Mitigating the effects of recurrent drought: The case of Setlagole community, Ratlou Municipality (North West Province)

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ABSTRACT

Disasters have increased in frequency and their impact has been intensely felt on the continent. This frequently results in damage to the resources and infrastructure on which humans rely on for survival and quality of life. When disasters strike, large segments of the population are faced with devastating consequences, which include food shortages, limited shelter and inadequate health services. Disasters are a result of a complex mix of natural and other hazards, including human actions and vulnerabilities. They consist of a combination of factors that determine the potential for people to be exposed to particular types of hazards. The frequency and impact of disasters in South Africa has increased significantly, the most common type of disaster being drought.

Droughts are the result of reduced amounts of rain received over a long period of time, but it includes delays at the beginning of the precipitation season that affects crops that depend on the rain. For the purpose of this study, agricultural and socio-economic drought received attention. Agricultural drought is when the humidity in the soil is not sufficient to assist crop production and growth in the area. Socio-economic drought arises when economic activities aligned with other elements do not meet the population demand. Agricultural droughts often have the latent effect of reducing agricultural production to such an extent that the livelihoods of the communal farmers are threatened. Drought effects often result in shrivelling crops, loss of water resources, vegetation and a decrease in livestock forage for communal farmers. This, in turn, leads to a decreased availability of food and the overall loss of livelihoods. In addition, activities such as crop growing and grazing conditions for livestock remain vulnerable, yet rural communities rely on these to generate income. The most severe impact of droughts do not simply include the absence of food supply for the community, but rather correlates directly with the severity and the duration of droughts. This often increases the community's vulnerability.

The empirical findings were concluded from focus groups interviews and semi-structured interviews as data collection for the study. The data collected from the field was compared to the Sustainable Livelihood Framework. The analysis revealed that drought mitigation in South Africa only exists in governmental policy documents.

Moreover, the lack of a disaster management plan for Setlagole makes it difficult to prepare for drought. An inadequate relationship between farmers and the government also makes it difficult to create a sense of shared vision and mission for drought alleviation. One prominent issue that makes the effects of drought so severe is the process of relief; it takes too long for the government to give assistance to the farmers. This shows that mitigation measures are needed to prepare both the farmers and the government for drought.

Key words: disaster, disaster risk reduction, drought, drought mitigation, Setlagole community, Ratlou Municipality.

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LIST OF ABBREVIATIONS

ADMP	Agricultural Drought Management Plan
CBO	Community-based Organisation
COGTA	Department of Cooperative Governance and Traditional Affairs
CRED	Centre for Research on Epidemiology
DAFF	Department of Agricultural Forestry and Fisheries
DFID	Department for International Development
DMP	Drought Management Plan
DMA	Disaster Management Act
DMAF	Disaster Management Advisory Forum
DRR	Disaster Risk Reduction
EWS	Early Warning Systems
FAO	Food Agricultural Organisation
ICDM	International Committee on Disaster Management
ISDR	International Strategy of Disaster Reduction
KPA	Key Performance Area
NAC	National Agricultural Committee
NADRMC	National Agricultural Disaster Risk Management Committee
NDMC	National Disaster Management Centre
NDMF	National Disaster Management Framework
NDRMF	National Disaster Risk Management Framework
NGOs	Non-governmental Organisations
PDMC	Provincial Disaster Management Centre
PDMF	Provincial Disaster Management Forum
OA	Organised Agriculture
QDA	Qualitative Data Analysis
READ	Department of Agriculture and Rural Development
SAWS	South African Weather Services
SLF	Sustainable Livelihood Framework
UN	United Nations
UNDP	United Nations Development Programme
UNISDR	United Nations International Strategy for Disaster Reaction
USA	United States of America

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1 CHAPTER 1: INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 Introduction

Over the last century, various natural disasters have affected a large number of people in Southern Africa. More than 75 million people in Southern Africa are affected by natural disasters every three years (Guh-Sapir *et al*., 2004*;* Anderson, 2000). In addition, such disasters account for 70% of the financial and 80% of human losses in the region (Guh-Sapir *et al*., 2004). Disasters have increased in frequency and their impact on the continent has been intensely felt (Jacques, 1996:34). This frequently results in damage to the resources and infrastructure on which humans rely for survival and quality of life. When disasters strike, large segments of the population are faced with devastating consequences, which include food shortages, limited shelter and inadequate health services (UNICEF, 2006, Guh-Sapir *et al*., 2004). In other instances, disasters have resulted in enormous economic losses and have caused substantial social problems, such as migration, family breakdown and loss of livelihood (Elahi, 1991, cited by Khan, 2008:662).

Gunn (1992:17) states that a disaster is a sudden event that compels the community to reach out for extra assistance such as aid in an effort to cope. Wisner *et al*. (2003:57) add that a disaster

> …occurs when a significant number of vulnerable people experience a hazard and suffer severe damage and disruption of their livelihood system in such a way that recovery is unlikely without international aid or aid.

Benson and Clay (2004:5) maintain that a disaster is an

> …occurrence of an abnormal or infrequent hazard that affects vulnerable communities or geographical areas, substantial damage, disruption, and perhaps casualties and leaving the affected communities unable to function normally.

Louw and Van Wyk (2011:18) emphasise that disasters are a result of a complex mix of natural and other hazards, including human actions and vulnerabilities. They

consist of a combination of factors that determine the potential that people might be exposed to particular types of hazards. Based on these definitions, a disaster is in this study viewed as the result of risk that evolves from multiple hazards, vulnerability and an inability to cope. According to the report by the Centre for Research on the Epidemiology of Disasters (CRED) (2011) drought is the most frequent and complex form of disaster affecting the population in South African. Hagman (1984:52) agrees that droughts are the most common phenomenon and have a devastating impact in South Africa. Ngaka (2012:1) also confirms that during the last decade, the frequency and impact of disasters in South Africa has increased significantly and that the most common type of disaster is drought.

Batisani (2011:803) describes drought as the most devastating and least comprehensible natural weather hazard. Wilhite and Glantz (1985:65) remark that drought is a form of a lack of rainfall that results in a lack of water availability for profitable activities or that negatively affects communities. Jacques (1996:35) also notes that

> …drought in general is a period whereby moisture availability falls below the current requirements of some or all the communities in an area and below their ability to sustain the deficit without damage, disruption or excessive costs.

Droughts are the result of reduced amounts of rain received over a long period of time, but it includes delays at the beginning of the precipitation season that affect crops that depend on the rain (Wilhite *et al*., 2005:97). Bryant (2005:105) in a similar vein concludes that drought is the result of a period of rainfall scarcity during agricultural production, which is severely disrupted when harvesting.

As mentioned above, there are many reasons and definitions for droughts. According to Bang and Sitango (2003:64) one can differentiate between four types of droughts. Identifying the type of drought can help one measure its severity. They are meteorological, hydrological, socio-economic and agricultural droughts. Wilhite (2000b:52) explains the difference between the types of droughts as follows:

- **Meteorological drought** is defined as a decreasing incidence of rain, beginning during the ordinary rainfall season towards the period of dry season
- **Hydrological drought** refers to a shortage of surface and subsurface water supply
- **Socio-economic drought** arises when economic activities aligned with other elements do not meet the population demand
- **Agricultural drought** is when the humidity in the soil is not sufficient to assist crop production and growth in the area
-

Although there are different types of droughts, this study focuses on agricultural drought.

According to Hulme and Sheard (1999:7) agricultural droughts often have the latent effect of reducing agricultural production to such an extent that the livelihoods of the communal farmers are threatened. Akpalu (2005:15) contends that drought effects often result in shrivelling of crops, loss of water resources, vegetation and a decrease in livestock forage for communal farmers. This, in turn, leads to weakening the availability of food and the overall loss of livelihoods. Ngaka (2012:41) agrees with this view by stating that activities such as crop growing and grazing conditions for livestock remain vulnerable, and rural communities rely on these to generate income. Consequently, a large number of livestock farmers have to move their cattle to better grazing lands. This has cost implications such as transport and could lead to illnesses (Ngaka, 2012:41). Vogel *et al*., (2010:35) warn that the most severe impact of droughts is not simply the absence of food supply for the community, but is in direct correlation to the severity and the duration of droughts. This often increases the community's vulnerability.

Drought is often regarded as a physical or natural hazard when it occurs. However, it has various implications on social elements, such as weakening the socio-economic life and the agricultural production of the community (Vogel, 1994:5). The risk related to drought in any given area is linked to the frequency of exposure to the incident and vulnerability context of the community (Wilhite, 2000a:82). According to Wisner

et al. (2003:9), vulnerability is defined as a combination of elements that determine the extent to which an individual's livelihood is exposed to risk by various events in society. Vulnerability is influenced by alterations within social factors, such as community size, community characteristics, social behaviour, policy and coping mechanisms (Wilhite, 2000a:82). Therefore, social factors in a community can either increase or decrease the community's vulnerability to drought. In South Africa, the severity of droughts has different effects on the community at large, specifically when focusing on their livelihood.

Broad ranges of disaster risk management mechanisms have been established to reduce the devastating effects of drought in South Africa (Van Zyl, 2006:31). The existing mechanisms include social welfare programmes such as drought relief funding for communal farmers, food aid for poor households, early warning systems and drought task teams to facilitate land use planning. Vogel *et al*. (2010:39) argue that these programmes are responsive in nature and they do not sustain the livelihood of the communities. Therefore, there is a great need for proactive risk reduction strategies to secure livelihoods. The United Nations International Strategy for Disaster Reaction (UNISDR) (2004) shows that disaster risk reduction strategies can mitigate the adverse effect of droughts in the community by focusing on building resilience. Edwards (2009:9) maintains that resilience is the capability of an individual, society or system exposed to hazards to adjust to maintaining an adequate level of identity, structure and function. When a community has resilience, the impact of recurrent droughts are reduced rather than managed.

The United Kingdom's Department for International Development (DFID) (1999) shows that the sustainable livelihood framework (***see*** *Figure 1*) can be utilised for planning new development strategies and for monitoring the existing activities that contribute to the sustainability of livelihoods within communities. The primary aim of the framework is to assist different stakeholders with different views to participate in structured discussions. Such discussions enhance stakeholders' knowledge of the factors that affect the livelihoods of communities and assist in different ways to find suitable strategies to enhance sustainable livelihood (DFID, 1999). The sustainable

livelihood framework also underlines several interactions between various factors that affect the livelihoods of the community. The framework can be used to build livelihood strategies to enhance the community's resilience (DFID, 1999).

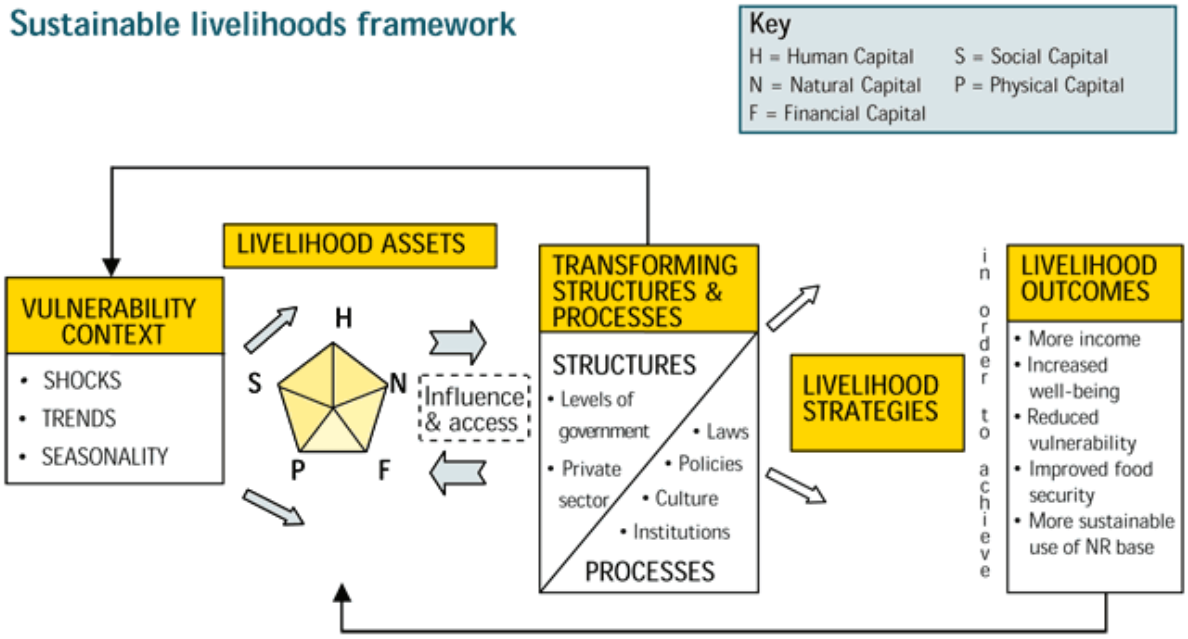


Figure 1: Sustainable Livelihood Framework (Source: DFID, 2005)

According to the Sustainable Livelihood Framework (SLF), people require various elements to achieve positive livelihood outcomes. The sustainable livelihood elements adapted from the DFID (1999) include the vulnerability context, livelihood assets, transforming structures and processes, livelihood strategies and livelihood outcomes. These can be explained as follows:

- The **vulnerability context** structures the external environment where people pursue their lives. Individuals' livelihoods and full access to assets are influenced by shocks (drought), trends (economic) and seasonality (less production) until they have only limited or no control (Chambers & Conway, 1991:57).

- **Livelihood assets** are fundamental in the sustainable livelihood framework as they determine communities' level of vulnerability. People require various assets to achieve positive livelihood outcomes. The sustainable livelihood framework identifies five capital assets that constitute livelihood building blocks and which can be used in developing disaster risk reduction strategies. The greater the combination of building blocks a community has to call on, the more resilient they become, and consequently, their disaster risk is greatly reduced (Chambers & Conway, 1991:58). The five capital assets are:

- Human Capital (such as skills and knowledge);
- Social Capital (e.g. interrelations and connectedness);
- Natural Capital (e.g. trees and land);
- Physical Capital (e.g. infrastructure and technology); and
- Financial Capital (e.g. financial resources).

- **Transforming structures and processes** refer to international or national governance structures and policies that ultimately influence communities' ability to improve a certain livelihood and render that livelihood safe from disaster risks. These structures and processes can hinder or assist the communities in developing working livelihood strategies (DFID, 1999:3).

- **Livelihood strategies** seek to develop an understanding of the different factors that influence people's choices of livelihood strategies, strengthen the existing positive factors and mitigate negative influences. The livelihood strategies can be transformed into livelihood outcomes that are more proactive in relation to the communities' needs (DFID, 1999).

- **Livelihood outcomes** are the livelihood strategies that provide communities with future prospects filled with determination and flexibility to adapt when facing any challenges. The element of outcomes strengthens the objective of the study by suggesting a workable strategy to mitigate the effect of drought (DFID, 1999).

1.2 Problem statement

The community of Setlagole (***see*** *Figure 2*) experienced severe agricultural droughts in the years 2003, 2006, 2008 and 2011. Precipitation patterns have been unpredictable and the dry spells have been frequent, resulting in an erratic rain fed cultivation (IDP, 2012:45).



Figure 2: Map indicating Setlagole village in the North West Province
(Source: GIS Maps, 2013)

The lack of rain has severely affected both farmers and the community at large because of poor harvests. Communal farmers specifically have had an estimated livestock mortality of more than 50 000 livestock units (cattle, sheep and goats) and a major crop production failure during this dry season. The result has been excessive food insecurity, with households forced to become dependent on food aid and handouts from the government (Department of Agriculture, 2010:40).

The social impact of droughts in the area has been staggering. Droughts have caused increased instances of urban migration, where members of households have had to migrate to urban areas for better opportunities, and in some cases people have been forced to sell their livestock in other districts (Getchell *et al*., 2002:177). The droughts have also had a negative impact on households headed by women and elderly people. With more than 40% of households depending on small-scale farming, household members have had to migrate to towns for jobs as they have become prone to food insecurity (Ma'ali, 2008:9). The ongoing periods of drought have made it difficult for the Setlagole community to produce sufficient crops and to maintain their livestock.

Other effects of droughts have included the loss of livestock as a result of foot-and-mouth disease, which is intensified by prolonged droughts (Getchell *et al*., 2002:178). Overstocking on livestock has made farmers vulnerable to this disease. More than 20% of farmers have had to sell their cattle in other districts. This has had a negative effect on the income from sales because of the additional transport costs incurred to move the livestock from Setlagole to other districts in the province (Getchell *et al*., 2002:198).

Based on the preceding scenario, the problem that this investigates centres on the extent to which the community of Setlagole village implements disaster risk reduction strategies to mitigate the effects of drought for a sustainable livelihood?

1.3 Research questions

The following research questions can be posed based on the problem statement:

i. What are the existing principles, practices and theoretical approaches to mitigate the effect of drought?
ii. What are the existing policy and legislative frameworks for drought relief management in South Africa?
iii. What are the causes of droughts and what implications do they have for the livelihoods of community members of Setlagole village?

iv. What preparedness and relief mechanisms are being utilised in the Ratlou Municipality to mitigate the effect of droughts in this area?
v. What recommendations can be made to mitigate the effect of droughts in the Setlagole village in the Ratlou Municipality?

1.4 Research objectives

In light of the above research questions, the specific objectives have been identified as follows:

i. To explore the existing principles, practices and theoretical approaches to mitigate the effects of drought in South Africa.
ii. To determine the existing policy and legislative frameworks for drought relief management in South Africa.
iii. To explore the causes and implications of droughts on livelihoods of community members in Setlagole village.
iv. To determine the preparedness and relief mechanisms being utilised in the Ratlou Municipality to mitigate the effects of drought in the area.
v. To suggest recommendations to mitigate the effects of drought in the Setlagole village.

1.5 Central theoretical statements

The following preliminary statements guides the research:

Wisner *et al*. (2012:261) state that the United Nations' (UN) master plan for disaster reduction (Hyogo Framework for Action) highlights the need for a progression in disaster risk reduction activities from early warning, community mobilisation, drought management to response.

The concept of disaster risk reduction is introduced and defined 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) adverse impacts of hazards within a broader context of sustainable development (UNISDR, 2009).

A disaster risk reduction strategy enables a community to work with organisations to mitigate and prepare for droughts before the phenomenon strikes (Twigg, 2004:87). It allows communities to plan ahead and improve human activities, such as agricultural activities, in communities that are dependent on agricultural cultivation for survival (Twigg, 2004:87). It also enables the community to have pro-active plans in place that reduce and prevent the impact of disasters (Smith & Petley, 2009:348). There are many forms of activities a disaster risk reduction strategy can utilise. These include public awareness campaigns, education and capacity building in the community to address recurrent problems (Twigg, 2004:86).

Cleary, a drought-specific disaster risk reduction strategy that is proactive in nature and focuses on community resilience through effective preparedness and mitigation is required. Such a strategy may enhance the resilience and preparedness of the Setlagole community to deal with disasters, risk and mounting vulnerabilities in a sustainable manner.

The sustainable livelihood approach is a fundamental tool that can be used in mitigating activities. These activities build resilience for the whole community and strengthen programmes that support strategies to reach livelihoods beyond current agricultural approaches and rainwater harvesting (Wisner, 2003:59). The approach can further assist the community to prepare for uncertain droughts by using their existing resources to reduce the impact of major drought.

1.6 Research methodology

This study employed a qualitative research design. Such a design allows the researcher to investigate and understand the phenomenon from the literature review and the participant's viewpoint through research tools or key instruments (Leedy & Ormond, 2005:96). A qualitative research design is exploratory in nature and seeks to understand the problem through the eyes of the participant. The research method selected was suitable for this proposed study because data were collected from

participants who had experienced the problem and they offered valuable information that was used to develop a document.

1.6.1 Research procedures

The method of investigation in this research consisted of a literature review and an empirical study.

1.6.1.1 Literature review

A literature review was conducted to enhance the researcher's knowledge about the field of research and to demonstrate how the researcher understands the content of the study (De Vos *et al*., 2011: 302*)*. Brynard and Hanekom (2006:37) suggest that a literature review consists of primary and secondary sources. For the purpose of this study, primary as well as secondary sources were consulted. These included:

- Existing documents and reports on past drought disasters and current vulnerabilities of the Setlagole society
- Current South African government reports on food security, agricultural production, droughts, environmental and drought mitigation strategies
- Statistical information for the village of Setlagole
- Risk and vulnerability mapping exercises that have been undertaken by the South African government
- Conference papers and scientific journal articles
- Theses and dissertations in the field
- Books
- Internet search engines
- Electronic databases, e.g. NEXUS, EBSCO, SAE Publications and others.

1.6.1.2 Empirical study

A qualitative research design gives the researcher total control over the study. The researcher can formulate questions and add significantly when necessary. A qualitative research design is based on information gathered through observable data or notes taken from interviews conducted with the participants during the study

(Du Plooy, 2002:25). In this study, focus group discussions and semi-structured interviews were used during data collection from the community of Setlagole village, Ngaka Modiri-Molema District Municipality, Organised Agriculture and the following Provincial Department(s): Agriculture, Disaster Management Centres and Social Development.

1.6.2 Data collection

More than one data collection technique can be used in a research study (Schutte, 2006:158). The data collection tools that were used for this study included focus group discussions and semi-structured interviews. These research tools allowed the researcher to receive first hand data by interviewing the respondents face-to-face.

