have been done that will help us in developing the action plan on how to mitigate and prevent disaster risks. Over and above, we have a DMOs who is responsible for DM issues. (LMM1)

What is the nature of disasters that is likely to affect your area?	
LDMO	The nature is different because wards are prevalent to different types. In ward 12 you find out that they are prevalent to flooding. But what is the most concern at uMshwathi is the lightning which has three fatalities in one ward. You can say that uMshwathi is more prevalent to lightning and structural fires. When you look at household fires you can see that there is a huge problem. So there when there have been thunderstorms with rain they are very vulnerable. Places like KwaSwayimane we have less problems of structural fires and we have a problem of drought and hail storm. We have a problem of the hail storm and strong wind is also a problem. (LDMO2)
LMM	We have draught prone areas, we also have areas where there are lightning strikes, and ward 12 has flooding places. (LMM2)

What strategies has the municipality put in place to engage citizens to collect Indigenous Knowledge (IK) for Disaster Risk Reduction?	
LDMO	Those are the Risk Assessments that we have been doing. Currently we are doing all Risk assessments and awareness campaigns to preach this DM issues. That is where we get to ask people of what are the strategies they are adopting when they come across these incidents. You find out that they tell us about the iz*insingizi*, which is a black and white bird. They tell us that they can tell that there will be a thunder storm followed by lightning with just by looking at the clouds. When it comes to the issue of drought they make use of water levels in the dams and they can tell that there will be drought. But what they use to protect themselves from the lightning, is they make use of the' older ways of dealing with the lightning. They make use of *abafana* of which I am not sure about. They also use tins as a form of awareness. The community do not respond, but it also goes together with political influences, where councillors would not want to report issues because they are reported by a person who is not from a certain political affiliation and sometimes the community themselves have a problem with the ward councillor. (LDMO3)
LMM	Risk assessment is the strategy that is used to collect IK for the use of DRR. IK is another knowledge that is being collected on what strategies have been used by the community in the past to prevent disaster risks, and when Risk Assessments were undertaken and we still have to

	do analysis and thorough research. The official compiling of this knowledge has not been done. We are looking to hire someone to officially collect and compile it for us. As we do Risk Assessments, we send invitations to communities and school to engage them in disaster risks reduction processes. We also use DMAF as a consultation strategy to engage stakeholders on DM issues and giving reports back on new development issues. (LMM3)

How has the municipality been collecting local based information for DRR purposes?	
LDMO	I think we have not had time to go deep in such a way that we go to the issue of compiling these indigenous strategies in our DM plans. We need to go to the community and only focus on the IK so that we can communicate with the elders of the community. We will be asking the community to tell us on how we can protect our households without only depending on the westernised knowledge. Disaster Management Advisory Forum: We are discussing all issues that involves a person's safety, IK everything that happened and still to happen, but it involves people's lives. So we seek ways to reduce all hazards, risks and every natural disaster that can affect people's wellbeing from all sectors of departments or government or whatever you can call it. **Risk Assessment:** The risk assessment, it is the first time for me to do this and there we targeting some disaster risks that are exposed to people, actually they are the ones who tell us. We are collecting the knowledge from the people. (LDMO4)
LMM	During the time we did Risk Assessments, we were engaging with community members in order to get that local knowledge. Utilise it for DRR; after we have done all research on IK we will then include these local based strategies as additional strategies to DRR. (LMM4)

What has the government done to promote the use of IK for planning and implementation of DRR strategies?	
LDMO	We do school visits and teach school kids on the dangers of lightning since it is one of the dangerous things that are affecting the community. That is not enough but we are still seeking We go straight to the communities which will work as when we do risk assessments for collecting IK. We start back to them and see what

	knowledge they have on IK for DRR. If we go to them not only to risk assessment ways to attack the issue. We just bring the community together and collect as the municipality and compile it to the municipal planning. We use different strategies from different wards or sections. When we are done collecting from different communities within the municipality and then we assemble the knowledge and document it. We also need to join in with other departments and see on how we can deal with this issue of IK for DRR. Another challenge is that we will need to integrate or complement this knowledge with the western knowledge because there are other communities that are not necessary African. This will help in sharing different strategies from different communities. One community can use strategies from other communities. Another challenge may be on beliefs of different communities; some strategies are not suitable to Christians, for example and therefore will not use those strategies. (LDMO5)
LMM	We have not been focusing on that but we value IK a lot because we have been working with structures to some of municipality issues, such as *Izangoma* to face some of the illnesses that affect the municipality. We communicate with them on how to integrate local medicine and western medicine. With regards to disasters, after this thorough research, we will then see on how we go forward with this Ik. (LMM5)

