The role of indigenous knowledge in disaster risk reduction: a critical analysis

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DECLARATION

I, Oageng Ivan Maferetlhane, declare that the study entitled: "**The Role of Indigenous Knowledge in Disaster Risk Reduction: A critical analysis**" is my own work, submitted for the awarding of the Master's degree, and that all sources I have used or quoted have been indicated and acknowledged by means of complete references, and that neither I nor anyone else at this University or any other educational institution has previously submitted this study for degree purposes.

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Oageng Ivan Maferetlhane   Date

DEDICATION

This dissertation is dedicated to my late mother Mamokete Maferetlhane who taught me to persevere and fight for success. I wish she was alive to see and celebrate this accomplishment. May God bless her soul.

ACKNOWLEDGEMENTS

ABSTRACT

Although the importance of Indigenous Knowledge systems has been recognised by international organisations, such as the United Nations and World Bank, the role of Indigenous Knowledge in Disaster Risk Reduction has to date not received the attention it deserves in South Africa. Little is known about how South Africa's indigenous communities use Indigenous Knowledge to avoid, prevent and deal with disasters. This study has sought to investigate the role of Indigenous Knowledge in Disaster Risk Reduction in Taung, South Africa. The research reported in this dissertation has focused on identifying the principles, procedures and best practices in the role of Indigenous Knowledge in Disaster Risk Reduction of the two indigenous communities of Qho and Mokasa 2 in Taung; and how this knowledge was acquired, interpreted and used. The overall objective of the research was to investigate the role of Indigenous Knowledge in Disaster Risk Reduction. The study sought to document information related to Indigenous Knowledge, so that its importance in Disaster Risk Reduction could be realised.

This research was conducted within a qualitative paradigm. Data were collected by means of semi-structured interviews. The participants in the study were representatives of the community and included elders, traditional leaders and healers. In addition, semi-structured interviews were conducted with representatives of institutions involved in the fields of disaster and traditional leadership. Semi-structured interviews were conducted with twenty respondents and three key informants/officials. The collected data were thematically analysed.

The findings in this study revealed that, generally, the people of Taung have rich Indigenous Knowledge in many areas of life. Taung local communities have a variety of Indigenous Knowledge and practices that are used in Disaster Risk Reduction initiatives, such as disaster prevention and preparation, food security, agriculture, water conservation, medicinal products, land use planning, as well as environmental strategies. These practices are used as survival strategies in times of disaster – and also to prevent the onset of disaster. In addition, the

findings from representatives of institutions also indicated that they are of the view that Indigenous Knowledge has a role to play in Disaster Risk Reduction.

The findings also revealed that Indigenous Knowledge is mainly possessed by older people in the community and this has implications for it possibly becoming extinct when they pass on. Although people possess Indigenous Knowledge and use it every day, they are not aware that it is Indigenous Knowledge, and that they are using it for the purposes of Disaster Risk Reduction. Despite the fact that people are not aware of Disaster Risk Reduction, the findings have established that Indigenous Knowledge plays a major role in Disaster Risk Reduction.

The examples provided in this study can be used to demonstrate the benefits of Indigenous Knowledge in Disaster Risk Reduction to communities. It has been shown that, in answer to the guiding question posed for this study, Indigenous Knowledge has an important role to play in Disaster Risk Reduction. The research concluded that Indigenous Knowledge could add value, since it plays a crucial role in Disaster Risk Reduction.

The study recommended that various strategies should be developed and implemented to improve the role of indigenous knowledge in Disaster Risk Reduction and more research should be conducted to collect Indigenous Knowledge, as it relates to Disaster Risk Reduction – for all those communities that depend on this very important resource.

SAMEVATTING

Alhoewel die belangrikheid van inheemsekennisstelsels besef word deur internasionale organisasies soos die Verenigde Nasies en die Wêreld Bank, word die rol van inheemse kennis in ramprisikovermindering nog nie die volle aandag gegee soos in Suid-Afrika verdien nie. Min kennis is beskikbaar oor hoe Suid-Afrika se inheemse gemeenskappe inheemse kennis gebruik om rampe te vermy of te voorkom. Hierdie studie is onderneem om the rol van inheemse kennis in ramprisikovermindering te ondersoek in Taung, Suid-Afrika. Die navorsing, waarvan hierdie mini-skripsie die verslag is, is gerig op die identifisering van beginsels, prosedures en die beste praktyke in die toepassing van inheemse kennis in die vermindering van ramprisiko by twee gemeenskappe, naamlik Qho en Mokasa 2 in Taung. Dit handel ook oor hoe hierdie kennis deur die gemeenskap verwerf, vertolk en gebruik word. Die grondliggende doelwit van die navorsing was om die rol van inheemse kennis in die vermindering van ramprisiko te ondersoek. Met die studie word inligting in verband met inheemse kennis gedokumenteer sodat die waarde daarvan in die vermindering van ramprisiko ingesien en in die toekoms gebruik kan word.

Die ondersoek is binne 'n kwalitatiewe paradigma uitgevoer. Die data is by wyse van gedeeltelik gestruktureerde onderhoude ingesamel. Verteenwoordigers van die gemeenskap, wat ouer mense, tradisionele leiers en -genesers ingesluit het, het aan die ondersoek deelgeneem. Daarbenewens is onderhoude gevoer met verteenwoordigers van instellings wat betrokke is op die gebied van tradisionele en rampleierskap. Semi-gestruktureerde onderhoude is gevoer met twintig respondente en drie sleutelinformante/beamptes. Die versamelde gegewens is tematies ontleed.

In hierdie ondersoek is bevind dat die mense van Taung oor die algemeen 'n ryk inheemse kennis op baie lewensterreine besit. Die plaaslike gemeenskap in Taung beskik oor verskillende soorte inheemse kennis en praktyke wat toegepas word in inisiatiewe om ramprisiko te verminder, inisiatiewe soos rampvoorkoming en -voorbereiding, voedselsekuriteit, landbou, waterbewaring, medisinale produkte, beplanning van grondgebruik, asook in omgewingstrategieë. Hierdie gebruike word toegepas as oorlewingstrategieë in ramptye en ook om die uitbreek van 'n ramp te voorkom.

Daarbenewens het die bevinding van verteenwoordigers van instellings ook aangedui dat hulle van mening is dat inheemse kennis hedendaags ingespan kan word om ramprisiko te verminder.

Daar is ook bevind dat hoofsaaklik die ouer mense in die gemeenskap oor inheemse kennis beskik, en die implikasie hiervan is dat inheemse kennis moontlik kan uitsterf. Hoewel mense oor die inheemse kennis beskik en dit daagliks gebruik, is hulle nie daarvan bewus dat dit sodanige kennis is nie en dat hulle dit vir die doel van die vermindering van ramprisiko inspan nie. Daar is bevind dat, hoewel mense nie bewus is van ramprisikovermindering nie, inheemse kennis 'n belangrike rol in die vermindering daarvan speel.

Die voorbeelde wat in hierdie ondersoek gegee word, kan gebruik word om die voordele van inheemse kennis t.o.v. die vermindering van ramprisiko aan gemeenskappe te demonstreer. Daar word aangetoon dat, as antwoord op die leidende vraag in hierdie ondersoek, inheemse kennis 'n belangrike bydrae kan lewer in risikovermindering by rampe. Met die ondersoek is tot die slotsom gekom dat inheemse kennis waarde kan toevoeg aangesien dit van deurslaggewende betekenis in die vermindering van die risiko tydens rampe is.

Die studie vereis dat verskeie strategieë ontwikkel en uitgevoer word om die rol van Inheemse Kennis oor Rampsrisiko te verbeter en beveel aan dat meer navorsing gedoen behoort te word om Inheemse Kennis te versamel aangesien dit betrekking het op die vermindering van ramprisiko vir al dié gemeenskappe wat afhanklik is van hierdie baie belangrike hulpbron.

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LIST OF ACRONYMS

ACDS	African Centre for Disaster Studies
CBD	Convention on Biological Diversity
DEAT	Department of Environmental Affairs and Tourism
DRR	Disaster Risk Reduction
DST	Department of Science and Technology
DTI	Department of Trade and Industry
ICSU	International Council on Science
IDNDR	International Decade for Natural Disaster Reduction
IKS	Indigenous Knowledge Systems
IK	Indigenous Knowledge
ISDR	International Strategy for Disaster Reduction
NCS	National Curriculum Statement
UN	United Nations
UNDRO	United Nations Disaster Relief Organization
UNISDR	United Nations International Strategy for Disaster Reduction
UNESCO	United Nations Educational, Scientific and Cultural Organization
WCDR	World Conference on Disaster Risk Reduction

CHAPTER ONE

INTRODUCTION

1.1   ORIENTATION

For some centuries, Indigenous Knowledge has been used by many communities around the world as a mechanism to survive natural calamities. There are several stories that have been related, after major disasters, on how communities have used indigenous ways to protect lives and property. According to the United Nations International Strategy for Disaster Reduction (UNISDR) (2008), after the 2004 Indian Ocean Tsunami, two success stories emerged, bringing new interest to the concept of Indigenous Knowledge. The United Nations International Strategy for Disaster Reduction (UNISDR) (2008) emphasized that the Simeulueans living off the coast of Sumatra, Indonesia, and the Moken living in the Surin Islands off the coast of Thailand and Myanmar both used knowledge passed on orally from their ancestors to survive the devastating tsunami.

According to Kamara (2005), studies in Kenya on the application and use of traditional knowledge in environmental conservation and natural disaster management cited examples of areas where such knowledge is still prevalent and is being harnessed. He stated that traditional Indigenous Knowledge of storm routes and wind patterns enables people to design their disaster management long in advance, by constructing shelters, such as wind-break structures, walls, and homestead fences appropriately. He further stated that similarly, knowledge of local rain corridors enables them to prepare for storms. Knowing the colour of clouds that may carry hailstorms enables people to run for cover. Knowing that prolonged drought is followed by storm, thunder and lightning during the first few rains enables people to prepare for and to expect a disaster. A change in birds' cries or the onset of their mating period can also indicate a change of season. Kamara (2005) also stated that similar application and use of Indigenous

Knowledge for disaster management is prevalent in Swaziland. Floods can be predicted from the height of birds' nests near rivers. Moth numbers can predict drought. The position of the sun and the cry of a specific bird on trees near rivers may predict the onset of the rainy season for farmers. The fact that Indigenous Knowledge has been used for many years is supported by Dekens (2007:3) who argues that since the 1970s, a growing body of literature has highlighted the importance of integrating local knowledge and practices into development and conservation projects. She argued that a less well-known finding, but one that is also to be found in a growing body of literature comes to a similar conclusion in relation to natural hazards and disasters. She substantiated her arguments by quoting literature studies in Sociology (Dynes, 1974; Fritz, 1968; Barton, 1970; Quarantelli 1978), Geography (White, 1974; Burton et al., 1978); and Anthropology (Torry, 1979) that supported her argument. Most of the work on human response and adaptation to natural hazards and disasters has advanced further in the developing world than in developed countries (Dekens, 2007:3). She argues that this may be due to the fact that most of the people who live in the developing world are still mainly using indigenous ways of life.

According to Mwaura (2008:4), the global scientific community has already acknowledged and endorsed the relevance of Indigenous Knowledge at the World Conference of Science in Budapest, Hungary in 1999. The conference recommended that scientific and traditional knowledge should be integrated, particularly in the field of environmental development. In 1999, the World Conference on Science assembled under the auspices of the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the International Council on Science (ICSU). These bodies urged governments to promote the understanding of Indigenous Knowledge Systems (hereafter referred to as IKS) (Battiste, 2002:8). The conference participants requested the sciences to respect, sustain, and enhance traditional knowledge systems and they recommended that scientific and traditional knowledge should be integrated into any interdisciplinary projects dealing with links between culture, environment, and development.

De Guchteneire *et al.* (2004) indicated that Indigenous Knowledge faces the risk of not being captured and stored in a systematic way – because it is handed down orally from generation to generation. Mosothwane (1997:727) stated that Ndaba asserted that the youth do not value Indigenous Knowledge because some issues that it raises are not scientific. Indigenous Knowledge, therefore, needs to be protected by studying and documenting it, in order to guard against its extinction. This also applies to the use of Indigenous Knowledge in Disaster Risk Reduction. This point is supported by the Department of Science and Technology (2004), which emphasizes the fact that Indigenous Knowledge needs to be recorded, protected and utilized in ways that will benefit both owners and communities. Guided by the above argument, it becomes necessary to inquire into and investigate the role of Indigenous Knowledge in Disaster Risk Reduction in South Africa.

In order to deal with disasters in South Africa, the Government in January 2003 promulgated the Disaster Management Act 57 of 2002 (South Africa, 2002). The Act calls for the active participation of all stakeholders, including the private sector, non-governmental organisations, technical experts, communities, traditional leaders and volunteers, in disaster risk management planning and operations. The Act also recognises the critical role that traditional councils can play. One of the functions of traditional councils is to promote Indigenous Knowledge systems for sustainable development and disaster management. In terms of this Act, it is clear that traditional authorities and communities have a critical role to play in terms of Disaster Risk Reduction.

According to Rengecas (2010), the Cabinet approved the Indigenous Knowledge Systems Policy in 2004. This Policy provided a broad basis for the "recognition, understanding, integration and promotion of Indigenous Knowledge resources within South Africa" (Department of Science and Technology, 2004). In addition, the 2004 policy placed the responsibility on various governmental departments to review the country's legislation, and to propose amendments to protect South Africa's traditional knowledge. Specifically the Department of Environmental Affairs and Tourism (DEAT)

initiated the Environmental Management Biodiversity Act, No. 10 of 2004, and its Regulations. These provide for the regulation of benefit-sharing. In addition, the Department of Trade and Industry (DTI) initiated the Patents Amendment Act, No. 20 of 2005, which ensures the protection of biodiversity, and also ensures adequate compensation to the indigenous communities (Rengecas, 2010). The legislation above deals with the benefits derived from the use of traditional knowledge. It does not protect traditional knowledge per se.

In terms of traditional knowledge, the Department of Trade and Industry has drafted the Intellectual Property Laws Amendment Bill, 2007 (the Bill) together with a policy framework on the Protection of Traditional Knowledge through the Intellectual Property System. The Bill seeks to protect the expression of traditional knowledge by amending the Performance Protection Act, No. 11 of 1967, the Copyright Act, No. 98 of 1978, the Trade Marks Act, No. 194 of 1993, and the Designs Act, No. 195 of 1993 (Rengecas, 2010). It establishes various forms of traditional intellectual property and these include traditional copyright works, traditional designs, traditional performances and traditional terms and expressions (trade marks). Generally the above-mentioned legislation was aimed to improve the role and importance of Indigenous Knowledge in South Africa and this presents an opportunity to enhance the role of Indigenous Knowledge in Disaster Risk Reduction in the country.

This chapter provides the problem statement for the phenomenon under investigation. Furthermore, it describes the key research questions, as well as the objectives of the research. The key concepts used in the study will be discussed; and an outline of the dissertation will be given.

1.2   PROBLEM STATEMENT

It is important to note that prior to 1994, and during the colonialism and apartheid eras, both colonialism and the apartheid system marginalized African Indigenous Knowledge Systems in favour of Western Knowledge Systems. Western knowledge was perceived

to be more advanced and better than the Indigenous Knowledge System. On the other hand, African Indigenous Knowledge Systems were perceived to be primitive and old-fashioned and of no use. As a result, the rich heritage and Indigenous Knowledge possessed by African traditional communities was never recognised and could not be used in areas such as Disaster Risk Reduction.

Despite the fact that the importance of Indigenous Knowledge systems has now been recognized by international organisations, such as the United Nations, the role of Indigenous Knowledge in Disaster Risk Reduction has to date not received the much needed attention it deserves in South Africa. Little is known about how South Africa's traditional communities have used their Indigenous Knowledge to prevent and cope with disasters. This argument is supported by Jordaan (2001:1), who argues that Indigenous Knowledge, as an instrument of development, has to date not received the needed attention in developing countries, in general, and in Africa in particular.

While Indigenous Knowledge Systems have not received much attention in South Africa, the government has introduced various pieces of legislation that are intended to recognise it. Some of the legislation includes the Indigenous Knowledge Systems Policy and the Traditional Health Practitioners Legislation. The Traditional Health Practitioners Legislation was intended to recognise the role of traditional healers in the health care system and to regulate their practices. Nevertheless, not much has been documented regarding these initiatives, and most of them are still fairly new.

This study therefore has identified a lack of proper recognition of the role of Indigenous Knowledge in Disaster Risk Reduction in South Africa. The study has sought to document information related to the role and use of Indigenous Knowledge in Disaster Risk Reduction, so that its importance in disasters can be realised. The researcher believes that a systematic analysis and documentation of the role of Indigenous Knowledge in Disaster Risk Reduction could provide valuable information for the prevention and mitigation of disasters; and it could also make a useful contribution to the field of Indigenous Knowledge in Disaster Risk Reduction in South Africa and its agenda. Consequently, it will attempt to indicate cases where it is used effectively. It is

in this context that the study has been conducted, with the objective of identifying principles, procedures and best practices in the role and use of Indigenous Knowledge in Disaster Risk Reduction in Taung, South Africa.

1.3   CONCEPTUALIZATION OF THE MAJOR CONCEPTS

Throughout this study certain concepts and terms are used. It is therefore necessary to define these concepts and terms to clarify the context in which they are used in this study.

1.3.1 Indigenous

The use of the term "indigenous" began with Robert Chamber's group at the Institute of Development Studies, University of Sussex, in 1979 (Rao and Ramana, 2007:130). Cocks (2006, 4) argues that the term indigenous has been challenging to define in many parts of the world. Moatlhaping (2007:26) says that some scholars claim that it is difficult to determine the status of "indigene"; and as such they shun the use of "indigenous" and prefer "traditional knowledge". Possey (1989: 241) argues that the general agreement in the Convention on Biological Diversity (CBD) was 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. Possey (1989: 241) further argues that at present those people from non-dominant sectors of society are determined to preserve, develop and transmit to future generations their ancestral territories, their ethnic identity as the basis of their continued existence as people, in accordance with their own cultural patterns, social institutions and legal systems. In contrast, Zazu (2007:17) argues that the term "indigenous" is closely linked to colonisation, and the marginalisation on non-dominant ethnic peoples by the western world. Zazu (2007:17) also states that the term has become synonymous with the term "native" – a colonial term that referred to, in most cases, the colonised peoples of the world. Furthermore Zazu (2007:17) argues that the term is also

highly politicized and carries a stigma in that those who are referred to as indigenous take the label as an offensive one. In this study, the term indigenous is used to refer to a specific region or locality or a particular geographic area. Indigenous can therefore be applied to a specific population of a particular area who possess a unique knowledge of a particular area.

1.3.2 Disaster

According to Singh (2007:4), the term 'disaster' owes its origin to the French word 'disaster' whereby 'des' implied evil and 'astre' stands for star. The United Nations International Strategy for Disaster Reduction (UNISDR) (2002) defines disaster as a "serious disruption, of the functioning of a society, causing widespread human, material or environmental losses, which exceed the ability of the affected society to cope using only its own resources". Parker (1992) identified a disaster as "an unusual natural or man-made event, including an event caused by failure of technological systems, which temporarily overwhelms the response capacity of human communities, groups of individuals or natural environment and which causes massive damage, economic loss, disruption, injury, and/or loss of life". Neil (1986) stresses that a disaster is a social event, where the propensity for damage is dependent upon the interplay between humans and their use of the physical and social world. Baumwoll (2008:9) argues that a disaster consists of the occurrence of a hazard or event that may cause harm, and the inability of a society to manage the consequences of the event.

In line with the above-mentioned definitions the South African Disaster Management Act of 2002 (No. 57 of 2002:6) defines a disaster as "a progressive or sudden, widespread or localised, and natural or human-caused occurrence; which firstly causes, or threatens to cause death, injury or disease; damage to property, infrastructure or the environment; or disruption of the life of a community. Secondly, it is of a magnitude that exceeds the ability of those affected by the disaster to cope with its effects using only their own resources". The definition of the Act provides for two components of disasters, namely, the inclusion of the disruptive impact of disaster events, physically and socially, as well as the relationship thereof with the vulnerability of the affected.

According to the above-mentioned components, not all adverse events are disasters, only those that overwhelm response capacity. From the definition it is clear that disasters are determined by the number of lives lost, injuries sustained, and damage to property, infrastructure and environment. It therefore means that if there are very few people dead or injured and damage to property, infrastructure and environment is minimal the event is not regarded as a disaster. In the context of this study, the term disaster is used to refer to a disruption of the normal functioning of a community, caused by natural or human-made events, which have physical, social, environmental and economic impacts.

1.3.3 Disaster Management

According to Baumwoll (2008:12), Disaster Management is a general term that incorporates all the actions related to disasters. The United Nations (UN) defines the term as "the body of policy and administrative decisions and operational activities, which pertain to the various stages of a disaster at all levels." The Disaster Management Act (2002:6) defines disaster management as a continuous and integrated multi-sectoral, multi-disciplinary process of planning and implementation of measures aimed at: preventing and reducing the risk of disasters; mitigating the severity or consequences of disasters; emergency preparedness; a rapid and effective response to disasters; and post-disaster recovery and rehabilitation. In this study Disaster Management refers to all actions aimed at preventing, reducing and dealing with disasters.