A focus group interview is an interaction between a group of people to gather data by means of a discussion (Struwig & Stead, 2001:99). This technique suited this study because participants were selected in such a manner that they had certain characteristics in common that relate to the topic of the discussion.

Focus group interviews were undertaken with government officials and members of the community of Setlagole village. Each interview involved six to eleven participants. Seven focus group interviews were conducted. Two focus groups discussions included government officials from the respective spheres of governance in the disaster management component, as well as other leading sectors. The other five focus group discussions were conducted with selected households who have been affected by the effects of droughts. The aim was to get an in-depth understanding of the mitigation strategies that are currently in use.

Semi-structured interviews were employed to gather in-depth information on the effects of drought on the community of Setlagole village. Such interviews were suitable for the study as they allowed the researcher to ask unstructured questions that help to probe and which allowed the respondents to explain their answers without being limited by the question (De Vos *et al*., 2011:353). The participants were regarded as experts because of the information that that they gave to the researcher.

Semi-structured interviews were conducted with purposively selected individuals who were knowledgeable and had valuable information regarding the topic. These interviews were conducted with officials from government, community leaders, farmers and community members from Setlagole village.

1.6.3 Data analysis

The qualitative data collected through semi-structured interviews and focus group discussions were audio-recorded, and the researcher made written notes and observations.

Neuman (2006:467) notes that data analysis involves "examining, sorting, categorising, evaluating, comparing, synthesising and contemplating the coded data as well as reviewing the raw and recorded data". The collected data was analysed by means of thematic analysis. The sustainable livelihood framework was utilised to ensure and monitor which livelihood assets or capital had been affected during drought periods.

1.6.4 Ethical considerations

Research should be based on joint agreement, collaboration, conventions and the accepted expectations of all participants in the research before any information is elicited from the participants (De Vos *et al*., 2011:114). All participants in the research endeavour were made aware of the intent of the research and their role in the whole process of data collection. Ethical guidelines were followed during the data collection of this study. These guidelines were provided to participants before they became involved in the research. These guidelines included:

- Anonymity: All data were rendered anonymous by removing identifying information and/or disguising real names
- Voluntary participation: Eligible participants were not forced to participate
- Informed consent: The research objectives and methods were fully explained to the participants and their consent requested before the research commenced

- Confidentiality: The participant's original information was only used by the researcher to compile the findings and participants' names remained confidential.

Lastly, this study sought ethical approval from the Ethics Committee of the North-West University prior to undertaking field work.

1.6.5 Chapter layout

The dissertation is divided into seven chapters:

Chapter one provides the background of the research study and explains the motivation for the research. Research questions and objectives are formulated based on the identified problem statement. Furthermore, the research methodology is explained.

Chapter two presents the literature study on the implications of drought for communities. Theories, principles and guidelines associated with reducing drought risk are discussed. In addition, this chapter investigates the causes and implications of drought in the Setlagole Village. Lastly, it discusses the current coping strategies that communities employ when it comes to drought episodes.

Chapter three scrutinises the sustainable livelihood framework to create an understanding of the factors that affect the livelihoods of communities and to explore suitable strategies to enhance sustainable livelihood.

Chapter four concurrently explores the existing policy and legislative frameworks for disaster risk reduction for drought relief management in South Africa.

Chapter five expands on the methodological framework employed in the study. The methodological framework guided and directed the data collection.

Chapter six presents the empirical findings of the research. The current preparedness and mitigation strategies employed by the Ratlou Municipality and the community of Setlagole Community are analysed.

Chapter seven concludes the study and provides recommendations to the Setlagole community to mitigate the effects of droughts.

2 CHAPTER 2 THEORETICAL FRAMEWORK

2.1 Introduction

Chapter 1 briefly discussed the problem under investigation to create an understanding of the issues underlying recurrent droughts in remote areas that depend on agriculture. This chapter provides a theoretical overview of drought and drought mitigation mechanisms. The discussion also addresses traditional and modern strategies, including the proactive and reactive strategy measures used in South Africa.

Drought is a frequent natural hazard in all semi-arid areas in the world, Africa included (Vogel *et al,* 2010:11). It has multiple impacts in different communities, although the extent of the effect depends on the livelihood cycle of the community (Mogotsi, *et al.,* 2012:50). In the Southern African region, drought has a severe impact on the biological, social and economic livelihoods of populations living in remote areas (Vogel, 2005:190). Drought can be described in different ways and from different angles (such as types of droughts, characteristic of droughts and vulnerability to drought). They are also described depending on the specific area and the impact at the time (Vogel *et al*, 2010:11). From these few statements it is clear that drought is a complex phenomenon that can be understood in different ways. In previous decades, different states, global and regional organisations and entities and non-governmental organisations have established strategies to address drought issues in specific areas (Knutson & Wilhite, 2008:142). These drought coping strategies have been created to set clear principles to be used to manage droughts and its severe impacts on societies. The goals and objectives of such strategies are to enhance mitigation options and preparedness for droughts. The different available drought coping strategies are discussed further on in this chapter (***see*** section 2.7).

According to the office of the International Strategy of Disaster Reduction (ISDR) (2009:13), drought resilience requires a central policy that integrates livelihood aspects such as agriculture, food security, water and hazard planning. These aspects, when fully integrated, form part of a community's livelihood through drought mitigation and resilience.

In and effort to comprehend the complex nature of drought, the first section of this chapter offers an in-depth discussion on drought based on the current literature. The causes and implications of droughts for rural communities are discussed as part of this section.

This chapter further provides the theoretical framework of the study and unfolds in the following way. First, the chapter starts off with a conceptualisation of the term *drought*. Second, the causes of drought, vulnerability to drought and impacts of drought receive attention. Third, the effects of drought on agriculture are explained to highlight the severity of the effect of drought on small-scale farmers. Finally, different drought coping strategies and measures are explored.

2.2 Conceptualisation of the term *drought*

Although it is difficult to define drought, current literature offers some definitions. The first set of definitions put emphasis on the actual amount of rain. Wilhite and Buchanan-Smith (2005:86) state that drought is a natural hazard that is experienced during lack of precipitation, although a normal period of precipitation is anticipated. The abnormalities or lack of rainfall extend over a certain (rain) season or a period longer than a season, which causes insufficient water resources in the area to meet the needs of the community and the environment (Wilhite & Buchanan-Smith, 2005; Jacques, 1995:26; Hazelton *et al*., 1994:3). Drought is usually referred to as the consequence of reduced rainfall over a longer period of time and it is associated with certain climate variability such as strong winds, high temperature and low relative humidity. Drought can also be regarded as the result of a delayed rainfall in a specific season, which can lead to hindered crop growth stages and ineffective of the rains (Hazelton *et al*., 1994:3). The number of rainfalls per season or the amount of rainfall over a period of time can reflect the severity of a drought.

The second set of definitions focuses on the temporal aspect of drought. Glantz *et al.,* (1997) remark that a “drought episode is a **normal, recurrent feature** of climate that occurs in virtually all climate zones, from very wet to very dry”. Wilhite (2000)

contextualises drought as a creeping phenomenon and adds that drought is a temporary abnormality within a normal climate and is experienced differently from one region to another. Drought is not a permanent feature of the climate like aridity. In drought-exposed regions precipitation is a normal feature of the climate (Glantz *et al.,* 1997).

Definitions by Van Zyl (2006) and Hazelton *et al.* (1994) supplement the references to the physical and temporal nature of drought by exploring the impact on human activities.

According to Hazelton (1994:3) drought can be defined as a

> "…condition resulting in a reduction of the utilisable water resources in a region or specific area to the extent that the community do not have sufficient or enough access to water resources".

According to Van Zyl (2006) and Wilhite (2000:63) drought is

> "...a deficiency in precipitation over an extended period, usually a season or more, results in a water shortage causing adverse impacts on vegetation, animals, and the community that dwells in that geographical area.

Additionally, Jacques (1995:35) in a similar vein concludes that drought

> "...in general is a period of low rainfall availability which is below the requirements of the communities in a specific geographical extent and below the community's ability to sustain the deficit without damage to their agricultural production (livestock and crops) and excessive costs to recover".

Based on the above-mentioned definitions the following defining characteristics form part of the operational definition of drought for the purposes of this study: Drought is a severe climatic dryness over a period of time that leads to a decrease in soil moisture and water levels to such an extent that it drops below the levels necessary to sustain natural, social and economic systems that depend on the area for survival or a livelihood. The effects of drought can linger for a longer period, even years after

the actual drought has ended.

Different types of drought can be distinguished within the above broader definition. The subsequent paragraph pays attention to the literature available on this matter.

2.3 Types of drought

Bang and Sitango (2003:64) differentiate between four types of drought: meteorological, hydrological, socio-economic and agricultural drought. The types of drought correspond to levels of severity, and as a result this classification is mainly used when measuring the severity of a drought in a geographically area.

Meteorological drought can be viewed as the onset or the beginning of a drought (Wilhite, 2000:61). The classification is based on the duration of a dry episode and the level of dryness in a specific geographical area (Wilhite, 2000:61). Wilhite and Glantz (1985) point out that meteorological drought, like any other drought, is the existence of deficiency in precipitation. Vogel (2005:56) highlights that since this type of drought marks the beginning of a possibly extensive drought, it is the least severe. Meteorological drought is characterised by hot weather and extremely sunny days. This kind or level of drought can easily be described per region. In a region with year-round precipitation and a humid climate, that is tropical or mid-latitude like England, Brazil and some states of the USA, this type of drought can be measured by the number of days. However, geographical areas such as Australia, India, and West Africa that is characterised by a seasonal precipitation pattern, and where lack of rainfall is normal, drought is measured over a longer period (Wilhite & Glantz, 1985).

Hydrological drought is defined as a lack of precipitation that has continued to the extent that it affects the surface and subsurface water used for water supply (Wilhite & Buchanan-Smith, 2005:9). Wilhite and Glantz (1985:56) indicate that hydrological drought occurs after a shortfall in the precipitation has lingered for a long period of time and which has had a severe negative impact on water supply systems (i.e. dams, reservoirs and ground water). Furthermore, this type of drought has societal

impacts such as reduction in water access and possible conflict among water users. Wilhite (2000:61) maintains that the main impact is on the water resource systems, which can lead to a loss of agricultural production in farming regions. For example, hydrological drought is regarded as a lack of rain. This may result in speedy depletion of soil moisture, which is unfavourable to farmers, but it will not affect water for recreational usage for almost a quarter of a year (Wilhite & Glantz, 1985).

Socio-economic drought is defined as a "...correlating supply and demand of goods and services, meaning that when the supply of some goods or services such as water and electricity are weather dependent then drought may cause shortage in supply of these economic goods" (Glantz *et al*., 1997:23).

Socio-economic drought integrates the elements of all the other types of droughts (meteorological, hydrological and agricultural) with the societal activities that are affected when the supply and demand is affected. All the goods (water, grazing, hydrological electricity power) that depend on precipitation are prone to socio-economic drought (Wilhite & Buchanan-Smith, 2005:120). An example is the drought in Uruguay between 1988-89 that reduced hydroelectric power production as a result of the power plant's dependence on water flow for the storage of power (Wilhite & Glantz, 1985:120). This problem led the Uruguay government to increase the price of electricity, with its subsequent ripple effect into socio-economic conditions.

Agricultural drought focuses on soil water shortage, reduction of ground water, reservoir water needed for irrigation systems and lack of rain (Wilhite, 2000:61). Agricultural drought can be viewed as a need for soil moisture for crops to be harvested during a specific period. Wilhite and Glantz (1985:59) mention that agricultural drought

> "...accounts for the variable susceptibility of crops during the different stages of crop development, from emergence to maturity. Deficient topsoil moisture at planting may hinder germination, leading to low plant populations per hectare and a reduction of final yield".

Agricultural drought leads to socio-economic drought, in most cases due to the recurrent impact on the harvested crops that provide food security in households (Wilhite, 2000). The amount of water available for agricultural use depends on prevailing weather conditions, plant characteristics (such as plant growth), natural and biological properties of the soil. Agricultural drought is viewed as the most severe within the agricultural context (Wilhite, 2000).

All droughts originate from a deficiency of precipitation or meteorological drought, but other types of drought cascade from this deficiency (***see*** figure 3 below).

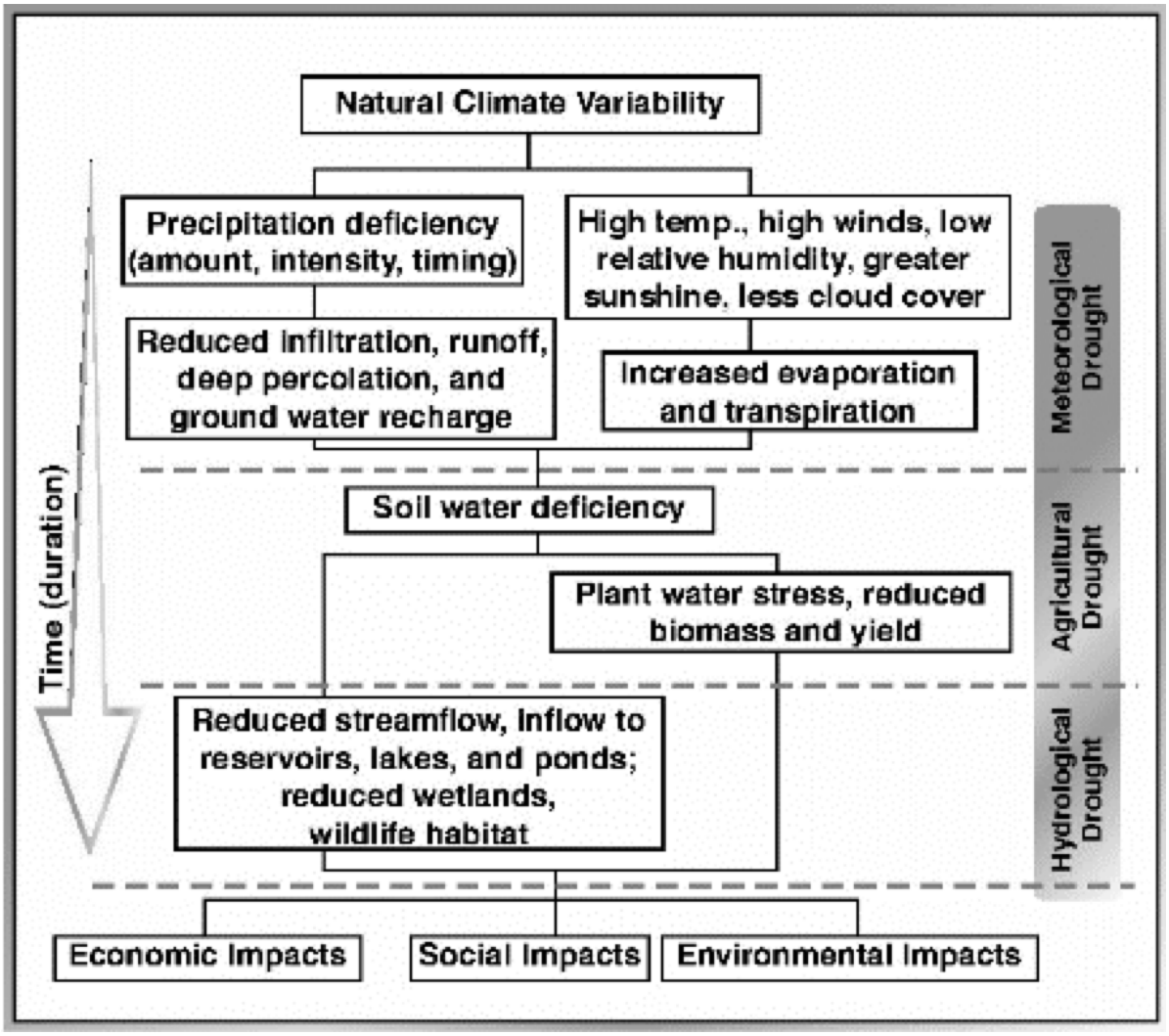


Figure 3: Flow chart showing drought progression and the relationship between Meteorological, Agricultural and Hydrological drought. Source: Wilhite (2000:10).

The primary focus of this study is on agricultural drought. Objectives number two and five of the study aims to determine what the impact of agricultural drought is on communities in general (according to the literature review) and more specifically on the community of Setlagole. The literature suggests that agricultural drought reduces the agricultural production of a community to such an extent that their livelihoods are weakened and threatened, which results in a state of vulnerability (Hulme & Sheard, 1999; Vogel *et al.,* 2010; Akpalu, 2005).

The next section briefly discusses and explains the causes of drought.

2.4 Causes of drought

Rainfall variability is one of the causes of drought in Southern Africa (Mason & Tyson, 2000:47; Vogel *et al.,* 2000:108). Only Southern Africa has a rainfall variability based on climates that have both wet and dry weather (Mason, 1996:47). Southern African precipitation variability is associated with the El Niño phenomenon (Lindesay, 1988:85; Rocha & Simmonds, 1997:235; Shinoda & Kawamura, 1996:22). During El Niño events more than 30 percent of precipitation variability is experienced in Southern Africa (Mason & Tyson, 2000:47). The El Niño phenomenon increases the impact of warm weather events on the rainfall of the southeast of the Southern African region. Due to El Niño warm weather events and droughts become more common over much of Southern African.

During 1997-98, a large El Niño event impacted on the Southern African region. Thompson *et al.* (2003:1249) point out that this El Niño event led to a major drought in the region, the impacts of which are only now gradually decreasing. The impact of the drought was recorded by the disaster management centres and non-governmental organisations (NGO) within the region to compare the increase of drought impact during El Niño events with normal periods. The results show that there was a significant increase of drought impact during the El Niño episode in the Southern African region (Thompson *et al.,* 2003:1249). It is estimated that there is more than a 120% increase in the expectation of drought disaster at the beginning of any El Niño episode (Thompson *et al*., 2003:1249). This means that the region of

Southern Africa is very prone to drought disasters. The discussion below clarifies the vulnerability of communities and households to the drought conditions, with a focus on South Africa.

2.5 Vulnerability to drought

Drought as a natural hazard can cause or exacerbate the existing vulnerabilities of individuals, communities or government (Sear, Campbell, Dambe & Slade, 1999). According to Sear *et al*., (1999) and Bang and Sitango (2003), vulnerability can be defined as "defencelessness, insecurity, exposure to risk, shocks and stresses and difficulty in coping with them". Wisner *et al.* (2004) note that vulnerability characteristics include individual or community inability to cope with, expect, resist and reduce the adverse impact of any hazard. They suggest that vulnerability integrates important factors in an individual's life that determine the degree to which the person's livelihood or life is exposed to risk by an observable event. If drought occurs, vulnerable people's risk will be exacerbated. In principle, poor households are more vulnerable than rich households (Wisner *et al*., 2004:9; Cannon, 2008:350 & Davis *et al*., 2002:339). Poverty and vulnerability are correlated most of the time. For instance, if two farmers lose their livestock to a drought episode, the rich household can survive as a result of insurance or a separate location for grazing. The poor farmer may have lost all his livestock as a result of one drought.

According to the United Nations International Strategy for Disaster Reduction (UN-ISDR) (2009) report on drought, communities can be vulnerable to drought due to many factors. These factors include lack of drought management policies, a lack of the implementation of those policies and a lack of drought preparedness. This shows the level to which the government should be working towards mitigating the drought risk in the community. If the government fails to prepare for the drought risk, the community will still be vulnerable to drought (ISDR, 2009). Several factors may cause a community vulnerable to drought to such underserving situations. These include underlying poverty, violent conflict, society dependence on over-exploitation of natural resources and lack of skills/knowledge, which can increase other ways of

mitigating drought (ISDR, 2009). These factors lead to an increase in vulnerability and a potential disaster (***see*** Figure 2 – below).

According to Wisner *et al.,* (2004) and Wisner, Gaillard and Kelman, (2012:150) there are two ways in which vulnerability is determined, namely the micro (household level) and macro level (community level). At a micro level, vulnerability is when a household livelihood is compromised as a result of a disaster. At a macro level of vulnerability the disaster affects the whole community. Wilhite (2000:63) notes that at the micro level, which refers to an individual household, vulnerability determinants involve physical, economic or social assets such as crops, livestock and money, relationships with other households and access to infrastructure and technology. At the macro level, the determinants of vulnerability include government structures such as the relief and response department accountable for the vulnerable communities and the entities who manage the resources that have to be provided to these communities (Wilhite, 2000:63). These determinants of vulnerability are assessed to measure the level of vulnerability of the individual or the community as per household assets and proper structures (Chambers, 1991:92).

Furthermore, vulnerability can be categorised as a function of the different factors of livelihood that determine a household's living, assets and livelihood if they are prone to any harm from any identifiable hazard (Dercon, 2002). It is crucial to understand an individual or a society's vulnerability to establish drought mitigation, relief and preparedness. An understanding of the causes of and the vulnerability to drought helps government structures and non-governmental organisations (NGOs) to plan and arrange the necessary resources to address the affected livelihood of the community. A disaster risk assessment is used to determine the severity of a hazard. The use of assessments assists when categorising the losses and grouping the mitigation strategies per community and individual. It is therefore important to undertake vulnerability assessment in communities (Dercon, 2002:25).