How does the municipality ensure the documentation of local based knowledge for DRR?	
LDMO	So far we have the sector plan, but as soon as we are done with compiling dmp, we will be able to tell from the documented IK strategies in the DMP. So we don't have documented knowledge right now we only have sector plans. (LDMO6)
LMM	We will document it down from the sources and make a guide to the implementation of IK strategies to reduce disaster risk. (LMM6)

How do district services affect the implementation of DRR strategies?	
LDMO	So far we don't rely on the district. We only rely on them when we need rehabilitation services, but for now we only get help in personnel form. Mthoko is just here to assist. But right now we have our own things and plans that are

	independent of the district. The relationship is good but sometimes it is not. (LDMO7)
LMM	I want to make it clear that we are also the part and parcel of DM, since Lungile is our DMO, she does those risk assessments and if it's a minor issue, we assist where we can. If it's out our jurisdiction, we invite the district and if the district fails then they invite the province. (LMM7)

Which policies that the local government has put in place to integrate DRR, Indigenous knowledge and community participation?	
LDMO	Not yet we only the stipulated one because we can only make by laws and they are only from the province. But even the province is aware of the use of IK for DRR. (LDMO8)
LMM	As I have said that we will do the research and analysed these things and identify practical situations and then it will form part of our framework after we have found ways of utilising them. (LMM8)

How can DRR related policies be improved?	
LDMO	I think since we are still on this to IK for DRR topic, policies that compels us local municipalities to include IK for our planning and IDPs. We also have to review policies that are disaster related and accommodate IK. Politicians are also a problem; they don't want to take it to their heads that disasters are our problem also as a local municipality. So over and above there is no common understanding between the politicians and us administrators. (LDMO9)
LMM	Policies are reviewed periodically, they are not viewed and to accommodate current developments. In this regard we only depend on the provincial and national government for policy development because our by-laws can go as far as our area or jurisdiction in terms of policy formulation. Again we face different challenges since DM is a District function. (LMM9)

How does the municipality identify disaster prone areas within the municipality	
LDMO	We are prone to these areas, ward 3, 5, and 6. We are prone mostly to lightning and the rest of types

	of disasters are occurring in different communities. (LDMO0)
LMM	Risk Assessment and reports from the community are one of methods we use and at some point we use National Weather Service. But the primary source is the Risk Assessment. (LMM0)

Appendix 15

Aligning Interview Questions with Responses: TLs

What knowledge does *inkosi* has on the concept of DRR?	
STL	UTL
jah the knowledge I have on DM, we are not taken care of, there are no assistance from the government, we don't have water, dams and boreholes to protect and feed our livestock. There is one more thing that I almost forgot is that we do not have Felds for our cows to be stored. We don't have proper fields for our cows and as a result livestock will die of hunger. This place is full of alien trees like wattle trees and they block fresh grass that have used by our livestock. (STL1)	Disasters come mostly in two ways here; it is hail storm and the strong wind. It is mostly dangerous because it destroys properties, and kills our livestock. The lightning is also the problem and the issue of drought. What do you understand about the use of IK to reduce disaster risks? We used to call the traditional healer to strengthen the house, the traditional healer always takes out *abafana* on the roof so that the storm and the lightning does not strike the household. And most of these lightning types would come with fire. If there we were going to experience drought there was too much wind, too much wind comes with drought because it dries the soil and another thing is that the wind does a lot of harm like blowing the houses and end up killing people. (UTL1)

What do you understand about the use of Indigenous Knowledge to reduce disaster risks?	
STL	UTL
Oh the lightning, traditionally there were indigenous ways and practices that were performed in most households, to prevent the lightning from destroying families. There were no such things as people being frequently stricken by the lightning. The knowledge that we have has been the knowledge that, when there was a strong wind and hailstorm, people were not allowed to work. secondly, people have lost the tradition and the use of local knowledge, in most cases when you bring this knowledge to the young generation, for example; there are children who go for Umhlanga, when they come back from Umhlanga, some people see it and like it but are resistant to follow the same procedures, that is how people have lost their traditions, which may lead us from even saying we are bewitched but only find out that it is us who have lost the tradition and values. (STL2)	First of all, I understand that we have our own knowledge that has been passed on from generation to generation, and this kind of knowledge is one that we inherited from our fore fathers. The problem with this knowledge we are compromising its usefulness and as a result we end up taking other people's knowledge. For this DRR you are talking about, I think it is something that comes with living, because we do things based on what we know and you find out that somebody names your practice; that story of a black person. Black people have had their practices for a long time but them now embracing them because they are named with fancy English words. You will see, many people will act as if they like what you are talking about and forget that they have lost it long ago. We have been consulting *Izinyanga* and *Izangoma*, we have been using herbs to heal ourselves, and we have been growing our own food for survival. In all that we have been using our own knowledge. So the use of IK for that DRR, the answer lies with focusing on what you know and what was taught to you by your parents. Again it could