1.3.4 Hazard

According to the UNISDR (2002), a hazard is defined as "a potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation". Dekens (2007: XI) defined a hazard as "a potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property

damage, social and economic disruption or environmental degradation". In this study, the term hazard is used to refer to a potentially damaging physical event, phenomenon or human activity that creates a danger to people's wellbeing, livelihood, property, or environment.

1.3.5 Risk

Risk is traditionally defined as a 'possibility for harm' (Baumwoll, 2008:12). According to the UNISDR (2002:17), in the context of disasters, risk is the probability of harmful consequences from a hazardous event, such as deaths, economic losses, injuries, physical and environmental damage, or destruction of livelihoods. In the context of this study, risk is defined as the likelihood of being affected by a disaster.

1.3.6 Vulnerability

Baumwoll (2008:14) defines vulnerability as a term that describes the susceptibility of a group to the impact of hazards. Baumwoll (2008:14) argues that the concept entered the disaster discourse in the 1970s and 1980s with a new approach to disasters entitled the "vulnerability approach". Furthermore, Baumwoll (2008:14) argues that this approach dismisses the idea that disasters are solely caused by natural or environmental forces. It is argued that disasters are "normal", and they are based on the vulnerability of a given society as being the main cause of disasters. According to the Disaster Management Act (2002:10), vulnerability means the degree to which an individual, a household, a community or an area may be adversely affected by a disaster. Dekens (2007:XI) refers to vulnerability as the conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards. In this study vulnerability is understood to be the degree to which a community or an individual is unable to resist hazard-related damage and loss, owing to its specific physical, economic and environmental circumstances. The researcher is of the opinion that the physical, social,

economic, and environmental conditions in which individuals, a household, or a community live can increase the degree and effect of a disaster.

1.4   RESEARCH QUESTIONS

On the basis of the problem statement, the following research questions can be posed:

i. What are key elements of Indigenous Knowledge and Disaster Risk Reduction?
ii. What theoretical approaches and viewpoints are in existence that can be applied to South African Indigenous Knowledge and Disaster Risk Reduction issues?
iii. What is the current role of Indigenous Knowledge in Disaster Risk Reduction in Taung, South Africa?
iv. What are the perceptions of the community of Taung on Indigenous Knowledge in Disaster Risk Reduction?
v. What recommendations can be made to improve the role of Indigenous Knowledge in Disaster Risk Reduction in Taung, South Africa?

1.5   RESEARCH OBJECTIVES

According to Mouton and Marais (1990:42), the research goals or objectives provide a broad indication of what researchers wish to attain in their research. The research objectives of the study are stated below.

1.5.1 General objective

The aim of this study was to critically analyse the role of Indigenous Knowledge in Disaster Risk Reduction. In addition, the objective was to analyse existing research, policy documents and relevant theories on Indigenous Knowledge Systems and Disaster Risk Reduction, and consequently to document how Indigenous Knowledge has been used in Disaster Risk Reduction in South Africa. The documentation of this knowledge was intended to enable the communities to understand how their traditional

ways have helped in reducing, preventing and coping with disasters, and how this knowledge can be used in future to prevent, deal and cope with disasters.

1.5.2 Specific objectives

In order to achieve the above stated aim, the more specific objectives of the research were as follows:

i. To determine the key elements of Indigenous Knowledge and Disaster Risk Reduction;
ii. To determine theoretical approaches and viewpoints on Indigenous Knowledge and Disaster Risk Reduction that are in existence that can be applied to South African context,
iii. To determine the current role of Indigenous Knowledge in Disaster Risk Reduction in Taung, South Africa;
iv. To determine the perceptions of the community of Taung on Indigenous Knowledge in Disaster Risk Reduction;
v. To make recommendations based on the literature review and the analysis of the data on how to improve the role of Indigenous Knowledge in Disaster Risk Reduction.

1.6   CENTRAL THEORETICAL STATEMENTS

The following preliminary statement can be made:

Currently there is a lack of proper recognition for the role of Indigenous Knowledge in Disaster Risk Reduction in South Africa, and little is known about how South Africa's traditional communities have used their Indigenous Knowledge to prevent and cope with disasters. Despite the fact that the importance of Indigenous Knowledge has been recognized by international organisations, such as the United Nations, the role of Indigenous Knowledge in Disaster Risk Reduction has to date not received the

necessary attention it deserves in South Africa. This statement is supported by Dekens (2007:3) who argues that the mainstream literature on natural hazards and disasters and the mainstream institutions charged with disaster management have ignored local knowledge and practices until recently. It is therefore important that systematic analysis and documentation of Indigenous Knowledge in Disaster Risk Reduction be effected to provide valuable information for the prevention and mitigation of disasters. This is done in line with the realization by Disaster Risk Reduction experts, practitioners and the international aid community that standard approaches to DRR could be improved by taking Indigenous knowledge into account (Baumwoll, 2008:56).

1.7   RESEARCH METHODOLOGY

The following section will provide a brief overview of the research methodology used in this study. More details of the research methodology and design are provided in Chapter Four.

The researcher chiefly made use of descriptive and exploratory research. The study used descriptive research, because it can explain and describe the role of Indigenous Knowledge in Disaster Risk Reduction. It portrayed the characteristics of Indigenous Knowledge in Disaster Risk Reduction. According to Mouton (2001), the descriptive function plays an important role in developing knowledge about the community needs, problems and attitudes towards service, about the nature of the service provided, and about the service used.

Since the study intended to enhance a body of knowledge on the role of Indigenous Knowledge in Disaster Risk Reduction, the descriptive research design was particularly appropriate. The function of the descriptive research method was to systematically describe the facts and characteristics of a given population, the area of interest and/or the phenomena (Merriam and Simpson, 1995).

The study was also exploratory in nature. According to Brink and Wood (1998), exploratory research investigates problems that have not been previously studied and attempts to identify new knowledge, new insights, new understanding, and new meanings, and, in addition, to explore any factors related to the topic. Babbie and Mouton (2001:79) say that this approach is typical when a researcher examines a new interest or when the subject of study is relatively new. The study has attempted to explore and find out what meanings communities give to their actions, and what issues concern them regarding the topic. This method was used mainly because the issue or problem under investigation has few or no earlier studies to refer to. In fact, very limited research has been undertaken into the role of Indigenous Knowledge in Disaster Risk Reduction in South Africa.

1.7.1 Research procedures

The methodology that was used in this study comprised two research procedures: a literature review and an empirical study. In answering the research questions and seeking to achieve the objectives of this study, a qualitative empirical research design was followed by utilising data from primary and secondary sources. This research design aimed to answer the questions raised via exploratory and descriptive research procedures. This research design made possible an in-depth understanding of the role and use of Indigenous Knowledge in Disaster Risk Reduction.

1.7.1.1 The literature review

In order to conduct a research of this nature, one needs to take into consideration what is already known. The literature review of the relevant sources related to the research project, therefore, featured prominently in this investigation. The researcher undertook a literature study to provide a broad overview of the use of Indigenous Knowledge in Disaster Risk Reduction area. In view of this, a wide range of journal articles, legislative and regulatory documents, books, theses, dissertations, newspapers articles and

articles, which had any relevance to the study, formed an important secondary source of the investigation.

The main limitation to the study is that there have been few studies done in the Indigenous Knowledge and Disaster Risk Reduction fields. The issue is under-researched; and thus there are only a limited number of scientific sources in this field. The available literature was however sufficient to complete this mini-dissertation.

1.7.1.2 The Empirical Study

For the purpose of this study, the research project was undertaken at two villages near Taung, namely Mokasa 2 and Qho in the North-West Province region of South Africa. The villages were selected because they are rural, remote from western influence, and harbour traditional knowledge. Geographical and other practical considerations, such as accessibility, were considered in the final selection of constituencies and the choice of setting in this qualitative field research (Nachmias and Nachmias, 1996:287). The area was also chosen because of the flood disasters that it has experienced in recent years.

The study area used to be part of the now defunct Republic of Bophuthatswana. Geographically, the area lies between Kimberley (in the West) and Vryburg (in the North). The people are predominantly Tswana speakers and they live in small communities of over 20 villagers under headmen. The Chief lives at Taung Village, which is the traditional capital of the area. The area is famously known for the "Taung Child Skull" that was discovered there in 1924. The area was affected by major flood disasters in March 2006 and January 2010.

The qualitative research paradigm was used to conduct the study. The qualitative approach was deemed to be the most suitable option because most of these people are uneducated and cannot read or write. The qualitative approach was considered useful to the study in view of its unique feature of allowing the researcher to get closer to subjects for an in-depth inquiry into the phenomenon under investigation.

According to Thorne (2000:15), qualitative research encompasses varying philosophical positions, methodological approaches and analytical procedures. The qualitative research approach was used, since it is best suited to help the researcher to understand human behaviour and functions. This approach was also good in helping the researcher understand how people feel, and why they feel as they do. According to Babbie and Mouton (2007:270), qualitative research is the generic approach in social research, according to which research takes, as its point of departure, the insider perspective on social action. Babbie and Mouton (2007:270) further state that qualitative researchers always attempt to study human action from the perspective of the social actors themselves. Strauss and Corbin (1990) stated that this approach is suitable where organisations, groups and individuals are studied. Therefore, this approach was deemed suitable for this research, since individuals and communities were being studied.

1.7.2 Sampling

The target population of this study comprised traditional chiefs, elders, healers who are indigenous men and women, and who are residents of the selected villages located in the surrounding areas of Taung. The other target population comprised the officials that work in areas related to disaster and traditional affairs. They were targeted because they are believed to be custodians of disaster issues and traditional affairs in the province, and could provide valuable information required to accomplish the research objectives of the study. The population in a study refers to a set of objects, whether animate or inanimate, which are the focus of the research, and about which the researcher wants to determine some characteristics (Bless and Higson-Smith, 2000:84).

Bless and Higson-Smith (1997:84) define sampling as a study of relationships between a population and the samples drawn from it. This is the selection of the specific research participants from an entire population; and it is conducted in different ways, according to the type of study. Sampling involves decisions about which people,

settings, events, behaviours, and/or social processes to observe. The snowball sampling technique was used. Snowball sampling aims to locate information-rich cases (Isaac and Michael 1997:223). Snowball sampling was considered a suitable method for the study because no census of the study population exists (Burns and Grove, 2005:350).

Key informants were requested to recommend individuals who were knowledgeable about traditional knowledge. In this instance, people – such as elderly people and traditional healers – played an important role. The sample population for this study was, therefore, biased towards the elderly people, traditional healers and traditional leaders (both men and women). They were interviewed by using a semi-structured interview schedule.

Purposive sampling was used to select the respondents from the Municipality, the North-West Provincial House of Traditional Leaders and the officials of the Association of Traditional Healers. The respondents were selected on the basis of their expertise and their job responsibility. According to Mason (2002:124), purposive sampling means selecting groups or categories to study on the basis of their relevance to the research questions, the theoretical position and the analytical framework, the analytical practice, and most importantly, the argument or explanation that is being developed. Mason (2002:124) further stated that purposive sampling is concerned with constructing a study group, which is meaningful theoretically and empirically, because it builds in certain characteristics or criteria which will help develop or test the researcher's theory or argument.

1.7.3 Data collection

According to Terre Blanche, Durrheim and Painter (2006:61), data are basic material with which the researcher works. Data can be in the form of numbers (quantitative) or language (qualitative). Data were collected by, firstly, conducting a literature review of all the relevant literature on guidelines and principles regarding the role and use of

Indigenous Knowledge and Disaster Risk Reduction. After conducting a thorough literature review, the data were then collected by doing semi-structured interviews with purposefully selected individuals and key informants, such as elders, chiefs and traditional healers. In addition semi-structured interviews were also conducted with officials from Greater Taung Local Municipality, the North-West Provincial House of Traditional Leaders and the Provincial Association of Traditional Healers.

The target population of this study comprised twenty (20) (male and female) respondents who were traditional chiefs, elders and traditional healers who are indigenous men and women, and who are residents of the selected villages located in the surrounding areas of Taung. The other target population comprised three (3) officials who were representatives of Institutions that work in areas related to disaster and traditional affairs such as the Municipality, the North- West Provincial House of Traditional Leaders and Association of Traditional Healers. For the purpose of this study the purposive sampling technique was used to select these respondents.

Qualitative data collected from semi-structured interviews were documented and audio-recorded. The analysis involved an in-depth data analysis, using appropriate techniques, such as mind-mapping, to reduce the data, and organizing them into themes, patterns, trends, and relationships that are easier to understand. Interpretation of the data involved extracting meaning and integrating the views of other authors into something new; this ensured that the final product was not merely the rewriting of existing knowledge, but new knowledge drawn from the findings and conclusions (Nachmias and Nachmias, 1991). The data collected were transcribed into specific themes; and these were later used to analyze the information.

According to Neuman (2006:304), a survey research interview is carried out to obtain accurate information from another person. An interview, according to Neuman (2006:305), is a short-term secondary social interaction between two strangers with the specific purpose of one person obtaining specific information from the other. De Vos, Strydom, Fouche and Delport (2007) also define semi-structured interviews as those

organized around areas of interest, while allowing flexibility in scope and depth. The usage of semi-structured interviews allowed the researcher to probe the interviewee's thoughts, values, views, feelings and perspectives on the role of Indigenous Knowledge in Disaster Risk Reduction.

1.7.4 Data analysis

Qualitative data collected from semi-structured interviews were documented and audio-recorded. Photographs were also taken. The first step in the analysis involved an in-depth data analysis, using appropriate techniques, such as mind-mapping, to reduce the data, and organizing them into themes, patterns, trends, and relationships that are easier to understand. Interpretation of the data involved extracting meaning and integrating the views of other authors into something new; this ensured that the final product was not merely the rewriting of existing knowledge, but new knowledge drawn from the findings and conclusions (Nachmias and Nachmias, 1991).The data collected were transcribed into specific themes; and these were later used to analyze the material.

1.8   ETHICAL CONSIDERATIONS

A letter requesting permission to conduct the research project was presented to the prospective participants (*see Annexure1*). The letter indicated the purpose of the research, and specified the kind of co-operation requested from the participants (the respondents). Before the data collection was resumed, the aim, purpose and importance of the research were explained to the respondents. As an obligation of ethical consideration, the participants in the research were informed that participation in the research was voluntary, and no-one was forced to participate and that they were free to decline to take part, and could withdraw at any point in the research project. Thus, the researcher dealt with the research subjects in an ethical and responsible manner. All ethical considerations, as stated by Babbie and Mouton, (2004:520) were taken into account.

1.9   THE LIMITATIONS AND OBSTACLES OF THE STUDY

A major limitation of the study is that there was limited literature on, and documentation of, the role of Indigenous Knowledge in Disaster Risk Reduction. The area is fairly new, and there has been very little research done, especially in Africa, and in particular, in South Africa. The available literature was however sufficient to complete this mini-dissertation.

1.10   CONTRIBUTION OF THE STUDY

By conducting this study, value could be added by raising awareness of the critical role that Indigenous Knowledge plays in disaster mitigation, as well as in the prevention and the preparation for disasters.

1.11   CHAPTER LAYOUT

The study is divided into four chapters:

Chapter 1:   Introduction

This chapter provides the background to the research and explains the need for the research. The chapter identifies the research problem, and provides justification for the research. Furthermore, it also briefly explains the research methodology employed to obtain the data and how the data were analysed.

Chapter 2:   Indigenous Knowledge: A Theoretical Overview

This chapter explores, reviews and critically analyses the literature on Indigenous Knowledge.

Chapter 3:   Disaster Risk Reduction: A Theoretical Overview

The chapter reviews and critically analyses the literature on Disaster Risk Reduction; and it also explores the role of Indigenous Knowledge in Disaster Risk Reduction.

Chapter 4:   Indigenous Knowledge in Disaster Risk Reduction: Empirical Findings

This chapter discusses the research methodology employed to obtain the data. Furthermore a data analysis and interpretation of the collected data are presented.

Chapter 5:   Conclusion/Summary and Recommendations

This chapter provides a summary of the findings, a discussion of the data, the conclusion and some recommendations on the way forward.

1.12   CONCLUSION

This chapter has provided an introduction and orientation to the study. Furthermore, the phenomenon under investigation was introduced by means of a problem statement. The key research questions, as well as the objectives of the research, were clearly stated. The methodology employed in the study was discussed. Key concepts and terms were also explained. The chapter has also presented an outline of the dissertation.

The next chapter will discuss and review the literature pertaining to Indigenous Knowledge. This chapter will give definitions of the terms used, provide a history of Indigenous Knowledge and discuss its characteristics and use.

CHAPTER TWO

INDIGENOUS KNOWLEDGE: AN OVERVIEW

2.1   INTRODUCTION

For a long time, Indigenous Knowledge has been looked down upon in favour of Western knowledge that was thought to have all the answers in dealing with disasters and human problems. However, things are now changing, because it is slowly becoming clear that Indigenous Knowledge is important and indigenous people hold a wealth of knowledge and experience that represent a significant resource in the implementation of Disaster Risk Reduction. This is shown in how Indigenous Knowledge has been used by many communities around the world, as a mechanism for surviving natural calamities. There are several stories that have been related, after major disasters, on how communities have used indigenous ways to protect their lives and property.

This chapter will give an insight into the meaning and development of an Indigenous Knowledge discourse. Firstly, attention will be given to the definition of Indigenous Knowledge, its characteristics and the initiatives which have shaped it. Moreover the chapter will provide an overview of best practices in the use of Indigenous Knowledge. Finally, the chapter will highlight the limitations as well as the challenges faced by Indigenous Knowledge.

2.2   INDIGENOUS KNOWLEDGE

The term "Indigenous Knowledge" has recently become a popular concept in the literature circles concerned. However defining Indigenous Knowledge (IK) and establishing working boundaries for studying the knowledge was not always an easy

task (Dei, 2002).This section will discuss how different scholars and researchers have defined the compound term "Indigenous Knowledge". It is important to note that there are numerous definitions of Indigenous Knowledge found throughout the literature. McGregor (2004) emphasized the fact that defining Indigenous Knowledge itself is controversial. Different researchers and scholars in the field of Indigenous Knowledge have defined "Indigenous Knowledge" in different ways – based on how they define and understand the term "indigenous". As it will be learned from the definitions below, there is no uniform definition of the term "Indigenous Knowledge". In view of the fact that there is no universally accepted definition, several interpretations must be reviewed, in order to have a better understanding of the term 'Indigenous Knowledge'.

Sekhar and Pugazhendi (2005:74) argue that the term Indigenous Knowledge was coined and first used by Brokensha et al. in their 1980 edited volume: *Indigenous Knowledge Systems and Development*. They state that the authors' goal was to find a term that represented the dynamic contributions of communities to problem solving, based on their own perceptions and conceptions, and the ways that they identified, categorized and classified the phenomena that were important to them.

According to Williams and Muchena (1991:52), Indigenous Knowledge can be defined in two ways, namely: the semantic and the conceptual. The semantic definition of Indigenous Knowledge views Indigenous Knowledge as 'native', originating and occurring naturally in a particular region; and it is sometimes associated with being simple, tribal, backward, traditional, static and inferior. On the other hand, the conceptual definition of the term Indigenous Knowledge views Indigenous Knowledge as an integrated system of cognitive values and practices, with a contextual information system and consequent comprehensive dimension in its application. The term Indigenous Knowledge refers to traditional and local knowledge, involving social, economic and environmental variables, unique to a particular culture or society, existing within and developed around specific conditions of women and men, indigenous to a particular geographical area – in contrast with knowledge generated within the

international system of universities, research institutes and private firms (Warren,1991:1).

Flavier and Erickson (1995:479) defined Indigenous Knowledge as the basis upon which society communicates and makes decisions. They argue that Indigenous Knowledge is dynamic; and it is continually being influenced by internal creativity and experimentation, as well as by contact with external systems. The fact that Indigenous Knowledge is dynamic, was supported by Mundy and Compton (1995:120), who argued that Indigenous Knowledge is constantly adapting to new conditions and technologies. Flavier *et al.* (1995:479) interpreted Indigenous Knowledge as "basically local knowledge that is unique to a given culture". They further argue that "indigenous information systems are dynamic – and continually being influenced by internal creativity and experimentation, as well as by contact with external systems". They refer to Indigenous Knowledge Systems, as science that is user-derived, not scientifically derived. This means that it is not researched, but is based on the everyday experiences of people.

Mascarenhas (2004:5) gives a definition of Indigenous Knowledge as 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. The passed-on knowledge and skills are then adapted and added to by the new generation, in a constant adjustment to changing circumstances and environmental conditions. They, in turn, pass on the body of knowledge intact to the next generation, in an effort to provide them with survival strategies. Rao and Ramana (2007:130) define Indigenous Knowledge as knowledge that is unique to a given culture or society. These authors argue that Indigenous Knowledge contrasts with the international knowledge system generated by universities and research institutions. Furthermore, they argue that Indigenous Knowledge is the basis for local level decision-making in agriculture, health care, education, natural resource management and a host of other activities in rural communities. They state that Indigenous Knowledge is passed down from generation to generation, by word-of-

mouth in many societies, and that Indigenous Knowledge also differs from Western knowledge in subject matter.