Communities do not find it easy to understand or measure drought vulnerability, but it is possible to measure this vulnerability in communities that are prone to drought at

specific times (Buchanan-Smith, 2003). A holistic understanding of the community is required to understand the level of vulnerability to a drought phenomenon within that community (Wilhite, 2000:64). NGOs, government structures and international humanitarian aid usually measure the impact of drought in a community and reveal trends and processes that lead to a vulnerability state (Wilhite, 2000:64). Vulnerable households and communities are those that cannot rebuild their livelihood during or after a drought hazard/disaster.

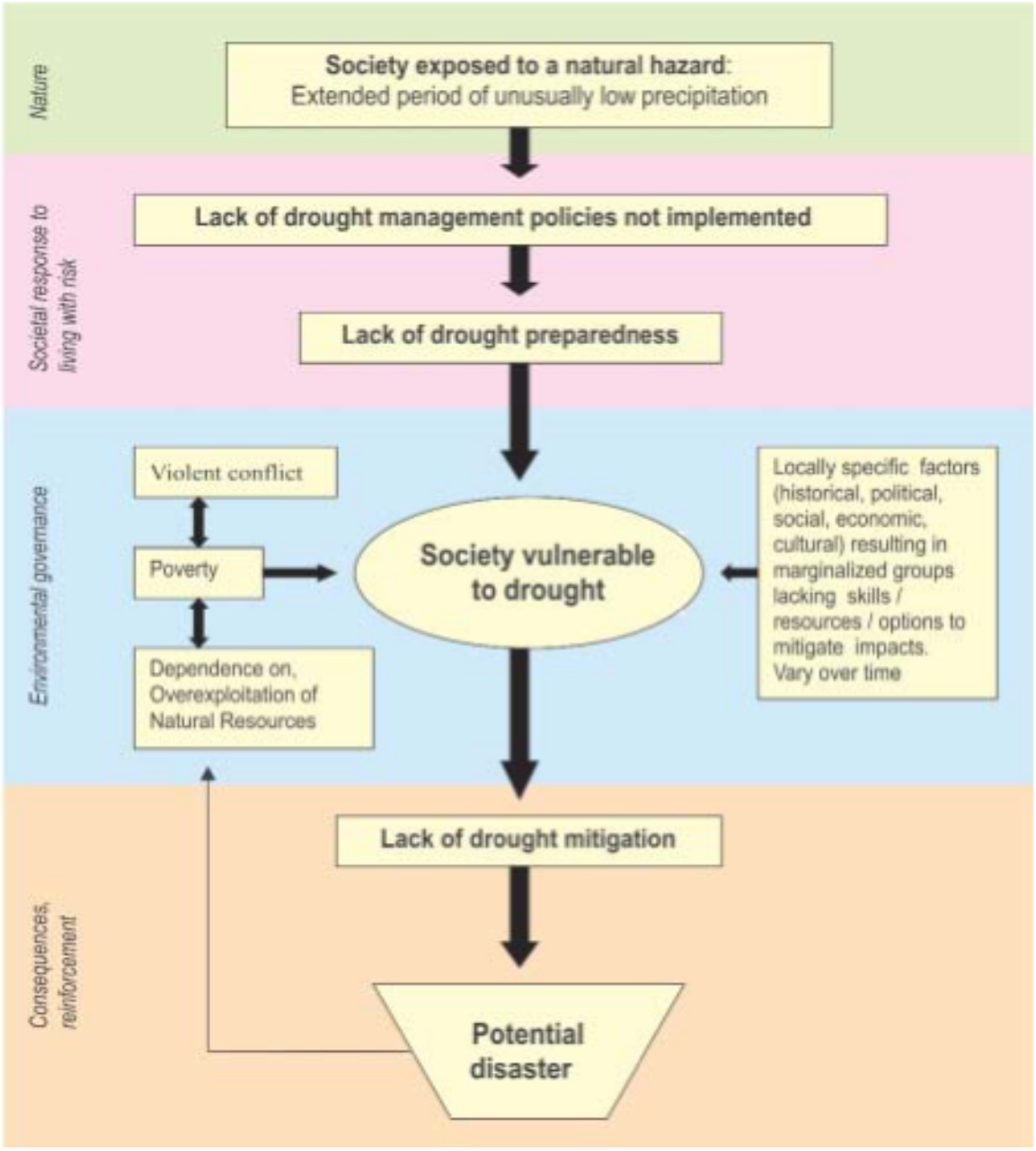


Figure 4: Drought-vulnerable Society. Source: (ISDR, 2009).

2.6 Impacts of drought

Drought episodes have severe impacts around the globe. In the 415 drought events experienced between the years 1970-2003, almost 1.5 billion people were affected worldwide (Kellett & Sparks, 2012:23). These drought events caused economic losses of up to $76 949 488 000 and 555 000 lives were lost, especially in the Sahel region (Mauritania, Mali, Niger, Chad, Benin, Sudan, Ethiopia, Somalia and Burkina Faso) over the past 20 years (Kellett & Sparks, 2012:23; International Strategy for Disaster Reduction, 2007).

Drought has certain effects on the social, economic and environmental livelihoods of the communities (UNDP, 2005). These influences of drought are commonly complex due to the nature of the phenomena that affect the livelihoods of the community (Folger, Cody & Carter, 2012:12).

These are elaborated on the section below.

2.6.1 The impact of drought on communities

The impact of drought can either be indirect or direct. Direct effects involve reduced forest and crop production, high levels of fire exposure, decreased water levels and increase in livestock mortality rate (Svoboda *et al.,* 2002:1187; Fafchamps *et al.,* 1998:284; Wilhite & Vanyarkho, 2000:255). These direct impacts create indirect impacts that affect the community in the area. The indirect influences include lower income for farmers, labour associated with agricultural production decreases and an increase in food prices and unemployment as a result of reduced crop production and forest productivity (Folger *et al.,* 2012:13). Vogel *et al.* (2000:32) mentions that drought can change the normal activities of the community that depends on the natural environment to produce food and earn income. Some droughts have an impact for some time after the actual episode of drought has ended.

Drought affects the social, economic and environmental livelihood of the communities and these are discussed below.

2.6.2 Economic impacts

Drought has negative implications for various sectors of a country's economy. The greatest effect is felt by the economic sectors that need water resources to fully operate. The most notable of these sectors is the agriculture sector (Folger *et al.,* 2012:14; Vogel, 2000:33). Specifically, the economic impacts of drought lead to income losses for the members of the community as a result of the losses in the agricultural activities such as crop and livestock production and plant diseases (Vogel, 2000:33; Svoboda *et al.,* 2002:1188). Reduced income can cause unemployment among farmworkers and farm dwellers, shortfalls in the capital of the farmers, increases in the credit risk of the farmer as a consumer of a financial institution and other financial matters that make it difficult for the farmer to sustain his business (Vogel, 2000:34). Within the retail industries, economic impacts can cause food prices to increase significantly due to reduced supply and production of goods and services in agriculture sector. These influences increase the costs of importing to drought areas and lead to increased transportation costs for farmers who are already experiencing drought risk (Fafchamps *et al.,* 1998:273).

2.6.3 Environmental impacts

The environmental impact involves the loss in plantations, trees and bushes that are key to the environment and the ecosystem. Other related environment influences caused by droughts are land degradation, soil erosion, severe loss of water and land quality (Fafchamps *et al.,* 1998:274). The effects of drought on the environment vary with each drought. In some instances there are effects that last long into the post-drought phase, while others take less time to rehabilitate. Some drought impacts may prolong to such an extent that the drought cycle will repeat itself. For example, in Botswana the government prefers to give communities humanitarian aid rather than planning and developing appropriate policies to reduce the environmental impacts such as reduced water supply in the Kalahari region (Batisani, 2011:805). This can cause the drought phenomenon to occur repeatedly. Loss of plantation as a

result of drought is considered to be a short-term loss, because the loss can be recovered as soon as the episode of drought passes and agricultural practice becomes normal. However, some effects are so severe that they become permanent, even after drought coping mechanisms (Fafchamps *et al.,* 1998:274; Vogel *et al.,* 2000:349). Severe drought may cause land degradation, and this may destroy biological productivity in the area, which will decrease agricultural and economic production within specific areas where there are communities dependent on those productions for several years (Vogel *et al.,* 2000:357). Knock-on effects which underlay other types of hazards are thus stimulated.

2.6.4 Social impacts

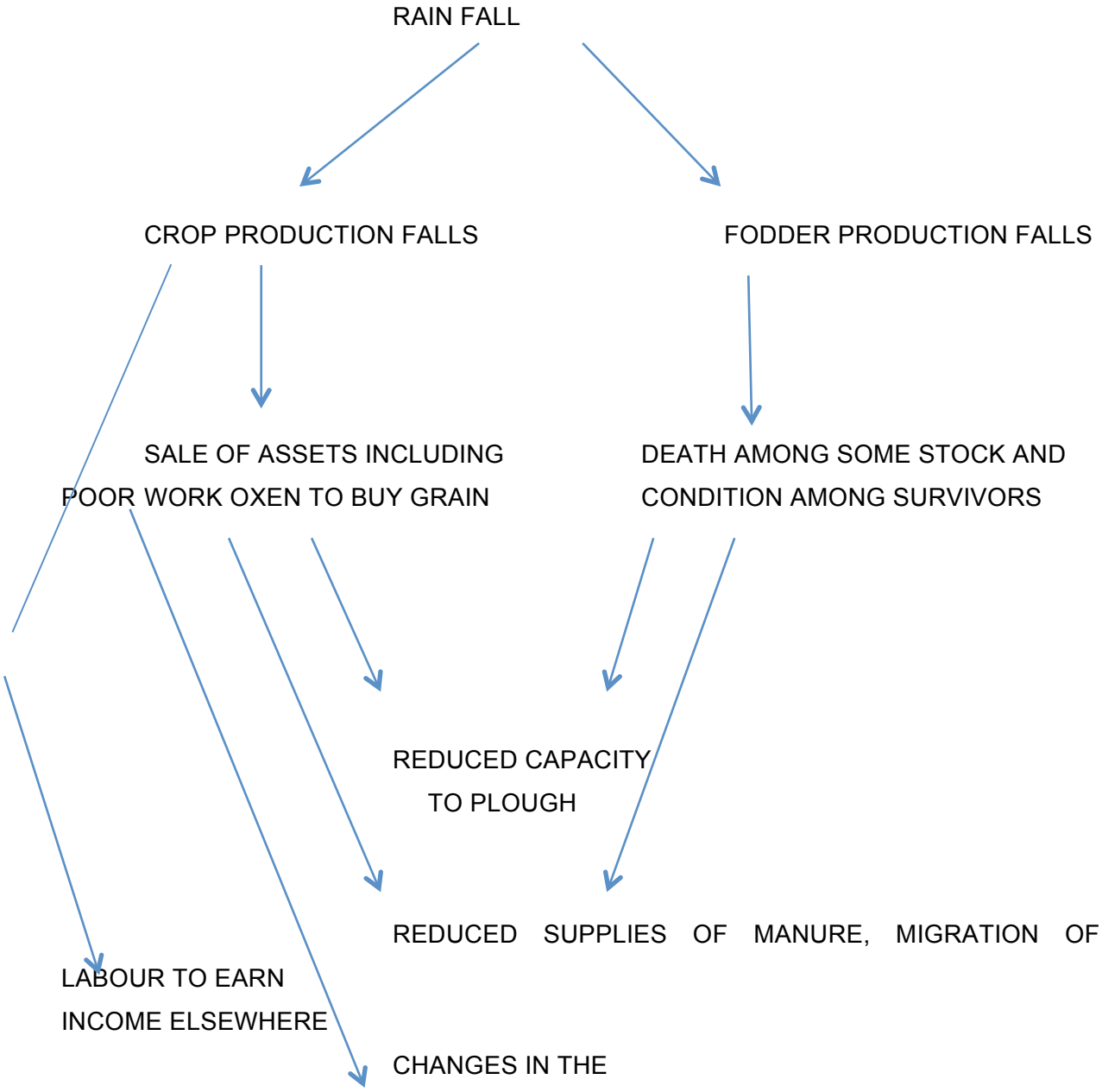
Droughts have a large number of severe social impacts on all societies (Vogel *et al.,* 2000:357). These impacts may include compromised health and safety for the community, loss in quality of life, increased food insecurity and conflict in shared services such as water and disaster aid relief (Alston & Kent, 2004:23). Wilhite and Glantz (1985:112) state that some of the social components of drought increases economic and environmental consequences when assessed and analysed. Social outcomes of droughts include food shortages and increased poverty, in other words food insecurity (Alston & Kent, 2004:23). Subsequently, some social repercussions of droughts may include the loss of human life as a result of food shortages and reduced quality of life and lifestyle (Gould *et al.,* 1999:75). Drought aid relief distribution can also have a social impact in communities that receive unequal drought relief (Gould *et al.,* 1999:76). Mogotsi *et al.* (2011:152) maintain that social impacts of drought include exacerbated water user and political conflicts, social unrest and public dissatisfaction with current governance plans to mitigate drought.

2.6.5 Effect of drought in agriculture

There are certain effects of drought that have a negative effect on agriculture as an industry. In agriculture, there are several types of farmers who are affected by droughts, namely, commercial, communal, small-scale and subsistence farmers (Reynolds *et al.,* 2001:58). The difference between the above-mentioned farmers is that the commercial farmers produce for the global market trade and the subsistence

farmers produce for survival and support of their families with an income generated in the proximate areas where they sell their crops (Reynolds *et al.,* 2001:58). In most cases, subsistence farmers are more severely impacted by drought than commercial farmers. Subsistence farmers often come from the previously marginalised communities. They have never had the opportunity to produce for the global market, as their farming is basically focussed on providing food security and diversifying the income in the household.

Figure 5 explains the possible impact of drought and is subsequently discussed.



DISTRIBUTION OF WEALTH

Figure 5: Effects of drought on farming areas (Source: FAO, 2009:5).

As a result of limited resources, subsistance farmers are more prone to drought as they depend on their production for food and material gain. Commercial farmers are more resilient as they have financial resources and mostly insurance for such epidemics. In addition, most of the commercial farmers are part of famers associations that provide information on such events. The section to follow examines the effects of drought on agricultural activities such as crop production and livestock holding.

2.6.5.1 Reduced crop production

There are several immediate effects of drought on agricultural production. The Food and Agricultural Organisation (FAO, 2009:10) and United Nations Development Programme (UNDP, 2005:6) note that a decrease in crop production can be viewed as the most immediate and longlasting consequence of the drought phenomenon as a result of insufficient and poor distribution of rainfall/precipitation. Farmers often harvest fewer crops during drought periods than usual to feed their households and are prompted to sell crops to other members of the community (FAO, 2009:10).

2.6.5.2 Decreased fodder supply

According to the FAO (2010:26), when crops are severely affected by drought, fodder production is reduced, and natural fodders are not less likely to be vulnerable to such dry conditions as compared to crop production. Scoones *et al., (*1996:284) and FAO (2010) add that reduced precipitation causes reduced pasture growth and as a results of disturbed crop production residues, a decline in fodder supply may accumulate.

2.6.5.3 Livestock mortality and malnutrition in animals

Inadequate fodder levels may lead to a high mortality rate among animals and malnutrition in the farmer's livestock assets (Heathcote, 1969:178). Scoones *et al.* (1996:284) maintain that in some contexts farmers prefer to move their livestock to

other areas that have sufficient pastures as a result of reduced fodder production. However, this is not a viable activity for all farmers (i.e. subsistence farmers). In the South African context farmers who own less livestock find it difficult to migrate to other areas for grazing since they have much to do in their current areas. Farmers have to have sufficient labour to take their livestock to other gazing areas and they need extra income and earnings to pay them (FAO, 2010:26). According to Scoones *et al.* (1996:284) the overall effect of a total decline in pastures and crop production reduces the ability of the farming sector to function. Importantly, this can lead to lower crop output in the next farming season.

2.6.5.4 Unplanned sales of livestock and purchase of grain

Heathcote (1969:178) postulates that drought can also lead to agricultural distress sales when losses of livestock (oxen) increase in the area. Distress sales are associated with low prices for livestock to reduce the loss of livestock as a result of high mortality rate in animals due to drought (Scoones *et al.,* 1996:285). This indicates that farmers sustain a severe financial loss as compared to normal sales without drought-induced effects (Scoones *et al.,* 1996:285). Every household's allocation of losses between animal mortality and distress sales will have different consequences and circumstances as a result of the household's vulnerability.

Additionally, there are periods in which farmers start to sell their livestock to buy food for survival (Scoones *et al.,* 1996:283). These periods usually occur when droughts strike in a specific location or region for a prolonged period of time (at a specific time frame). Often, during such periods, farmers will start to sell the animals (livestock) that least contribute to the production of the farm, such as goats and sheep (FAO, 2009:10). However, as the period of drought prolongs farmers will start selling their most usable livestock such as herds and donkeys, which are usually used as transport in the villages of developing countries (Heathcote, 1969:178; FAO, 2009:10). Breeding livestock such as chickens are also sold to manage losses in the households, such as lengthened food deficits (Heathcote, 1969:178). It should be noted that during the period of drought, household livelihoods are vulnerable and exposed to risk. It can be therefore be concluded that the more vulnerable the

household is, the more severly the household will be affected by the adverse impacts of droughts.

According to Mortimore and Adams (2000:50) the financial instability of the households dependent on agriculture can be associated with drought. As much as circumstances can differ per household, wealth is determined based on owned assets, extra income from other sources and the degree to which these resources are better affected by drought than crop production and livestock (Mortimore & Adams, 2000:50). The most vulnerable households are severely affected by drought as they own fewer assets (Horridge *et al.,* 2005:290). Horridge *et al.,* (2005:290) note that such households can be traced when extra grain is needed. In addition, some households have no access to food, even when they have extra income sources. They survive by borrowing, some even by stealing in certain times during drought episodes. Some wealthy households can benefit from drought to gain land and other resources at reduced prices from the distress sales by underprivileged households (Horridge *et al.*, 2005:290).

2.6.5.5 Reduced dung production

When subsistence and small scale farmers loose livestock it reduces dung production for their household usage. Animal dung is considered important for natural uses such as fuel for firewood and fertilizer on cropped soils (Scoones *et al.,* 1996:284). According to the FAO (2010:26), the importance of dung can be attributed as per area, and it varies between farming systems based on different factors. In addition, dung can provide households with draft hydro power. In other instances, poorer families can sell their dung cakes and make a cash income for their family. Dung is also used as a commodity to manure the fields to increase the crop yields and it allows larger fields in dry areas to rapidly mature various crops (FAO, 2010).

2.6.5.6 Out-migration to diversify income sources

Another way in which drought affects the circumstances of households is when farmers start to release labour as a result of crop production failures (Horridge *et al.,*

2005:290). This labour reduction decreases the amount of household food reserves for either the farmers or the farm workers, or both (Horridge *et al.,* 2005:290; Mortimore & Adams, 2000:50). In other instances, the total effects of drought on farm productivity can be determined during or after the migration period, which refers to individuals who migrate from the rural area to urban areas. This might have implications for the household's farm productivity (Horridge *et al.,* 2005:290). Acute food shortages in households can increase when the individuals who migrate to urban areas are being employed far from home and take longer to travel home or experience difficulties in sending money home. However, in some cases such an arrangement might assist the household with the income needed to feed the family while there is a shortage of farm labour until the subsequent harvest season.

These effects of drought have serious implications for households for several decades. However, through historical experiences in different regions and societies, coping mechanisms have been developed to mitigate the situation.

2.6.6 Drought impacts in South Africa

In recent decades, drought has been a frequent natural hazard in South Africa. Between 1992/1993 one of the major impacts of drought was the import of maize into South Africa (Van Zyl, 2006:78). The country didn't have sufficient maize for the overall population. The effects of drought resulted in crop failure, which became evident in the population flow from the rural locations to the cities, closure of farms and farm labour lay-offs and increased debts in the agricultural industry (Van Zyl, 2006:78).

Another drought impact is severe veld fires that destroy large areas for grazing during a drought episode. During 1992, devastating fires destroyed hundreds of hectares of grassland in South Africa (Van Zyl, 2006:78). During 1994 strong winds and dry conditions led to large areas of grazing being destroyed by fires.

Other examples of drought impact in South Africa include:

- In 1991-1992 the production of sunflower seeds fell from 589 000 to 173 000 tons.
- In 1992 the wheat production fell to 1.2 million tons, which meant that one million tons had to be imported at an estimated cost of R550 Million.
- Between the years 2003-2004 grain sorghum production dropped by 95 000 tons from a production of 283 000 tons annually (Van Zyl, 1993).
- A drastic fall in wool production was measured during the drought episode of 1992-1993, almost from 101.7 million to 77.75 million kg.
- During the 2006-2008 drought period an estimated 50 000-70 000 jobs were lost as a result of a lack of crop production for commercial farmers to sell in the market (NDMC, 2010).
- The drought episodes of 2012/13 affected more than 23 346 farmers in the North West Province, which resulted in a R1.5 billion financial loss for the farmers.

2.6.7 Drought coping strategies

Coping strategies can be classified into pre-drought and post-drought strategies. The classification depends on whether these strategies can help reduce the risk or alleviate the impact on the shortfall in the production in a certain period (Hazelton *et al.,* 1994:31). Several drought coping mechanisms are in use throughout the world. Many authors (Hazelton *et al.,* 1994:31; Wilhite, 2000:25; Panley, 2009:9; Tideman & Khatana, 2004:4) highlight that the use of drought coping strategies is a major accomplishment that enables or provides the community with some capacity to cope. According to Hazelton *et al.* (1994:31) drought coping strategies are made up of a number of drought mitigation measures. Drought mitigation measures comprise ecological, social, environmental and technological measures that aim to alleviate drought impacts and equalise losses (Holm & Morgan, 1985:468). Two strategies have been developed in previous years, namely traditional and modern strategies.