	be much simpler if we had not lost our traditions; the problem with us is that we have lost everything; our traditions, and the culture itself. Even our rituals are now civilised and modified. We do white weddings now, we use coffins and the worse of all we speak English to one another.(UTL2)

To what extent does *inkosi* promote and encourage the use IK for DRR?	
STL	UTL
When I speak about the lightning it is left with each household to protect their families from the changes of weather conditions for people to consistently possess this IK, it starts with you as the community leader to pass it to your children through storytelling, to keep it in the family. So that they will pass it to others. And eventually the whole community gets that knowledge. (STL3)	knowledge that have been used by our ancestor was to grow food and keep food on *izinqolobane*, and there were ways to prevent our stored food from getting rotten, we would dig a huge hole and throw the maize in with *isangcobo*; that was the way to protect and store our maize. Growing maize was the back bone of the Zulu person. with it we would make different things such as, making *incwencwe*, brewing *umqombothi, samp* and everything, it is really the back bone of the black nation. (UTL3)

How does *inkosi* encourage the community into participating in government programmes to reduce disaster risks?	
STL	UTL
let me not go to the community about disasters, because we are not that involved in DM, I would rather speak on livestock and I am with uMshwathi livestock association, I was there recently in the meeting, the most important that we are fighting for is that we must be catered for and our livestock should be catered for when planning for disasters. And when we are stricken by disasters, we need to be catered for. That is what we spoke about and that we are mostly affected by drought and as a result our livestock won't have grass and even if the cow has food if there is no water, the cow won't survive. (STL4)	Government doesn't come often to us, now we just stick on doing our own things. We don't even have water, whenever we complain about water they send those big water cans to give us water. A person of this age cannot go up the road to wait for water, it is too far. The municipality normally doesn't use the traditional knowledge; they use westernised knowledge. The municipality us tractors for growing food and we did not use that we used home-made hoes and we did not have that, although they are quite effective. However, these days we sometimes see them coming to our communities to ask us about these disasters. (UTL4)

How does your community use indigenous knowledge to anticipate and plan for disasters?	
STL	UTL
There were ways and procedures followed to prevent the hailstorm to harm the community. Apart from working during the hail storm there were things done such when people see that the storm is coming, for example when the storm is coming from imposana, people would come out of their houses and shout at it. that is the first thing which is kind of deep and that many people did not welcome and did not know that it can be prevented because they thought it could not be avoided. (STL5)	If we anticipated the hail storm, we used to take out *abafana* and shout at it and chase it from our gardens and households. We did that by spilling salt or use sea water in our households and gardens, so that it won't affect our lives. As for floods, we did not have a traditional way to avoid them, unless there would be accompanied by the storm, we would use *abafana* to prevent it from the household. These things are not done anymore because they are taken away from us. The whites have taken everything from us, our values, practices, even our ways of building houses have changed, and we now build houses that are mostly western. (UTL5)

What efforts that have been made by the traditional leadership to engage communities for DRR planning and implementation?	
STL	UTL
What is most important is, currently we were visited by cogta, Mr Hlela, he has not come here Etsheni area, he has done it at ekupholeni, and emambedwini. He will come to encourage the community to use and conserve the local knowledge and also learn from the community. (STL6)	The municipality normally doesn't use the traditional knowledge; they use westernised knowledge. The municipality use tractors for growing food and we did not use that we used home-made hoes and we did not have that, although they are quite effective. However, these days we sometimes see them coming to our communities to ask us about these disasters. (UTL6)

What discussions has the traditional leadership committee undertaken to improve DRR strategies?	
STL	UTL
I would be lying, we have not been discussing mostly about disasters but we have been discussing about protecting our livestock from dying and that comes from the livestock association. Disasters are normally handled by the municipalities, both local and district. (STL7)	This thing of DM is the responsibility of municipalities; however, we end up being called in by municipalities to sit in their forums and discussions about disasters. (UTL7)