Although many authors have attempted to define "Indigenous Knowledge", others have criticized and disagreed with the definitions given. Authors such as Naidoo (2007:4) argue that a limitation of most definitions of Indigenous Knowledge is that they tend to convey an over-romanticised notion of it. The main criticism is that not all indigenous ways of living have proven to be sustainable. Based on this fact, he argues that it is important to bear in mind that indigenous knowledge may not be a panacea for all environmental problems, as it too is characterised by certain limitations. Despite the limitations, Naidoo acknowledges that Indigenous Knowledge has an important role to play as a way of knowing and understanding the world. In order to resolve the identified limitation Naidoo argues that Indigenous Knowledge Systems and modern Western science should be mixed. Another criticism with the definitions of Indigenous Knowledge is that they do not factor in the effects of modernisation.

Despite the fact that various writers may use similar definitions of Indigenous Knowledge, conclusions and perceptions about this concept are, however, often controversial. According to writers such as Mundy and Compton (1999), the definition of indigenous knowledge has progressively been based on the dichotomy between "scientific" knowledge and "indigenous" knowledge. The contention, however, is that due to changing natural environments, the definition of Indigenous Knowledge must go beyond specific or traditional pieces of knowledge. It is argued that in defining Indigenous Knowledge, it is essential to include the changing physical and social environments and associated generation of contemporary ways of knowing (Semali and Kincheloe, 1999).

Based on the above discussions, one can come to the conclusion that almost all definitions emphasize key aspects of Indigenous Knowledge such as its unwritten nature, dynamism and that it is given meaning by a specific community within a specific context. The analysis of the above definitions reveals that several interrelated aspects

appear to be more or less specific to IK. It is clear that the term Indigenous Knowledge does not have a single or simple definition. However, the essence of the above definitions is that Indigenous Knowledge is a unique part of the lives of a particular community. Central to most of the above definitions and conceptions of Indigenous Knowledge are the issues of culture, tradition, history, and the way of life of a given community of people. In addition, the definitions imply that Indigenous Knowledge includes experience, information and the insights of people. Most importantly, the definitions include how people use this knowledge in their everyday lives. At this juncture it is crucial to state that Indigenous Knowledge can neither be perceived as unique to Africa or more specifically black Africans, nor to non-Western people only. Often, there is a misconception by many people that Indigenous Knowledge is only confined to Africa or to non-Western people. It should be noted that across the world, one finds diverse indigenous communities. Indigenous Knowledge and indigenous communities are found all over the world in various areas, such as in Australia with the "Aborigines"; in New Zealand, the "Maoris"; in Botswana the "San"; and in Zimbabwe, the "Tonga "as well the Red Indians in the United States and the Yanomami tribe in the Amazon rainforest. It is, therefore, important to guard against falling into the trap of assuming that Indigenous Knowledge is limited to the black peoples of Africa, or to the non-Western communities of the world. It is the researcher's view that even the Europeans or whites also possess a measure of Indigenous Knowledge. It is a fact that the Afrikaans-speaking South Africans (Afrikaners) also have Indigenous Knowledge. In South Africa, we have the "boererate" among the Afrikaners; and these remedies can also be treated as Indigenous Knowledge. Indigenous Knowledge is not confined to tribal groups or to the original inhabitants of an area. It is not even confined to rural people. Rather, any community possesses Indigenous Knowledge: rural and urban, settled and nomadic, original inhabitants and migrants (Jordaan, 2001:20).

For the purpose of this study, Indigenous Knowledge is described as an all-inclusive knowledge that covers technologies and practices that have been and still are being used by indigenous and local people for existence, survival and adaptation in a variety of environments. The definition recognises that Indigenous Knowledge should be

inclusive, and that it should cover both knowledge that was used in the past and knowledge that is still being used in the present by people to exist, survive and adapt in different environments. It also acknowledges the fact that such knowledge is not fixed, but it evolves and changes, based on the prevailing conditions; and that it can influence and be influenced by circumstances.

2.3   INDIGENOUS KNOWLEDGE SYSTEMS

In most cases, people find it difficult to distinguish and understand the difference between the two concepts, namely: Indigenous Knowledge and Indigenous Knowledge Systems. Therefore, it is important that a differentiation should be made between these two concepts.

According to Akenji (2009:42), a knowledge system is an assemblage or combination of things or parts (practices, beliefs, values, ways of knowing, and suchlike) to create a complex or unitary whole. Barac (2003) defines Indigenous Knowledge Systems as knowledge, innovation and practices of indigenous and local communities and people around the world. Indigenous Knowledge Systems are collections of societal systems represented by the totality of products, skills, technologies, processes and systems developed and adapted by cohesive traditional societies, and produced, applied, practised, and preserved over generations – to ensure their long-term existence, sanctity and progress within their natural, social and economic environments (Odora-Hoppers, 2001). Similarly, Mapara (2009:140) defines Indigenous Knowledge Systems as bodies of knowledge of the indigenous people of particular geographical areas where they have survived for a very long time. According to the National Curriculum Statement (NCS) (2003:4), Indigenous Knowledge Systems 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.

From the above definitions, it is clear that Indigenous Knowledge Systems and Indigenous Knowledge are not one and the same thing. Indigenous Knowledge

Systems are a body of knowledge of which Indigenous Knowledge is a part. On the other hand, Indigenous Knowledge is the practice and use of the acquired knowledge. Although the definitions are different, it is clear that all of them emphasise certain key characteristics. These characteristics differentiate Indigenous Knowledge Systems from all the other forms of Knowledge Systems. Within the context of this study, Indigenous Knowledge Systems are understood as a combination of Indigenous Knowledge bases, such as ideas, beliefs, customs, tools, techniques and other activities preserved over generations to ensure long-term survival. In this regard Indigenous Knowledge is viewed as a component of larger knowledge systems, which are known jointly as Indigenous Knowledge Systems.

2.4 UNDERSTANDING THE DIFFERENCE BETWEEN INDIGENOUS AND WESTERN KNOWLEDGE SYSTEMS

Indigenous Knowledge develops through extended experiences in a specific environment, resulting in concrete information which relies on evidence directly from these experiences (Howes and Chambers, 1980:417). Agrawal (1995) argues that, in contrast, Western scientific knowledge breaks down and rearranges collected data often far removed from the specific experience. Indigenous Knowledge originates within the community, which contrasts with scientific knowledge, which is often influenced by many outside sources unrelated to the local culture or environment. Indigenous Knowledge is locally-focused, based in the reality of the specific community and its cultural, moral, political, and cosmological implications. Scientific Knowledge prides itself on its universal validity, divorcing itself from the local context (Banuri and Apfell-Marglin, 1993: 425). Scientific knowledge is documented as a means of maintenance, dissemination and validation; whilst Indigenous Knowledge is most often orally disseminated, which better suits its dynamic and local character.

As regards the type of knowledge, Indigenous Knowledge usually contains highly detailed, intimate information relating to livelihoods, in areas such as agriculture, agro-forestry, soil fertilisation, health care, and so forth. On the other hand, scientific

knowledge often focuses on abstract ideas and philosophies, one step removed from any concrete realities. Western science has developed a significant body of documented evidence from which new and refined ways of doing things are constantly being developed. By contrast, Indigenous Knowledge is exchanged and transferred orally, and the knowledge is local and context-specific, unlike the Western scientific quest for universalism. Also, very little of the vast body of Indigenous Knowledge that exists worldwide has been subjected to testing by using Western scientific methods. This is perhaps what has led to its questionable status within conventional Western education (Rhea 2002). Indigenous Knowledge Systems interpret how the world works from a particular cultural perspective; hence, the knowledge systems of indigenous communities differ considerably from community to community, depending on the locality. Snively and Corsiglia (1997) argued that a fundamental principle underlying Indigenous Knowledge Systems is that the subject matter may be examined and interpreted contextually. Indigenous Knowledge Systems tend to be more holistic, acknowledging the interconnectedness of natural systems, including human beings, and are, thus, strongly value-based (Snively and Corsiglia, 1997).

Stephens (2000:11) argues that there are commonalities between Indigenous Knowledge Systems and Western scientific systems. These include factors, such as "honesty, inquisitiveness, perseverance, open-mindedness, and empirical observations in natural settings, pattern recognition, and verification through repetition, inference and prediction". Rahman (2000:5) states that "both knowledge systems are in a constant state of evolution; and both systems have also been developed for their own 'universe', and are thus characterized by areas of greater or lesser expertise". Indigenous Knowledge Systems originated relatively independently of (and not in competition with) Western science. Despite their differences, or maybe because of these differences, Indigenous Knowledge and Western science should be seen as two systems of knowledge that can complement, rather than compete with each other (Science and Development Network, 2004).

As discussed above, it is clear that Indigenous and Western Knowledge Systems are two distinct knowledge systems. Although the two systems are different there are also commonalities. Finally these two systems can also be complementary, rather than in competition with each other. The next section will discuss unique characteristics of Indigenous Knowledge.

2.5   CHARACTERISTICS OF INDIGENOUS KNOWLEDGE

According to De Guchteneire *et al.* (2004:6), Indigenous Knowledge has the following characteristics:

- Is generated within communities;
- Is oral in nature;
- Is not systematically documented;
- Is location and culture specific;
- Forms the basis for decision-making on survival strategies;
- Concerns critical issues of human and animal life; and
- Is dynamic and based on innovation, adaptation, and experimentation.

Each of these characteristics will be discussed below.

2.5.1 Indigenous Knowledge is generated within communities

Indigenous Knowledge is generated within communities. This fact is supported by Baumwoll (2008:46), who points to the fact that the origin of Indigenous Knowledge lies within the communities themselves. Baumwoll (2008:46) argues that the process of developing is accomplished solely by the community. The fact that Indigenous Knowledge is generated within communities enables any community to develop and create its own Indigenous Knowledge – unique to its local context and circumstances.

2.5.2 Indigenous Knowledge is oral

Indigenous Knowledge refers to the large body of knowledge and skills that have been developed outside the formal education system, and which are handed down orally from generation to generation (De Guchteneire *et al.,* 2004:5). It is orally transmitted and is not recorded or documented in any medium. This means that it is agraphic (not available in the form of writing) because it is a body of knowledge that is passed on from one generation to the next one directly, through oral or verbal means of learning (Maurial, 1999).

2.5.3 Indigenous Knowledge is not systematically documented

Indigenous Knowledge is not systematically documented. As stated earlier, Indigenous Knowledge is transferred mainly orally by word-of-mouth. This means that in most cases it is not scientifically documented and recorded in writing. De Guchteneire *et al.*(2004:5) argue that since it is not captured and stored in a systematic way it has a disadvantage in comparison with Western knowledge. It is easier to preserve and pass Western knowledge from generation to generation since it is written in books. Lack of systematic documentation of Indigenous Knowledge makes it difficult to access it, and the result is that many people do not know about it. The fact that people do not have proper access to this knowledge makes it susceptible to being lost. This may result in it becoming extinct when its holders pass away before they pass it to the next generation.

2.5.4 Indigenous Knowledge is location and culture specific

Indigenous Knowledge is unique to a given culture, location or society (De Guchteneire *et al.,* 2004:6). This means that each locality has its own unique local knowledge. This is supported by Maurial (1999) who states that Indigenous Knowledge is local, meaning knowledge that has been developed for a specific locality. Indigenous Knowledge in one area is not necessarily the same as in other areas. The Indigenous Knowledge of Mahikeng is different from that of Taung. People living in a particular locality or region

determine their own Indigenous Knowledge that is unique and conducive to their continued existence and survival in their particular community.

2.5.5 Indigenous Knowledge is the basis for decision-making

Warren (1998) argued that Indigenous Knowledge is the basis for survival strategies and decision-making. This means that this knowledge is developed by people to help them survive in their particular locality. Indigenous Knowledge can be used as a cost-effective and sustainable strategy, to help poor people in their daily struggle for survival. This knowledge can be used for survival in different areas of life, such as health, food preparation, agriculture, education and Disaster Risk Reduction (De Guchteneire *et al.,* 2004:7).

2.5.6 Indigenous Knowledge is concerned with critical issues of human life

For many centuries, human beings have recognised the need to have harmony between the natural and social environments. This is supported by De Guchteneire *et al.* (2004:5) who note that over many centuries human beings have been producing knowledge and strategies that enable them to survive in a balanced relation with their natural and social environments. Maurial (1999) argued that Indigenous Knowledge is holistic in that it is generated and replicated within human relationships, as well as in their relationship with nature. Maurial is supported by Koro (2005) who emphasises that Indigenous Knowledge is holistic, because it is inclusive in its epistemological framework and in its approach to reality. Koro further argues that Indigenous Knowledge is holistic because it is embedded in the culture, languages, norms, and value systems; and it cannot, as such, be detached from the people who hold it, hence its holistic nature.

2.5.7 Indigenous Knowledge is dynamic and based on innovation, adaptation and experimentation

Indigenous Knowledge is dynamic and is the result of a continuous process of experimentation, innovation, and adaptation. This means that Indigenous Knowledge evolves and adapts according to the circumstances in the particular environment. Indigenous Knowledge can be combined and used with knowledge based on science and technology. The dynamism, adaptability, uniqueness and innovation of Indigenous knowledge is revealed in how communities living in a particular locality or region develop and determine their own Indigenous Knowledge. This is usually unique and conducive to their continued existence and survival in their particular community (De Guchteneire *et al.*, 2004:5).

From the preceding paragraphs on Indigenous Knowledge, it is clear that Indigenous Knowledge, like any other knowledge system, has a very rich legacy. The characteristics also indicate the uniqueness of Indigenous Knowledge; and this sets it apart from other forms of knowledge systems.

2.6   INITIATIVES THAT HAVE SHAPED INDIGENOUS KNOWLEDGE

This section will shed more light on the initiatives that have shaped Indigenous Knowledge – both internationally and locally.

2.6.1 International initiatives that have shaped Indigenous Knowledge

The interest in Indigenous Knowledge is recognised in several international documents, such as the Universal Declaration of Human Rights, the Convention on Biological Diversity, the Draft United Nations Declaration on the Rights of Indigenous Peoples, the International Labour Organisation Convention No. 168 and the International Covenant on Economic, Social and Cultural Rights (Simeone, 2004: 3). In addition, in 1992, the United Nations conference on Environment and Development, the Rio Declaration and

Agenda 21 both made reference to Indigenous Knowledge (Baumwoll, 2006: 21). Furthermore, Baumwoll (2006: 21) states that Agenda 21 and the Convention on Biological Diversity also emphasized the need for governments to preserve and maintain the knowledge practices of indigenous and local communities, and to encourage the right of traditional communities to share in the economic and social benefits arising from the utilisation of such knowledge, innovations and practices.

To ensure that Indigenous Knowledge is recognised and promoted the World Bank also launched the Indigenous Knowledge for Development programme in 1998 and, in addition, it developed a database of Indigenous Knowledge and a multi-lingual website and monthly publication dedicated to sharing and promoting Indigenous Knowledge engagement in development (McPherson 2007:25). Furthermore, to address the indigenous issues relating to economic and social development, culture, the environment, education, health and human rights, the United Nations General Assembly proclaimed the International Decade of the World's Indigenous Peoples from 1995-2004; and they established a permanent forum on Indigenous Issues in 2000 (McPherson, 2007:24). According to Baumwoll (2006: 62), the work of this decade included several United Nations (UN) specialized agencies established to design and implement projects with indigenous people on health, education, housing, employment, development and the environment that promoted the protection of indigenous peoples and their customs, values and practices.

In 1995 the United Nations launched a second International Decade of the World's Indigenous Peoples to strengthen international co-operation and the commitment needed to find solutions to the issues faced by indigenous peoples (Baumwoll, 2006: 62). As mentioned above, the United Nations in 2002 established a Permanent Forum on Indigenous People's Issues. The importance of Indigenous Knowledge was also recognised in the field of sustainable development. In 2002, the World Summit on Sustainable Development noted the importance of Indigenous Knowledge for sustainability. The Summit, in its document on paragraph 25, recognised the importance of the political rights of indigenous people for sustainable development. Furthermore, it

also acknowledged the importance of the relationship between Indigenous Knowledge for sustainable development and other fields, such as natural disaster mitigation, poverty eradication, climate change, agriculture, mountain ecosystems, biodiversity, forests, health, Africa, and science and technology (Baumwoll, 2008:62).

From the above paragraphs, it is clear that there have been a number of initiatives that have been started by several international bodies, in an attempt to recognise and promote the important role that Indigenous Knowledge can play in sustainable development. The next section will focus on the initiatives that have been started in South Africa – to ensure that Indigenous Knowledge is recognised.

2.6.2 South African initiatives that have shaped Indigenous Knowledge

The emergence and recognition of Indigenous Knowledge in South Africa started in 1994, after the demise of the apartheid system. This statement is supported by Akenji (2009:25) who pointed out that, after 1994, Indigenous Knowledge became a critical component of the restructuring of South African Science and Technology. The first National Workshop on Indigenous Knowledge in South Africa was held in 1998, under the auspices of the Portfolio Committee on Arts, Culture, Science and Technology (Nel, 2005; 2006). According to Akenji (2009:26), Thabo Mbeki, the former South African President, in an article in the Mail and Guardian (2003:36) also pointed out the significance of African Knowledge Systems in the production of knowledge.

The importance of Indigenous Knowledge was also recognised in section 17(2) sub-section (g) of the Disaster Management Act of 2002 (Department of Local Government, 2002). The Act specifically stipulated that the electronic database developed by the National Disaster Management Centre must contain extensive information concerning disasters that have occurred or could occur in Southern Africa and disaster management issues, including information on Indigenous Knowledge relating to disaster management. Additionally, the National Curriculum Statement (2003:4) also recognised the value of Indigenous Knowledge Systems in assisting problem-solving in all fields. It

specifically expects teachers to integrate Indigenous Knowledge Systems into their teaching. According to Rengecas (2010), in 2004 the Cabinet approved the Indigenous Knowledge Systems Policy. This Policy provided a broad basis for the "recognition, understanding, integration and promotion of Indigenous Knowledge resources within South Africa". In addition, the 2004 policy placed the responsibility on various governmental departments to review the country's legislation and propose amendments to protect South Africa's traditional knowledge.

The above paragraphs have highlighted the initiatives related to the recognition of Indigenous knowledge. From the discussion it is clear that attempts to protect and preserve Indigenous Knowledge only started in the 1990s. Although attempts to promote Indigenous Knowledge only started in the past two decades, big strides have been made in promoting and preserving it. This is shown in the legislation and initiatives that have been started both in South Africa and internationally. The next section will discuss the best practices in the usage of Indigenous Knowledge. Furthermore, the discussion will draw attention to the limitations and challenges which are faced by Indigenous Knowledge.

2.7   BEST PRACTICES IN THE USE OF INDIGENOUS KNOWLEDGE

According to Boven and Morohashi (2002), *'Best* practices' as related to Indigenous Knowledge refer to examples and cases that illustrate the good use of Indigenous Knowledge in developing sustainable survival strategies for indigenous communities. These practices are survival mechanisms that have been used for many years by indigenous communities. Some of the examples of these practices include, amongst others, indigenous healthcare, land use management, the protection of animals, the protection of plants, and traditional methods of preserving and conserving water.

Indigenous Knowledge is part of the healthcare systems in many indigenous communities. According to Eyong (2007), more than 80% of the world's population uses the services of traditional healthcare. This claim is supported by Soewu and Ayodele

(2009) who state that traditional healthcare is combined with conventional healthcare systems. Julek (1994) refers to various studies in which therapeutic modalities based on indigenous cultural traditions and religions have been found to be generally effective and in some cases more successful than official treatment, particularly in the rehabilitation and prevention of chemical substance dependence in Asia, the Americas and Southern Africa. In some countries traditional healing approaches are the main resources used to address various problems relating to health and well-being, while in other countries, including many 'Western' societies, traditional healers and 'Western' medical practitioners are often consulted simultaneously. It is therefore clear that indigenous knowledge has an important role to play in the health of many communities.

Another area where Indigenous Knowledge plays an important role is the conservation of water. Cheserek (2005) says in order to protect water bodies from contamination indigenous communities use certain taboos. Such taboos include not washing in or near the river or stream, lactating mothers are not allowed to come to water points and throwing objects into water bodies is prohibited. All these taboos are intended to assist the community to protect and conserve water which is a very important resource. Moreover, Indigenous Knowledge plays a critical role in enhancing household food security. In a study that was conducted in Uganda by Agea *et al.* (2008) it was found that Indigenous Knowledge is used in enhancing food security. The study found that some households use animal wastes such as chicken manure, cow dung and crop residues such as coffee husks to fertilize their gardens in order to have increased crop yields. In addition, it was found that the use of locally made concoctions as pesticides to control pests that attack crops while in the field and while in storage was common in Mukungwe sub-country, Masaka district.

From the above discussion it is clear that indigenous practices play an important role in enhancing household food security. This shows that indigenous knowledge practices are relevant and that many people depend on their use for household food security. The aforementioned 'best practices' have illustrated certain examples and cases of the good use of indigenous knowledge in developing sustainable survival strategies for

indigenous communities. These practices have assisted many indigenous communities to survive. The next section will discuss the limitations of Indigenous Knowledge

2.8   LIMITATIONS OF INDIGENOUS KNOWLEDGE

The preceding discussions so far have pointed out the benefits of Indigenous Knowledge in the livelihoods of many indigenous communities. However, it is important to note that Indigenous Knowledge has its limitations and weaknesses. Various researchers have argued that Indigenous Knowledge has a number of limitations. Some criticisms that have been levelled against Indigenous Knowledge will be considered in the section below. Critics argue that a careful study of Indigenous Knowledge indicates that not all knowledge and activities of local people are valid and environmentally sound. Most of the critics state that some of the practices of Indigenous Knowledge have had undesirable effects.