2.6.7.1 Traditional strategies

According to Tideman and Khatana (2004:6) traditional coping strategies are gathered from rural communities that have experienced drought before. It can also

be called indigenous knowledge systems (Tideman & Khatana, 2004:6). It includes informal practices such as traditional coping mechanisms that aim to alleviate drought and enhance the understanding of the systems that exacerbate drought/climate variation phenomenon. Traditional coping mechanism include migration to available water and pastures for livestock, setting dry grazing pastures aside and splitting up livestock in order to reduce the risk (Tideman & Khatana, 2004:4). Other types of traditional coping mechanisms are hunting wild animals for meat and income. In the past one practice was to raid neighbours' cattle, but this practice has died out (Tideman & Khatana, 2004:4). One good example of a traditional mechanism is sited by Holm and Morgan (1985:468), who says that the Botswana government provides rural inhabitants with an employment scheme that gives them an opportunity to use their traditional skills and receive income from the government for doing so. These strategies were effective, especially in regions where the government was fully functional at an operational level, managed the programmes and made enough funds available.

2.6.7.2 Modern strategies

Tideman and Khatana (2004:6) state that even though traditional coping strategies have been used, development in the agriculture sector has enabled modern coping strategies. Rural communities have started using these modern strategies to cope with the negative effects of drought. Two examples of modern coping strategies are the expansion of income sources and reduced asset consumption. The process of income expansion through other sources requires that farmers should not only depend on agriculture to earn income, but rather have an alternative income source that can increase the income of the household. Reduced asset consumption entails that the current livelihood of the farmers and crop production should be consumed in a manner that farmers do not run out of products (Tideman & Khatana, 2004:6). Panley (2009:9) also outlines two strategies, namely risk reduction through diversification and establishing flexible decision-making. Diversification is practiced when farmers increase their income sources by reducing income shortfall by cultivating other crops that are not easily negatively affected by drought on returns

(Panley, 2009:9; Tideman & Khatana, 2004:6). According to Tideman and Khatana (2004:6) income diversification can occur in the following ways:

- Increase in animal husbandry: farmers keep their livestock and continue to produce milk.
- Increase in non-agricultural activities and dependence on salary by working in mines, building construction, retail sector and any state owned employment.
- Increased migration and influx into neighbouring areas: migration increases the movement of citizens and livestock to other areas during the episode of drought.
- Empowering women into the labour force and changing the less involvement of women in labour. This will help the household because the income that women generate as part of the labour force will automatically increase the household's current income.
- Using farmers associations, banks, loans, government schemes, family and friends to borrow money to increase their farm's production.

Panley (2009:10) notes that modern strategies also involve the prevention of shortfalls in consumption during drought to maintain income the same as during periods of normal consumption. Specific strategies include reduction of consumption, occupying loans, savings and migration, relying on aid and donations, and assets liquidation. These strategies do not necessarily eradicate shortfalls, but rather increase the income stability during drought, which has the ability to decrease the agricultural production of a household (Panley, 2009:10). Townsend (1995) states that it is possible for farmers to bank their savings during normal agricultural periods. This means that farmers can use savings as extra income during a period of drought so that he/she can maintain consumption at a normal level as in other agricultural seasons.

There are two drought strategy measures and drought mitigation measures that are usually used when the traditional and modern coping strategies are not utilised. These mechanisms will be discussed in the following section.

2.6.8 Drought strategy measures to mitigate the impact of drought

Hazelton, Pearson and Kariuki (1994:31) note that there are drought strategy measures that can be used to mitigate the adverse impacts of drought episodes on the communities, namely:

- Proactive strategy measures
- Reactive strategy measures

Yevjevich (1990:25) illustrates that the difference between proactive strategy measures and reactive strategy measures is planning and management. During proactive strategy measures, preparation and planning for drought is of importance and has to be mindful. Systematic actions have to be considered in order to reduce the risk of drought impacts. Proactive strategy measures have been found cost more effective to implement than reactive strategy measures (Yevjevich, 1990:25). He further describes reactive strategy measures as focusing more planning (measures) during an ongoing drought and the impacts are measured instantly to be able to manage them without being sustainable with the drought phenomena (***see*** Figure 6 below).

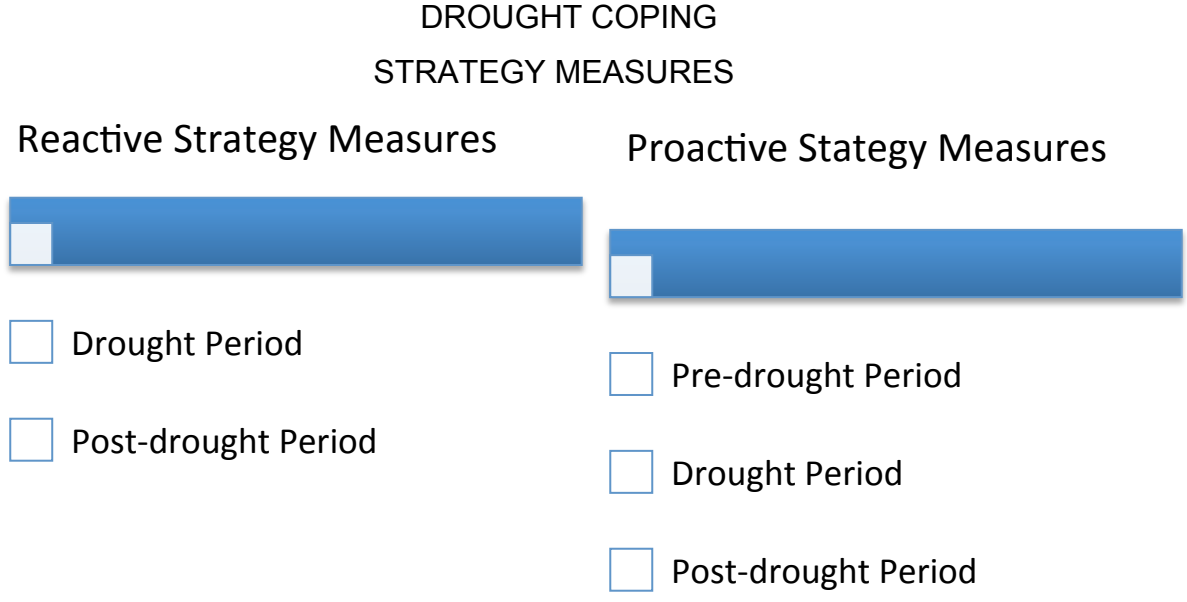


Figure 6: Division of the drought strategy coping measures (Source: Hazelton *et al.,* 1994).

2.6.8.1 Proactive strategy measures

Figure 6 above indicates that proactive strategy measures include three basic periods. According to Hazelton *et al.,* (1994:31) the first phase/period is called the pre-drought preparation. This phase focuses on the increase of water accessibility, which enables farmers to be more resistant to a lack of water and the deficit over a long period of time. Previous experiences of droughts (impacts, effects, types and reactive/proactive measures) are used for future interventions (Yevjevich, 1990).

The next phase in the proactive strategy focuses on basic planning and implementation of strategies/measures to alleviate drought such as contingency plans and changes in accordance to water supply/demand to reduce the impact of drought (Yevjevich, 1990).

Lastly, Hazelton *et al*. (1994:32) describes the last phase as post-drought measures. This strategy specifically focuses on ways to lessen/minimise the spread of drought impacts on households in terms of their environment, economy and social setup. Proactive strategy measures assist farmers to prepare and plan for a drought episode beforehand so that they can deal with the adverse impacts.

2.6.8.2 Reactive strategy measures

Reactive strategy measures have two phases, as shown in **Figure 6**. These two phases are the ongoing drought period and the post-drought period (Hazelton *et al.,* 1994:32).

According to (Hazelton *et al*., 1994:32) the first phase of the reactive strategy deals with ongoing drought, which entails planning to manage and rehabilitate the state of an ongoing drought. These measures can involve drought aid, which is supplied to communities that are negatively stricken by drought phenomena. For example, a rural community will receive food parcels from the government or a humanitarian aid organisation during an on-going drought.

The last stage/phase of reactive strategy measures is the post-drought period. This phase deals with the after-effects of a drought, which may include minimising the spread of drought impacts that are beyond unavoidable geographic locations, economic stability and social equality. A good example is the water awareness campaigns and development of boreholes to increase water access in the community.

However, when these drought mechanisms are not as effective as is required, drought mitigation measures is an option to use as they are more specific when addressing drought risk.

2.6.8.3 Drought mitigation measures

Drought mitigation measures are established as effective continuous methods to cope with drought ant to address drought risk. These mitigation measures are also classified as a collection of measures utilised as coping mechanisms for households in drought prone areas (Hazelton *et al.,* 1994:32). Drought mitigation measures can be categorised in three groupings, namely supply-oriented, demand-oriented and minimisation of impacts and losses (Yevjevich, 1990:29). These are discussed below.

I. Supply-oriented measures

Supply-oriented measures involve both the future benefits of water storage and the relationship between water losses and the severity of water deficits. The four aspects of supply-oriented measures are discussed below.

Existing water supply can be better used by implementing the following measures:

- Subsurface water storage such as ground water can be regarded as a way to increase drought mitigation;
- Surface water stored in reservoirs and public dams can be used during periods of droughts;
- The transfer of surplus water from the upstream reservoirs to inter-basin and within-basin water is another way of drought mitigation; and

- The improvement of water supply through water conversation.

The development of new water supply during periods of drought can be used as part of the following measures:

- The use of salt water conversion, which promotes the continuous use of saline and brackish water conversion at full capacity, is also drought mitigation measure;
- Fossil and mining ground water through artificial recharge of surplus water that can replace fossil water in deep grounds during drought periods;
- Rainfall augmentation, which involves a process of cloud seeding and meteorological conditions that increase rain, is also regarded as a drought mitigation measure; and
- The process of dew and fog harvesting can be accomplished through artificial mist collection devices in such a way that they inter-connect the air masses to release water vapour condensation.

The establishment of alternative water supply enhancements that are used during drought periods.

- The existence of connections for water transportation and the extension of water supply grids can increase water supply during the drought season;
- The enlargements of conveyance capacities lessen the need for more water supplies;
- Physical water transportation through tracks and train is another way to increase drought relief in areas experiencing severe drought (Cuhna *et al.*, 1980:23); and
- The conjunctive use of all sources of water and increment can be regarded as a drought mitigation measure.

II. Demand-oriented measures

Water use is shaped by the provision of legal, economic and environmental consent with stipulated conditions (Yevjevich *et al.*, 1990). During a drought, water demand

can be decreased through a demand-oriented measure. These are divided into three groups (1) active, (2) reactive and (3) impact analysis.

The active measures of demand reduction aim to increase capacity in drought prone areas.

- Legal restrictions and public pressure can re-direct communities to follow the proper guidelines and responsibilities during drought periods (Ackerman, 1995); and
- Consumption of available water resources is monitored and evaluated through economic inducement to verify that communities use water at an optimal rate.

Reactive measures entail that all the consequences of intentional and unintentional measures are outlined by matching demand and reduced water use.

- The recycling systems are also regarded as drought mitigation measure in certain periods through the use of different low cost water recycling methods; and
- The user production adjustment entails users' ability to use less water in crop production and their households.

Impact-minimisation measures help to reduce the effect of drought by using the following measures: anticipation of drought and the spread of risk and losses.
Drought anticipation can help communities develop disaster preparedness for drought impacts.

- Drought forecast and early warnings are used in different structures of government and rural communities; and
- Measures for implementing forecast and warning is another way to reduce drought through awareness to prepare the government structures and the community.

Spread of risk and losses entails that management of reduction of losses requires adjustment/preparedness in insurance, protection, and aid.

- The process of drought insurance can be achieved through political, socio-economic and cultural systems that are related to the conditions of the affected households;
- Individual protection seeks for income diversification of households' activities such as saving money and engaging in other lines of work to increase income at home.
- International, national, regional, local and non-profit organisation relief and rehabilitation aid such as food and services is another way of drought mitigation;

Agricultural adjustments have to be maintained through crop, livestock and drought resistance to reduce the impact of drought.

2.7 Conclusion

The literature discussion reveals the severity and devastating impacts of droughts on households and the community. In most cases, these adverse effects leave many rural households in unfavourable conditions for long periods of time. The previous and current drought mechanisms that are in use each have their own advantages or disadvantages. The discussion illustrates that drought is usually caused by the El Niño phenomenon, which is not a normal feature of climate in the context of South Africa. Drought has severe repercussions that make communities vulnerable. There are determinants of drought vulnerability. These determinants of drought are used to measure the loss of livelihood as a result of drought to understand the overall impact of drought on the household/community.

The above discussion analysed drought impacts in both a more specific and general manner. The influence of drought vary as per sector and household. Different households are affected differently. In general, drought consequences can be grouped into three categories namely environmental, social and economic. As a result of drought communities become disoriented, and some households have to change their way of living to cope with the phenomenon or they have to learn to use drought coping mechanisms.

Drought coping mechanisms are used when a household has resources and the capacity to mitigate the drought. These coping mechanisms include traditional coping strategies and modern coping strategies. In some contexts farmers prefer to use proactive coping mechanism or reactive coping mechanisms to alleviate drought. In addition to these, there are drought mitigation measures that are either supply- or demand-oriented. These measures have been practised in South Africa, but the country still has a wide scope of drought disasters that need mitigation measures.

Therefore, it is imperative that a Sustainable Livelihood Framework (SLF) should be discussed to protect household livelihoods.

3 CHAPTER 3: SUSTAINABLE LIVELIHOOD FRAMEWORK (SLF)

3.1 Introduction

This chapter provides an explanation of a how the sustainable livelihood framework can be used to assess the livelihood strategies employed by the community of Setlagole in relation to drought hazards.

First, the chapter provides a brief overview to conceptualise what is meant by 'livelihood'. Second, the chapter continues to discuss the framework used to analyse sustainable livelihoods based on an overview of the concept of 'sustainable livelihood'. Third, the components that constitute a sustainable livelihoods framework (assets, vulnerability context and livelihood strategies) are briefly explained.

Fourth, the pursuit of different livelihoods strategies is explored (livelihood diversification and agricultural development). In addition, the analysis of the range of formal and informal organisational and institutional factors that influence sustainable livelihood outcomes are examined, after which the discussion links sustainable livelihood framework components with 'drought disasters' by means of examples. Lastly, the chapter shows how the framework operates in relation to five key indicators. Each key indicator is briefly discussed and relevant examples are provided.

3.2 Definition of livelihood

In the mid-1980s, Robert Chambers started working on livelihood. He soon realised that conventional development concepts did not produce the desired outcomes and the human population was under enormous pressure (Chambers, 1991). In answer to this, Chambers developed the idea of sustainable livelihood to improve the efficiency of integrated development (Kollmair & Gamper, 2002). Chambers' concept is based on the basics of the Sustainable Livelihood Approach as proposed by the Department for International Development (DFID). The concept of sustainable livelihoods has become increasingly important as part of the development debate in the years since its introduction. New formulations of the idea of sustainable livelihood

have proliferated (Morse, McNamara & Acholo, 2009:4 & Carney, 1998; Scoones, 1998).

Authors define sustainable livelihood in many different ways. However, Roe (1998) simplifies the central tenets by illustrating the common call to diminish the complexity and uncertainty that compromises the sustainability of the livelihoods of poor people. The concept of sustainable livelihood can be viewed:

> "as a certain way of thinking about the objectives, scope and priorities for development, for the government to enhance service delivery to address the underlying poverty issues".

The above definition holds true for drought stricken areas like the Setlagole community as well.

Chambers and Conway (1991) highlight the definition of livelihood used during the World Commission on Environment and Development (WCED) that was held in 1987. The definition is based on the factors that make it sustainable and is underpinned by the livelihood framework. The definition of livelihood is explained as follows:

> "a livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living; a livelihood is sustainable when it can cope with and recover from stress and shocks, be able maintain or enhance its capabilities and assets, provide sustainable livelihood opportunities for the next generation; and which contributes to the net benefits of other livelihoods at local and global levels and in the short and long-term" (Chambers & Conway, 1991:7).

There are several processes that should to be taken into consideration when defining the concept of livelihood. Any such processes should help people learn how to let their livelihoods recover from shocks and stresses and should enable them to maintain and enhance capabilities and assets for the future generation. Resilience

during times of stress and shocks is central to the meaning of livelihood (Morse, McNamara & Acholo, 2009:4).

Carney (1998) provides a simple and shorter definition of livelihood, derived from the Cambers and Conway definition. According to Carney (1998:3) a livelihood:

> "…comprises the capabilities, assets (including both material and social resources) and activities required for a means of living."

When adding sustainability to considerations of terminology, Carney (1998) defines livelihood as…

> "…a livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resources base" (Morse, McNamara & Acholo, 2009:4).

Based on the definitions considered above, the following definition will be the operational definition for this study: Livelihood refers to people's capacity to generate and maintain their means of living and to use it to enhance their well-being and that of future generations. These capacities become crucial whenever natural, economic, environmental or political is consent, and also available and accessible. These capabilities are strengthened by equity, resource ownership and flexible and shared decision-making.

Scoones (1998) adds that livelihoods are only sustainable when households:

- are resilient during times of shocks and stress;
- do not need any external aid or support (economically or institutionally sustainable);
- maintain production of natural resources and;
- do not compromise the livelihood of other people in a close proximity (Ashley & Carney, 1999).

The Sustainable Livelihood Framework (SLF) is an important tool in this chapter. A summative discussion that explains the different ways in which SLF is used to analyse and promote planning and development is offered below.

3.3 Sustainable livelihood framework

According to Ashley and Carney (1999:4). the Sustainable Livelihood Framework (SLF) is based on the ideologies that are concerned with poverty reduction. SLF involves the way in which poor people live their lives and the importance of existing structures and institutional challenges. Ashley and Carney (1999:4) note that the SLF is drawn from three decades of views on changing poverty, starting in 1980. Cannon *et al*. (2003:4) is of the view that the SLF is formed from both the participatory approach and the poverty analysis approach, both methodologies that was used to deal with poverty issues before and during the 1980s. Predominantly, the poverty analysis approach focuses on the importance of different assets such as social capital to measure the well-constructed social relations of the poor. The participatory approach in turn focuses on diversified goals that people want to achieve and the ways they want to reach those livelihood goals. These approaches influenced policy frameworks and governance at the community level, although it generally focuses on understanding and supporting the integration of both the local and global community (Cannon *et al*., 2003:4).

The DFID report on Halving World Poverty 2015 (2000) indicates that natural hazard occurrences that lead to larger scale disasters can be viewed as threats/challenges to poverty reduction. The report also notes that the vulnerability of poor households to shocks/stressors has to be reduced. Poor households are more vulnerable to hazards and risk as a result of their low income and low cost assets (Ashley & Carney, 1999:4 & Cannon *et al*., 2003:4). The SLF is used to attempt to understand the process underlying poverty and vulnerability within social, cultural, political and institutional contexts (Cannon *et al*., 2003:3). Communities and the government feel the urgent need to develop new and improved interventions to reduce vulnerability due to poverty. Ashley and Carney (1999:4) note that SLF can be regarded as an

analytical tool since it provides a proper structure that can be used to help build an understanding of livelihoods. Such an understanding is important to guarantee the external support concurrent with poor people's livelihood strategies and priorities.

The SLF focuses on the factors and issues that affect people's livelihoods and their relationships (Department for International Development, 2001). Currently, the SLF is mainly used during new planning and development, and policy formation and activities. However, the SLF also assesses the contribution of the sustainability of the livelihoods on the current livelihood strategies (DFID, 2001; Holloway *et al.*, 2005). The DFID considers this framework of sustainable livelihood people-centred and there is no specific or linear process that is used for the framework to operate, nor does the framework try to address people's present livelihood factors in a model of reality (de Satge *et al.*, 2002). The aim of SLF is to assist different stakeholders with different viewpoints when engaging in structured and logical debate about the different factors that influence people's livelihoods, their comparative importance and the way in which they interact (Cannon *et al.*, 2003:4).

The SLF has been utilised by academics, researchers and in publications of developmental organisations such as CARE and Oxfam (Carney *et al.*, 1999) since the early 1990s. As such it is a tool to improve the understanding of the livelihoods of the poor, to establish new developmental strategies, and to monitor the existing measures to alleviate poverty. According to Morse, McNamara and Acholo (2009:3) the SLF is known as a theory that identifies crucial assets in people's livelihoods, their trends over a period and amount of space. Furthermore, SLF is known for determining the nature and the extent to which shocks and stressors (socio-economic, physical, technological and environmental) impact on those assets. Morse *et al.* (2009:3) continues to explain that after the first process, which is asset identification, the SLF takes into consideration a broad context to understand people's way of living (i.e., legal, political, institutions, economic and infrastructure) before interventions are planned to decrease vulnerability of the community by enhancing the their current livelihood through certain strategies.

SLF underlines interactions between factors that affect a community. Adato and Meinzen-Dick (2002:5) support this statement by conceptualising the SLF's aim as an analysis tool for poverty, resource accessibility and wider livelihood activities and the main interactions between the factors at different levels (i.e. micro, intermediate and macro).