How does the traditional leadership ensure the inclusion of relevant stakeholders in giving historic knowledge to reduce disaster risks?	
STL	UTL
COGTA works with all *amakhosi* as COGTA is the department of traditional leadership, COGTA works with different people from different sections, for example, Swayimane has 4 section; Itshe, Cuphulaka, uKuphola, amaMbedu and uMayizekane. We also work with the municipality and although we have not been involved in these processes of DM and especially in the inclusion of IK for disasters. (STL8)	We have not spoken or engaged communities on giving this knowledge for use in disasters. Many people die with the knowledge. Basically because there was indigenous medicine, for example when you want to heal a person with traditional medicine, you find out that there is no one to treat because the knowledge holder has passed on. That is the reason why we are dying because we had our ways of doing things but we end up using things that were not meant for us as Africans. (UTL8)

How does the traditional leadership integrate disaster management policies with the indigenous ways of doing things?	
STL	UTL
There are, it is just that we do not focus on policies, as *amakhosi*, we are mostly involved on the implementation of those policies as it is known that there are structures that are responsible for policy making. in short I am not that involved in policy making, however I know that their policies that have been drafted to protect traditional knowledge and to use it for different things such as DM. there are traditional policies that are not seen as most effective and that have been neglected and over powered by the modern policies makers especially politicians. If I can make an example on policies that have been used by local communities for growing vegetables and food, was respecting certain days of the week. If! speak about the IK may be for DM and agriculture, let me go back at the beginning and speak about *unomkhubulwane*, when I speak about *unomkhubulwane* I speak about the Queen; where there was a day that was it used for working especially agricultural activities, there is no one who is not allowed to work. Here KwaSwayimane, we use Saturday as the day to leave everything in terms of working our gardens. It is not only KwaSwayimane, but every area and their *inkosi* do the same, but days tends to differ from section to section. These days are normally controlled one thing; of which is the day we saw *unomkhubulwane*, here KwaSwayimane Nomkhubulwane was seen on Saturday and that is why we respect this day as the day where no agricultural activities should take place. And if we work on this day disasters happen and we suffer a	There are policies for disaster that the government have implemented but they are not local based and they for the modem society and do not incorporate traditional policies for preventing disasters. As I said earlier, we have lost everything that is ours, even our values. We are living a lie; a white man invasion. There are lot of things that were given to us which are lies. Take politics for example, politics has taken everything from us, traditional leadership has been given less power and the justice system has been done to deprive our people. How can we say we were freed by one person yet that person could not even free himself? We were fighting to free that person and when he came out of jail and thanked a white person for freeing him. After that the very same person took our money and bought the land that white people took from us for free but now the tax money is paying for this land that was stolen from us. What I mean is that politics is the main diseases that deprive our knowledge and ways of doing things. (UTL9)

lot these days because people have lost the tradition, their values and practices. (STL9)	

Appendix 16

Aligning focus group guide with responses

What is the nature of disasters that have taken place within the community?	
Code	Focus Group Responses
SFGA1 AND UFGA1	One problem that we have is the issue of drought and the municipality supplies us with water but it is not enough for watering our plants in the gardens and also for our livestock to drink. We also have a problem of insects which each and destroy our vegetables such as *imifino* and all sorts of vegetation we have around here. (SFGA1) For the hail storm, we used to shout at it and it is believed that if you shout at it will stop and people would shout and say *"hhay hhay asihambe isichotho*, and Use Sea water or salt to chase it gardens and from destroying household. (UFGA1)
SFGB1 AND UFGB1	Lightning affects us most but also the hail storm is damaging our food in the gardens and also our homes. You find out that when you harvest you get far less than you expected. Drought is recently on top of this community's challenges and we are struggling with it as we have forgotten our practices. (SFGB1)
SFGC1 AND UFGC1	We have hail storms and damaged and we got help from the municipality. The strong wind is also accompanying the hail storm. We have also had droughts now and then, but if we suspect it, we normally go to the mountain to ask for the rain. Specifically, one of the elders would go to the mountain to ask for the rain, and when that elder return from the mountain, we normally get the rain. It is true, as she said, that if we wanted the rain someone from the community elders would go to the mountain and pray to the rain queen for the rain. (UFGC1)
SFGE1 AND UFGE1	We have a big problem of lightning. We are mostly prone to lightning, and recently drought has become one of the major ills that we suffer. Another thing may be severe thunder storms which normally start around the month of September. (SFGE1)