According to Naidoo (2007), one of the limitations of Indigenous Knowledge is that not all indigenous ways of living have proved to be sustainable. Based on this limitation it is clear that Indigenous Knowledge may not be a panacea for all challenges. Furthermore, Naidoo (2007:5-7) argues that the shortcoming of most of the definitions is that they do not factor in the effects of modernisation. Moreover, Naidoo states that for many local communities dealing with issues that are mainly underpinned by poverty, the possibility of escape from it (poverty) by using modern methods may prove more compelling than by using Indigenous Knowledge. The above factors may result in communities placing more emphasis on competing for limited resources, such as food, space and shelter in a manner other than utilizing indigenous practices. Tanyanyiwa and Chikwanha (2011:140) argue that Indigenous Knowledge is sometimes accepted uncritically because of naive notions that whatever indigenous people do is naturally in harmony with the environment. Furthermore, they argue that there is historical and contemporary evidence that suggests that indigenous peoples have also committed environmental 'sins' through over-grazing, over-hunting, or over-cultivation ofthe land. The authors

argue that it is misleading to think of indigenous knowledge as always being 'good, 'right', or 'sustainable'.

The example that the above-mentioned authors give is that a critical assumption of Indigenous Knowledge approaches is that local people have a good understanding of the natural resource base because they have lived in the same, or similar, environment for many generations, and have accumulated and passed on knowledge of the natural conditions, soils, vegetation, food and medicinal plants. According Tanyanyiwa and Chikwanha (2011:140), under conditions where the local people are in fact recent migrants from a quite different ecological zone, they may not have much experience with the new environment. In these circumstances, some indigenous knowledge of the people may be helpful, or it may cause problems (e.g., use of agricultural systems adapted to other ecological zones). Furthermore, they argue that wider economic and social forces can also erode Indigenous Knowledge. In addition, pressure on indigenous peoples to integrate with larger societies is often great, and as they become more integrated, the social structures, which generate indigenous knowledge and practices, can break down.

Banda (2008:71) argues that to early missionaries and the colonial masters, African Indigenous Knowledge Systems (AIKS) existed in a vacuum and that they never even belonged to the community. Furthermore Banda state that AIKS are considered to be very rigid and unwritten, backward and superstitious. In a number of cases AIKS have been considered to be absolutely incompatible with modern society and development and should, therefore, be relegated to the archives and museums. In some extreme cases, AIKS have been described as desperate and irreconcilable systems of thought which are unstructured, unscientific and just a myth. The assumption is that, unlike Western knowledge, which is ever being constructed, AIKS are always there waiting to be passed on from generation to generation, hence are old, and not universal. The other argument is that although Indigenous knowledge is perceived to be more widely shared locally, no one person, authority or social group would claim knowing it all

(Sillitoe, Dixon, & Barr, 2005). Others argue that it does not exist nowhere as a totality, as there is no grand repository, and hence no coherent discourse (Sillitoe *et al.*, 2005).

According to Mosothwane (2007:726), Indigenous Knowledge does have limitations, although researchers have praised it for conserving the environment. Some researchers assert that Indigenous Knowledge is losing ground because there is no congruence between people's belief systems and how they behave. Furthermore, it has been noted that the lack of an ecocentric philosophical tradition among the indigenous people has led to extensive environmental degradation. Mosothwane (2007) has also indicated that some aspects of Indigenous Knowledge should be discarded because they do not tally well with industrial development. The authors are also of the view that traditional knowledge tends to be in conflict with industrial development.

Another limitation of Indigenous Knowledge is that although such knowledge systems have a certain amount of flexibility in adapting to ecological change, when change is particularly rapid or drastic, the knowledge associated with them may be rendered unsuitable and possibly damaging in the altered conditions (Grenier,1998). According to Grenier (1998), another limitation of Indigenous Knowledge is that sometimes the knowledge, which local people rely on, is wrong or even harmful. This therefore implies that practices based on the wrong knowledge, mistaken beliefs, faulty experimentation, or inaccurate information can be dangerous and may even be a barrier to improving the well-being of indigenous people. The implication is that this may increase the vulnerability of the people that rely on the information to hazards and eventually disasters.

The above section has provided an overview of the limitations of Indigenous Knowledge. From the discussions it is clear that Indigenous Knowledge has a number of limitations which can result in negative consequences. Therefore it can be argued that the view of Indigenous Knowledge as an untainted knowledge base does not hold. It cannot be assumed that all indigenous knowledge will necessarily provide a sustainable answer to livelihood challenges in poor indigenous communities. The

following section will explore the challenges that are actually faced by Indigenous Knowledge.

2.9   THE CHALLENGES OF INDIGENOUS KNOWLEDGE

Although Indigenous Knowledge plays an important role in many areas of life, it is faced by many challenges. The main challenges can be identified as follows and are discussed below:

· 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 Indigenous Knowledge; and
· reconciling Indigenous Knowledge and Western Knowledge.

2.9.1 Marginalization

The main challenge that is faced by Indigenous Knowledge is marginalization. According to Ocholla (2007:56), the marginalization of Indigenous Knowledge has occurred over the years. Ocholla (2007) states that marginalization refers to exclusion – a state of being left out, or of insufficient attention to something. Marginalization is caused by the perception that Indigenous Knowledge is primitive and old-fashioned, and therefore has no value. This perception results in Indigenous Knowledge being marginalized, and this being so, Western Knowledge is used, because it is thought that it is more advanced and better suited to a third-world country. This fact is supported by Mosothwane (1997:727), who stated that the youth do not value Indigenous Knowledge, because some of the issues that it raises are not really scientific. According to Ocholla (2007:56), there are many causes or reasons as to why marginalization occurs. Among these, are the following:

- tacit knowledge is not codified or systematically recorded and therefore difficult to transfer or share;
- it lives solely in the memory of the beholder and is mostly oral, meaning that unless transferred, it dies with the beholder;
- it is embedded in the culture/traditions/ideology/language and religion of a particular community and is therefore not universal and difficult to globalize; and
- it is mostly rural, commonly practised among poor communities and is therefore not suitable in multicultural, urban and economically well provided communities.

In addition, Ocholla (2000:57) argues that marginalization has also occurred because families and communities are becoming increasingly disintegrated and globalised: a trend that may have stemmed from the push-pull of technologies, and the over-extensive supply of mass products, services and mass-media gadgets, and being content to occupy private spaces where Indigenous Knowledge once thrived.

2.9.2 Lack of being captured and stored in a systematic way

De Guchteneire *et al.* (2004) indicated that Indigenous Knowledge faces the risk of not being captured and stored in a systematic way, because it is handed down orally from generation to generation. In the context of South Africa, this point is supported by the Department of Science and Technology (2004), which emphasizes the fact that Indigenous Knowledge needs to be recorded, protected and utilized – in ways that could benefit its owners and the communities.

2.9.3 Over-reliance on the intergenerational oral transmission

Another challenge is over-reliance on the intergenerational oral transmission of Indigenous Knowledge (Esia-Donkoh and Asare, 2009:10). In addition, Esia-Donkoh and Asare argued that influences of foreign religions and modernisation have constituted the external challenges. In the study that the authors conducted, the respondents commented that the foreign religions, such as Islam and Christianity, have tended to

downplay the indigenous concepts of gods, ancestors and totems, as well as their rituals and other practices. Thus, according to Esia-Donkoh and Asare (2009:10), these affect local people's spiritual attachment to environmental resources.

2.9.4 Disappearance

Additionally, Indigenous Knowledge is faced by the challenge of disappearing (Msuya 2007:1). Msuya (2007:1) argues that Indigenous Knowledge faces the threat of extinction, because of the failure to record it, and because of problems associated with the preservation and protection of such knowledge. This is mainly due to the fact that most of the Indigenous Knowledge practices are not written down. The knowledge is transmitted from one generation to the next, orally and in practice. It is therefore easy for Indigenous Knowledge to become extinct – due to the lack of any reliable records. Msuya (2007:4) says that one of the leading factors that explain the possible extinction of Indigenous Knowledge is the fact that concentration has been on the direct cash value, ignoring the non-cash. To support his statement, the author argues that in the area of research, attempts have been made to research and document medicinal plants, since such initiatives lead to discoveries that can be used by the pharmaceutical industry to develop medicines (Msuya, 2007:4).

2.9.5 Management of Indigenous Knowledge

Further challenges of Indigenous Knowledge relate to its management. The main challenges to the management of Indigenous Knowledge include the methods of identifying it, the access to it, the intellectual property rights and the media and format in which to preserve it (Dlamini, 2009:33). According to Lawas and Luning (1996), the collection of Indigenous Knowledge is laborious, time-consuming and costly. The implication is that Indigenous Knowledge ends up not being collected, due to the time taken and the cost of collecting it. Lastly, but not least, Domfeh (2007:46) argues that a major threat to Indigenous Knowledge is how to reconcile it with modern science, without

one substituting the other, thereby respecting both of the two sets of values, and building on their respective strengths.

2.9.6 Reconciling Indigenous Knowledge and Western science

According to Domfeh (2009), a major challenge that African countries continue to face is how to reconcile Indigenous Knowledge and modern science without substituting each other, respecting the two sets of values, and building on their respective strengths. In most instances Western knowledge ends up taking precedence over Indigenous Knowledge and this is mainly due to the perception that it is superior to such knowledge.

The above sections have highlighted the various limitations and challenges of Indigenous Knowledge. From the discussions it is clear that Indigenous Knowledge has a number of limitations and challenges which are negatively affecting and impeding its development and advancement. Therefore it is important that these challenges should be addressed to ensure that Indigenous Knowledge contributes positively to the livelihood of indigenous communities.

2.10 CONCLUSION

This chapter has given an overview of the Indigenous Knowledge discourse, viewing the development of the field and the reasons for the growing interest in it. From the literature consulted, it is clear that Indigenous Knowledge has been looked down on and the reason for this is that Western knowledge was thought to have all the answers in dealing with disasters and human problems. However, it has been found that things are now changing, because it is slowly becoming clear that Indigenous Knowledge is important, and indigenous people hold a wealth of knowledge and experience that could represent a significant resource. From the discussion it is clear that Indigenous Knowledge provides various benefits to the indigenous communities. Despite the fact

that Indigenous Knowledge provides benefits it also has limitations and it is faced by many challenges and as such it is criticized by a number of authors.

The next chapter will provide an overview of Disaster Risk Reduction and how it relates to Indigenous Knowledge. The section will begin by discussing the definitions of Disaster Risk Reduction, its characteristics, challenges and its use. Lastly, it will provide an overview of recent developments in Disaster Risk Reduction, both internationally and locally. Attention will also be given to Indigenous Knowledge and its contributions to Disaster Risk Reduction (DRR).

CHAPTER THREE

DISASTER RISK REDUCTION: AN OVERVIEW

3.1   INTRODUCTION

Indigenous communities are increasingly susceptible to disasters as a result of their vulnerabilities created by social, cultural, economic, political and environmental circumstances. Even though Western Knowledge has assisted and provided benefits in the field of Disaster Risk Reduction, its focus has mainly been on the physical components of risk, rather than on the social, cultural, economic, political and environmental factors which surround the risk. In many cases, this has resulted in the failure of these strategies to impact on those most vulnerable. This has resulted in an increased call within the field of Disaster Risk Reduction for the benefits of Indigenous Knowledge – in order to identify those most vulnerable to such hazards and to render assistance.

This chapter seeks to explore and highlight the benefits of Indigenous Knowledge in Disaster Risk Reduction, and to address the current gap in the Disaster Risk Reduction literature by identifying Indigenous Knowledge strategies that can be incorporated into Disaster Risk Reduction. The chapter also focuses on giving insight into the meaning and development of the Disaster Risk Reduction field. The concept of Disaster Risk Reduction will first be discussed; this will be followed by initiatives that have shaped it. Then an overview of the role and use of Indigenous Knowledge in Disaster Risk Reduction will be provided. The chapter will also discuss the vulnerability of indigenous communities and how Indigenous Knowledge can assist them to deal and cope with disasters. Lastly the chapter will discuss limitations and challenges of Disaster Risk Reduction.

3. 2   CONCEPTUALIZING DISASTER RISK REDUCTION

It is important to note that there are numerous definitions of Disaster Risk Reduction found throughout the literature. However, Mitchell (2003:4) states that there is no universally agreed definition of Disaster Risk Reduction. This is supported by Ritchie (2003), who asserts that the terms "Disaster Reduction" and "Disaster Risk Reduction" have brought about a lot of discussion and confusion among scholars, and this is mainly due to a lack of uniform definitions. Van Niekerk (2005:5) writes that the concept of Disaster Risk Reduction is more widely used than disaster reduction, as it indicates an emphasis on what is being reduced, as opposed to "disaster reduction", which might merely increase the perception that the main focus of disaster (risk) reduction is disasters, rather than the hazards and conditions of vulnerability. On the other hand, the World Bank (2004) states that Disaster Risk Reduction comprises man's attempts to avoid hazards and reduce vulnerability.

The South African National Disaster Management Framework (2005:113) defines Disaster Risk Reduction as "the conceptual framework of elements considered with possibilities to minimize vulnerabilities and disaster risk throughout a society, to avoid (prevent) or to limit (mitigate and prepare for) the adverse impacts of hazards, within the broad context of sustainable development". According to Dekens (2007:XI), disaster risk reduction is the conceptual framework of elements considered with the possibilities of minimising vulnerabilities and disaster risks throughout a society. This is to avoid (prevent) or to limit (mitigate and prepare for) the adverse impacts of hazards, within the broad context of sustainable development. The UNISDR (2002:25) defines Disaster Risk Reduction as "the systematic development and application of policies, strategies and practices to minimise vulnerabilities and disaster risks throughout a society, to avoid (prevent) or to limit (mitigate and prepare for) the adverse impact of hazards, within the broad context of sustainable development". The United Nations Development Programme (2004:135) agrees with the definition provided by the UNISDR. In addition, the UNISDR (2009:10) further defines Disaster Risk Reduction as the concept and practice of reducing 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 events.

Baumwoll (2008:13) says that the term Disaster Risk Reduction refers to the steps taken before a disaster occurs, or the pre-disaster activities. These steps would be taken in order to reduce the impacts any disaster may have. She argues that the term is more specific than the term disaster management, since this term only refers to mitigation and preparedness. According to the UNISDR (2009:10), disaster risk reduction is the concept and practice of reducing 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 any such adverse events.

In analyzing the above definitions it is clear that for Disaster Risk Reduction to be effective there are a number of activities that must be undertaken such as:

- building capacity of people to prevent, avoid and deal with disasters;
- creation of a favourable environment by government, involvement of all segments of society;
- government assuming primary responsibility by providing the legal and institutional framework for disaster risk management;
- Disaster Risk Reduction being done with the assistance or involvement of the communities at local level;
- Disaster Risk Reduction is more effective if driven with the assistance or involvement of the communities at local level; and
- reduction of risks through systematic efforts.

From the above discussion, it is clear that there is no single definition of the term Disaster Risk Reduction. In analysing the definitions it can be deduced that Disaster Risk Reduction entails three elements, namely: minimisation of vulnerabilities, avoidance of such hazards, and limitation of the impacts of these disasters. In this

study, Disaster Risk Reduction refers to those actions taken prior to, during and after a disaster, which are aimed at preventing, reducing and limiting the negative impacts of disasters. This refers to the pre-disaster period before the disaster happens, the actual disaster period when a disaster strikes, and the post-disaster period after the disaster has occurred.

The next section will discuss various initiatives aimed at promoting Disaster Risk Reduction, both internationally and locally. The section will discuss how these initiatives have assisted to shape the Disaster Risk Reduction field.

3.3   INITIATIVES THAT HAVE SHAPED DISASTER RISK REDUCTION

Various initiatives exist, as the outcome of pledges made by the international and local community, in an effort to achieve disaster risk reduction. This section will shed more light on the initiatives that have shaped Disaster Risk Reduction, both internationally and locally.

3.3.1 International initiatives that have shaped Disaster Risk Reduction

In this section, international initiatives that have shaped Disaster Risk Reduction are discussed. Specifically the section will explore how the field of Disaster Risk Reduction has considered the inclusion of Indigenous Knowledge in the initiatives.

3.3.1.1 The International Decade of Natural Disaster Reduction (IDNDR)

On 1 January 1990, the United Nations launched an International Decade for Natural Disaster Reduction, following the adoption of Resolution 44/236 (22 December 1989). The Decade was intended to reduce, through concerted international action, especially in developing countries, loss of life, poverty damage and social and economic disruption caused by natural disasters. To support the activities of the Decade, a Secretariat was established at the United Nations Office in Geneva, in close association with the United

Nations Disaster Relief Organization (UNDRO). According to Van Niekerk (2005:52), the increasing concerns about disaster impacts and the need to promote capacity and knowledge to deal with disaster events resulted in the UN General Assembly declaring 1990-1999 as the International Decade for Natural Disaster Reduction (IDNDR). This was declared in December 1987, after the UN General Assembly adopted resolution 42/169. Van Niekerk (2005:53) states that during this decade, a concerted international effort was made to reduce the loss of life, property and livelihoods, and the social and economic disruption caused by the violent impact of nature on vulnerable conditions. The aim of this decade was to ensure a shift in the reactive approach to natural disasters to a pro-active planning and prevention approach (Smith, 2002:348). The IDNDR envisaged that all countries would have conducted national risk assessments, developed national and/or local prevention preparedness plans, and implemented global, regional and national warning systems (UNESCO, 2000). The declaration of the decade as International Decade of Natural Disaster Reduction assisted in ensuring that there was a shift in how people viewed disasters – from a reactive to a proactive approach.

3.3.1.2 The Yokohama Strategy and Plan of Action for a Safer World

Van Niekerk (2005:58) states that another significant event which shaped the Disaster Risk Reduction agenda in the 1990s was the World Conference on National Disaster Reduction held in Yokohama, Japan, in May 1994. This was the first international conference where the issues of disaster risk reduction were given consideration. This fact is supported by Tau (2007:46), who states that Yokohama was the first conference where the social aspects of vulnerability were given any serious consideration. This led to the adoption of The Yokohama Strategy and Plan of Action for a Safer World. The Yokohama Strategy and Plan of Action for a Safer World (1994) stressed that every country has a sovereign and primary responsibility to protect its people, the infrastructure and the national, social and economic assets from the impact of disasters. The Yokohama Strategy and Plan of Action emphasized that community involvement and active participation should be encouraged in order to gain greater insight into the

individual and collective perception of development and risk, and a clear understanding of the cultural characteristics of each society as well as its behaviour and interactions with the physical and natural environment (ISDR, 1994:2). The document further states that knowledge is of the utmost importance to determine those things which favour or hinder prevention and mitigation or encourage or limit the preservation of the environment for the development of future generations, and in order to find effective and efficient means to reduce the impact of disasters. In point H of the strategy it is stated that there is a strong need to strengthen the resilience and self-confidence of local communities to cope with natural disasters through recognition and propagation of their traditional knowledge, practices and values as part of development activities (ISDR, 1994:8). Specifically, point R indicates that all countries are called upon to: aim at the application of traditional knowledge, practices and values of local communities for disaster reduction, thereby recognizing these traditional coping mechanisms as a valuable contribution to the empowerment of local communities and the enabling of their spontaneous cooperation in all disaster reduction programmes (ISDR, 1994:12).

3.3.1.3 The Second World Conference on Disaster Reduction (WCDR)

In December 2003, the UN General Assembly adopted resolution 58/124, in which it was decided to convene a second World Conference on Disaster Reduction (United Nations, 2003). The resolution resulted in the second conference being held. The overall objective of the Second World Conference on Disaster Reduction was to increase the commitment to the implementation of Disaster Risk Reduction at all levels, and in particular, its integration into development planning processes. The Second World Conference on Disaster Reduction, which was held in Kobe, Hyogo, Japan, on 18-22 January 2005, further promoted the need to invest in preventive action to deal with current disaster trends. During the Conference, the progress made was recognized, but it was also admitted that much remained to be done. In response, Governments and agencies agreed on the Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters. UNISDR (2005:75) emphasized that education, sharing of experiences and the building of capacities are

primary elements to create and support the community as a key to reducing disaster risks. Furthermore, the conference indicated that education should involve the enhancement and use of Indigenous Knowledge. This point clearly shows that the conference recognized the value of traditional and Indigenous Knowledge Systems.

3.3.2 Initiatives that have shaped Disaster Risk Reduction in South Africa

According to Van Niekerk (2005:105), before June 1994 South Africa did not have a holistic approach to dealing with disasters and issues of risk. He further argues that before then South Africa dealt with disasters by following the traditional trend that viewed disasters as resulting from "acts of nature", as rare, inevitable events that could not be predicted or avoided. Van Niekerk (2005:105) states that this belief resulted in a reactive focus on disasters. The focus was to deal with the post-disaster consequences or adverse effects of disaster. The Disaster Management Act, 2002 (Act No.57 of 2002) was promulgated on 15 January 2003. This Act provides a legislative framework for achieving the above objectives, by providing direction for the implementation of disaster management in all spheres of government in South Africa, including the need for consultation with communities and stakeholders, in order to reduce disaster risks. The Act recognises the critical role that Indigenous Knowledge can play. Section 53 (2) f) of the Act emphasises that Indigenous Knowledge relating to disaster management should be taken into account. The Act also highlights that traditional councils also play an important role in disasters and one of their functions is to promote Indigenous Knowledge Systems for sustainable development and disaster management. It is clear that the Act recognises that Indigenous Knowledge has a critical role to play in terms of Disaster Risk Reduction.