Morse *et al*. (2009:56) note that there are several ways in which SLF is used to conceptualise the way households cope with unforeseen or disrupting events. SLF explores the vulnerability context of people's livelihoods. This means that SLF supports the process of assessing the way people live in a vulnerability context that is formed by different influential factors, including changing seasonal challenges/opportunities, economic stresses and long term trends (Scoones,1998:65). SLF examines the way people depend on different livelihood assets and the relations that exist between the assets, which can in turn be influenced by a vulnerability context, a range of institutions and processes, and the way people use assets as the foundation to develop livelihood strategies to reach expected livelihood outcomes.

It is evident that the SLF advocates policy development and implementation based on an understanding of poor people and their livelihood strategies (Ellis, 2000:289). The SLF also reinforces the notion that poor people should be involved in determining developmental priorities and be able to influence the institutions and processes by taking ownership of factors that impact their lives (Ellis, 2000:289).

The SLF follows a holistic approach in the sense that it encourages analysis that cross-cuts different sectors and considers a range of role players and their influences on multiple livelihood strategies and their outcomes. The SLF is dynamic in nature; it tries to comprehend changing circumstances over time and the integration between the different factors. Part of the process involved is to identify the strengths of the poor people before considering the needs and doing the problem assessment. Morse *et al*. (2009:58) add that SLF enables researchers to distinguish and create links between the macro and micro levels. Lastly, the SLF is concerned

with sustainability in all dimensions, such as the economic, social, ecological and institutional dimensions.

According to the SLF, people require various elements to achieve positive livelihood outcomes. The framework's (***see*** Figure 1) purpose is to be dynamic when recognising changes in the community as a result of external fluctuations and the household's action. The sustainable livelihood elements adapted from the DFID (1999) include the vulnerability context, livelihood assets, transforming structures and processes, livelihood strategies and livelihood outcomes. The framework is explored as part of this study by beginning at the vulnerability context, after which the livelihood assets that people collect for their livelihood will be thoroughly explained. Lastly, the policies, institutions and processes that lead to livelihood outcomes will be examined.

The different elements of the sustainable livelihood framework are explored, starting with the vulnerability context and ending off with livelihood outcomes.

3.3.1 Vulnerability context

According to Adato and Meinzen-Dick (2002:8) the vulnerability context refers to the environment where households pursue their lives. Devereux (2001) defines the vulnerability context as the external environment where communities live. Gain becomes important in the midst of impacts that have the potential to affect people's assets and capitals.

The vulnerability context comprises:

- Trends: physical, natural or social resources and economic indicators such as fluctuating prices. Some common trends may include governance trends and demographic trends as a result of human mobility (migration).
- Shocks: can be abnormal changes in people's health, impact of natural disasters such as droughts, dramatic economic change, floods, livestock mortalities, crop production failure and lack of water as an important resource for the agricultural industry.

- Seasonality: can be seasonality in job creation, seasonality of prices, crop production and availability of resources or health (Adato & Meinzen-Dick, 2002:8).

Trends, shocks and seasonality are components that can impact the community negatively or positively. First, trends may include reduced natural resources such as water, which can have a significant impact on the crop production on a farm. Secondly, shocks may be viewed as unexpected incidents that have a negative effect on the livelihoods of the community. Shocks in this case may include a natural hazard such as drought, which occurs unexpectedly and may last for a longer period than expected and have a severe impact on the production of the crops on a farms. Lastly, seasonality may refer to new employment opportunities, for instance, during the rainfall seasons a household's income may increase as a result of increased crop production.

It should be taken into consideration that the vulnerability context in the SLF framework lies far from the stakeholder components, and it is beyond people's (community) control (Kollmair & Gamper, 2002:5).

However, some trends and seasonality may not be negative to the community's livelihood. These trends and seasonality may arise and shift the community in a positive direction also (Kollmair & Gamper, 2002:5). Examples include technological trends (which can be used for income diversification) and the seasonality of crop production, which can increase the income of a farmer's household and can secure a livelihood (Kollmair & Gamper, 2002:5).

3.3.2 Livelihood assets

Livelihood assets are fundamental in the SLF as they determine communities' capacity, because the more assets a household have, the less vulnerable they are. People require various assets to achieve positive livelihood outcomes. The SLF identifies five capital assets that constitute livelihood building blocks that are used in developing disaster risk reduction strategies. The greater the combination of building

blocks a community has to call on, the more resilient they become and consequently, their disaster risk is greatly reduced (Chambers & Conway, 1991:58). Adato and Meinzen-Dick (2002:9) note that instead of focusing on only one asset such as land, the sustainable livelihood framework suggests that we consider all five capital assets:

- **Physical capital**: includes current infrastructure such as buildings, roads, water (supply and demand) and sanitation, technology and shelter. Physical capital may influence the sustainability of a livelihood due to the 'trade-offs' and opportunities that come along as a result of good quality output. In other instances, infrastructure is a prerequisite for education and access to sanitation services. In a drought scenario, water access (through reservoirs and pipelines) is viewed as one of the most important forms of physical capital.

- **Natural capital**: includes water, land, biodiversity, environment and air quality. It is crucial for the survival of those households who extract their livelihoods from those natural resources. Stakeholders have the responsibility to manage their use of natural capital in such a manner that they do not exceed the usage.

- **Financial capital**: includes savings (cash), credit (bank, cash loans and car finance) and inflow (insurance, state funds and benefits). Kollmair and Gamper (2002) describe the two main sources of this capital:
    - Available stocks: refers to cash, livestock, assets, bank deposits and not having debts.
    - Regular inflow of money: this refers to income benefits, insurance, policies, state funding and funding from other third parties.

In a drought scenario, financial capital is witnessed when a farmer starts to ask financial support from other farmers as a result of a lack of production.

- **Human capital**: includes knowledge, skills, health and labour. These aspects can enable a household to follow different livelihood strategies and to reach livelihood outcomes. However, in other instances, human capital varies

according to the size of the household; skills come from the households and the leadership potential that is possessed by the members of the households.

- **Social capital**: includes the networks, ability to work together, access to shared opportunity and membership to organisations. Furthermore, social capital may include aspects such as age group, place of stay and gender. Kollmair and Gamper (2002:6) indicate that social capital may be positive or negative in a society as a result of rules, norms and the procedures that have to be followed to join the social group. For instance, a young female farmer may want to join a group of men in the small scale irrigation association, but the rules of the association may restrict her in some way.

3.3.3 Transforming policies, structures and processes

Structures, policies and processes affect how people use their assets in pursuit of different livelihood strategies (Adato & Meinzen-Dick, 2002:9). These include international or national governance structures and policies that ultimately influence communities' ability to improve a certain livelihood and render that livelihood safe from disaster risks (DFID, 1999:3). Kollmar and Gamper (2002:7) note that transforming structures and processes is central to the SLF and provides feedback to the vulnerability context. Policies influence trends such as economic, environmental and ecological trends through government and political structures. In other instances, they mitigate and minimise the effects of shocks (natural hazards) and the level of seasons under normal conditions by using market structures. Adato and Meinzen-Dick (2002:9) support that statement by stating that these institutions and organisations shape the livelihood of the households by influencing full access to different capital/assets, strategies and vulnerability.

They also state that the structures and processes can hinder or assist the communities in developing working livelihood strategies (DFID, 1999:3). Kollmar and Gamper (2002:7) describe structures as either public or private institutions that work with and for the community to enhance development and reach their sustainable

livelihood. The processes are described as the determining factors that help structures and the community to integrate to reach sustainable livelihood.

3.3.4 Livelihood strategies

Livelihood strategies seek to develop an understanding of the different factors that influence people's choices of livelihood strategies, strengthen the existing positive factors and mitigate negative influences (Chambers & Conway, 1991:57). There can be more strategies per household as long as they create income, well-being, security, and re-productive goals (Adato & Meinzen-Dick, 2002:8). They add that the pursuit of a broad variety of livelihood strategies can have a positive effect on the household's financial stability and labour availability at various seasons in the year and even for poverty reduction strategies. The livelihood strategies can be transformed into livelihood outcomes that will be more proactive to the communities' needs (DFID, 1999).

3.3.5 Livelihood outcomes

Livelihood outcomes are the livelihood strategies that provide communities with future prospects filled with determination and flexibility to adapt when facing any challenge (Chambers & Conway, 1991:57). Livelihood outcomes may include increased income, food security and sustainable natural resources usage. Other outcomes may include stable assets base, vulnerability reduction and improved well-being (Ashley & Carney, 1999). Livelihood outcomes strengthens the objective of the study by suggesting a workable strategy to be used in mitigating the effect of drought (DFID, 1999).

The following section will describe the elements of livelihoods that indicate if the livelihood outcomes are achieved.

3.4 Elements of livelihoods

According to Scoones (1998) there are five elements intrinsic to the meaning of a livelihood and these elements have become an established guideline to assess livelihood outcomes. The first three elements all relate to the link between work and

employment as a means of poverty reduction, and challenges such as social security, well-being and the capabilities of the community (Scoones, 1998). The last two elements focus on the resilience of the community as an indication of a positive livelihood. These elements are as follows:

- **Reduced poverty**: the poverty level and condition is important when assessing livelihoods. A broad variety of measures are used to determine the poverty line based on income/consumption level (Baulch, 1996).

- **Creation of working days**: this refers to the ability to combine livelihood measures to develop employment for a certain period of the year. This may include out-of-season farm employment or subsistence production used to earn income, in other words job creation opportunities.

- **Well-being and capabilities**: People's livelihood can be measured by their well-being and capabilities such as what they can do. This element also emphasises livelihood outcome criteria, which include diverse factors such as self-esteem and happiness (Chambers, 1997).

- **Livelihood adaptation, vulnerability and resilience:** This element assesses vulnerability and resilience and the ability of the household to positively adapt and cope. However, an analysis of all factors such as past experiences of shocks and stresses are considered. Some stress and shocks may result in avoidance or tolerable responses.

- **Natural resource base sustainability**: Most households in rural areas rely on natural resources. Holling (2003) states that natural resource based sustainability is the ability of a system to maintain productivity when subject forces, such as stressors and shocks, have a negative impact on the household.

3.5 Conclusion

Despite the differing social problems per household and per community, which may underlie poverty, lack of resources (financial, physical, social and natural) in a household and the exposure to risk, there are tools that can be used to determine the vulnerability and resilience in the community.

The chapter described and explored the Sustainable Livelihood Framework (SLF) as an important tool that can be used to determine risk and that enables the community to create new resilient strategies and to provide feedback to assess the expected outcomes. The SLF is an integral and future-oriented tool that places the community's needs before everything. The aim and purpose of the framework is crux of chapter 6. It relates to the level of vulnerability and resilience that have been determined through the focus-group interviews and semi-structured interviews. The data taken from the community will be measured by using the SLF to determine whether new livelihood strategies have been achieved to offer the community a better future.

The following chapter focuses on different legislation, acts and policies in drought management, both historical and current. A global perspective is provided, followed by the South African legislation and acts on drought management.

4 CHAPTER 4: DROUGHT LEGISLATIVE FRAMEWORK IN THE SOUTH AFRICAN CONTEXT

4.1 Introduction

Drought risk has a severe impact on the agricultural industry, and most of all on vulnerable households and communities around the world. Different countries around the world have acknowledged the importance of drought risk reduction by creating policies and legislative frameworks to address issues related to drought. Vogel (1998) notes that the extent to which a country copes with drought risk is determined by the decision-makers in the government (policy and legislature makers). These policies and legislative frameworks are used to direct and dictate the role players in drought risk reduction, to plan and implement the necessary activities (prevention and mitigation), and to establish the structures that are guided by the legislation (Vogel, 1998).

The first section of this chapter illustrates and analyses South African policies and legislative frameworks on drought. This section aims to enhance the understanding of the process in which the community of South Africa is guided and regulated to reach the common goal of drought risk reduction in some provinces. Policies and legislative frameworks at the national level are discussed, with a specific focus on structures and the frameworks that can be used in each province to deal with drought. It is also important to note that the role of the global and regional levels of policy making is to coordinate activities, increase knowledge, support and facilitate effective and efficient practices that vulnerable communities can use to minimise the adverse impacts of drought risk. Lastly, the aim of South African policies and acts is to familiarise the country with key outputs and to outline the context within which the country has to formulate and align its policies and legislative frameworks to alleviate current drought trends. Country policies help to set up institutions that enhance prevention and mitigation at a local level.

The South African governments have over the years established several policies and legislative tools that are used to alleviate drought risk. These policies and legislative frameworks have certain implications for vulnerable communities and operational

activities at a local level (Vogel, 1998; Backenberg & Viljoen; 2003:17; NDA, 1998:33). Therefore, the second section of this chapter will be a summative discussion of South African legislation and policies. This chapter provide an in-depth overview to illustrate the legislative framework and policies, including structures and programmes that are utilised to reduce drought risk. Since drought has a more severe impact on the agricultural industry than on other sectors, a brief discussion on agricultural disaster risk management is also included.

4.2 National and local drought policies: South African context

In the previous decades, more organisations and role players have become involved in drought mitigation with an increased knowledge of the effects of drought on individuals and their livelihoods. As a result there are now many different stakeholders that aim to establish awareness of disaster risk reduction measures such as mitigation, preparedness and prevention (ISDR, 2009:29). These plans and practices have guided the South African government to establish drought policies and planning processes over the last decades.

4.2.1 South Africa: Drought legislative framework

According to Wilhite (2005:151), South Africa has experienced many periods of drought risk in the past. During the great depression in the early years of the 1930s, South Africa experienced a severe drought that had a significant influence on the policies of the Republic. The following discussion is based on several legislative frameworks and policies that have been developed in South African to assist communities and the government to alleviate drought risk.

4.2.1.1 Historical background on drought policy and legislative framework: South African perspective

South Africa experienced droughts during the 1960s, 1980s and early 1990s (Hazelton, 1994:9), but during this time the South African government provided more assistance to commercial farmers than subsistence farmers. Wilhite (2005:151) maintains that ad hoc responses to rural communities during the 1982-83/1992-93

droughts were not sustainable and proved that South Africa did not have an adequate drought policy.

Vogel (1994) notes that during the 1960s, the South African government proposed to establish new drought relief and management structures to alleviate drought in different provinces. The government established a new Drought Committee. Some structures needed a smaller number of staff during the off season as personnel are only needed after the onset of a drought episode (Vogel, 1994). During the 1960s-1980s, the Drought Committee mainly paid attention to livestock maintenance and sustainability, instead of assisting poor communities in rural villages (National Department of Agriculture, 2005).

Hazelton (1994:50) says that during the previous decades, the South African government had established drought assistance programmes that in most cases provided relief for the commercial farmers, particularly those who are involved in the livestock industry. The amount provided for relief escalated at a fast pace (Bruwer, 1990). During the 1984-85 drought, almost R447 million was provided as relief, but by 1987-89, R1300 million was spent on relief (Wilhite, 1990). Van Zyl (1993) shows that R4 000 million was spent on the 1992-93 drought period. This shows that the manner in which the drought assistance programme was used was ineffective and not sustainable as a result of escalating cost.

Some reports and task commissions that the government used to consolidate during drought episodes are the following (Vogel, 1994):

Table 1: Table depicting reports and task commissions used by the government to consolodate during drought episodes (Vogel, 1994).

Year	**Report**	**Key Issue**
1914	Commissions of Drought	Assessments of drought episodes and the issue of drought-increased erosion
1923	Drought Examination	Examining poor farmers'

	Commission Report	management skills and grazing practices. New recommendations were suggested.
1941	Provision against Drought	Study on the geographic area of drought and the disaster relief mechanisms
1946	Phase Drought Relief Scheme	Formation of Drought assistance scheme.
1949	Fodder Bank Committee report on Drought	Agricultural Insurance scheme comments that fodder for emerging farmers should be stored and be provided during time of help.
1965	Drought Feeding	Formation of a drought Relief Plan and Central Drought Committee.
1968	Drought Planning and Assistance	Farmer's management skills to be improved, natural resource management system needed (soil and production).
1970	Commission on Agriculture	Farming system had to be changed to cope in climatic conditions and production has to be more resilient to drought
1980	Drought Scheme proposed	Scheme provides assistance to farmers to cope with drought and encourage farmers to be self-sufficient.

The drought assessment commission of 1914 found soil erosion to be one of the increasing effects of drought in the country (Dodson, 2003). The farmers had to

better manage their water system and conserve the soil. In the 1960s, the South African government introduced drought relief plans and management structures. These plans assisted the government to reduce drought issues and soil conservation (Vogel, 1994). The committee focused on livestock farmers during drought periods. However, the staff members of this committee was active only during emergency conditions.

During the 1980s, the South African government established the Phase Drought Relief Scheme. This scheme was created to assist farmers who had to cope with the different impacts of drought (Bruwer, 1989; Vogel, 1994). The Phase Drought Relief Scheme was a tool that the government used for transport rebates, subsidies for losses and loans to assist the farmers to cover the financial losses and stabilise farm production (Bruwer, 1989; Vogel, 1994). The failure of the above-mentioned assistance scheme was that it resulted in and increased dependence on the state (Vogel, 1998).

Vogel (1994) offers the view that the South African government was not pushing the farmers to be more proactive, independent and to plan ahead for their farms. He (2000) adds that most subsistence farmers were not given aid. These policies were established to assist farmers with low profit and inefficiency, instead of focussing on food security and rainfall variability. This can be ascribed to the contribution of commercial farmers to the gross domestic product of the country. During the transition that started in 1994, a need for a more proactive approach that could assist both commercial and subsistence farmers was noted. The following legislative tools were established post-1994 to enable the South African Government and the community to work together during drought seasons: the Disaster Management Act 57 of 2002 (DMA), the National Disaster Risk Management Framework of South Africa of 2005 (NDRMF 2005), Drought Management in South Africa (DM in S.A) and the Agricultural Drought Management Plan (ADMP).
The following section discusses the key post-1994 legal tools to manage drought disasters.

4.3 Public Policy on Disaster Management: Drought

The South African government has established a number of acts and policies regarding drought to be used when implementing mechanisms that will eradicate the severity of drought in communities.

4.3.1 The Constitution of the Republic of South Africa, 1996

The Constitution of South Africa (1996), section 41(1) (b) obliges the three different spheres of government to "secure the well-being of the people of the Republic". The Bill of Rights, which is Chapter 2 of the constitution, stipulates that every citizen in the country has the right to "life, equality, human dignity, environment, property, health care, food, water and social security". These above-mentioned rights are concurrent to the main aims of disaster management as a government responsibility.

4.3.2 Disaster Management Act of 57 of 2002 (DMA)

The Disaster Management Act 57 of 2002 was proposed in the White Paper of 1999 on Disaster Management. The DMA took effect on 1 April 2002 in all spheres of government. Van Zyl (2006:49) describes the main elements of the act as follows: The act provides for

> "an integrated and coordinated disaster management policy that focuses on preventing or reducing the risk of disasters, mitigating the severity of disasters, emergency preparedness, rapid and effective response to disasters and post-disaster recovery. Also, the establishment of national, provincial and municipal disaster management centres, including the allocation of disaster management volunteers in different local and district municipalities".

There are different main applications in the DMA. Firstly, the integration of risk reduction into developmental planning seeks to assist government and the community in working towards achieving sustainable development. Vogel (1998) is of the view that ensuring disaster that risk reduction activities are similar to developmental objectives in the country can increase possibilities of a successful disaster risk reduction practice. Strategies need to be established to reduce the

vulnerability of poor and disadvantage people during disasters. Van Zyl (2006:81) maintains that disaster risk reduction strategies have to minimise the level of vulnerability of poor communities and should enable the community to be resilient in the future.

Backeberg and Viljoen (2003:8) give the following insights regarding the Disaster Management Act. They state that the act has a mandate to protect the environment. One possible way to achieve that mandate is to shift away from an ideology that disasters are scarce and should be managed by emergency services and rescue teams for response instead of disaster reduction. The DMA proposes that a shared vision comprises awareness and that responsibility should be established to reduce the risk in households, communities and society in general. The Act indicates that several improvements are needed, for instance capacity, information about disasters, monitoring and evaluation. A shared responsibility may involve institutional emergency preparedness and response capacity in all different spheres of the government. The DMA maintains that increased commitment in disaster management activities and strategies to reduce risk is sorely needed.

The Disaster Management Act mentions several responsibilities of the National Disaster Management Centre (NDMC). They are as follows:

- To ensure that an effective disaster management strategy is fully developed and implemented within all the spheres of South African government and other stakeholders (other departments, NGOs and private organisations);
- To provide al the stakeholders with the necessary guidelines and procedures to determine risk and assess the vulnerability of the community;
- To coordinate disaster risk management at all the levels of government;
- To have a financial model that will be best suited for municipalities to handle their finances from the National Treasury;

- To promote and assist the implementation of disaster management measures in all sectors of society;
- To establish relationship and communication links with other countries to enable them to share their different experiences regarding disasters.

After the formulation of the Disaster Management Act, the NDMC introduced a framework that is used to implement all the services and functions that are done by disaster management officials.

4.3.3 National Disaster Risk Management Framework of South Africa 2005

After the promulgation of the Disaster Management Act 57 of 2002, the government of South Africa decided to establish a framework for disaster management. The name for the legislative tool is the National Disaster Risk Management Framework (NDMF) and the primary objective is to provide a coherent, transparent and inclusive policy on disaster management that will be appropriate for the whole country of South Africa. The National Disaster Risk Management Framework was established in 2005 and took effect in the same year.