What do you understand about the use of indigenous knowledge to reduce disaster risks?	
Code	Focus Group Responses
SFGA2 AND UFGA2	Look at me and if you understand my age circumstances, is there any knowledge I can easily lean now? I have always used the knowledge that I have inherited from my parents and community elders of my time. Again, I cannot use their machines if ever I am being exposed to them. I just believe we were born with it, it is our surroundings that we have to use as ways of protecting ourselves from the ills and changes of nature. In this case, I think local knowledge can assist in reducing disaster risks and above that, black people or specifically Zulu tribe should go back to their roots and rediscover themselves in order to be able to remember these basic practices such as this one. (SFGA2) First of all, respect and love for your surroundings is the first step of understanding our knowledge. We respect the nature and we also value everything that comes from nature because we believe that it was given by God to our ancestors. That is why every spring of year, we go to the mountain and ask for a rain from the rain queen. When we do that we then go and plant for *unomkhubulwane* other clans call it inkosaszane. (UFGA2)
SFGB2 AND UFGB2	As they have said there isn't much we as elders can learn now, so the best way is to use what we have because we are quit old and nobody likes listening to us anymore. (SFGB2) For those who are still going for their periods, were giving those who were eligible to go to the mountain; they give seeds for plantations of food the queen. You were not allowed to do male circumcision during that time. We have lost our culture and community values, I wish you could take to the community hall and listen to the fancy English that people will speak and not involving IK or traditional knowledge. We have planted and harvested without consulting the rain queen, that is why we are being blown by the wind and lashed by the sun. (UFGB2)
SFGC2 AND UFGC2	I use the knowledge that I have because the municipality or councilors are too far from us and we are in a rural place and we have our practices that we have acquired long ago. What I only understand about my knowledge is that it has kept me alive for many years and I will stick to it and let younger people take the new way of doing things. But in my house the traditional healer is and will be

	consulted for any challenge that I face as a head of the house. (SFGC2)
SFGD2 AND UFGD2	We respected the day of growing food for the rain queen. When we go to that place a person who still goes for monthly period was not allowed to go to that place, which made elders to be eligible to plant for the rain queen. When they go there they sing and with their faces covered, they sing carrying their hoes, going to plant and they use to sing using insensitive songs of which as young boy were told not to listen. (UFGD2)
SFGE2 AND UFGE2	To add on what she said, we went there to plant for the rain queen to ask for the rain, for the hailstorm not to come again and also to ask for going to our gardens. And when we return from that place we used to go to the river and bath. I grew up doing that, but now people are not doing that anymore, and these weather changes are calling us on remembering our past and on how we have not been respecting the rain queen. (UFGE2)

As a community member, what historic knowledge have you been using to reduce disaster risks?	
Code	Focus Group Responses
SFGA3 AND UFGA3	Let get this straight, historic knowledge, says black people depend on the nature for survival. So, we must not act as if we were born with all these sophisticated western things. A black man calls a traditional healer, if his child, wife or himself is sick; we use traditional medicine to heal wounds, or people. As for disasters, we use *abafana* for lightning, we use seawater for hailstorm, we also shout at it for awareness and most importantly; black people are known of being very respectful. In that we value and possess high respect for our nature because it more like our mother. (SFGA3) Another way of preventing the hailstorm and ask for pure rain from the rain queen, we used to send children, mostly virgins to wear leaves of a cabbage tree and go to the river to sing for the rain queen to stop the hail storm and bring the rain. (UFGA3)

SFGB3 AND UFGB3	We have lost it all, every section has its procedures that they follow as to make sure that the nature is respected and we did that by ensuring that we don't go or work in the gardens during certain days of the week, this is a way of showing respect to the rain queen. (UFGB3)
SFGC3 AND UFGC3	To protect food from our gardens we use salt, or water from the sea, we use seawater with sea sand, and spill it in our gardens. (SFGC3) We used to plant the cycad at the gate to protect the house from being vulnerable to the lightning and other natural ills. (UFGC3)
SFGD3 AND UFGD3	We also go to the bush and plant the first crops for the rain queen (*unomkhubulwane*), which is done to increase and nurture fresh produce from the gardens. Whatever we are planting, it is going to be the first harvest and we were cultivating these crops before our own. We normally do that at the beginning of spring season. There is also a belief that children should go to the river, wearing cabbage tree leaves to ask for rain. And it is well known that when spring season approaches, all families of the community are calling traditional healers to strengthen the home to protect it from being vulnerable to the lightning and hailstorms. The healer leaves these sticks and advice the head of the house to take *abafana* out whenever there is a thunderstorm or some has passed. (SFGD3) We used to do what is called *ukubethela*, which was a process of calling a traditional healer to strengthen the household. (UFGD3)
SFGE3 AND UFGE3	To protect our food and homes from floods, we normally dig huge furrows that surround either the house or gardens. In that way floods do not destroy our homes or our gardens. (SFGE3) Inyanga would prepare sticks called *abafana*, which was also called isikhonkwane or *abafana*. But now since there is civilization, people do not use that anymore. We were advised by inyanga to take these sticks out whenever we suspect the storm and lightning. (UFGE3)