In addition to the above initiatives, educational institutions in South Africa have also developed programmes that are aimed at building capacity for Disaster Management and Disaster Risk Reduction. The University of Cape Town for instance developed a Disaster Mitigation for Sustainable Livelihoods Programme (DiMP) to address the problems of vulnerability, risk and sustainable development in relation to disasters,

(Vermaak & van Niekerk, 2004) . Currently, the DiMP is running two projects, namely: Periperi and Mandisa.

- Periperi ("partners enhancing resilience for people exposed to risks") is a network of partners committed to risk reduction in Southern Africa. Periperi's most important mission is to reduce the impact of natural and other threats in communities at risk (DiMP, 2001).

- Mandisa (Monitoring, mapping and analysis of disaster incidents in South Africa) is a research initiative aimed at consolidating years of recurrent disaster incidents in the Cape Metropolitan area, as a pilot study.

According to African Centre for Disaster Studies (2012) in January 2002, the Potchefstroom University for Christian Higher Education (now North-West University, Potchefstroom Campus) in its School of Social and Government Studies, also established the African Centre for Disaster Studies (ACDS). The Centre was moved to the Research Focus Area: Sustainable Social Development (now called Social Transformation) in the Faculty of Humanities, in October 2006. The aim of the ACDS was to "address the need for world-class training, education and research in disaster-related activities within Southern Africa and the wider African context". The ACDS aims to address the research, as well as the training and education needs, in disaster risk in Southern Africa and the wider African continent. The focus is on offering training courses to practitioners on aspects of disaster risk management. The Centre provides training at, inter alia, Master's and doctoral level.

The University of the Free State started the Disaster Management and Training Centre for Africa (DiMTEC). The aim of the Centre is to provide training in the field of disaster studies. The Centre provides a Master's degree in disaster management and various short courses. The Centre's first course was approved and registered with the South African Qualifications Authority (SAQA) in 2001. In 2002; DiMTEC was established under the University's Department of Agricultural Economics – with a view to being made independent later. In 2006, the Centre became an independent unit, University of the Free State Disaster Management Training in Africa (DiMTEC) (2012). Another

initiative was the formation of a specialist unit at the University of the Witwatersrand in 2006 called reVAMP (re Vulnerability, Adaptation and Mitigation Planning), which amongst others related to research concerns, focuses on rural vulnerability and food security issues in Southern Africa. In addition, the University of South Africa started a Programme in Disaster Management in the School of Public Management and Planning. The aim of this course was to train individuals in public and private institutions in various issues relating to Disaster Management, University of the Witwatersrand (2012).

The above sections have highlighted the contributions made by several initiatives promoting Disaster Risk Reduction. It is clear that the initiatives have played a tremendous role in assisting to promote Disaster Risk Reduction. With regard to the recognition of the role of Indigenous Knowledge most of the above initiatives are not explicit but stress more technical knowledge. The next section will discuss the challenges of Disaster Risk Reduction.

3.4   VULNERABILITY OF INDIGENOUS COMMUNITIES TO DISASTERS

As discussed in Chapter One Western Knowledge has been favoured over Indigenous Knowledge. The implication is that indigenous communities have found themselves in circumstances that make them more vulnerable to disasters than any other group. This section will discuss the factors that make indigenous communities more vulnerable to disasters.

3.4.1 Conceptualisation of the term vulnerability

Before we discuss the vulnerability of indigenous communities to disasters it is important to understand what vulnerability is. According to UN/ISDR (2004:17), vulnerability is a term that describes the susceptibility of a group such as an indigenous community to the impact of hazards. The concept entered the disaster discourse in the 1970s and 1980s with a new approach to disasters entitled the "vulnerability approach" (Baumwoll, 2008). Mgquba and Vogel (2004) state that vulnerability can be defined as a

person or element being prone or susceptible to damage or injury. Broadly, vulnerability refers to the characteristics of a person or group in terms of their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard. This definition advocates the notion that disasters are not only caused by natural and environmental forces. It argues that disasters are "normal" and based on the vulnerability of a given society as a main cause of disasters. Conditions such as social and economic conditions, for example poverty, education level, employment and shelter, determine the vulnerability of an individual or community. The UNISDR definition of vulnerability emphasizes four factors that can compound or alleviate vulnerability, namely: social, economic, physical and environmental. These factors will be discussed in more detail in point 3.4.2.

From the above discussions it could be argued that vulnerability is the probability of a person or element being prone or susceptible to damage or injury. Based on the discussions it can be concluded that disaster vulnerability can be alleviated by reducing exposure to social, economic, environmental and physical vulnerability factors. These factors play a critical role in either decreasing or increasing a person's or community's vulnerability to disasters. For any Disaster Risk Reduction initiative to be successful it is important that the physical, economic, environmental and social aspects should be improved. The next section will discuss the factors that make indigenous communities more vulnerable to disasters.

3.4.2 Factors impacting on vulnerability

Indigenous communities around the world are highly susceptible to disasters as a result of their vulnerabilities created by their social, cultural, environmental, economic, political, and physical circumstances. Other factors that influence their vulnerability to disasters include age, gender, linguistic ability and background, ethnicity, race, and state of physical and mental health. These factors will be discussed in detail below.

3.4.2.1 Social factors

Baumwoll (2008) states that social vulnerability refers to the impact of disasters on the social structure of a society and vice versa. The most common social factors that increase indigenous communities' vulnerability include limited access to health, education and housing. In most instances these communities face considerable disadvantages in the key areas of health, education and housing. Due to their status in society indigenous communities have a lack of access to knowledge and information on health, low levels of education and inadequate access to shelter and safety. The above conditions make these communities to accord a much lower priority to Disaster Risk Reduction activities. Instead of using their resources for DRR initiatives they use them to address more pressing needs such as health, education, employment, housing, food and transport. This therefore makes them more vulnerable to disasters than any other groups. Another factor that increases the vulnerability of indigenous communities is that in many instances they are extremely isolated. They are also often located in remote and risk-prone areas. Often these areas are difficult for emergency services to access them easily. There have been instances where fire services could not gain access to informal settlements due to the fact that the roads were inaccessible and not negotiable or even non-existent. The remoteness of the location of indigenous communities results in challenges for the delivery of relief and recovery assistance during disasters (Kelman, 2008).

3.4.2.2 Cultural factors

Maskrey (1998) defines cultural vulnerability as systems of beliefs regarding hazards and disasters. There are various cultural factors that contribute to vulnerability. McEntire (2005:192) identifies "public apathy towards disasters, defiance of safety precautions and regulations, and dependency and an absence of personal responsibility" as such factors. Some of the beliefs and practices of Indigenous Knowledge state that all events are inevitable and humanity should therefore submit to fate without dispute. An indigenous community may believe that a mountain is their protector/saviour or is a

shrine and they are not permitted to live anywhere but near it. This may increase their vulnerability if the area is susceptible to a disaster. Due to certain religious and cultural beliefs people may not attempt to prevent, reduce or deal with hazards causing disasters.

3.4.2.3 Environmental factors

Environmental vulnerability refers to the natural environment in which a society is located and the impact of environmental degradation (Baumwoll, 2008). While environmental damage affects everyone, it has a particularly adverse impact on indigenous communities/people whose lives remain closely tied to the land and who depend largely on the environment for food. Environmental damage affects the well-being of indigenous peoples in that the availability of traditional foods and medicines is diminished as a result of environmental degradation.

3.4.2.4 Economic factors

Economic vulnerability is related to the number of economic resources in the country, the ability of the country to support itself in the face of a disaster and the susceptibility of a country's economy to disasters (Baumwoll, 2008). A country's economic stability and the amount of money allocated to disaster management determine economic vulnerability. Indigenous communities are considered to be more vulnerable to economic challenges due to their standing in the society. In most instances indigenous communities are marginalized from the economic mainstream and they live in poverty. Poverty is generally recognized as one of the most important causes of economic vulnerability, on the grounds that the poor tend to have much lower coping capacities, and thus they bear a disproportionate burden of the impact of disasters, conflict, drought, desertification and pollution.

3.4.2.5 Political factors

Aysa (1993) defines political vulnerability as limited access to political power and representation. Politics also have a serious influence on the vulnerability of indigenous communities. This vulnerability occurs when people lack political voice. The political factors identified by McEntire (2005:191) include "minimal support for disaster programs among elected officials; over centralization of decision making; and isolated or weak disaster related institutions". Due to their standing in the society indigenous communities may be ostracized and not be considered when resources are allocated. Politicians and governments may give priority to the influential sectors of society who have the power to vote for them.

3.4.2.6 Physical factors

According to Baumwoll (2008) physical vulnerability refers to the physical characteristics of a country, which can be classified according to three components: geography, infrastructure, and population. Kelman (2008:22) states that an individual's physical characteristics also influence the individual's vulnerability to death or injury from natural hazards. Such characteristics include age, gender, linguistic ability and background, ethnicity, race, and state of physical and mental health. An individual's state of health includes physical mobility, speed of reaction, intelligence, and medical history.

Elderly people are more susceptible to diseases and are also more vulnerable to injuries during structural collapse caused by natural hazards such as storms and earthquakes. In addition, elderly people are more vulnerable to some biological hazards than younger people, and also have decreased mobility (state of health) which increases vulnerability to rapid-onset hazards. As a person's state of health declines due to old age, physical mobility is impaired, linguistic ability may regress, and ability to respond appropriately to warnings or situations may be compromised. The above-mentioned conditions increase the vulnerability of old people in situations requiring a rapid response due to decreased mobility.

A person's state of health can also increase their vulnerability to disasters. As a person's state of health declines, physical mobility is impaired, linguistic ability may regress, and ability to respond appropriately to warnings or situations may be compromised. The issue of linguistic ability (oral and reading comprehension) is also very important in Disaster Risk Reduction. Individuals who do not understand warnings and safety instructions due to their educational background, youth or age, hearing impediments (state of health), intelligence, or a linguistic background different from the language of the community are more vulnerable to rapid-onset hazards such as storms and flash floods. Individuals who do not understand a language in which a warning about an impending disaster is issued may be more vulnerable to that hazard due to their lack of understanding and comprehension of the hazard.

In order to reduce and manage vulnerability for disaster reduction of indigenous communities, McEntire (2005:217) suggests the following five measures:

The first measure relates to establishing a knowledge-base. This is aimed at gaining an understanding of vulnerability and also conducting regular assessments of the liabilities and capabilities in the physical and social environments. The second measure is the "education of policy makers and citizens on disasters, and strengthening of disaster prevention and preparedness institutions". Thirdly, measures include harnessing technology, protecting the environment, and reducing poverty to reduce vulnerability, by addressing contextual factors. Fourthly, additional measures should be taken to implement vulnerability management by promoting individual and community empowerment and responsibility, and lastly "activities should be integrated and coordinated through public, private and non-profit partnerships and collaboration as a way to reduce liabilities and raise capabilities" (McEntire, 2005:217).

It is important to note that improved risk reduction for indigenous communities cannot be attained without the will and involvement of the communities and strategies that take into account the needs and diversity of these communities. Therefore the involvement of the communities is vital and this requires long-term commitment to the inclusion of

indigenous communities in the planning of Disaster Risk Reduction strategies on the part of all levels of government and agencies. This should include a cross-functional approach that builds partnership arrangements with indigenous communities. Although the capacity of Indigenous communities to prepare for, deal with and mitigate the effects of disasters is severely limited, it is important to recognize that there are a number of indigenous strategies possessed by these vulnerable indigenous communities that can add value in the achievement of Disaster Risk Reduction objectives. It is therefore important that these indigenous strategies should be explored and exploited for the benefit of Disaster Risk Reduction.

From the above discussion it can be observed that indigenous communities are faced with many challenges that make them more vulnerable to disasters. Given the identified vulnerability factors it could be argued that indigenous communities will be more vulnerable since they are unlikely to have the required resources to deal effectively with the hazards. Therefore it is important that special attention should be given to address the vulnerability of indigenous communities. The next section will discuss the introduction of Indigenous Knowledge in Disaster Risk Reduction.

3.5   DISASTER RISK REDUCTION AND INDIGENOUS KNOWLEDGE

The introduction of Indigenous Knowledge in Disaster Risk Reduction, the reasons for the growing interest in it, and arguments for the value, relevance and importance of Indigenous Knowledge in Disaster Risk Reduction will be discussed.

3.5.1 Introduction of Indigenous Knowledge in Disaster Risk Reduction

Ellen (2007:15) states that the relevance of local environmental knowledge in responding to natural hazards was recognised for the first time in 1975, in an article that was written by Daniel Vayda. Ellen states that the article that was written by Vayda criticised ecological anthropology and called for an investigation of the relationships between the characteristics of hazards and people's responses thereto. According to

Dekens (2007:3), in the late 1970s other articles, which examined specific case studies on human responses to earthquakes, droughts and frosts, in areas such as Peru, Sahel and West and East Africa (such as Nigeria and Kenya), New Guinea, South Africa and India, also emerged. Furthermore, Dekens (2007:3) states that since the 1970s, a growing body of literature has highlighted the importance of integrating local knowledge and practices into development and conservation projects. A less well-known, but also growing body of literature comes to a similar conclusion in relation to such natural hazards and disasters. However, Baumwoll (2008:66) argues that interest in Indigenous Knowledge has been extremely slow in entering the field of Disaster Risk Reduction. To support this statement, Baumwoll (2008:66) argues that the first reason that caused the delay was that disaster prevention and management initially focused on technological solutions, such as having better surveillance techniques, high-tech warning systems, and stronger infrastructure. This meant that the social science perspective, such as local knowledge, was not even considered, since it was in conflict with the current view at the time that believed that geophysical knowledge and technical systems constituted the most effective disaster prevention and response methods.

Dekens (2007:3) says that since the 1980s, however, increasing numbers of institutions have recognised the importance of integrating 'local knowledge' into development. Institutions such as the World Bank initiated a database of best practices in Indigenous Knowledge. The same applies to disaster management, with increasing research initiatives, national and UN agencies, and major international Non-Governmental Organizations (NGOs) beginning to take local knowledge and its stakeholders into account. Many NGOs have been established locally, regionally, and globally to address these issues or to engage in activism on behalf of those at risk. Dekens (2007:4) claims that many case studies on local knowledge exist, especially local environmental knowledge, but usually the links between this local knowledge and disaster management and preparedness are not made sufficiently explicit. Additionally, several examples from large environmental disasters have brought the issue to the attention of academics, practitioners and the general public. These examples are found in cases

questioning what happened during tsunami disasters and what was found out about the people who survived that particular disaster (Baumwoll, 2008:66).

Although the above-mentioned literature has recognised the relevance of Indigenous Knowledge to disaster, it did not make any clear and direct link between Indigenous Knowledge and Disaster Risk Reduction. Indigenous Knowledge was still being ignored in the established disaster management discourse despite the fact that more attention was being given to the role and value of this knowledge in other fields. Furthermore, the values of Indigenous Knowledge that were highlighted in the academic literature only began to appear in policies and practices of Disaster Risk Reduction organizations at the beginning of the twenty-first century (Baumwoll, 2008:64).

From the above discussions, it becomes clear that it took Indigenous Knowledge some time to be properly recognized in the academic literature. It can, therefore, be argued that the lack of academic writing on the importance of Indigenous Knowledge in Disaster Risk Reduction also delayed the recognition of Indigenous Knowledge in the disaster management discourse. The next section will discuss the arguments that support the value of Indigenous Knowledge in Disaster Risk Reduction.

3.5.2 Value of Indigenous Knowledge in Disaster Risk Reduction

Based on the developments in the fields of Indigenous Knowledge and Disaster Risk Reduction over the past years, a number of arguments that promote the value of Indigenous Knowledge in Disaster Risk Reduction have now emerged. According to Baumwoll (2008:69), four primary arguments have been made for the value of Indigenous Knowledge in Disaster Risk Reduction. The four arguments will be discussed and examined below.

The first argument states that many communities hold knowledge in the form of strategies or know-how; and this provides methods for reducing disaster risk (Baumwoll, 2008:70). These new strategies can then be transferred and adapted for use by other

communities experiencing disasters. In the context of Africa, Indigenous Knowledge is used by communities as a survival strategy to deal with disasters. Moatlhaping (2007:93) makes an example of "Mafisa" (the loaning of cattle or livestock) to a poorer member of the community. A person who has borrowed cattle looks after them and uses the milk to feed his/her family. This is a strategy that is used to fight poverty in the community. According to De Guchteneire *et al.*(2004:6), Indigenous Knowledge is entrenched in the community. The fact that Indigenous Knowledge is generated and entrenched within communities enables any community to develop and create its own Indigenous disaster risk reduction methods. These are then unique to its local context and circumstances.

The second argument is that the affected communities' participation is increased by Indigenous Knowledge; and this empowers them to take a leading role in Disaster Risk Reduction (Baumwoll, 2008:70). Community participation is best illustrated in the indigenous governance system that is used in many African communities. Through this system the governance of the community is in the hands of the chief, but the responsibility is given to the chief and the traditional council. In times of disasters, such as droughts, the chief distributes food and cattle to the people who have been most affected. De Guchteneire *et al.* (2004:7) argue that Indigenous Knowledge can be used as a cost-effective and sustainable strategy, to help poor people in their daily struggle for survival. This knowledge can be used for survival in different areas of life, such as health, food preparation, agriculture, education and Disaster Risk Reduction.

The third argument is that project implementation is enhanced by the knowledge contained in Indigenous Knowledge (Baumwoll, 2008:70). Respecting and accounting for Indigenous Knowledge provides an understanding of local practices and contexts. Since Indigenous Knowledge is advocated for the use of local people, this assists in the successful planning and implementation of projects. A project that takes into account local people's economic, political, social and cultural understanding is also more acceptable; and people are more willing to implement it.

The last argument is that the non-formal means whereby Indigenous Knowledge is disseminated provide a successful model for further education on Disaster Risk Reduction (Baumwoll, 2008:70). The oral mode, in which Indigenous Knowledge is often passed down, is very effective, since it emphasizes the importance of non-formal education. The dissemination of information through alternative methods outside formal schooling, such as songs, story-telling and tales is also very effective. According to De Guchteneire *et al.* (2004:5), Indigenous Knowledge refers to the large body of knowledge and skills that have been developed outside the formal education system, and which are handed down orally from generation to generation.

The four arguments outlined above illustrate that Indigenous Knowledge adds value in Disaster Risk Reduction and plays a critical role dealing with disasters. The chapter concludes by discussing some of the examples on how Indigenous Knowledge has been applied to Disaster Risk Reduction.

3.6   USE OF INDIGENOUS KNOWLEDGE IN DISASTER RISK REDUCTION

According to Kamara (2005), studies in Kenya on the application and use of traditional knowledge in environmental conservation and natural disaster management have cited examples of areas where such knowledge is still prevalent and is harnessed. He states that traditional Indigenous Knowledge of storm routes and wind patterns enables people to design their disaster management long in advance by constructing shelters, wind-break structures, walls, and homestead fences appropriately. He further states that similarly, the knowledge of local rain corridors enables them to prepare for storms. Knowing the colour of clouds that may carry hailstones enables people to seek cover. Knowing that prolonged drought is followed by storm, thunder and lightning during the first rains enables people to prepare for or expect a disaster. A change in birds' cries at the onset of their mating period indicates a change of season. Similar applications and uses of Indigenous Knowledge for disaster management are also prevalent in Swaziland. Floods can be predicted from the height of birds' nests near rivers. Moth

numbers can predict drought. The position of the sun and the cry of a specific bird on trees near rivers may predict the onset of the rainy season for farming.

Mulenga (2010:22), in a study in Kamaroja, Uganda, reported the use of Indigenous Knowledge in Disaster Risk Reduction as follows: *Cluster of six stars*: cluster-relationships with the moon can be used for the prediction of bad years; *Birds*: migratory patterns of birds are good sources of information on seasons, for example, the arrival of a certain group of birds signifies that rains can be expected shortly, and that there will be a good harvest; *Rats*: when rats are plentiful, it is an indication of drought the following year; *Trees*: if trees flower/produce a lot during a dry season, this is an indication/prediction of drought the following year; and *Animals "kneeling"* when drinking water: this is an indication of a bad year. Chang, Yanda and Ngana (2010:70), in a study in Tanzania, stated that the behaviour of animals and the appearance and movement of birds and insects can frequently be used by Hehe and Nyakyusa elders to predict the weather and the climate. The appearance of large swarms of red ants in September to November is an indication of imminent rainfall onset; and it also indicates that the coming rainfall season will be a good one. Huy (2009:22), in a study in Hai An, Vietnam, found that a local traditional method for predicting cyclones, floods, and other hazards had been set up. Indigenous Knowledge is used to interpret observed natural signals. The movement of sea waves, the appearance of clouds and wind directions are observed, and their interpretation disseminated to assist in preparing for disasters. Chigeza (2008:14) in a study conducted in Taung, South Africa, found that older persons used their Indigenous Knowledge of changing seasons, the lunar cycle and the stars to determine seasonal patterns to deal with drought. Older persons mentioned that the shape and the location of the moon can be used as an early sign to predict drought.

From the above discussion it is clear that Indigenous Knowledge can play an important role in Disaster Risk Reduction. The examples provided above demonstrate the positive benefits of Indigenous Knowledge in Disaster Risk Reduction to communities. Therefore it can be concluded that Indigenous Knowledge plays a crucial role in Disaster Risk Reduction and can add value to it.