The DMA (2002, Section 6) and the Draft National Disaster Management Framework (2004) both define the NDMF as a "legal instrument specified by the Disaster Management Act to address such needs for consistency across multiple interest groups, by providing a well-coordinated, structured and transparent policy on disaster management in South Africa". However, the framework is structured into four Key Performance Areas (KPA) and the three Enablers (Van Zyl, 2006:52). The mandate of the KPAs is to assist in managing disasters and the main objective with the Enablers is to reduce the vulnerability of the communities through the support of other stakeholders such as the private sector and the NGOs (NDMF, 2005; van Zyl, 2006). The four KPAs and the Enablers are outlined below:

- Key Performance Areas:

1. integrated institutional capacity for disaster risk management;
2. disaster risk assessment;
3. disaster risk reduction; and

4. response and recovery.

- Enablers:

1. information management and communication;
2. education, training, public awareness and research; and
3. funding arrangement for disaster risk management.

Van Zyl (2006:51) is of the view that the KPA 1 focuses on developing the institutional capacity for disaster risk management policy and legislation. He adds that the first main structure is the Intergovernmental Committee on Disaster Management (ICDM). This structure consists of necessary Department and Cabinet members that are involved in Disaster Risk Management in the National Legislature (Van Zyl, 2006:51). The National Disaster Management Centre (NDMC) and the Disaster Management Advisory Forums (DMAFs) (National, Provincial and Municipality) were established in this category. The NDMC is responsible for guiding and establishing the frameworks for government's disaster risk management (Van Zyl, 2006:52). Then, the DMAFs responsibility is to coordinate a joint consultation for different role players and to promote and integrate their different activities with regard to disaster risk management.

The KPA 2 specifically focuses on establishing and coordinating disaster risk assessments in the country. The primary objective of the KPA is to develop an approach to assessing and monitoring disaster risk and it will be used to inform different departments of the government and the different levels of disaster risk management structures in the government (Van Zyl, 2006:52). The United Nations Development Programme (2010) defines disaster risk assessment as

> "a process that determines the nature and extent of such risk, analysing hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property, services, livelihoods, and the environment on which they depend".

A comprehensive assessment can be a form of support as far as it provides understanding of the causes and impacts of the losses. Thus, a risk assessment can be used as a priority document in the decision-and-policy making process in shared governing institutions.

The focus for KPA 3 and 4 is disaster risk reduction (KPA 3) and response and recovery (KPA 4). Van Zyl (2006:58) briefly explains that KPA 3's objective is that role players in disaster risk management should work towards developing disaster risk reduction programmes and systems that are in line with the approved frameworks. Van Zyl (2006:58) maintains that the NDMC must ensure that all the role players and the different levels of government produce their own disaster risk management plans and frameworks. KPA 4 specifically gives priority to effective disaster response and recovery. To achieve this KPA, a few response and recovery strategies and contingency plans have to be established and implemented when disaster strikes (Van Zyl, 2006:65).

Lastly, the three enablers in the framework come to the fore. The first enabler supports the enhancement of an information management system and the establishment of a well-coordinated communication link between all role players in disaster risk management (Van Zyl, 2006:67). The second enabler supports the public awareness, training, education and research in disaster risk reduction. Van Zyl (2006:67) maintains that the third enabler puts emphasis on the funding model that the role players in disaster risk management can use. This enabler also assists with the budget, application for funds, approvals and spending of the unit for disaster risk management.

The function and coordination of the activities mentioned above should have capacity to develop those frameworks. The next section focuses on the function and coordination of an agricultural disaster risk management unit.

4.3.4 Disaster Risk Management and Climate Change Unit of Department of Agriculture, Forestry and Fisheries

One body that provides policy and implementation in the agricultural industry is the Unit of Disaster Risk Management and Climate Change. This unit has certain functions and provides coordination to assist in reducing the impacts of disasters in South African agriculture. These functions are as follows:

- National policy and plan development (National Drought/Flood Mitigation Plans;
- Ensuring uniform disaster risk assessment approaches;
- Prioritising disaster risk reduction and climate change adaptation coordination for agriculture risk;
- Ensuring facilitation disaster risk management and climate change adaptation integration into all sectors of DAFF (including disaster management plans);
- Coordinating national disaster risk reduction and climate change representation of DAFF.

Figure 7 below shows a hierarchy of the institutional arrangements of agricultural disaster management in South Africa. There are three levels of government where the structure is formulated, which is as follows:

- National level: Agricultural Disaster Risk Management Unit, which has the following sub-units: National Agricultural Disaster Risk Management Committee (NADRMC), National Agricultural Disaster Risk Management Forum, National Agricultural Committee (NAC), Organised Agriculture (OA) and National Disaster Management Centre (NDMC).
- Provincial level: Early-warning system (EWS), Provincial Disaster Management Forum (PDMF) and Provincial Disaster Management Centre (PDMC).
- Local level: Local Disaster Management Centre (LDMC), Non-governmental organisations (NGO), and Community-based organisations (CBO) and the agricultural section. The structure of the unit is presented below:

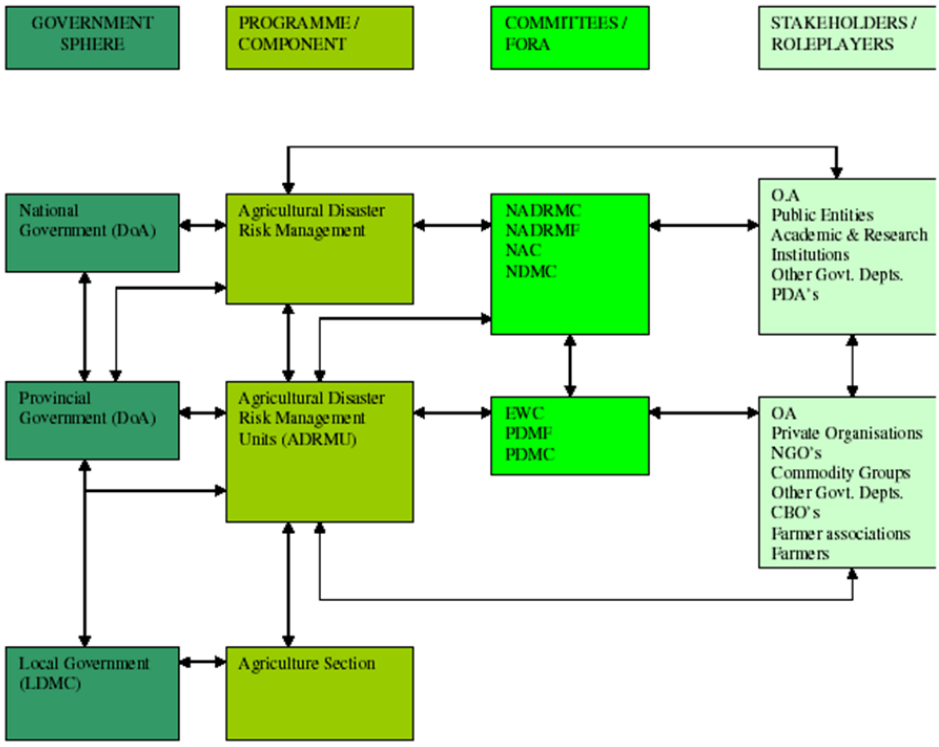


Figure 7: Institutional arrangements for agricultural disaster management in South Africa.

4.3.5 Agricultural Drought Management Plan

The Agricultural Drought Management Plan (ADMP) is a long term plan that was established by the Department of Agriculture, Forestry and Fisheries (DAFF), the main aim of the ADMP is to reduce the risk of drought through an effective and joint drought management system for livestock, crops, price, animal husbandry, income systems that are easily affected by drought episodes and that decreases the use of natural resources (DAFF, 2010).

The ADMP has four specific principles that provide a brief outline and aim of the plan. These guidelines are as follows:

- Establishing a communication line for information sharing and management, monitoring and evaluation of drought episodes to find the causes of drought and the social impact assessment through social

vulnerabilities caused by the impact of droughts. Furthermore, to recommend new ways to mitigate the effects of the drought;

- To make use of drought monitoring maps to compile and update the management tools of drought;
- To maintain and implement the early warning system as part of drought monitoring tools; and
- To develop and implement projects and programmes that focus on drought risk reduction, mitigation, preparedness, response, relief, recovery and rehabilitation (DAFF, 2010).

The ADMP emphasises that the DAFF has a leadership role in reducing the impact of drought on the society. These roles and responsibilities are outlined below:

- Establishing and updating of a consolidated ADMP;
- Creating, operationalising and updating drought management policies and projects;
- Conducting research on areas prone to drought;
- Making funds available for drought episodes
- Providing capacity building awareness on drought mitigation;
- Sharing decisions on new drought policies and services with other sector departments;
- Assessment of the impact of drought phenomenon on sustainable develop in the agricultural sector;
- Doing assessments with provincial offices on droughts risk;
- Coordinating early warning communication lines;
- Coordination of disaster relief scheme;
- Outlining the procedure of drought assistance; and
- Funding drought relief programmes from the National Treasury during drought relief schemes with the National Disaster Management Centre (NDMC).

It is subequently necessary to discuss the established plans that are necessary for drought management. The following discussion focuses on the drought management plan that was drafted by the National Department of Agriculture.

4.3.6 Drought Management Plan (DMP)

Apart from the Disaster Management Act and the National Disaster Risk Management Framework, the Department of Agriculture, Forestry and Fisheries of the government of South Africa developed a Drought Management Plan in the year 2005. The agricultural department highlighted that section 24(b) (ii) of the Constitution of South Africa, 1996, indicates, “every citizen of South Africa has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that secure economic and social development”. This can result in the development of a disaster risk management structures and systems such as preparedness, prevention, rehabilitation, response mitigation, reduction, and recovery for a natural hazard such as drought (White Paper on Agriculture, 1996).

According to the discussion document prepared by the Department of Agriculture (2005), the vision of the drought management plan is to establish well-coordinated disaster risk management structures and systems for crops and livestock and prices and income systems to reduce the risk and impact of droughts. The plan proposed the following guidelines to reduce the drought risk:

- The creation of an information management system and a monitoring and evaluation system for drought situations to enable the Department of Agriculture to observe and detect the biological, physical and social vulnerabilities and oppose it with action.
- Making available maps that will indicate and provide updated information on the development of drought.
- Making available rangeland/vegetation indicative maps to assist farmers to be proactive in their decisions.
- Improving and making use of early warning systems for farmers; and
- Developing new disaster risk reduction programmes that will enhance preparedness, mitigation, response, recovery and rehabilitation (White Paper on Disaster Management, 2005).

Drought Management is the joint responsibility of all spheres of South African society, namely the government, farmers, farmers associations, rural and urban communities, private organisations and the society as a whole (DMP, 2005). Furthermore, the impact of drought on other Southern African countries should be considered, since the phenomenon can jump the borders.

There are several principles that can guide South Africa towards effective and efficient drought management, and they are as follows:

The Disaster Management Act (57 of 2002) should be used as a principal document that will guide the objective of a drought management plan. One major strategy for the drought management plan is to create awareness and preparedness in the agricultural industry. The drought management plan should reinforce the shared responsibility between the government and the agricultural sector and amend the current drought assistance programmes. Lastly, the drought management plan should break down the different responsibilities of the spheres of government and other role players when considering drought (DMP, 2005).

4.4 Conclusion

A legislative framework entails acts, policies and plans that are used by different sectorial departments, disaster management units and the community as a whole to minimise/reduce the risk that drought holds for society. These policies and acts are proposed and coordinated by the cabinet of the country. However, in most cases the current theoretical framework **(refer chapter 2)** is not followed as it is supposed to be and it is not implemented the way it was proposed. The importance of a legislative framework is that it should act as a guiding tool that assists all the role players that are involved in minimising the risk of drought. In South Africa, however, most sections of the legislation is difficult for the officials to implement and it becomes difficult for the government be accountable for the actions that should have been taken.

5 CHAPTER 5: RESEARCH METHODOLOGY

5.1 Introduction

The preceding three chapters offered a comprehensive review of literature, statutes, policies and standards relevant to this research. From this foundation, key theoretical characteristics emerged, which provide a substantial basis for comparison with the collected data.

Chapter 1 offered only a brief description of the research methodology. This chapter directs the reader with regard to the methodological aspects that were employed in this study to collect data from the community. The first section of the chapter focuses on the reason for the choice of a qualitative research design. This is followed by a discussion on the selection of data collection tools for this study. Lastly, the data analysis techniques are explained.

5.2 Research design

According to Brynard and Hanekom (2006:35) a research design can be described as the way in which a researcher collects and processes data within the parameters of a proposed framework for the research process. In a similar vein, Fox and Bayat (2007:7) notes that the different methods of research can be categorised into three research designs, namely the qualitative, quantitative and mixed method design. These research designs offer types of inquiry that provides specific direction for the procedures to be followed (Creswell, 2013:12; Denzin & Lincoln, 2011).

A qualitative research design was selected as the strategy of inquiry for the purposes of this study.

5.3 Qualitative research design

A qualitative research design aims to work with information gathered through observable data or notes taken from interviews conducted with the participants during the study (Du Plooy, 2002:25). Authors such as Creswell (2013:42) and Denzel and Lincoln (2011:3) define a qualitative research design as follows:

> "…Qualitative research design is a situated activity that locates the observer in the world. Qualitative research consists of a set of interpretive, material practices that make the world visible. These practices transform the world. They turn the world into series of representations, including field notes, interviews, conversations, photographs, recordings, and memos to the self. At this level, qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them".

The design allows the researcher to investigate and understand the phenomenon both from the perspective of the literature review and from the participant's viewpoint by means of the research tools or key instruments (Leedy & Ormond, 2005:96). A qualitative research design is exploratory in nature and seeks to understand the research problem through the eyes of the participant (De Vos *et al.*, 2011:308).

Struwig and Stead (2001:12) simply state that one advantage of using a qualitative research design is that the researcher is able to interview the participants and interpret the information the way the information is understood. Leedy and Ormrod (2005:141) remark in similar vein that a qualitative research design furthermore provides broader details regarding the findings that may arise, increases validity and helps the study to gain convergence. Therefore, the qualitative method is suitable to study society and individuals living within it.

In addition, the qualitative research design gives the researcher total control of the study. The researcher can establish questions and add significantly when necessary (De Vos *et al.*, 2011:269).

Creswell (2007:45; 2013:185), Struwig and Stead (2001:12), and Maree *et al.*, (2009:79) highlight several characteristics of the qualitative research design as an ideal design tool in social research. Creswell (2013:185; 2007:45) delineates

qualitative research by pointing out four characteristics. He states that a qualitative research design uses a naturalistic approach that seeks to collect data from the field/setting in which the participants are experiencing the social dilemma (or the problem under investigation). This research design does not use a laboratory or complete surveys, instead the design forces the researcher to talk directly to the participants and it enables the researcher to observe and see participants in their context. Maree *et al*. (2009:79) adopt a more descriptive view by saying that a naturalistic approach seeks to better understand phenomena in a real-world setting and that information should not be manipulated. In this study, the researcher collected data from the community of Setlagole and the different stakeholders who are affected by the drought phenomena. Thus the researcher conducted the research in a real-life, natural situation.

Secondly, the researcher is a key instrument and is viewed as a characteristic of a qualitative research design (Maree *et al*., 2009:79; Struwig & Stead, 2001:13). Although the researcher may use multiple sources of data, namely observations, documents, interviews or audio data, the researcher is the main instrument that gathers all the data (Creswell, 2013:185). Maree (2009:79) provides a clearer perspective by highlighting that the involvement of the researcher is necessary in the ever-changing real-life situation, since the researcher has to record the changes in the real-life situation. For this study, the researcher made use of documents, interviews and audio-visual information about the community of Setlagole village. All the data from the field were analysed and combined with the existing literature to formulate an interpretation.

The third characteristic is flexibility and an emergent design, which makes the research relatively open and unstructured (Creswell, 2007:45; Struwig & Stead, 2001:13). This characteristic puts more emphasis on the idea that the initial research plan can be amended and some of the sections/phases can be changed or shifted structurally after the researcher has been in the field or begins to collect data from the participants. Creswell (2013:185) adds, for example, that the questions for the interviews may be adapted, the participants and even the areas that were visited

may change. A qualitative research design's main objective is to learn about the social problem from the participant's point of view. For this study, the researcher was flexible in situations that required such flexibility.

The last characteristic is the holistic approach or process research (Struwig & Stead, 2001:13; Creswell, 2007:47). This characteristic enables the researcher to use the qualitative research design to learn about the social problem from prior events, including interrelated events. The characteristic also emphasises the holistic approach because the researcher will be developing a complex view of the problem under investigation by analysing multiple ideologies and identifying cross-cutting factors that are involved in the bigger picture (Maree *et al.*, 2009:80). These characteristics are the base foundation that motivated the researcher to select qualitative research design in conducting research at Setlagole village in the North-West Province, South Africa.

5.4 Sampling

According to Brynard and Hanekom (2006:54), sampling is a method utilised by a researcher to select a small group of people from a larger population with the same characteristics and sufficiently appropriate in-depth information about the proposed study. Sampling methods help to choose individuals who will represent the larger group.

The target population for this study includes traditional and communal farmers, community leaders and heads of households in Setlagole village. Another target group will be the government officials working in the disaster management departments. These include officials from the Ratlou local municipality and Ngaka-Modiri Molema district municipality (disaster management centre), the Provincial Disaster Management Centre and the Department of Agriculture unit for climate change and disaster management in the North West province. These officials are targeted because they provide services related to disaster management and agricultural problems. Thus they are presumed to have access to valuable

information and in-depth knowledge that can address the study's research objectives.

Purposive judgment and snowball sampling procedures were used for this study. Creswell (2007:125) explains purposive judgment sampling as a form of sampling that selects participants purposefully because they are well informed and understand the research problem. Purposive sampling in this study was used to select the government officials, disaster management officials and the community leaders of Setlagole. The above-mentioned participants are selected because of their job categories and position in the Setlagole village.

Snowball sampling was used to select community members. Alston and Bowles (2003:90) stated that snowball sampling is suitable when there is no information on the sampling frame. While Royse (2004:197-198) maintains that this sampling method seeks to find more participants for the study by random selection from other participants that have already been interviewed. For this study, the community leaders were requested to recommend farmers, families and heads of households who are greatly affected by the droughts and with appropriate knowledge on the research problem.

The data collection method selected, namely focus group interviews and semi-structured interviews, suit this study because data were collected from the participants that have experienced the problem and the institutions that are responsible for service delivery and the management of drought events.

The different data collection method is discussed on the following section.

5.5 Data collection methods

Struwig and Stead (2001:98) state that there are different ways to collect data from the research setting in the field. However, these data collection tools are selected based on the objective of the research study. Schutte (2006:158) remarks that more than one data collection tool can be used in one research study. For this study, focus

group interviews and semi-structured interviews were chosen as data collection tools. These research tools are most frequently used in a qualitative research design because they allow the researcher to gather first-hand information by interviewing the respondents in a face-to-face manner. The researcher conducted interviews with the community of the Setlagole village and the institutions that are affected by the impact of drought episodes (Brynard & Hanekom, 2006:38).

5.5.1 Focus group interviews

A focus group interview is an interaction between groups of people to gather data by means of a discussion (Struwig & Stead, 2001:99). A focus group interview consists of four to twelve participants. All participants take part voluntarily and should be given the same respect (Struwig & Stead, 2001:99). Leedy and Ormrod (2005:180) add that a focus group interview should be conducted in an environment that is comfortable and free from destructions, such as noise. Participants should be informed about the importance of their contribution to the study and the researcher should assure them of their worth (Struwig & Stead, 2001:99). Focus group interviews are essential because the researcher listens to the participants and learns from them.

Focus group interviews help the researcher to gain more information by asking one question to all participants to the discussion so that they can share their insights (Maree *et al*., 2009:90). Maree *et al*. (2009:90) maintain that focus group interviews rely on the general assumption that such an interview involves a productive group with a broad range of answers, even previous experiences are discussed. As such, Struwig and Stead (2001:98) define focus group interviews as "… a carefully planned discussion designed to obtain perceptions on a defined area of interest in a permissive, non-threatening environment…" Maree *et al*. (2009:90) are of the view that during focus group interviews participants should not inhibit other participants by making discouraging statements.

According to De Vos *et al*. (2011:363) the focus group interview is of fundamental importance because participants are selected from among people with certain

characteristics in common that relate to the topic of the discussion and they all explain their knowledge about the problem in different ways. Maree *et al*. (2009:90) offer the view that focus group interviews generate in-depth data that is difficult to find when using other data collection methods, although some participants may be reluctant to share their personal opinions. A focus group interview often allows the researcher and the participants to discuss issues that are regarded as important (Struwig & Stead, 2001:99). Maree *et al*. (2009:91) add that focus group interviews allow the participants to use and develop each other's ideas and suggestions so that the group ultimately arrives at a more detailed view than one can with individual interviews.