What methods have been used to keep the local knowledge within the community for DRR?	
Code	Focus Group Responses
SFGA4 AND UFGA4	White people have managed to get hold of pens long ago, so they wrote to keep record of every information. Even our knowledge would make sense and could be traceable if we had written it ourselves. The best way of keeping the knowledge is to write it down and save documents. But for us we prefer this method of passing it on through telling the next person, although that comes with many challenges such as people interpreting the knowledge. (SFGA4) Sometimes we make use of isiZulu sayings and proverbs to convey the message. There is a saying that "*loze line ngakithi*" (like to you, it will rain on us to), we normally say this to selfish people because during our times rain was the valuable thing as it brought food and very green vegetation. (UFGA4)
SFGB4 AND UFGB4	We use *izinganekwane* to instil the knowledge to this future generation. However, televisions have destroyed all that because their stories are more interesting than ours and it's because they are visualized. (SFGB4) I used to have a time with my children, we use to have time for storytelling, and tell them about different practices and knowledge on natural dangers, medicine and also talk about beliefs. (UFGB4)
SFGC4 AND UFGC4	Traditional songs and prays are also another way of keeping the knowledge. Back in the days, elders were known to be very wise people to consult, so it was easy to keep that knowledge because there was an understanding that they are knowledge holders and they are wisdom holders. Nowadays we have nothing, our children look like knowledge holders because even we have believed that modern knowledge is superior to the one we have. (SFGC4)
SFGD4 AND UFGD4	IsiZulu sayings and proverbs are other ways of keeping the knowledge. If IsiZulu teachers can be as good as ensuring that, their learners understand different meanings that may come with proverbs and saying, we can keep our knowledge at the same time practicing it. (SFGD4) You know, when we tell children to go to the river, wearing cabbage tree leaves, it is where we give the knowledge to the community and the youth at the same time. This is all done because, as the

	amaZulu tribe, we believe that for the knowledge to live long, we need to pass it to future generations, although that comes with different interpretations. (UFGD4)
SFGE4 AND UFGE4	In the family we normally make use of traditional dances and songs that conveys a massage. Most of these songs are sang in relation to a situation that may arise or that the family or community is experiencing. There is a norm that when the community is being attacked by the drought and there is no rail, the last born would be given a platform to sing and shout within the premises of the house. That last born would sing "*aline magcina kamama"* (let it rain, my mother's last born). After that we believe that the rain will come in few days or weeks. That child will grow up doing that and we then give him or her a thorough explanation of why is it done another knowledge that we believe they will need. (UFGE4)

How do you ensure that you play a role in giving indigenous knowledge for DRR purposes?	
Code	Focus Group Responses
SFGA5 AND UFGA5	These days' children spend more time in school than home, so I think at times it is difficult to instill these things into their heads because, here at home we tell them one thing and at school they are told otherwise. The knowledge they get from school always overpower ours because western history was recorded and I think it is interesting than ours because we could not write our history. (SFGA5) The future generation won't get this knowledge because as we are of this age, old but still growing, nowadays there is high level of insults when you tell a person about the knowledge that you used. People normally call that witchcraft, hence you are offering the knowledge that raised you where you were growing up, currently there is a famous insult of which is witchcraft, you find it difficult to share and you end up on not sharing, but we continue practicing and using this knowledge on our own and practicing the knowledge we were raised with. (UFGA5)
SFGB5 AND UFGB5	Hahaha ey civilization have brainwashed our children. We are the only or the last generation to possess this knowledge. Even though most of us have lost it, there are ways that some of us can and are still trying. I personally tell stories to my grandchildren and I make sure that they are interesting enough for them not to forget. (SFGB5)