3.7   CONCLUSION

Chapter Three has discussed Disaster Risk Reduction with the aim of giving meaning and development to the field. The chapter started by providing an overview of the Disaster Risk Reduction discourse, the development of the field, and the initiatives that have shaped it, and the challenges that are faced by Disaster Risk Reduction. The chapter also looked at the literature that underpins the role of Indigenous Knowledge in Disaster Risk Reduction. The review also revealed that indigenous communities are faced by several challenges and are vulnerable to disasters. The vulnerabilities that were highlighted include social, political, physical and cultural factors. This review has shown that Indigenous Knowledge is important, and indigenous people hold a wealth of knowledge and experience that represents a significant resource in the field of Disaster Risk Reduction. It has become clear that there are several stories that have been related, after major disasters, on how communities have used indigenous ways to protect their lives and property. From the discourses, it has emerged that there are a variety of Indigenous Knowledge forms and practices from different countries that are used in Disaster Risk Reduction initiatives, such as disaster prevention and preparation, food security, agriculture, water conservation, medicinal products, land use planning and environmental strategies. Examples provided in this chapter can be used to demonstrate the benefits of Indigenous Knowledge in Disaster Risk Reduction. Nevertheless, the review also revealed that there are several challenges that are still faced by Disaster Risk Reduction. Some of the challenges that were highlighted include human and financial resources, institutional capacity and political will. Despite the challenges, the chapter concluded that Indigenous Knowledge can add value; and it has positive benefits for the Disaster Risk Reduction field.

From the above discussion, it is clear that Indigenous Knowledge in Disaster Risk Reduction is receiving recognition; but at the same time, it is faced by a number of limitations and challenges. The next chapter will provide a brief overview of the research methods used in this study, and present and analyse the findings of the research done

and interpret these findings by comparing them with the relevant theoretical statements and literature.

CHAPTER FOUR

INDIGENOUS KNOWLEDGE IN DISASTER RISK REDUCTION: EMPIRICAL FINDINGS

4.1   INTRODUCTION

In Chapters Two and Three an overview of Indigenous Knowledge, the Disaster Risk Reduction discourse and the role of Indigenous Knowledge in Disaster Risk Reduction was provided. In this chapter, the findings of the study on the role of Indigenous Knowledge in Disaster Risk Reduction will be presented and discussed. The first part of the chapter provides information on the research design, how the research was planned and undertaken, as well as the reason for the selection of the methodology utilised in undertaking the study. The second part focuses on how the actual empirical research unfolded; and it presents and discusses the findings that were derived from the study.

4.2   CONTEXT OF THE STUDY

The research project was, as mentioned above, undertaken at two villages near Taung, namely Mokasa 2 and Qho in the North-West Province region of South Africa. The villages were selected because they are rural and harbour Indigenous Knowledge. Geographical and other practical considerations, such as accessibility, were considered in the final selection of constituencies and the choice of setting in this research (Nachmias and Nachmias, 1996:287). The area was also chosen because of the flood disasters that it had experienced in recent years. The study area used to be part of the now defunct Republic of Bophuthatswana. Geographically, the area lies between Kimberley (in the West) and Vryburg (in the North). The people are predominantly Tswana speakers; and they live under headman in small communities of over 20 villagers. The Chief lives at Taung Village, which is the traditional capital of the area.

The area is famously known for the "Taung Child Skull" that was discovered there in 1924. The area was affected by major flood disasters in March 2006 and January 2010.

4.3   METHODOLOGY

Two research methods were utilized: a literature review and an empirical study. In answering the research questions and seeking to achieve the objectives of this study, a qualitative empirical research design was followed. The presentation of information in this chapter is effected, to a lesser degree, in numbers. This is by no means a quantitative study and only the number of respondents interviewed is on occasion presented in numbers. The qualitative research design aimed to answer the questions raised via exploratory and descriptive research procedures. Qualitative data were captured through semi-structured interviews. This research design made possible an in-depth understanding of the role and use of Indigenous Knowledge and Disaster Risk Reduction. The qualitative research design will be elaborated on further in this section (see 4.3.1).

The researcher chiefly made use of descriptive and exploratory research. The study used descriptive research, because it can explain and describe the role of Indigenous Knowledge in Disaster Risk Reduction. It accordingly portrayed the characteristics of Indigenous Knowledge in Disaster Risk Reduction. According to Mouton (2001), the descriptive function plays an important role in developing knowledge about the community needs, problems and attitudes towards service, about the nature of the service provided, and about the service used. Since the study intended to enhance a body of knowledge on the role of Indigenous Knowledge in Disaster Risk Reduction, the descriptive research design was particularly appropriate. The function of the descriptive research method was to systematically describe the facts and characteristics of a given population, the area of interest and/or the phenomena (Merriam and Simpson, 1995).

Furthermore, the study was also exploratory in nature. According to Brink and Wood (1998), exploratory research investigates problems that have not been previously

studied and attempts to identify new knowledge, new insights, new understanding, and new meanings, and, in addition, to explore any factors related to the topic. Babbie and Mouton (2001:79) say that this approach is typically used when a researcher examines a new interest or when the subject of study is relatively new. The study has attempted to explore and find out what meanings communities give to their actions, and what issues concern them regarding the topic. This method was adopted mainly because the issue or problem under investigation had few or no earlier studies to refer to. In fact, very limited research has been undertaken into the role of Indigenous Knowledge in Disaster Risk Reduction in South Africa.

4.3.1 Data collection

Data were collected by, firstly, conducting a literature review of all the relevant literature on theories and principles of Indigenous Knowledge and Disaster Risk Reduction. In order to conduct a research project of this nature, one needs to take into consideration what is already known. The literature review of the relevant sources related to the research project, therefore, featured prominently in this investigation. The researcher undertook a literature study to provide a broad overview of the use of Indigenous Knowledge in the Disaster Risk Reduction area. In view of this, a wide range of journal articles, legislative and regulatory documents, books, theses, dissertations, newspaper articles and academic articles, which have relevance to the study, formed an important secondary source of the investigation.

After a thorough literature review had been conducted, the data were then collected by doing semi-structured interviews on purposefully selected individuals and key informants, such as elders, chiefs and traditional healers. In addition semi-structured interviews were also conducted with officials from Greater Taung Local Municipality, the North-West Provincial House of Traditional Leaders and the Association of Traditional Healers. Qualitative data collected from semi-structured interviews were documented.

The qualitative research paradigm was, as mentioned earlier, used to conduct the study. According to Thorne (2000:15), qualitative research encompasses varying philosophical positions, methodological approaches and analytical procedures. The qualitative research approach was used, since it is best suited to help the researcher to understand human behaviour and functions. This approach was also effective in helping the researcher understand how people feel, and why they feel as they do. According to De Vos (2007:269), a qualitative research design allows for flexibility in that it gives the researcher the freedom to adjust the design to better suit the situation and also allows a much less structured approach. One aspect that motivated a qualitative research design to be chosen for this study was that such a design allows for multiple realities to exist that are determined by the perceptions and experiences of the individuals or groups and therefore are context specific (Struwig and Steed, 2001:16,17).

Babbie and Mouton (2007:270) state that qualitative research is the generic approach in social research, according to which research takes, as its point of departure, the insider perspective on social action. Babbie and Mouton (2007:270) further assert that qualitative researchers always attempt to study human action from the perspective of the social actors themselves. Strauss and Corbin (1990) pointed out that this approach is suitable where organisations, groups and individuals are being studied. Therefore, this approach was deemed suitable for this research, since individuals and communities were studied.

4.3.2 Study population and sampling

The population in a study refers to a set of objects, whether animate or inanimate, which are the focus of the research, and about which the researcher wants to determine some characteristics (Bless and Higson-Smith, 2000:84). De Vos et al. (2002) define sampling as taking a proportion of a population and considering it representative of that population. This means that it is the selection of the specific research participants from an entire population. Sampling involves decisions about which people, settings, events, behaviours, and/or social processes to observe.

The target population of this study comprised respondents (male and female) who were traditional chiefs, elders and traditional healers who are indigenous men and women, and who are residents of the two selected villages located in the surrounding areas of Taung. For this population, the snowball sampling technique, which aims to locate information-rich cases (and key informants), was used (Isaac and Michael, 1997:223). Snowball sampling was considered a suitable method for the study, because no census of the study population exists (Burns and Grove, 2005:350). Key informants were requested to recommend individuals who are well versed in traditional knowledge. In this instance, people, such as elderly people and traditional healers, played an important role.

The other target population consisted of officials who were representatives of Institutions that work in areas related to disaster and traditional affairs such as the Municipality, the North-West Provincial House of Traditional Leaders and the Association of Traditional Healers. For the purpose of this study a purposive sampling technique was used to select the respondents from various entities. They were targeted because they are believed to be custodians of disaster issues and traditional affairs in the province, and could provide valuable information required to accomplish the research objectives of the study. According to Mason (2002:124), purposive sampling means selecting groups or categories to study on the basis of their relevance to the research questions, the theoretical position and the analytical framework, the analytical practice, and most importantly, the argument or explanation that is being developed. Mason (2002:124) further stated that purposive sampling is concerned with constructing a study group, which is meaningful theoretically and empirically, because it builds in certain characteristics or criteria which will help develop or test the researcher's theory or argument.

4.3.3 Data analysis

The first step in the analysis involved an in-depth data analysis, using appropriate techniques, such as mind-mapping, to reduce the data, and organizing them into themes, patterns, trends, and relationships that are easier to understand. Interpretation of the data involved extracting meaning and integrating the views of other authors into something new; this ensured that a final product was not merely the rewriting of existing knowledge, but new knowledge as drawn from the findings (Nachmias and Nachmias, 1991).

The data collection was supplemented by using a separate notebook, but only the important points were noted down. All interview tapes were assigned and labelled with random numbers, which were then matched to pseudonyms the researcher had created for all the interviewed respondents. All the interview data were organized, according to the individual's pseudonym, and the date the conversation had occurred. Separate files were created for each individual interview session; and these were stored in folders on the laptop. The analysis of all the interviews began during the process of transcription. The data collected were transcribed into specific themes, which were then used to analyze the findings. Several topics were identified and put into themes, which were organised into main and sub-themes. Once all the transcribed data had been analyzed, the researcher constructed a preliminary list of themes that appeared relevant at that stage of the analysis. The data were then re-read, to establish the individual codes that would be used to segment portions of the data so that they could then be re-assembled under the relevant theme or themes.

4.4 INTERVIEW SCHEDULE

The schedule was divided into the following four sections:

(a)   Section A: Profile of the respondents

Section A focused on the respondents' profile, as this relates to age, gender, education, marital status and religious beliefs. The information was intended to provide a clear picture of the profile of each of the respondents.

(b)   Section B: Understanding disaster and types of disasters

Section B dealt with the understanding of the concept disaster and the different types of disasters experienced. Respondents had to identify disasters experienced, as well as indicate what they thought were the causes of these disasters, and how they dealt with them. The aim of this section was to establish the respondents' understanding of the concept of disaster – and its related terms – as well as the different types of disasters.

(c)   Section C: Understanding Indigenous Knowledge and its use

Section C focused on the understanding of the concept of Indigenous Knowledge and how it is used in the community. The purpose of this section was to determine the understanding of respondents with regard to Indigenous Knowledge and its different uses.

(d)   Section D: The role of Indigenous Knowledge in Disaster Risk Reduction

Section D investigated the role of Indigenous Knowledge in Disaster Risk Reduction. It also probed the current shortcomings of Indigenous Knowledge in Disaster Risk Reduction. Lastly, this section sought to uncover what can be done to improve the role of Indigenous Knowledge Systems in Disaster Risk Reduction.

4.4.1 Evaluating the interview schedule

Before pre-testing the interview schedule, the researcher of this study sought expert opinion regarding the validity of the questions. The interview schedule was distributed to

the study supervisor and co-supervisor. Their suggestions were noted; and some changes were subsequently made to the draft interview schedule, which was then pre-tested.

4.4.2 Pre-testing the interview schedule

According to Newell (1993:112), pre-testing, also called a pilot study, is important in assessing whether the "line of questioning" is appropriate, and whether the tool is understandable and simple to use. The interview schedule was pre-tested on elders, who had knowledge of Indigenous Knowledge – to afford the researcher an opportunity to identify questions that could be misunderstood by the respondents, ambiguous questions, unnecessary questions, missing questions and to find general reactions to the questions (Babbie and Mouton, 2001:119).

After the format and contents of the interview schedule had been approved by the study leader, the fieldwork was undertaken by the researcher. Participants were given an introduction to the study; and they were asked if they were willing to participate. Most of the people could not understand the questions in English; and therefore, the researcher explained them in the local language (which is Setswana).

4.5 EMPIRICAL FINDINGS

This section focuses on how the actual empirical research unfolded; and it presents and discusses the findings that were derived from the study.

4.5.1 Profile of the respondents

The following data reflect the profile of the respondents in terms of age, gender, marital status, educational level and religious beliefs.

4.5.1.1 Age of the respondents

In the interview schedule, a question on the age of the respondents was included to establish the age categories of the respondents in the study. The nature of the study dictated that the elder members of the villages were preferred as research respondents. This is due to the fact that their age meant that they had accumulated knowledge and experience over time; and that makes them, in all probability, custodians of Indigenous Knowledge.

The respondents in this study mainly fell into the age range of older than 68. Nine (9) of the respondents were older than 68, while seven (7) were between the ages of 58 – 68. Three (3) of the respondents were in the age group of 47-57, and only one (1) was in the age range of 36-46. This therefore means that the majority of the respondents were in the age group of older than 68, followed by the age range of 58-68. It could therefore be argued that the recommendations arrived at through this study are informed by, and built on, rich and well-informed input from all the chosen age categories.

4.5.1.2 The gender of the respondents

A question on gender was included, in order to determine the ratio of participation in the study, according to gender. The gender can be relevant because data are needed from people in leadership roles and these roles are generally occupied by males. Information on gender was also necessary because the gender of individuals could have an influence on how disasters affect them.

In terms of gender, the results show that twelve (12) of the twenty respondents were males, while eight (8) were females. The large number of males could be due to the fact that males are more likely to be in leadership positions in the villages. Another reason may be that snowball sampling depends on the referral of respondents. As such, more males would have been referred to the researcher (who is of the same sex as the initial

respondent: male). The somewhat larger number of men in the study may indicate the fact that there are still patriarchical practices in the village.

4.5.1.3 Educational level

A question on education was included to establish the educational level of the respondents in the study. Information on education was relevant because the level of education of participants has an impact on the rate at which awareness programmes on mitigation, preparedness and post-disaster strategies are incorporated into reducing the vulnerability of affected individuals and communities.

The results show that three (3) of the respondents had not attended school. Six (6) of the respondents had obtained a primary school education (Grade R to Grade 7), and eleven (11) had obtained a secondary education (Grade 8 to12), whilst none of the respondents had obtained a tertiary education. Apart from formal education, the respondents indicated that they had also obtained knowledge and education through traditional institutions. These forms of education are known as Bogwera (the male initiation institution) and Bojale (the female initiation institution). Four respondents indicated that they had gone to the initiation school. Bogwera and Bojale are rituals that mark the rites of passage from boyhood to manhood, or from girlhood to womanhood. All girls and boys are expected to undergo these initiations, in order for them to enjoy privileges as mature citizens in the affairs of the tribe, including marriage. It is a place where they are taught about culture, morality, respect for other people, and responsibility to one's community. Indigenous Knowledge that is acquired from the traditional institutions is important in assisting in disaster mitigation and preparedness. To improve the effectiveness and success of Disaster Risk Reduction initiatives could be incorporated into these traditional institutions.

4.5.1.4 Religious beliefs

A question on religion was included to establish the religious beliefs of the respondents in the study. Information on religious beliefs of respondents was important for the study because certain beliefs can have an influence in increasing hazards. In some beliefs there is a doctrine that states all events are inevitable and humanity should submit to fate without dispute. Some indigenous communities may believe that a mountain is their protector/saviour or an unsafe place is a shrine and that they are not permitted to live anywhere but near it. Living near a vulnerable area will increase their vulnerability. Due to certain beliefs people may not attempt to prevent, reduce and deal with hazards, causing disasters due to their religious beliefs. Information on religious beliefs was thus important to understand respondents' views on disasters. This issue will be discussed in detail under the results of understanding and beliefs regarding disasters.

With regard to religious beliefs, the data show that thirteen (13) of the respondents were followers of Christianity. Most of the respondents however practise their Christianity together with their African traditional beliefs. They consult traditional healers from time to time, when they have problems. They also believe in ancestors and conduct relevant rituals. Seven respondents indicated that they practised African religion. That means they only believe in their ancestors.

The above section focused on the respondents' profile as it relates to gender, age, education, marital status and religious beliefs. The intention was to provide a profile of the respondent and analyse the influence that it might have on Disaster Risk Reduction. From the above information and its analysis it is clear that the profile of a community has an influence on how they will deal with hazards and disasters. This statement is supported by Kelman (1998:22) who argues that the characteristics of a population such as gender, age and state of health influence the vulnerability of that population to natural hazards.

The next section provides the details regarding the analysis of the findings of the data collected (other than the profile of the respondents) on the role of Indigenous Knowledge in Disaster Risk Reduction.

4.6.   DISCUSSION OF THE STUDY

In the following discussion the findings and the analysis of the data collected will be presented as they relate to the theory and themes identified in Chapters Two and Three. The discussion will be in line with the objectives set forth in Chapter One.

4.6.1   Views on disasters

Section B of the interview schedule dealt with the understanding of disaster and the types of disasters experienced. In addition, respondents had to indicate what they thought were the causes of the identified disasters, and how they had dealt with them. Therefore, this section presents the respondents' understanding of disaster, the types of disaster experienced, their causes, and additionally how they had dealt with them.

In order to establish whether the respondents were familiar with the term 'disaster', they were requested to define it in their own words. The following common definitions emerged:
- "A disaster is great damage".
- "A disaster is an accident that disturbs the lives of people". (Kekotsi e e kgoreletsang maphelo a batho!)
- "A disaster is something that disrupts normal day-to-day life."
- "A disaster is an accident that affects many people."

Most of the responses confirmed that respondents had some understanding of disasters. In discussions with the respondents it could be established that the respondents' understanding of a disaster is more or less in line with the literature definition in the Act and UNISDR as stated in Chapter Three. The respondents' understanding also reflects the essence of the definition of the Disaster Management Act, 2002 (No. 57 of 2002). The definition of the Act stated that a disaster is determined

by the number of lives lost, injuries sustained, damage to property, infrastructure and environment. For any event to be declared as a disaster people who die or are injured should exceed the norm and damage to property, infrastructure and environment should exceed a certain magnitude. The fact that the majority of participants were found to have a good knowledge of the term indicates that awareness exists regarding disasters.

To be able to obtain a further understanding of how the respondents understand and view disasters, respondents were questioned on the cause of disasters and their experiences of them. The questions attempted thereby to define and illuminate how disasters in Taung are experienced and perceived. All of the respondents indicated that they have been directly affected by some kind of a disaster in the past. Respondents were questioned with regard to what they know are the causes of disasters. The respondents related/described the causes/source of disasters as being uncontrolled, since they were caused by nature, for example climate change and change of seasons. Respondents also indicated that the occurrence of disasters is not only related to natural causes, but also to unnatural causes. Views that emerged were that disasters are also caused by the actions of people, for example, by angry ancestors or a god, snakes, fighting and witchcraft.

In terms of the experiences of respondents of disasters when asked to indicate the type of disaster experienced, they all indicated that they had been affected by floods. The respondents indicated that this was especially related to the devastating floods that the Taung area experienced in 2006 and early in 2010. The second most frequently experienced disaster was drought; this was experienced by more than half of the respondents. Half of the respondents indicated storms, whilst the rest indicated fire as a disaster which they had experienced. When respondents were asked how they dealt with disasters, they indicated that they employed a variety of strategies. Respondents indicated that they use their own resources to deal with disasters. They rely on extended family and other community networks. This is done through the assistance that they receive from their families through remittances. Some of the strategies that are used are to exchange or sell livestock. Furthermore, they also receive humanitarian

emergency relief, medical assistance, and access to clean water and shelter from the government and from humanitarian organisations. Relief is also received in the form of grants and food parcels from the government. Respondents indicated that they also benefit from the employment created during the reconstruction of infrastructure damaged during disasters.

4.6.2 Views on Indigenous Knowledge

Section C of the interview schedule dealt with respondents' understanding of the concept Indigenous Knowledge and' experiences regarding it. The respondents had to indicate Indigenous Knowledge practices that have been used by the community/village. In addition, the respondents had to respond to questions on how Indigenous Knowledge is used in the community, how it is passed on and whether they believed that it is still important at present.

Of the twenty respondents interviewed in the study, a very large majority (nineteen) indicated that they had an 'excellent' knowledge of the term 'indigenous knowledge'. The fact that the majority of the respondents had a good understanding of the term 'indigenous knowledge' indicates that this knowledge actually exists within the study area.

The common definitions that emerged from the respondents were that;

- "Indigenous Knowledge is knowledge that is unique to the tribe". (Ke kitso ee kgethegileng ya morafe).
- "Indigenous Knowledge is knowledge of culture and tradition".
- "Indigenous Knowledge is part of their everyday life."
- "Indigenous knowledge is knowledge acquired from the ancestors."