De Vos *et al*. (2011:363) state that focus group interviews can be a useful tool when the researcher has to investigate a varied range of individual perceptions in a defined area of interest. The researcher has the responsibility to promote disclosure among the focus group participants to gain the necessary data for the study (De Vos *et al*., 2011:363). Maree *et al*. (2009:56) concur with this view that focus group interviews are cost-effective and enable the researcher to generate complex data at one time. Fox and Bayat (2007:7) conclude that focus group interviews generate data rich in detail within a short period of time, unlike one-on-one interviews that may prolong the research process for too long.

The interview schedule used for the focus group interviews is included as Annexure B.

5.5.1.1 Selection of focus group participants

In this study, focus group interviews were be conducted with district municipality disaster management officials, provincial disaster management officials and community leaders who are perceived as public service providers to the community. Each interview consisted of four to eight participants. Three focus group interviews will be conducted. One focus group included officials of the district municipality's Disaster Management Centre who are involved in drought management. The second focus group interview consisted of the officials from the provincial Disaster Risk

Management Centre that is involved in drought management also. Lastly, the local governance (Ratlou Municipality) officials were consulted as community leaders from the respective spheres of governance and the community. The expectation was that this group could give a clear understanding of the previous droughts and how relief schemes have assisted the community. The aim was to get a clear in-depth understanding of the mitigation strategies currently in use.

5.5.1.2 Language considerations

The three focus group interviews were conducted in English and the questionnaire was also in English. The researcher is fluent in Setswana, Sotho and Xhosa. If the participants wanted to express themselves in another language when answering the questions, the researcher could understand easily.

5.5.1.3 Limitations of the method

According to Maree *et al*. (2009:91) and De Vos *et al*. (2011:364) one of the limitations of focus group interviews is that the outspoken participants in the interviews have the ability to direct the discussion, and this might hinder the assessment of the less assertive participants' viewpoints. This limitation was taken into consideration during this study.

5.5.1.4 Advantages of the method

The researcher anticipated that this method could assist him in generating in-depth data on the topic under investigation. The in-depth data that the researcher is hoping to get, is data that will enable the research to use the theories and empirical findings to formulate themes that will be helpful when the researcher is recommending mitigation strategies.

The following section provides an explanation of the second data collection method, namely semi-structured interviews.

5.5.2 Semi-structured interviews

According to Struwig and Stead (2001:98) semi-structured interviews consist of elements of both structured and unstructured interviews. De Vos *et al*. (2011:351) state that semi-structured interviews provide flexibility between the researcher and the participants during the interview. The method is more suitable for researchers who are interested in complex and controversial social problems.

Maree *et al*. (2009:86) note that semi-structured interviews may last for a longer period, might be intense and detailed, although this is determined by the topic under investigation. Greeff, cited by De Vos *et al.,* (2011:292) is of the view that the method requires the participant to answer a multiple set of pre-planned questions. Struwig and Stead (2001:90) strongly maintain that the method also allows the researcher to probe to get clarity on unclear answers. However, the method requires an agreement between the researcher and the participants before the interview commences. De Vos *et al*. (2011:352) indicate that semi-structured interviews require that the participant be provided with a questionnaire and that the person should be allowed to determine how the interview will proceed, instead of all the questions in the interview schedule being asked. In semi-structured interviews, the researcher has to be a good listener and engage with the participant throughout the interview without interrupting during an explanation (Richard & Morse, 2007:113).

Semi-structured interviews are suitable for this study as they allow the researcher to ask unstructured questions that help to probe and that allow the respondent to explain their answers without being limited by the question. At the same time the structured aspect of the semi-structured questions facilitates clarity and focus in responses (De Vos *et al*., 2011:353). In semi-structured interviews, participants are always regarded as experts based on the information they have for the researcher. Maree *et al*. (2009:87) gives the insight that a semi-structured interview schedule should be provided to the participants (experts) to indicate the line of inquiry. In addition, the researcher has to be able to identify developing lines of inquiry that are associated with the problem under investigation (Maree *et al*., 2009:87). The researcher should always remind the participant of the aim and purpose of the study.

Semi-structured interviews were used to gather in-depth information on the effects of drought on the community (farmers, families and heads of households) of Setlagole village and sector departments (other stakeholders). Semi-structured interviews were conducted with purposively selected individuals who are knowledgeable and have valuable information regarding the study. These interviews were conducted with officials from sector department of government, farmers (commercial & emerging) and heads of households from Setlagole village.

The qualitative data collected through semi-structured/unstructured interviews and focus group discussions were audio-recorded, and written notes and observations were taken. The interview schedule is included as Annexure C and D.

A thorough explanation of the analysis of the data will be outlined in the following section.

5.6 Qualitative data analysis and interpretation

5.6.1 Data analysis

According to De Vos *et al*. (2007:399) qualitative data analysis is defined as a "…non-numeric examination and interpretation of observations, for the purpose of discovering underlying meanings and patterns of relationships…" Gibbs (2007) maintains that the idea of analysis implies some kind of transformation. He adds that the researcher starts with generating enough qualitative data and follows the process of data stages, and then the researcher has to process data into understandable themes that can offer a trustworthy and insightful analysis. Neuman (2006:467) notes that data analysis involves "examining, sorting, categorising, evaluating, comparing, synthesising and contemplating the coded data as well as reviewing the raw and recorded data".

Creswell (2009:195) adopts a more descriptive view, namely that data analysis should be a process that is done concurrent with the interviews. The researcher may analyse data from the interviews conducted earlier while waiting for other interviews.

This may include writing up memos that will be part of the narrative report and the arrangement of the empirical finding structure.

The steps in the analysis of data involves reducing data by sorting and organising data into meaning. The meaning that is identified is used to form categories. The categories formed enable the researcher to formulate themes and the direction of the research. Themes classification is perceived to be an essential part of the qualitative design (Welman *et al.*, 2006:210). This is followed by data interpretation to develop new knowledge by formulating all the findings. In this study, data will be analysed through a **thematic analysis**.

The following steps are employed during the data analysis stage as proposed by (Creswell, 2009:197):

Step 1: Organising and preparing data

In this stage, the researcher has to transcribe all the interviews, go through the material and type all the field notes made during the interviews. The researcher should also sort and arrange data into different types, based on the sources that provided the information.

Step 2: Reading the data

The researcher has to read all the data thoroughly to gain a general understanding of the information received from all the participants. This stage will enable the researcher to reflect on the overall meaning of the data generated in the field.

Step 3: Coding data

This stage is the beginning of the coding process. Creswell (2009:197) indicates that coding is the process of organising data by bracketing chunks (or text or image segments) and writing a word representing a category in the margins. In this research study, **NVivo** coding was employed. Nvivo data coding is a qualitative data analysis (QDA) computer software package mainly used by qualitative researchers.

This qualitative data analysis software is useful in this study because certain data is rich text based and some data is used as multimedia information.

Step 4: Descriptive coding

In this stage, the researcher uses the coding process to describe the setting, people and categories/themes for analysis. These themes were formulated into the major findings (headings in the empirical study) in this research study. Creswell (2009:197) states that these themes and categories should portray the different perspectives of the research participants and should be presented with a wide range quotations and evidence.

Step 5: Discussion of findings

The researcher has to convey the coded data in a narrative analysis. During this stage, the researcher may use narrative analysis to discuss the findings in different ways, namely the discussion of several themes, visuals, tables, graphs, figures and interconnecting themes as assistant in the discussion of the findings.

Step 6: Interpretation of data

Lastly, data are interpreted accordingly. This step highlights the lessons learned from the field and information is compared to the theories or the literature discussed the previous chapters. During this stage, new questions might be formulated to get to the bottom of the problem under investigation.

During the analysis the findings were monitored and verified using the Sustainable Livelihood Framework as an analysis tool.

5.6.2 Sustainable Livelihood Framework as an analysis tool

The Sustainable Livelihood Framework (SLF) was utilised to ensure and monitor which livelihood assets or capital have been affected during a given drought period. The study employs the SLF (see chapter 3) as a data analysis tool as the researcher used the elements of the framework to assess the conditions associated with the

impact of drought. These included the strategies that the community of Setlagole plans to use in the future.

5.7 Ethical clearance

Research ought to be based on joint agreement, collaboration, conventions and accepted expectations amongst all participants in the research before information is gained from the participants (De Vos *et al.*, 2011:114). All participants in the research should be aware and agree on what is accurate and not accurate in scientific research (Babbie & Mouton, 2004:470). Guidelines to be provided to participants before they become involve in the research include:

- **Anonymity**: All data were subjected to anonymity by removing identifying information and/or disguising real names;
- **Voluntary participation**: Eligible participants were not forced to participate;
- **Informed consent**: The research objectives and methods were fully explained to the participants before the research commences. The letter of consent is included as Annexure A;
- **Confidentiality**: Each participant's original information was only used by the researcher to compile the findings for the research purposes and participants' names remained confidential.

Accordingly, in accordance with the above ethical considerations, the researcher sought permission to conduct research from the head of the Provincial Disaster Management Centre (PDMC) of the North West Provincial Department of Cooperative Governance. Permission was granted and it was further indicated that the approval includes permission to conduct research in the provincial departments of Cooperative Governance and Traditional Affairs (COGTA) and Disaster Management District Municipal Centre of Ngaka Modiri-Molema District Municipality as the Department granting such permission is responsible for these institutions and the ethical clearance regulated by the North-West University's ethical committee.

5.8 Limitation of the study

Limitations in this study were identified as the following:

5.8.1 Single area

The research was inspired by the recurrent droughts in the North West Province. However, the researcher restricted the research to a specific community as scope of the study would have been too wide if the North West Province had to be included as a whole.

5.8.2 Reliability and validity

Research requires that the researcher explains how the accuracy and validity of the research study were assured. Both research validation and reliability have different meanings in qualitative and quantitative research designs. According to Creswell (2009:201) qualitative validity entails that the researcher uses certain procedures to validate the accuracy of the generated findings. Qualitative reliability means that the researcher employed approaches similar to other research and projects at large (Gibbs, 2007). Creswell (2009:201) indicates that validity and reliability in research are addressed through trustworthiness, authenticity and credibility.

The principal researcher for this study has tried to be as honest as possible with the findings generated from the community of Setlagole. The reseacher used the data only for the purposes of this study. The data generated from the community of Setlagole were validated and made reliable through various types of processes that were highlighted in other sources from the literature review (see chapter 2, 3 & 4) and the researcher also made use of the structures from the Dr Ngaka Modiri Molema (Disaster Risk Management) district.

5.9 Conclusion

The primary aim of this chapter was to provide the reader with a full overview of the research methodology that was used for data collection. The subsequent chapter compares the theoretical insights and the data collected from the field to formulate scientific recommendations.

6 CHAPTER 6: EMPIRICAL FINDINGS: AN ANALYSIS

6.1 Introduction

In this study three chapters (2, 3 and 4) focused on a theoretical framework, the Sustainable Livelihood Framework (SLF) and drought legislative framework respectively. The focus of those chapters is used here to describe and evaluate the prevailing situation in Setlagole village regarding the risk of drought in the area. The relevant theoretical and legislative frameworks and the model of sustainable livelihood framework were used as the guideline for analysing data collected from the field. There are several guidelines and principles that were mentioned as part of the empirical research. These guidelines and principles formed themes that were then analysed through comparison.

This chapter firstly addresses the data collected from Setlagole village. Then, identified themes are discussed according to their linkage to the theory and the themes identified from the literature. This chapter aims to determine to what extent drought has consequences for the livelihoods of the farmers of Setlagole village and to test the relief and preparedness mechanisms employed by government to reduce the risk of drought in Setlagole village.

6.2 Overview of the study area

Setlagole village is a small rural village 70 kilometres from Mahikeng, the capital city of the North West Province, South Africa. The village is situated in one of the poorest local municipalities, namely the Ratlou local municpality, under the administration of the Dr Ngaka Modiri-Molema District municipality in North West Province of the Republic of South Africa (IDP, 2012:3).

The village of Setlagole is under the leadership of a traditional council and the national government. This implies that the decision making regarding Setlagole village is vested in the traditional council, although the government has the control over land. Setlagole village has a low population density and a very large area of unused land (***see*** Chapter 5 section 5.4). The level of agricultural production in the area is very low. However, agricultural production is the main method of generating

income. The second method of generating income is migration of the citizens to bigger industrial/urban areas for better income and wages. Setlagole village lacks infrastructure, such as water and sanitation structures, government facilities and retail infrastructures. There are few buildings in the area and the municipality itself does not have facilities as they rent office space in a shopping complex.

In the following section, the representation of the study is discussed as follows:

6.2.1 Study representation

For the purpose of this study different role players were consulted, including the farmers, agricultural unions, government sectors, higher education institutions, and humanitarian aid organisations.

The composition of Setlagole community for this study was as follows:

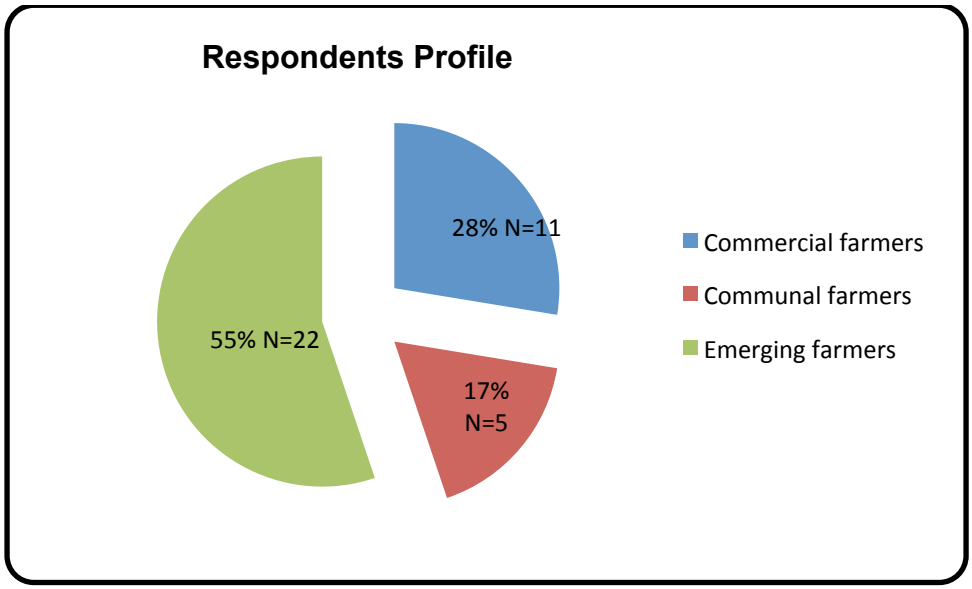


Figure 8: Composition of farmers as respondents

Figure 8 above provides an overview of the farmers who were consulted during the field work. All these farmers were interviewed in five different focus groups. The actual number of farmers was as follows: emerging farmers (n=22), commercial farmers (n=11) and communal farmers were (n=5).

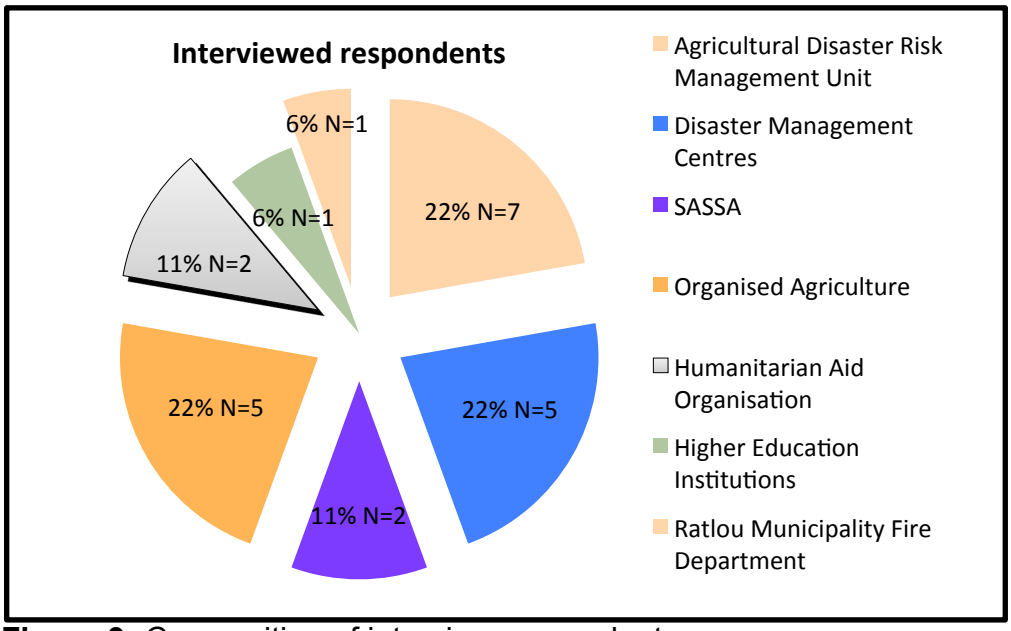


Figure 9: Composition of interview respondents

Figure 9 gives the breakdown of interviews conducted with sector departments, disaster management centres and other role players in the study. The aim of these interviews was to test the severity of drought as a hazard to the community. Although most respondents indicated in the chart below are not citizens of Setlagole village, these officials are the responsible entities mandated to assist the farmers and farming communities to cope and mitigate the effects of drought. The total number of role players as respondents was 23 as illustrated above in 6.2. The total number of the interviews, both focus group discussions and semi-structures interviews, was 19..

The sections below explain the findings of this study. This is done according to the analytical framework alluded to previously. This section is structured as follows:

- Drought and other related hazards as risks;
- Socio-economic impacts of drought on households' livelihoods;
- Drought occurrence;
- Drought coping mechanisms;
- Drought mitigation strategies;
- Government institutional capacities; and
- Stake holder involvement.

6.3 Drought and other related hazards as a risk

There are different hazards in the Dr Ngaka Modiri-Molema District Municipality. To establish whether or not the community of Setlagole regard drought as a hazard, the respondents were asked about risks and hazards in Setlagole village. Most respondents in the study area indicated that Setlagole village was prone to several hazards such as veldt fires, floods, environmental degradation and droughts that affect their livelihoods negatively.

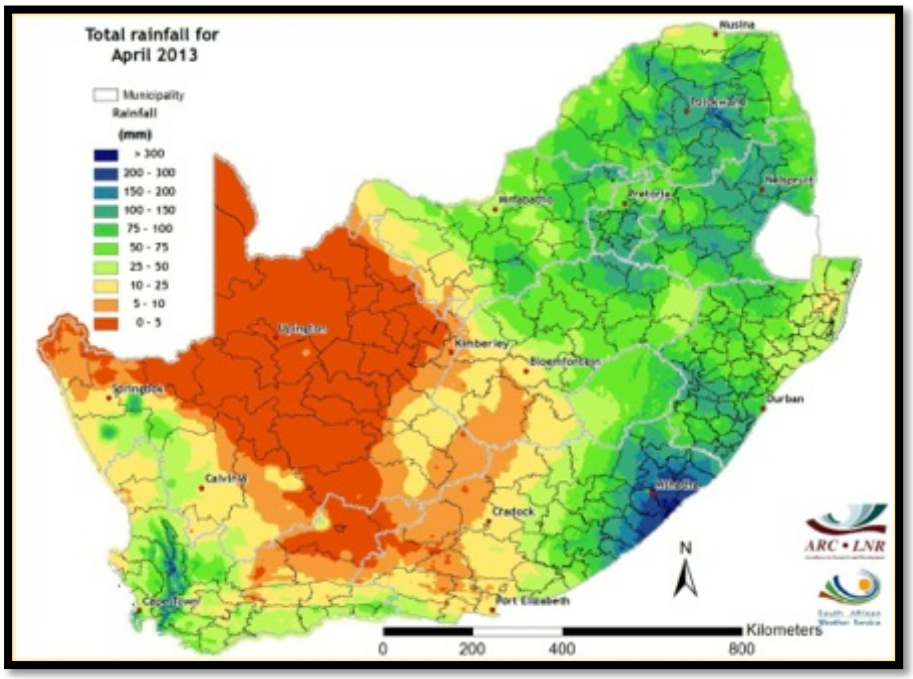


Figure 10: Map indicating rainfall variability during drought episode of 2013. (Source: ARC Maps, 2013).

The respondents named the following as hazards that pose risks to the community:

- Drought, fires, veldt fires, floods, environmental degradation, socio-economic related hazards, crime (livestock theft and robberies), water shortage, lack of infrastructure and shortfall on electricity for the community.

These are in line with the hazards identified in the Dr Ngaka Modiri-Molema District Municipality's Integrated Development Plan (IDP, 2012:45). For drought purposes, it can be deducted from the map (**figure 10**) above that the South African rainfall

statistics of April 2013 indeed shows an instance of drought in the greater South Africa region, including the area where Setlagole village is located.

A large number of respondents in Setlagole village expressed that they have fallen victim in such a way that they are fully dependent on the government to reduce the risks they face from hazards. However, some respondents said that they had to adapt to their situation since they do not necessarily get assistance from the government to reduce the impact of hazards and disasters. Furthermore, some respondents from Setlagole village indicated that drought and water shortages are the most severe hazards, although most officials mentioned that drought is not a major hazard in Setlagole village because the area is prone to water scarcity. Other respondents from the community mentioned that issues such as agricultural production that is related to socio-economic factors make the livelihoods of the community difficult to maintain. A large number of respondents from government mentioned that the lack of a disaster management plan in the Ngaka Modiri-Molema District Municipality makes it difficult for them to know the hazards that pose risks in Setlagole village. Other government respondents noted that a lack of practice-based research hinders their ability to know the hazards in Setlagole village.