SFGD5 AND UFGD5	Nowadays there are floods and they happen mostly when the snake comes out of the river (*inkanyamba*). This is because nowadays the youth do not respect the nature and the storm, back then we used to cover every shiny thing, and sit in the room a used light to ensure that the lightning does not strike the house, because it is believed that the lightning does not like the darkness. Some people attacked by the lightning as a result of negligence, nowadays the youth use cell phones, and they do not want to shut down the television. We used to use lamps called isiphefu, and it is believed that thunderstorms were the way of the creator to show his power to his people. (SFGD5) We don't share because of the reasons of witchcraft. I thank you for this because you remind me of something, here at Esikhaleni we were taught by a young child when we were attacked by the storm, and that child ask us if we still plant for the rain queen, I looked at the child and I told other parents that we have lost our culture and rituals, our youth will not know anything about our ways of doing things and their past. (UFGD5)

How do you ensure that the youth understand and make use of this knowledge?	
Code	Focus Group Responses
SFGA6 AND UFGA6	You know, old Zulu people are known to be stubborn, and that is how they see it. Nevertheless, the truth is, we believe in what we believe in and most people use that as way of softening the new generation. This generation is very soft, is very understanding and as a result they end up losing their principles and practices in a quest of trying to be civilized. We tell our stories to them with a believe that they will tell to another. (SFGA6) These young people do not listen they do not regard IK as something that exist and that is still relevant. (UFGA6)
SFGB6 AND UFGB6	We have got our knowledge that we have been using for years and we are using it, although we don't share anymore because nobody wants to know since the western knowledge has overtaken. (SFGB6) In terms of lightning, they always use their cell phones with no fear of the lightning and watch television during lightning strikes. When you go to their rooms you find out that these young boys are watching soccer and you cannot get in their way because they will tell you about coppers that are distributed by the municipality and that they are

	the ones who go to school so they know more than us. (UFGB6)
SFGC6 AND UFGC6	They love old stories, so I tell them old stories. I normally start with my youth stories. I tell them about the time when I was still young and end up telling them about serious thing. Even when I want to tell them about politics and the history of our family, I make sure that I start with the interesting part of which may be about how and where I met their mother. So I also use that opportunity to talk about the realities of respecting the nature and the rain provider. (UFGC6)
SFGD6 AND UFGD6	We only share with our children because they are the ones who assist us, although they are not interested in knowing our old practices as black people. This is only because the youth is being told that our ways of doing are inferior and unfortunately, we do not have any way of proving that most of the western knowledge is ours and that it is just that they have polished and modified it so that it will look sophisticated. (SFGD6)
SFGE6 AND UFGE6	As you ask me that, I still have the old knowledge that I need to pass it to you and you need to take it as it is. It starts when one of the families in the community has a family member who has passed on. During this time, we mourn by not going to gardens and not even shouting at the children. Children were not even allowed to go to the funerals; this is because it is believed that if you take children to the funeral they will be haunted by evil spirit. (UFGE6)

What indigenous indicators does the community use as instruments to anticipate certain and different disasters?	
Code	Focus Group Responses
SFGA7 AND UFGA7	Hot wind and phony fields were some indicators that we will experience drought and as a result we would be expected to grow drought resistant crops. (UFGA7)
SFGB7 AND UFGB7	We use clouds to anticipate the hailstorm and heavy rainfall; there black and white clouds, back in the days there were small sticks called (*abafana*) to prevent the lightning from striking households. To prevent the hailstorm or to reduce the risks of it and there were knots that were knitted. This protected the plantations from being destroyed by hailstorm. (SFGB7)

	A very strong lashing sun is sometime an indication that there might be thunderstorms followed by lightning. (UFGB7)
SFGC7 AND UFGC7	There was a ritual where elders used to go to the mountain and ask for a rain to end the drought, and when they come back, the rain surely rained. We are not doing it now because in the modern times they can lough at you and call the practice a witch craft. (SFGC7) Isikhonyane is one of the things that we know for sure that there will be a hailstorm. One other thing is the Horn bill, this type of bird tells us if there will be thunderstorms and if they are going to be severe or not. (UFGC7)
SFGD7 AND UFGD7	When there would be a lightning, people in the house would feel fatigue and sleep, then attack the house on their sleep. The first aid to that is to give the people in the affected house milk and or *maas*. (SFGD7) We sometimes use dark clouds as a way of anticipating heavy rain and lightning. However, these indicators are not always on point, sometimes dark clouds come with a heavy rain without lightning and some come with thunderstorms or hailstorms. (UFGD7)
SFGE7 AND UFGE7	There are many types of birds that are we use as indicators to predict weather conditions. Some birds only sing when there is going to be heavy rains and we end up coming up with ways to imitate and translate their way of telling us what to do, for example some will sing like "*Phezukomkhono*" there we know that the bird is encouraging us to go to our gardens and plant food and that there we must expect too much rain. (UFGE7)