Some respondents said that Indigenous Knowledge is knowledge used in their everyday life that is passed on to their children, who perpetuate it from one generation to the next. Both communities perceive Indigenous Knowledge differently, but they both provide an understanding of it as ancestral knowledge that is passed down along the generation lines.

From the above statements, it can be argued that the respondents' understanding of Indigenous Knowledge reflects the essence and core characteristics of Indigenous Knowledge, as defined by Flavier *et al.* (1995), and Warren (1991) and others, as discussed in Chapter Two. It is important to note that one of the major lessons learnt from the respondents' definition and interpretation is that Indigenous Knowledge is not limited only to the academic literature. According to the interviews conducted with the respondents, Indigenous Knowledge encompasses the traditional values, norms, habits and other principles, which comprise the history and experiences of the respondents.

With regard to how Indigenous Knowledge is applied, the respondents indicated that it is used in a variety of ways, such as in cattle and goat rearing, the protection of animals, the protection of plants, healthcare, transport, kraals, fire places and in conserving water. These aspects will be discussed below.

Respondents indicated that cattle rearing is an important survival strategy in their lives. Cows are used as sources of food. They provide meat and milk. Milk is used for eating with porridge, drinking, making tea, or in the fermentation of sour milk or natural yoghurt. In addition, cattle are important for their leather. The leather is also used to make blankets, which can be used during winter to provide warmth. The leather is also used in their houses to make floor mats. Furthermore, the cow is important for its dung. The cow dung is also useful in the construction of traditional houses. Cow dung is used to decorate, paint and draw art on the walls and floors of the house. Dry cow dung is also used as a source of energy. It is used to make a fire for cooking. Furthermore, cow dung is also used as manure in the gardens. The above findings are similar to the study that was conducted in Uganda by Agea *et al.* (2008). In the study it was found that

Indigenous Knowledge is used in enhancing food security. The study found that some households use animal wastes such as chicken manure, cow dung and crop residues such as coffee husks to fertilize their gardens in order to have an increased crop yield.

In addition to the functions above, cattle are also used during traditional ceremonies, such as (mpho ya badimo) 'the gift of ancestors'. This function is conducted to appease the ancestors when they are angry, to ask for good luck and for thanksgiving. Cattle are also slaughtered during weddings and burial ceremonies. They are also used when young men are to be married – to pay the bogadi dowry (lobola). With regard to the protection of animals, the respondents indicated that they would not cause harm or kill certain animals, such as Tlhware (Pythons), and birds such as Ntsu (Hawks), and Peolane (Swallows). They attributed this practice to the belief that disasters such as death, drought, famine, floods, drastic diseases, death and thunderstorms will follow the killing of these animals, reptiles and birds.

Additionally, the respondents indicated that some of the birds are associated with spirits; and killing them may cause disorder and possibly cause mental illness or death to those who kill them. The respondents also indicated that they would not kill or eat the Tholo (Kudu) because of its totemic status. Respondents indicated that there are certain trees and plant species that are considered sacred. Therefore, they should be protected and should not be destroyed. Some of these trees are Mosetlha (Peltophorum africana), and Mokgalo (Ziziphus Mucronata). The trees are not to be cut during the ploughing period or before harvesting is complete, because cutting them may bring drought and famine. The cattle kraal is central to most traditional Tswana villages, and is the focus of life. In Taung, the respondents indicated that a kraal also plays an important part in the lives of the community. A kraal is a place where animals, such as calves, goats and sheep are kept. The material that is used for fencing the kraal is brushwood and shrubs. This material is used to prevent wild animals from attacking the domestic animals, and also to prevent thieves from stealing their livestock.

In Taung, the respondents indicated that a fireplace also plays an important part in the lives of the community. Fireplaces are used for cooking. The fireplace is outside; and this is mainly to prevent houses burning, and to prevent death from smoke inhalation. Cooking is mainly done on a fire that is made from wood or dried cow dung. In the evenings, old people tell young children stories and tales about their tribes at the fireplace.

Respondents indicated that they have two indigenous methods of preserving maize. They indicated that the first method of preserving maize is to harvest it dry, and then store it. This maize can then be cooked at a later stage. The second method is to harvest the maize whilst it is still fresh or wet, and then boil it until cooked. After the maize has been cooked, it is placed in the sun for drying and stored for use in the future. Then when the maize is needed, it is boiled again. It can be served on its own, or it can be mixed with beans, to make "dikgobe" or dry maize corn. The respondents indicated that in order to conserve water, there are certain beliefs that are held by the community. One of the beliefs is that no-one is supposed to fetch water with a black pot or a pot used for cooking. It is believed that fetching water in a black pot causes the well to run dry or angers the spirits. Moreover, it is believed that fetching water with a metal container affects the sweetness of the water as drinking water. These beliefs and myths are intended to preserve and conserve water.

4.6.2.1 How is Indigenous Knowledge passed on?

Question 3.3 was intended to discover how Indigenous Knowledge is passed on by the respondents and by the tribe. With regard to how knowledge is passed on from generation to generation, the respondents indicated that Indigenous Knowledge is passed on and imparted through a variety of ways, such as storytelling, tales, poetry, teaching, observation and practical training.

Respondents were asked where they had acquired their Indigenous Knowledge and their responses indicated that most of the knowledge had been acquired from family

members, predominantly from parents and grandparents, followed by other relatives, community members and the traditional authority. This shows that the elders of the community including traditional healers, old men and women, play an important role in passing knowledge on to the next generation. Respondents indicated that Indigenous knowledge is passed down from generation to generation through cultural transmission. They pointed out that the main mode of transmission of Indigenous Knowledge was verbal instruction from parents or elders, or practically from observation of parents and elders, and lastly, through community meetings at the chief's kraal. This is done through the presentation of folktales, proverbs and stories.

4.6.2.2 The importance of Indigenous Knowledge

Question 3.4 was included to establish the importance of Indigenous Knowledge to the respondents in the study. When asked whether Indigenous Knowledge is still important in the current lifestyle, a large majority (sixteen out of twenty) of the respondents indicated that Indigenous Knowledge still plays an important role in the life of the community. Five of the sixteen respondents argued that Indigenous Knowledge needs to be adopted together with the current scientific knowledge, in order for it to remain relevant and to be effective. Four respondents argued that Indigenous Knowledge was outdated, and that it is no longer relevant for the current age. What emerged is that whilst most people like to think that Indigenous Knowledge is outdated and less valuable, the Taung communities still have a high regard for Indigenous Knowledge Systems. The results indicate that the majority of the respondents still believe that Indigenous knowledge is relevant.

4.6.3 The role of Indigenous Knowledge in Disaster Risk Reduction

Section D of the interview schedule formed the core theme of the study, and it investigated the role of Indigenous Knowledge in Disaster Risk Reduction. It also probed the current shortcomings of Indigenous Knowledge in Disaster Risk Reduction.

Lastly, the section sought to find what can be done to improve the role of Indigenous Knowledge Systems in Disaster Risk Reduction.

4.6.3.1 The role of Indigenous Knowledge in Disaster Risk Reduction in the community

This section discusses the role of Indigenous Knowledge in Disaster Risk Reduction, as experienced by the respondents. Question 4.1 is the core question in this study. It was included in the questionnaire to identify, explore and analyse the role of Indigenous Knowledge Systems in Disaster Risk Reduction. The results are indicated below:

(a) Indigenous Knowledge of weather predictions and interpretation

The respondents indicated that some of the older people in the community have developed intricate knowledge that is used to read and interpret weather patterns. This is done through observing seasonal patterns, changing seasons, the lunar cycle and the stars. The respondents indicated that the colour of clouds is used to determine those clouds that may carry hailstones. The position of the moon is used to determine if it is going to rain or not. The position of the sun may predict the onset of the rainy season. The direction of the wind is also used to determine whether it is going to be cold or not. Besides the weather patterns, the respondents indicated that they consult their natural environment and animal behaviour in order to determine possible weather patterns. They indicated that a change in birds' cries, or the onset of their mating period, indicates a change of season. In terms of the value of the knowledge, the respondents argued that the weather prediction knowledge helps them to know whether they will be receiving rainfall or not in a particular year. This assists them in preparing for disasters, such as famine.

Furthermore, they also argue that this knowledge assists them in knowing the type of crop to be planted, for example whether to plant drought-tolerant crops only, or any other kind of crop instead. With regard to the onset of drought, the respondents

indicated that the shape and the location of the moon are indications of an early warning sign of drought. Respondents indicated that if the moon is upside down, it means that there will be drought. A crescent shape signifies rain, while a full moon signifies less or no rain**.** Knowing that prolonged drought is followed by storm, thunder and lightning during the first rains, enables people to prepare for or expect a disaster.

(b) Coping Strategies

Respondents indicated that before the flood season starts, the people conduct various activities. These include the repair and strengthening of their houses, filling sacks with soil to cushion and prevent water from entering yards, digging ditches to divert water, and planting trees around houses to protect them from soil erosion. They also store emergency survival dry food, fire wood and keep portable earthen cooking stoves for use during emergencies. The respondents indicated that since floods create a scarcity of food, the most critical preparation is to ensure that there is sufficient food during flood periods. To keep meat (beef, mutton or goat) for long periods, while at the same time preventing it from rotting, it is made into biltong (digwapa). This assists them in ensuring that there is sufficient food during the flood period. Some salt is added to fresh meat; then it is cut into strips and sun-dried. This meat can be kept for over a year, and still be edible.

Other foodstuffs, such as vegetables and fruit are also dried. The respondents indicated that, in most instances, emergency food supplied by the humanitarian organizations or government organizations reach affected areas after a few days. The preserved food is, therefore, used whilst the affected areas are still waiting for emergency food supplies. It was indicated that the people who survive are those who prepare themselves by having sufficient dried food for emergencies.

In order to cope during floods respondents have developed various strategies. In order to ensure clothes, blankets and food remain dry, respondents indicated that the people make wooden platforms inside their rooms to live on and keep useful materials above

the level of any flood water which enters their houses. They also store water for drinking utensils in calabashes (nkgo).The respondents indicated that some of the traditional coping mechanisms employed by the community are to install pipes to channel used and run-off water to prevent overflowing of water into the homesteads.

To ensure survival after the flood period, respondents indicated that people plant quick-growing vegetables, such as spinach; and they look for wild food, such as Morogo wa Thepe (wild spinach), and other foods that grow immediately after the flood. Respondents indicated that to ensure that life returns to normality as soon as possible, people affected by flood start repairing their houses and clearing the debris from the houses immediately.

Respondents indicated that some of the traditional coping mechanisms employed by the community for dealing with fires include the use of wet maize bags, water buckets, as well as water from the taps to extinguish shack and wild fires. There are varying ways in which indigenous communities alert the population to an impending disaster. These may include whistling, the beating of drums and the sounding of horns. Preparedness renders early-warning systems particularly valuable.

The results of the interviews with the officials reinforced the outcomes of the data from key respondents. The data from the officials supported the fact that rural communities have developed unique and intricate forms of Indigenous Knowledge that can be used to prevent, mitigate and deal with disasters. They indicated that this is done through observing the climate, weather patterns, the environment and animals. The officials stated that these strategies play a very important role in Disaster Risk Reduction in the areas being studied.

(c) Food security

The respondents indicated that their forefathers had developed and applied several agricultural farming techniques. These have been passed down from generation to

generation orally. In the agricultural sector, respondents indicated that Indigenous Knowledge is used to provide food for the families. They indicated that farming is used to grow vegetables and fruit to meet the needs of the households. Agricultural production is done through the development of complex systems, which involve factors, such as a diversity of crops, well-dispersed plantings, varying fallow periods, as well as the sharing of labour and food production. Some of the practices include the use of indigenous seeds, the cultivation of drought-resistant crops, mixed cropping, valley farming, livestock diversification, harvesting wild fruits and berries, food storage and preservation. In most cases, the type of agriculture that is practised is subsistence farming and back-yard gardening.

Cultivation of the soil is done by using a hand hoe, and is normally done by women. The soil is fertilized by using a mixture of ash, kraal manure, compost and soil. This is used because commercial fertilisers are not easily available, and they are too expensive to purchase. The ash is used to reduce the soil acidity, while the manure and compost are used to provide organic fertilizer and to retain the ground water. The vegetables that are planted comprise pumpkins, maize, beans, cabbage, spinach, potatoes, tomatoes and onions. These vegetables are preferred, because they are used to supplement meat. From the above examples, it becomes clear that agriculture is used as a survival strategy to grow food and to meet the survival needs of the households, and additionally, to fight poverty. Therefore, it can be argued that this strategy is used by the respondents to reduce the risk of poverty in their households. In addition, it is also used to provide an extra income for the households because the surplus can be sold.

(d) Ailment treatment

During the interviews, the respondents indicated that they use wild plants as traditional medicine for healing purposes. The study revealed that almost all of the respondents use plants for medicinal purposes. The plant parts that are used include roots, leaves and bark. The various herbs, roots, leaves, barks and so forth are known to cure a range of illnesses, including snake bites, pain, common flu, impotence and many more illnesses. Often knowledge related to healing powers and medicine, rain-making, the

strengthening of families through traditional herbs and plants and others, is usually only accessible to 'powerful members' of the community, such as the chief, the village doctors, very old members of the community, as well as women and men who have come through the initiation schools. According to the respondents, only females are responsible for medicine used to treat infants or babies' illnesses, such as sunken fontanel, troubled umbilicus, teething, constipation and colic. In addition, the knowledge in using medicinal plants for healing in the communities is mainly kept and maintained by women in the households. Medicinal plants not only protect the public health, but can also contribute to hunger eradication and poverty reduction. They are also sold to herbal shops to earn an income.

The above indigenous strategies are in line with the findings of other studies conducted. In the literature review in Chapter Two it was revealed that the Simeulueans living off the coast of Sumatra, Indonesia, and the Moken living in the Surin Islands off the coast of Thailand and Myanmar both used Indigenous Knowledge passed on orally from their ancestors to survive the devastating tsunami (United Nations International Strategy for Disaster Reduction (UNISDR, 2008). Similarly studies in Kenya on the application and use of traditional knowledge in environmental conservation and natural disaster management showed that communities use traditional knowledge of storm routes and wind patterns to design their disaster management activities long in advance (Kamara, 2005). According to Kamara (2005) the use and application of Indigenous Knowledge for disaster management is prevalent in Swaziland. Communities in Swaziland predict floods observing the height of birds' nests near rivers. They also use the position of the sun and the cry of a specific bird on trees near rivers to predict the onset of the rainy season for farmers. In a study that was conducted in Uganda by Agea *et al.* (2008) it was found that Indigenous Knowledge is used in enhancing food security. The study found that some households use animal wastes such as chicken manure, cow dung and crop residues such as coffee husks to fertilize their gardens in order to have an increased crop yield. Based on the above examples it can therefore be argued that the findings of this study are in line with other literature results.

4.6.3.2 The contribution of Indigenous Knowledge to Disaster Risk Reduction

Question 4.2 was included to discover the future contribution of Indigenous Knowledge to Disaster Risk Reduction. In order to determine how Indigenous Knowledge can contribute to Disaster Risk Reduction, the participants were asked to give their opinion on how Indigenous Knowledge could make a contribution to Disaster Risk Reduction. In replying to the question, the respondents stated that, generally, the people of Taung have a rich Indigenous Knowledge that is used in Disaster Risk Reduction and in many other areas of life. They argued that the knowledge that people possess can make a valuable contribution to the field of Disaster Risk Reduction. The respondents indicated that Taung local communities have a variety of local knowledge items and practices, such as disaster prevention preparation, food security, water conservation, medicinal products, land use planning, and the preservation of food, drought and early warning strategies that can contribute to Disaster Risk Reduction initiatives. These practices can, therefore, be used as survival strategies in times of disaster, and also to prevent the onset of disaster. During the interviews with the officials, the common view that emerged was that in order for Indigenous Knowledge to contribute to Disaster Risk Reduction, there is a need to ensure that the local knowledge and practices used in Disaster Risk Reduction initiatives are recorded, and promoted for future use in the communities.

According to the study conducted by Kamara (2005), studies in Kenya on the application and use of traditional knowledge in environmental conservation and natural disaster management cited examples of areas where such knowledge is still prevalent and harnessed. The findings of the empirical study are in line with the research conducted by Moatlhaping (2007) and Akenji (2009) on the use and value of Indigenous Knowledge. On the other hand, the research findings also support the Baumwoll (2008) research that indicates that Indigenous Knowledge adds value to Disaster Risk Reduction.

4.6.3.3 Shortcomings of the use of Indigenous Knowledge in Disaster Risk Reduction in the community

Question 4.3 was included to establish the shortcomings in the use of Indigenous Knowledge in Disaster Risk Reduction. From the interviews, it emerged that one of the major limiting factors to the use of Indigenous Knowledge in Disaster Risk Reduction in the community is the lack of documentation. The fact that Indigenous Knowledge is transferred mainly orally by word-of-mouth means, as mentioned before, that, in most cases, it is not scientifically documented. It is not captured and stored in any systematic way. The lack of systematic documentation makes Indigenous Knowledge difficult to access, and the result is that many people do not know about it. The fact that people do not have proper access to this knowledge makes it susceptible to being ignored and neglected.

Respondents also indicated that some of the other limitations include the lack of proven scientific procedural explanations, young people's perception that indigenous knowledge is obsolete and out-dated when compared with Western scientific knowledge and practices. Education and exposure, especially of the young generation, to modern training has biased people's attitudes towards using Indigenous Knowledge. Moreover, the respondents indicated that the fact that the holders of Indigenous Knowledge are old people is a shortcoming in itself. They indicated that there is a danger of Indigenous Knowledge in Disaster Risk Reduction being lost when old people pass on. Furthermore, the respondents also indicated that the advancement of technology also poses a threat to the preservation of Indigenous Knowledge. They pointed out that Indigenous Knowledge does not develop at the same pace as Western knowledge. There are no standard measures for applying Indigenous Knowledge – which discourages its use in today's modern world. Indigenous knowledge bearers do not take aggressive steps to discover more indigenous knowledge options. Indigenous practices are continually shunned because they are associated with ignorance, illiteracy or poverty.

From the interaction with the respondents the researcher recognised that although people possess Indigenous Knowledge and use it every day, they are not aware that it is Indigenous Knowledge, and that they are using it for the purposes of Disaster Risk Reduction. In addition, the officials indicated that one of the major hindrances to the use of Indigenous Knowledge in Disaster Risk Reduction in the community was the lack of documentation. Furthermore, officials indicated that another shortcoming is young people's perception that indigenous knowledge is out-dated compared with Western scientific knowledge and practices, and therefore it cannot be used in Disaster Risk Reduction.

4.6.3.4 What can be done to improve the role of Indigenous Knowledge in Disaster Risk Reduction?

Question 4.4 was included in the interview schedule to discover what can be done to improve the role of Indigenous Knowledge in Disaster Risk Reduction. The respondents indicated that Indigenous Knowledge on Disaster Risk Reduction should be combined and integrated with culturally sensitive scientific knowledge that would suit the environment of communities. They argued that this is important, since many Disaster Risk Reduction strategies have failed due to their inability to fit in with the local context. Moreover, they argued that communities need to be empowered to recognise the importance of their knowledge, and how it could contribute to reducing disaster risk. This can be done by making them aware of the value of the knowledge that they possess. This can be done through specific workshops and training programmes. For Indigenous Knowledge in Disaster Risk Reduction to be preserved and transmitted to the younger generation, it must be included in the school education system and indigenous schools, such as "Bojale" and "Bogwera" circumcision schools. Older people must also be given an opportunity to impart this Indigenous Knowledge to young people. Many respondents felt that the use of Indigenous Knowledge must be promoted in all Disaster Risk Reduction practices.

This was expected to give an opportunity to those who know much about Indigenous Knowledge to share what they know with others, especially for disasters where modern techniques are not readily available. This statement is reinforced by the officials, who indicated that Indigenous Knowledge in Disaster Risk Reduction can be improved, and should be integrated with scientific knowledge relevant to the local environment. Furthermore, they argued that more information on local knowledge in Disaster Risk Reduction should be documented. Finally, these officials indicated that old people should teach more young people Indigenous Knowledge in Disaster Risk Reduction, such as predicting and interpreting the weather patterns, environmental protection, food security and disaster prevention and mitigation strategies.

4.7   CONCLUSION

The findings of this chapter have shown that the Taung local communities have a variety of local knowledge categories and practices that are used in Disaster Risk Reduction initiatives, such as disaster prevention preparation, food security, agriculture, water conservation, medicinal products, land use planning, social linkages and environmental strategies. This chapter has demonstrated that people in Taung make use of Indigenous Knowledge methods to prevent, reduce and deal with disasters. From the data collected in this study, it can be argued that the respondents' understanding of Indigenous Knowledge reflects the core characteristics of Indigenous Knowledge, as identified by authors, such as De Guchteneire *et al.* (2004) and Flavier *et al.* (1999), as was discussed in Chapter Two. Similarly, the respondents' understanding of disaster is more or less in line with the literature definition of the United Nations International Strategy for Disaster Reduction (2002), the definition of Disaster Management Act, 2002 (No. 57 of 2002), as discussed in Chapter Three.The findings of the research lend credence to the existing literature regarding the role and use of Indigenous Knowledge in Disaster Risk Reduction. From the data collected in this study, it was established that both the communities under investigation utilise forms of indigenous knowledge in Disaster Risk Reduction, although in varying degrees. It

can, therefore, be argued that these findings are in line with the literature review in Chapter Three.

The next chapter will discuss the conclusion to this study and provide some recommendations for the future improvement of the role of Indigenous Knowledge Systems in Disaster Risk Reduction.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1   INTRODUCTION

This chapter gives a conclusion to the study, which is based on exploring the role of Indigenous knowledge in Disaster Risk Reduction in the Taung community. The problem statement of this study was explained in Chapter One, as well as the main goal, objectives and research questions. In Chapters Two and Three an overview of Indigenous Knowledge, the Disaster Risk Reduction discourse and the role of Indigenous Knowledge in Disaster Risk Reduction were provided. Chapter Two utilised a literature study to explore the meaning and development of an Indigenous Knowledge discourse. Firstly, attention was given to the definition of Indigenous Knowledge, its characteristics and the initiatives which have shaped it. Moreover the chapter provided an overview of best practices in the use of Indigenous Knowledge.

Chapter Three concentrated on exploring and highlighting the benefits of Indigenous Knowledge in Disaster Risk Reduction, and addressed the current gap in the Disaster Risk Reduction literature by identifying Indigenous Knowledge strategies that can be incorporated into Disaster Risk Reduction. An overview of the role and use of Indigenous Knowledge in Disaster Risk Reduction was provided. In these two chapters a comprehensive review was conducted of the literature, statutes and policies relevant to this research and from that review key theoretical characteristics emerged which provide a substantial basis for comparison with the data collected through interviews and observations. In Chapter Four the research methodology was explained and motivation given for the use of a qualitative research design. Chapter Four continued with the presentation of the empirical phase of the study by presenting the findings of the research done.

This final chapter will now in conclusion present the recommendations of the study. This will be done by firstly giving an overview of the research aims, objectives, theoretical statement and research questions set out in Chapter One. This chapter thus provides a summary of findings in accordance with the aims and objectives of the study. As part of this the recommendations will be given as they relate to research objectives and questions. The recommendations in this chapter will be given to ensure that the Taung community gain meaningful insights from this study into the process of utilizing Indigenous knowledge in Disaster Risk Reduction. The recommendations will give advice on how government, communities and all other relevant Disaster Risk Reduction stakeholders can improve the role of indigenous knowledge in Disaster Risk Reduction in order to make the Taung community safer and more resilient in the face of disasters. Recommendations will also assist in improving the role of Indigenous knowledge in Disaster Risk Reduction.

5.2   CENTRAL THEORETICAL STATEMENTS

For the purpose of the study the following preliminary central theoretical statements were made:

The study thus argued that there was a lack of proper recognition for the role of Indigenous Knowledge in Disaster Risk Reduction in South Africa, and little is known about how South Africa's traditional communities have used their Indigenous Knowledge to prevent and cope with disasters. The lack of proper recognition is found despite international organisations, such as the United Nations, recognizing the important role of Indigenous Knowledge in Disaster Risk Reduction. Dekens (2007:3) argued that the mainstream literature on natural hazards and disasters and the mainstream institutions charged with disaster management have ignored local knowledge and practices. The study also argued that the role of Indigenous Knowledge in Disaster Risk Reduction has to date not received the needed attention it deserves in South Africa. Therefore it was important that systematic analysis and documentation of

Indigenous Knowledge in Disaster Risk Reduction be effected to provide valuable information for the prevention and mitigation of disasters.

5.3   CONCLUSION OF THE STUDY

The main aim of this study was to analyse the role of Indigenous Knowledge in Disaster Risk Reduction. In addition, the objective was to analyse the existing research, policy documents and relevant theories on Indigenous Knowledge Systems and Disaster Risk Reduction, and then to document how Indigenous Knowledge has been used in Disaster Risk Reduction in Taung, South Africa. The documentation of this knowledge was intended to identify how communities use Indigenous Knowledge to reduce, prevent and cope with disasters, and how this knowledge can be used in future to prevent, deal and cope with disasters.

The study was guided by the following research questions:

i.   What are key elements of Indigenous Knowledge Systems and Disaster Risk Reduction?

ii. What theoretical approaches and viewpoints are in existence that can be applied to South African Indigenous Knowledge Systems and in the Disaster Risk Reduction context?

iii. What is the current role of Indigenous Knowledge Systems in Disaster Risk Reduction in South Africa?

iv. What are the perceptions of the community of Taung on Indigenous Knowledge in Disaster Risk Reduction?

v.   What recommendations can be made to improve the role of Indigenous Knowledge Systems in Disaster Risk Reduction in Taung, South Africa?

For the purpose of the study the following objectives were formulated:

i.   To explore the concepts and content of Indigenous Knowledge and Disaster Risk Reduction;

ii. To analyse applicable theories and viewpoints on Indigenous Knowledge and Disaster Risk Reduction issues, and to apply these theories and perspectives to the South African context;

iii. To determine the current role of Indigenous Knowledge in Disaster Risk Reduction in Taung, South Africa;

iv. To determine the perceptions of the community of Taung on Indigenous Knowledge in Disaster Risk Reduction;

v.   To make recommendations based on the literature review and the analysis of the data on how to improve the role of Indigenous Knowledge in Disaster Risk Reduction.

These objectives of the study were achieved, and will be discussed in the following sections.

5.3.1 The findings of the study revealed that:

The findings in this study revealed that, generally, the people of Taung have a rich Indigenous Knowledge in many areas of life. Taung local communities have a variety of Indigenous Knowledge beliefs and practices that are used in Disaster Risk Reduction initiatives, such as disaster prevention and preparation, food security, agriculture, water conservation, medicinal products, land use planning, as well as environmental strategies. These practices are used as survival strategies in times of disaster – and also to prevent the onset of disaster. In addition, the findings from representatives of institutions also indicated that they are of the view that Indigenous Knowledge has a role to play in Disaster Risk Reduction. The findings also revealed that Indigenous Knowledge is mainly possessed by older people in the community; and this has implications for it possibly becoming extinct when they pass on. Although people possess Indigenous Knowledge and use it every day, they are not aware that it is Indigenous Knowledge, and that they are using it for the purposes of Disaster Risk Reduction. Despite the fact that people are not aware of Disaster Risk Reduction, the findings have established that Indigenous Knowledge plays a major role in Disaster Risk

Reduction. The examples provided in this study can be used to demonstrate the benefits of Indigenous Knowledge in Disaster Risk Reduction to communities. It has been shown that, in answer to the guiding question posed for this study, Indigenous Knowledge has an important role to play in Disaster Risk Reduction. The research concluded that Indigenous Knowledge could add value, since it plays a crucial role in Disaster Risk Reduction. The study recommended that various strategies should be developed and implemented to improve the role of Indigenous Knowledge in Disaster Risk Reduction and more research should be conducted to collect Indigenous Knowledge, as it relates to Disaster Risk Reduction – for the benefit of all those communities that depend on this very important resource.

With regard to understanding the concepts of Indigenous Knowledge and disasters, the results have shown that a high number of respondents have a fair understanding of Indigenous Knowledge, of disasters, and other related issues (*see points 4.6.1 and 4.6.2*). The literature study, the in-depth review of the initiatives, policy, and the legislative frameworks, and the existing publications on the role of Indigenous Knowledge have all shown that there are various theoretical approaches and viewpoints on Indigenous Knowledge and Disaster Risk Reduction (*see Chapters 2 and 3).* However, it was noted that there have been few studies done on the role of Indigenous Knowledge and Disaster Risk Reduction.

The results presented in Chapter Four have shown that, in answer to the guiding question posed in this study, Indigenous Knowledge has a significant role to play in Disaster Risk Reduction. Results demonstrate that the indigenous coping strategies and mechanisms utilized in this study can be used to demonstrate the benefits of Indigenous Knowledge in Disaster Risk Reduction for communities. Therefore, it may be concluded that Indigenous Knowledge has a value to add, and that it plays a crucial role in Disaster Risk Reduction. Moreover, the study found that, generally, the people of Taung have a rich Indigenous Knowledge in many areas of life. The study revealed that the Taung local communities have a variety of local knowledge beliefs and practices that can be used in Disaster Risk Reduction initiatives, such as disaster prevention

preparations, food security, agriculture, water conservation, medicinal products, land use planning, social linkages and environmental strategies. These practices are used as survival strategies in times of disaster, and also to prevent the onset of these disasters. The findings also showed that Indigenous Knowledge is mainly possessed by older people in the community; and this has serious implications for it becoming extinct, when they pass on. Although people possess Indigenous Knowledge and use it every day, they are not aware that it is Indigenous Knowledge, and that they are using it for the purposes of Disaster Risk Reduction. Despite the fact that people are not aware of Disaster Risk Reduction, the findings have established that Indigenous Knowledge plays a major role in Disaster Risk Reduction. Furthermore, the community has developed unique and intricate pieces of Indigenous Knowledge that can be used to prevent, mitigate and deal with disasters. This is done through observing climate, weather patterns, the environment and animal behaviour. These strategies play a very important role in Disaster Risk Reduction in the areas studied. Some of the traditional coping mechanisms employed by the community to achieve disaster preparedness, mitigation and to deal with disasters comprise the use of inter alia wet maize bags and, water buckets, to extinguish shack and wild land fires (*see* point *4.6.3*).

The study has shown that there are a number of shortcomings in the current use of Indigenous Knowledge in Disaster Risk Reduction. Among others, the challenges include a lack of interest, especially among young people. There is a perception that indigenous knowledge is out-dated compared with Western scientific knowledge and practices, and that it, therefore, cannot be used in Disaster Risk Reduction. Therefore, Western knowledge is favoured over Indigenous Knowledge. Indigenous Knowledge is mainly possessed by old people; and there are no mechanisms in place to ensure that it is going to be passed on to the younger generation. Thus, there is a very real danger that it will be lost when old people pass on. The study also indicated that there is a lack of proper documentation of the role of Indigenous Knowledge in Disaster Risk Reduction. The lack of documentation of this knowledge makes it difficult to preserve and transfer information on the role of Indigenous Knowledge in Disaster Risk Reduction.

5.4   RECOMMENDATIONS

Recommendations made in this study are informed by the views of the respondents and the outcome of both the literature review and the empirical study. In order to promote the role of Indigenous Knowledge Systems in Disaster Risk Reduction in South Africa, the following recommendations are suggested:

5.4.1 Development of new strategies required to improve the role of Indigenous Knowledge in Disaster Risk Reduction

5.4.1.1. Documentation of Disaster Risk Reduction information

One of the aims of study was to document information related to the role and use of Indigenous Knowledge in Disaster Risk Reduction. The researcher believes that a systematic analysis and documentation of the role of Indigenous Knowledge in Disaster Risk Reduction could provide valuable information in the prevention and mitigation of disasters.

From the findings of the study it is clear that Indigenous Knowledge in Disaster Risk Reduction faces the risk of not being captured and stored in a systematic way because it is handed down orally from generation to generation. It was observed that Indigenous Knowledge in Disaster Risk Reduction is mainly possessed by old people; and there are no proper mechanisms in place to ensure that it is passed on to the younger generation. Thus, there is a very real danger that it will be lost when old people pass on. In addition, the study indicated that there is a lack of proper documentation of the role of Indigenous Knowledge in Disaster Risk Reduction. The lack of documentation of this knowledge makes it difficult to preserve Indigenous Knowledge in Disaster Risk Reduction. This is mainly due to the fact that most of the Indigenous Knowledge practices are not written down. It is therefore, easy for Indigenous Knowledge to become extinct – due to the lack of any reliable records.

To ensure that indigenous Knowledge does not become extinct the Department of Science and Technology (2004) emphasized that Indigenous Knowledge needs to be recorded, protected and utilized – in ways that could benefit the owners and the communities. It should be noted that one of the best approaches to preservation of Indigenous Knowledge is documentation in some permanent form with public accessibility. According to Abioye, Zaid and Egberongbe (2011), many methods for the documentation of Indigenous Knowledge have been suggested by different authors. Abioye, Zaid and Egberongbe (2011) state that the International Institute of Rural Reconstruction (IIRR) suggested identifying specialists, case studies, field observations, in-depth interviews, participant observations, participative technology analysis, surveys, brainstorming, games, group discussions, role play, village reflections, village workshops, flow charts, mapping, taxonomies, participatory video and photo/slide documentation for the purpose of such preservation of Indigenous Knowledge. The IIRR also reported that Indigenous Knowledge could be documented in the form of descriptive texts such as reports, inventories, maps, matrices and decision trees; audiovisuals such as photos, films, videos or audio cassettes as well as dramas, stories, songs, drawings, seasonal pattern charts, daily calendars and so on. Chande (1993) reported that surveys, competitions and interviews also help document Indigenous Knowledge. Dubey, Naraina, and Gupta (1993) reported several methods of preservation such as the case study method, the oral history method; key informant means, making diagrams, case histories, critical incidents, preference ranking and inventories. Singh and Rajoo (1993) concluded that individual and group interviews, participant observations and agro-ecosystem analysis play a vital role in documenting indigenous practices. It is clear that methods such as oral history, case study, group interview, dialogue, field observation and joint interpretation may be employed as major methods to document Indigenous Knowledge.

For indigenous Knowledge in Disaster Risk Reduction to be successful in Taung, it is suggested that the community should implement some of the above suggested documentation measures as follows:

- In view of the oral nature of Indigenous Knowledge it is recommended that the documentation process should entail recording Indigenous Knowledge Disaster Risk Reduction strategies on tape and then transcribing them into paper format for printing.

- To transfer and disseminate Indigenous Knowledge in Disaster Risk Reduction to the younger generation, older people must share and impart Indigenous Knowledge to the young people using folktales and storytelling.

- Many people in rural areas practise customs such as attending initiation schools. Therefore, initiation schools could also be used to teach younger generations about Indigenous Knowledge strategies that are used in Disaster Risk Reduction as indicated in Chapter Four.

- Communities should consider using cultural and art centres to teach Indigenous Knowledge strategies that are used in Disaster Risk Reduction. Places such as Kgotla (tribal council court) could also be used for this purpose.

- To ensure documentation of Indigenous Knowledge in Disaster Risk Reduction it is important that government should allocate funding for this purpose.

- Research institutions should also be requested and be given support to conduct research on Indigenous Knowledge in Disaster Risk Reduction strategies and to publish the results.

5.4.1.2. Development of Disaster Risk Reduction policy

The core challenge that is currently facing Disaster Risk Reduction is the lack of a comprehensive and well-articulated policy that takes into account all aspects of Disaster Risk Reduction such as legal and institutional frameworks, resourcing (funding, human resources, equipment etc). A policy is a vital requirement for the effective application and management of Disaster Risk Reduction. It not only confers authority on the institution but also creates an enabling framework and gives general direction to the management and application of Disaster Risk Reduction. Although there is a Disaster Management Act it does not sufficiently address all aspects of Disaster Risk Reduction.

Therefore it is proposed that a comprehensive policy that will administer Disaster Risk Reduction activities should be developed.

5.4.1.3. Integration of knowledge systems

As discussed in Chapter Two (section 2.3.) Indigenous and Western Knowledge Systems are two distinct knowledge systems, but there are also commonalities. These two systems can also be complementary, rather than in competition with each other. It is clear that the inclusion of Indigenous Knowledge in scientific approaches can have a huge impact.

Based on the above it is recommended that Indigenous Knowledge should be combined and integrated with culturally sensitive scientific Disaster Risk Reduction knowledge suitable to the environment of communities. This is important, since many Disaster Risk Reduction strategies have failed, due to their inability to fit into the local context. By mixing the two systems their effectiveness in preventing, reducing and dealing with disasters will be enhanced.

5.4.2 Further research

Aspects that can be further researched are the following:

- A wider variety of approaches could have given the researcher an opportunity to gain more knowledge on actual Indigenous Knowledge practices, therefore an ethnographic approach is highly recommended for future studies.

- Further research needs to be conducted to authenticate indigenous beliefs and strategies used for Disaster Risk Reduction.

- Further studies including larger sample sizes, can be conducted in other provinces in South Africa. This would provide more insight into different

geographical areas on the use and importance of Indigenous Knowledge, as a way of reducing the impact of disasters.

5.5 CONCLUSION

The study has attempted to identify and analyze the principles, procedures and best practices regarding the role of Indigenous Knowledge in Disaster Risk Reduction – of the two indigenous communities of Qho and Mokasa 2 in Taung. The research revealed that, generally, the people of Taung have a rich Indigenous Knowledge in many areas of life. It showed that Taung local communities have a variety of Indigenous Knowledge beliefs and practices that are used in Disaster Risk Reduction initiatives, such as disaster prevention, preparation, food security, agriculture, water conservation, medicinal products, land-use planning and environmental strategies. These practices are used as survival strategies in times of disaster, and also to prevent the onset of disaster. In addition, the findings from representatives of the institutions sampled also indicated that they are of the view that Indigenous Knowledge has a role to play in Disaster Risk Reduction. The findings also revealed that Indigenous Knowledge is mainly possessed by older people in the community. It has been shown that, in answer to the guiding question posed for this study, Indigenous Knowledge has a large role to play in Disaster Risk Reduction.

The study has thus recommended that various strategies should be developed and implemented to improve the role of Indigenous Knowledge in Disaster Risk Reduction and more research should be conducted to collect Indigenous Knowledge, as it relates to Disaster Risk Reduction from all those communities that depend on this very important resource. In conclusion, it can be argued that Indigenous Knowledge can add value, and that it plays a crucial role in Disaster Risk Reduction.

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ANNEXURES

ANNEXURE 1: INTERVIEW SCHEDULE

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INTERVIEW SCHEDULE

Section A

</div>

1. Biographical Information

1.1   Village

A   ☐   B   ☐

1.2   Gender

Male   ☐   Female   ☐

1.3   Age

Younger than 25	
25 - 35	
36 - 46	
47 - 57	
58 - 68	
Older than 68	

1.4 Education

None ☐ Primary ☐ Secondary ☐

Tertiary ☐

1.5 Religious beliefs

Christian ☐ Muslim ☐ Jewish ☐

None ☐ Other ☐ Specify: _____

Section B

2. Understanding of the concept: Disaster

Briefly explain the concept of disaster to the interviewee and give examples of disasters and ask them whether they have experienced anyone of the listed disasters in the community/village.

2.1 Indicate which disasters have been experienced by the community/village

Floods	
Drought	
Earthquake	

Fire	
Storm	
Other	

2.1.1 If you answered "other", please specify…………………………………….

2.2 What do you think are the causes of the mentioned disasters in your community?

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2.3 How did you deal with the mentioned disaster/s?

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Section C

3. Understanding of the concept: Indigenous Knowledge

Briefly explain the concept of Indigenous Knowledge to the interviewee and give examples of IK and ask them whether they make use of IK in the community/village.

3.1   Indicate the IK that has been used by the community/village

Traditional Medicine/Herbs	
Pastoralism	
Agriculture	
Gathering of wild food	
Classification systems for plants, animals, soils, water and weather	
Knowledge about flora, fauna and inanimate resources and their practical uses	
Other	

3.1.1 If you answered "other", please specify……………………………………..

3.2   How is indigenous knowledge used in the community?

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3.3   How is this indigenous knowledge passed?

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3.4   Do you believe that indigenous knowledge is still important in current ways of
       life?

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Section D

4.   **Role of indigenous Knowledge in Disaster Risk Reduction**

4.1 What is the current role of indigenous knowledge systems in disaster risk reduction in the community?

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4.2 How can indigenous knowledge systems contribute to disaster risk reduction?

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4.3 What are the current shortcomings of the use of indigenous knowledge systems in disaster risk reduction in the community?

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4.4   What can be done to improve the role of indigenous knowledge systems in disaster risk reduction?

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ANNEXURE 2: INTRODUCTION LETTER

**NORTH-WEST UNIVERSITY
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13 August 2010

TO WHOM IT MAY CONCERN

RE: LETTER OF INTRODUCTION-MR OAGENG MAFERETLHANE

I hereby wish to introduce to you Mr Oageng Maferetlhane, who is a final year student of Master of Development and Management in Disater Studies at the North West University, Potchefstroom Campus. As part of his studies he is required to complete a research study and the title of his research is: **The role of Indigenous Knowledge Systems in disaster risk reduction: A critical analysis**.

The aim of this research study is to critically analyse the role of Indigenous Knowledge Systems in disaster risk reduction. In addition, the objective is to analyse existing research, policy documents and relevant theories on Indigenous Knowledge Systems and disaster risk reduction and consequently document how Indigenous Knowledge has been used in disaster risk reduction in South Africa.

Specifically, this research study seeks to:

i.   Explore the concept of Indigenous Knowledge Systems and disaster risk reduction;
ii. Analyse the applicable theories and viewpoints on Indigenous Knowledge Systems and disaster risk reduction issues and apply these theories and perspectives to the South African context;
iii. Determine the current role of Indigenous Knowledge Systems in disaster risk reduction in South Africa;
iv. Determine the current shortcomings in the use of Indigenous Knowledge Systems in disaster risk reduction;
v.   Make recommendations based on a literature review and the analysis of data on how to improve the role of Indigenous Knowledge Systems in disaster risk reduction.

Mr Maferetlhane has the necessary orientation, motivation and capacity to deal responsibly with confidential information. I therefore, humbly request your office to assist him with the necessary information and support for the completion of his study.

Your kind consideration of this request will be greatly appreciated.

Yours sincerely

**Prof André Duvenhage
Research Director**