Are there any government programmes for DRR? **Probe: If so, what efforts that have been put in place by the community to engage themselves into government programmes for DRR?**	
Code	Focus Group Responses
SFGA8 AND UFGA8	There are programmes, it is just that they are given to us to implement and with that I blame ward committees for not discussing it with the community before implementing. We want to participate but there are no proper ways of participating and we are not sure of procedures that are followed for us to be heard. (SFGA8) There used to be people form agriculture, but it was mainly focused on agriculture and touch climatic changes. But the municipality has not done enough to involve the community for disasters. Now during winter, we don't have fields to take our cows to because we are told that our cows will be confiscated if they are seen around other households and to get it back we have to pay. So this looks more like a white man's community nor rural that we use to have during our times. (UFGA8)
SFGB8 AND UFGB8	No they don't, they always feed us with their western knowledge, even if they do come to us, and they normally come when they have to give us food parcel, tents and sponges. (SFGB8) The municipality has not involved us in terms of contributing or giving us the platform to give this knowledge. Not often, we are not involved in matters of disaster but we get food parcels after been stricken by things like lightning or burnt by structural fires. (UFGB8)
SFGC8 AND UFGC8	We are always called in for community meetings mostly to discuss development issues, but those issues are not solved and I think these things are done to make us believe that the councillor is working. (SFGC8) The councillors only come during election campaign and have not had water since 2008 but we have a big dam in our community. The only thing we are told is that we should take care and protect it. I do not know who is responsible for this but the people who are responsible for providing water now is the municipality. (UFGC8)
SFGE8 AND UFGE8	Here we have a problem of being neglected when we complain about floods, because we are always vulnerable to floods, the government doesn't want to take action or even remove some of the houses. (SFGE8)

How does the community involve themselves into government programmes for the improvement of DRR strategies?	
Code	Focus Group Responses
SFGA9 AND UFGA9	In most cases if you taught yourself to be active in everything that is happening in and around your community; it is easier for you to be involved in anything that the community does. I myself involved in many things and some of the government programmes. I also sit in the community war room; we normally discuss issues that are affecting the community. There are many people dying because of lightning at uMshwathi, so in recent days we are called now and then to discuss possible way of protecting our families from the lightning. (SFGA9) We don't have any specific way but we use our ways of protecting ourselves from all those natural ills. (UFGA9)
SFGB9 AND UFGB9	The municipality does not involve us in terms of giving the knowledge that we have on reducing disasters. They don't even come since we have a problem of the shortage of water. They don't ask us of how we are coping with this issue of drought. (SFGB9) I don't really think we doing much because even if the government does not reach out to us, but we still have these kids that are still young. We should be putting more emphasis of these ways of doing things into our children instead of trying to change other peoples' old children. The problem is that we have lost control of our children and so they will not listen to us anymore because they were not raised with this knowledge that we possess. (UFGB9)
SFGC9 AND UFGC9	People who are mostly involved in these things is young people because they like their votes and councillor only visit us during these times where we are going for elections, they promise all nice and important things and wait for us to vote. After we have voted then they leave us until it is voting time again. (SFGC9) At the end of the day, the best thing to do is to keep quiet and do what you believe in. these people always involve us when they need our votes and when we call for them nobody reach out to us and help us. So when you are not listened to, the only option you are left with is to stay in your

	house and do what you know and what cat can help you to survive. (UFGC9)
SFGD9 AND UFGD9	We like to tell stories about our old way of doing things but we know that we will get laughed at and we also know that this new generation of the white man don't need our knowledge and they treat it as the methods that were used as a result of being illiterate. (SFGD9) I personally think we do not matter anymore, we are a dead generation, our kids have been exposed to the knowledge that was sold to our forefathers and the mistake started there when we thought white people knowledge is better that ours. Yes, it is better than but it does not mean I cannot use mine and it cost too much to go hospitals, buy their medicine drink their water and also use their fertilizer. So I think we are just there to see our knowledge perish. The white man has been here for a long time and there is nothing we can do without the support of this generation. (UFGD9)
SFGE9 AND UFGE9	The municipality is the one who have to come to us and talk about those things, because we have our things and we don't benefit from them all the time because they give promises and fail to keep them. (SFGE9) It is quite difficult to involve yourself into something you not even welcome and encouraged to get into. However, as the community; our role is only played by keeping the old principles that we retained and inherited from our ancestors. (UFGE9)