Natural hazards such as drought, floods and environmental hazards pose great risks to the livelihoods of the community, who depend largely on agricultural production. These risks were identified by respondents who were consulted about reducing the impacts of drought through relief mechanisms based on their different roles. According to Kadzatsa (2011:28), planning in disaster reduction includes prioritisation of identified hazards after conducting a disaster assessment. This implies that all the above-mentioned hazards are likely to occur in Setlagole village. Those hazards that pose the greatest risk to the community should be prioritised. However in spite of the importance of risk assessment and prioritisation in effectively managing disaster risks, there is no disaster management plan for the district municipality as alluded to in the Disaster Management Act 57 of 2002 (***see*** Chapter 4, section 4.3.2). Therefore, this means the community will always be exposed to risks and hazards until a disaster management plan is formulated.

It is clear from the above discussion that the government and community differ regarding drought as a hazard. This can be as a result of lack of disaster management planning. However, the government officials had the opportunity to make use of the municipality IDP to identify issues in the community. Therefore, it is clear that the government officials do not necessarily have clear knowledge about this community and this in turn raises questions regarding the effectiveness of service delivery in the community. In other instances, the relationship between the government and the community seems to not function properly. The community is aware of the problem and urgency of drought, but this is not visible to the government, this can be due to lack of communication between the two parties.
The respondents described the hazards named above as follows:

Drought: A large number of respondents viewed the causes of drought as increased heat waves, lack of precipitation, low humidity, high temperatures, dry windy conditions and abnormal climate. Some respondents argued that drought is their biggest issue as a hazard. This natural hazard not only leads the community to a state of vulnerability, but there are other shocks that it causes such as de-bushing, desertification of land and other stressors. In other instances, these droughts lead to farmers migrating to better areas with better grass. However, this can be classified as seasonality in the vulnerability context (within the SLF), since farm workers will be employed by a new farmer in the area (Adato & Meinzen-Dick, 2002:8).

Drought is a hazard that occurs during a certain season. For instance, one major cause of drought is heat waves, which usually occurs during the December-March period (Summer). During such seasons, the crop yields lower since most crops become dry as a result of climatic issues (***see*** Chapter 3, section 3.4). These stressors may be classified in the vulnerability context of SLF (***see*** Chapter 3, section 3.4).

Water shortage: Water-related problems in South Africa can become severe (DWA, 2009). Water shortage is classified as a regional problem, but it is more severe in the

Setlagole area (DWA, 2009). Some respondents indicated that in Setlagole village, the water shortage sometimes becomes so severe that the community goes for more than four months without running water or water from the government. Respondents from Setlagole village added that some government officials sell water to the community using the facilities and water resources of the government, such as water tank trucks. One respondent said that:

> "as a female, I can go for more than three weeks without water to use in the household for bathing, cleaning and cooking, beside for other purposes such as agricultural activities".



Figure 11: Livestock farming in dry areas of Setlagole village.

Some of the respondents indicated that the communal farmers usually depend on a one of the local businesses that has a borehole to provide them with water for their livestock. Other respondents have also noted that the water shortage is so severe that sometimes it hinders their children from going to school as a result of a lack of water on the school premises. The respondents complained that the government does not do the necessary maintenance of the boreholes in the area of Setlagole village. One of the respondents stated that:

> "the government is fails dismally to provide water and related services in Setlagole village".



Figure 12(1): Old borehole that is not maintained in Setlagole.



Figure 12(2): Damaged shared water supply.



Figure 12(3): Soil erosion and environmental degradation as a result of floods.

(Source: Shoroma, 2014).

Some of the issues in Setlagole village can be observed from the photographs in the figure above. The first picture (***see* figure 12**) on the left shows an old borehole that is situated next to the South African Police Services in the area of Setlagole village. This boreholes has stopped working several years ago and has not been fixed since then. The second picture on the right shows an unused old tap that supplies water to half of the community Setlagole village. This tap has been malfunctioning for a number of years without any correction. The last picture situated in the bottom shows soil erosion and environmental degradation in the area as a result of drought and floods. This condition makes the land uneven and increase challenges that are faced by the community to access ground water.

All the government respondents from the interviews agreed that water shortage is a major hazard in the North West Province. However, one official respondent indicated that the government does not maintain the boreholes because the water level in Setlagole is too low for the community to extract ground water. This has led the government to provide water to the area using water tank trucks. Some officials said that water shortage is the result of lack of precipitation and climate change, especially the increase in El Nino episodes due to global warming increase issues in Setlagole village. The discussion with other government officials also revealed that the distance from Mahikeng to Setlagole inhibits them from providing the community with sufficient water for households because they have to drive water to the area daily from Mahikeng. Although, in turn, one respondent strongly argued that some officials sell water to the vulnerable community and this increases the issues in the community.

If the government has regular and continuous contact with the community, they would have been aware of the water service needs. It is clear that drought and water scarcity are main hazards in the area, which makes the problem statement of this study relevant. The lack of knowledge in the government regarding these hazards has implications for reducing the risk posed by these hazards. Moreover, the lack disaster management plan also increases the risk severity posed by these hazards

and vulnerabilities. As such, government officials have to recognise drought and water shortages in future risk assessments and DRR planning processes.

The discussion and responses above imply that the relationship between the government and the community is slightly dysfunctional. This is especially embodied by the differing opinions on what priority risks are in the specific community and a lack of a disaster risk management plan for the Setlagole area. According to the SLF, the government is classified as one of the most prominent structures that provide services to the people. However, it can be argued that the community members are not happy with the services they get from government, but they are still dependent on them. Issues related to lacking service delivery, notably lack of water provision, impacts the livelihoods assets of the community, such as water for cleaning and cooking (***see*** Chapter 3, section 3.4). The water policy of South Africa is not properly followed by the officials who sell water to the community. Specifically, the policy states that access to safe clean water should be basic human rights. The policy also prohibits the officials from selling water, which should be done by the municipality (section 2 of the Water Act). Lastly, there is lack of communication between the community and the government, which can be observed from the government's discontinuation of boreholes in Setlagole, while the community is adamant that there is sufficient ground water in the area.

6.4 Socio-economic impacts of drought on the livelihoods of the local households

There are several impacts that are exacerbated by drought. Vogel *et al.* (2000:32) say that drought can change the normal activities of the communities that depend on the natural environment to produce food and earn an income. These impacts may be direct (loss of livestock) or indirect (job losses). Many respondents have indicated that one major impact of drought is loss of profit and income.

Table 2: 2012/13 drought financial implications in the North West Province

	100000 LSU's	150000 LSU's	250000 LSU's
30 days @1%	R50m *1	R75m *2	R125m *3
@2%	R 100m	R 150m	R 250m
@3%	R 150m	R 225m	R 375m
60 days @1%	R 100m	R 150m	R 250m
@2%	R 200m	R 300m	R500m *4
@3%	R 300m	R 450m	R 750m
90 days @1%	R 150m	R 225m	R 375m
@2%	R 300m	R 450m	R 750m
@3%	R 450m	R 675m	R 1,125b
120 days @1%	R 200m	R 300m	R 500m
@2%	R 400m	R 600m	R1b *5
@3%	R 600m	R 900m	R 1.5b

(Source: PDMC-NW, 2013). **LSU:** LivestockUnit(s)

Legend

*1 - Initial submission figures, *2 – Current Number of LSU's captured, *3 – Expected Number of LSU's if Bojanala District Municipality and Dr Kenneth Kaunda District Municipality is included, *4 – Recommended (60 day assistance at 2% of body weight for 250 000 LSU's, *5 - Recommended (120 day assistance at 2% of body weight for 250 000 LSU's.

This is mainly a problem with commercial and emerging farmers. Farmers lose income, as a result they reduce the number of farm workers they employ until they have enough capital to pay workers and buy fodder. Some respondents noted that

they lose financial means in that they planning to use certain funds for other things, but during drought they have to buy feed and livestock to remain in agriculture.

The above **Table 2** shows the financial impacts of drought by calculating the amount of money needed to buy feed and maintain livestock for 120 days from the previous drought of 2013 in the North West Province.

In one focus group, respondents said that one of the major impacts of drought is livestock mortalities. This happens especially where there are communal and emerging farmers who do not have sufficient grazing for livestock, as this leads to over-grazing. Over-grazing has left these farmers without any grass or feed. However, in the other discussion with the respondents it was noted the communal farmers do not own their own land because the land belongs to the traditional authorities. These traditional leaders do not want the farmers to introduce farming skills they do not know, and this in turn increases the effects as farmers are not permitted to use the land without consultation. Some respondents revealed that overgrazing exacerbates low crop yields and outbreaks of epidemics. The respondents mentioned that this can be seen when farmers graze in one area and this automatically leads to reduced harvesting of crops and lack of control, which means that animal disease increases.

Some respondents also noted that household incomes are stretched as a result of drought. Natural resources in the environment, such as the wetlands, become too dry for any activities, for example crop harvesting and gardening for household purposes. A group of respondents noted that crime levels in the area have increased significantly, especially crimes such as stock theft and robberies on farms. In the other discussion, the respondents noted that social conflict (xenophobia) related to crime increases as the community is severely affected by droughts and the level of job losses increases. This situation frustrates the community and becomes the community's platform to get attention from the government. The impacts of drought in Setlagole are described in **figure 13** below:

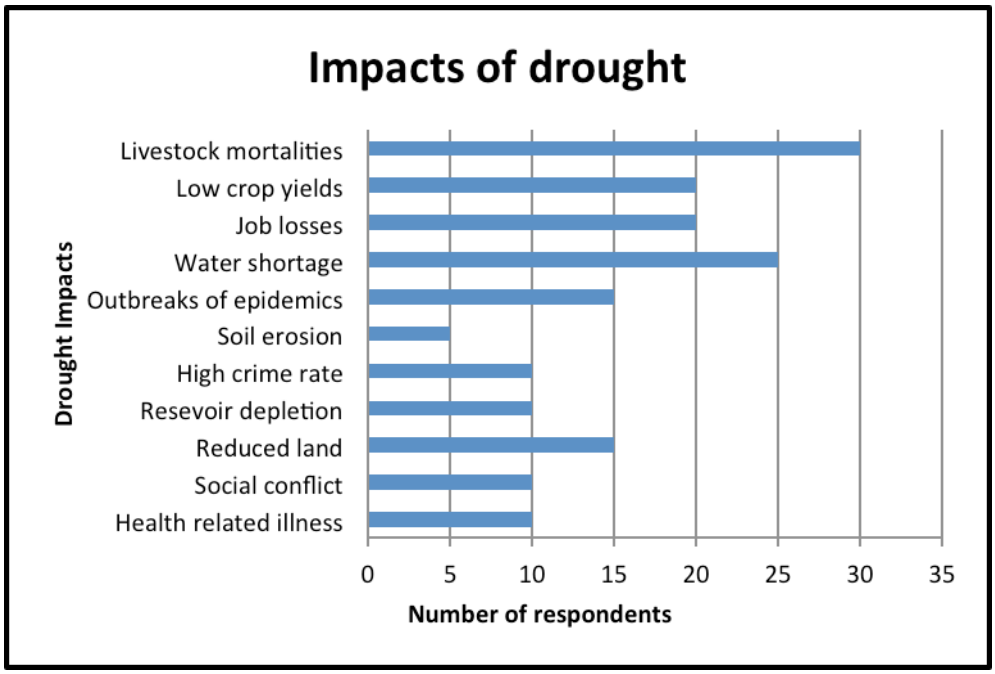


Figure 13: The impact of drought in Setlagole.

In general, discussion interviews with the relevant role players such as the Department of Agriculture, Organised Agriculture and the Disaster Management officials in the province also revealed that drought has several impacts for the farmers in Setlagole village. One official noted that emerging farmers lose their cattle first, and this is primarily due to poor grazing conditions and practices.

Other respondents added that throughout any given year the emerging farmers feed their cattle all the fodder they have without planning for the drought and other related agricultural hazards. This in turn results in a lack of fodder during drought, which automatically means livestock mortalities will increase. Some of the respondents also mentioned that some farmers do not have any access point or any marketing strategy to sell their livestock when drought is anticipated. As a result of this practical hindrance, these farmers lose their livestock during drought.

In another discussion with the government respondents, some noted that the effects are more severe for both older-in-age and emerging farmers who are dependent on the government grants, because the government does not make provision if they lose any livestock. The respondents also noted that during a drought period,

livelihoods are influenced by the occurrence of diseases in animal and humans (as a result of a lack of water). Sometimes diseases spread because of grazing on reduced land and it spreads to other neighbouring villages. According to the Disaster Management Plan (DMP) of DAFF (2012:14), the socio-economic impacts are the main issues related to drought. Commercial and emerging farmers loose financial capital as a result of drought. The SLF (*see* **figure 1,** Chapter 1) has certain livelihood assets that determine whether the community has been negatively affected by the prevailing episodes of drought. The livelihood assets of Setlagole community are certainly affected severely by the prevailing drought events. Everybody is affected, but especially emerging and communal farmers. The community finds it difficult to plan for drought because they do not even have other necessary livelihood assets to be employed during times when there is no drought.

The literature on SLF emphasises that human beings' livelihoods should be protected at all times. However, the data yielded from the Setlagole village reflects an element of ignorance from government, since they do not know the issues affecting the communities (***see*** Chapter 3, section 2). The Constitution of South Africa maintains that the community should be given priority and their livelihoods should be protected at all times, but this is difficult to achieve this in the absence of a disaster management plan. In addition, the law requires the government to provide water to the citizens, instead of selling water to the community. This already exploits the livelihood of vulnerable communities and increases dishonesty (***see*** Chapter 4, section 4.3.1). In addition, traditional council values and traditions actually seem to increase the impact of the drought since these traditional structures are also a transforming structure (as noted in chapter 2) in a society as the decision by the tribal council directly affects the livelihood of many farmers. Thus, it is clear that transforming structures can increase the impact of droughts in the community. Furthermore, these structures can increase vulnerability and risks in the community especially when there are no plans for such hazards.

6.5 Drought occurrence

In the view of the respondents from Setlagole village, they frequently experience drought. Droughts have occurred on many occasions and this has had severe impacts on the community. The respondents in the area indicated that the most severe drought was experienced in the year 2013. According to the respondents, they have stated that this drought was most severe because a number of livestock died and crop yield was very low during that period. Additionally, some respondents indicated that they even lost livelihoods, land tenure and livestock as a result of that event.

The discussion with the government respondents confirmed that the 2013 drought episode was severe because financial losses of up to R530 million occurred as a result of this drought (DAFF, 2013). Furthermore, the government respondents also pointed out that the last episode of drought had a significant impact on the society as a whole, these impacts have been discussed in the previous section. The impacts and eventual cost was higher than expected in spite of the fact that an early warning system was in place. Therefore, the possible risk reduction and subsequent cost reduction (in terms of impact) of the EWS was reduced as the farmers do not have preparation plans that make provision for the information from early warning systems.

Drought is one of the major hazards in South Africa and it has been noted in several national and international reports that South Africa is prone to drought. There have been many events of drought, particularly in the North West Province of South Africa (***see*** Chapter 2, section 2.2).

Table 3: Drought occurrence in Setlagole village: 2004-2013

Number of years	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Drought occurrence		x	x	X			X	X	X	x

This phenomenon has been prevailing in farming communities around the province. The drought occurrence can be tabulated as follows for the past decade (the years

that have an indication of (x) are the years during which there were droughts in the community). The SLF model makes provision that vulnerability context of the community can be directly or indirectly affected by seasonality. Therefore, the above table shows that the vulnerability context of the community is almost chronically affected by droughts, with seven (7) out of ten years (10) registered as impacted by drought. With droughts being such a chronic problem in the area of Setlagole, it is disturbing to note that both the community and government have not taken more concrete steps to develop a disaster risk management plan to avert or lessen possible catastrophes associated by drought

6.6 Drought coping strategies

Coping strategies during drought episodes refer to immediate coping skills or people who assist the community with developing their capacity to cope with drought (***see*** chapter 2, section 2.6.7). Dercon (2002) notes that coping mechanisms refer to various strategies that are employed by farmers or individual households, government or institutions to cope with recurrent effects of droughts. However, coping strategies may be employed by an affected farmer, then if the farmer is unable to cope better with that strategy, the farmer can consult to the government to intervene (***see*** Chapter 4, section 4.3.5). According to SLF structures, policies and processes affect how people use their assets in pursuit of different livelihood strategies (Adato & Meinzen-Dick, 2002:9). These include international or national governance structures and policies that ultimately influence communities' ability to improve a certain livelihood and render that livelihood safe from disaster risks (***see*** Chapter 3, section 3.4.2). Therefore, it is clear that the government needs a structure that will facilitate the relationship between farmers and government throughout their efforts regarding drought. This structure could focus on strengthening drought preparedness plans and new relief mechanisms.

In the interviews with the farmers, the respondents mentioned that during drought episodes, there are limited coping strategies that they usually practice. A large number of respondents indicated that the system of government is not helpful to them during a drought event because it is not timeous and the provision of funds

from the government is not sufficient. Organised agriculture supported this by revealing that during the previous drought episodes, most farmers did not receive government assistance as a result of tender processes that were developed. As a result of that, the respondents said that one of their coping strategies was to reduce the number of their livestock by selling them to commercial farmers, but this in turn was a problem because after the drought episode had passed, the farmers no longer had enough livestock. However, some farmers indicated that they use the money they raise from selling their livestock to buy fodder for the livestock that is left.

Some respondents (commercial farmers) indicated that they would receive weather reports from their Organised Agricultural Unions for their specific area using data from the SAWS, which usually helps when an El Nino event is expected. Some respondents mentioned that they use their indigenous knowledge systems, such as a dry dusty wind that blows along the north-west of Setlagole area (known as rainfall or thunderstorms) and sunshine to prepare for future weather. In other instances, respondents noted that they make use of social media such as Facebook or Twitter to ask for donations from the wider farming community to assist them with fodder for livestock and transport. Using social media is a faster way for farmers to get assistance than to wait for the government to provide relief for them.

In other interviews, the respondents indicated that those who are in need of feed will be invited by farmers with sufficient grazing land to bring their livestock to their farms until the period of drought ends. In addition, some respondents noted that they usually buy fodder together (in bulk) because they then receive a discount on the feed. Other respondents mentioned that since they do not necessarily have any feed or money, they rely on harvesting their crops so that they can use it to feed their livestock. Lastly, some respondents mentioned that they have to watch their livestock die because they do not have money or feed to provide for them. These are respondents who are dependent on the government to assist them during such events, but since government processes take too long, most farmers have already lost their livestock or sold them at a cheaper price to commercial farmers by the time the government provides feed to the farmers.

The government role players in turn complained that most farmers wait for the problem to be severe before they take the necessary measures, and this makes coping difficult for the farmers and the government. One respondent mentioned that the farmers do not use the advice they get from the government officials. This means that the problems are transferred to government. Some of the government officials mentioned that they usually advise the farmers by providing early warnings through SMSs, newsletters and agricultural forums. In addition, the government respondents also noted that they have a process for distributing fodder to farmers for relief. These fodder bags are distributed at 20 bags per farmer, but in other instances, fodder distribution was done based on the number of livestock. One group of respondents stated that some farmers prioritise younger livestock rather than the older livestock, because they believe that the young livestock will adapt to the drought event. Others stop their cows from suckling their calves.

The interviews with both community members and government officials revealed that the farmers of Setlagole village are dependent on the government to assist them with the necessary relief mechanisms to reduce the impact of drought. As a result of the lengthy process of the government to assist the farmers, these structures only become helpful to the community after a long period, and the livelihood of the community is compromised as a result of the lack of urgency with government. Government has implemented initiatives to help provide relief, but, questions can be asked about their effectiveness as farmers on the ground do not always experience the positive impact of such interventions. It is clear that the government gives assistance, but then it is too little or too late, and the farmers have to cope mostly by themselves.

In the following section drought mitigation in the Setlagole village is analysed.

6.7. Drought mitigation strategies (Awareness Campaigns)

The response from government officials is quite contrary to the experience of the respondents from the group of farmers who feel that the government becomes involved too late. The contradiction could point to a lack of communication between the government and the farmers, who may not receive early warning messages and notices of meetings. In addition, the relationship between the farmers and the government might be poor. The term mitigation refers to lessening the effect of a hazardous event on communities at risk. Mitigation strategies allow a community to understand their problem (hazard) and to determine the level of planning that is needed to reduce the risk of drought. According to the DMA, each municipality is supposed to have their own disaster management plan, complete with details on disaster mitigation strategies. Since this specific municipality does not have a plan, it is very difficult to have mitigation strategies (***see*** Chapter 4, section 4.3.2) and adequate relationships with at risk communities. As a result of not having mitigation strategies, farmers will experience drought either at the same level or worse in future. In conclusion, it is clear that even though most farmers do not have mitigation strategies, farmers belonging to organised agriculture are in a better position to cope as they have the social capital through the organised network to receive information. This strengthens their social capital in the livelihoods assets, which shows that they have support and networks that assist them during drought.

According to the respondents from Setlagole village, most farmers do not have any mitigation strategy at all. They said that it is difficult for them to have mitigation plans for drought because of the long period that most droughts last. Some respondents have indicated that they have regular meetings with their Organised Agriculture leadership for advice. Others respondents indicated they have been saving money on a monthly basis for feed when it is needed. Some respondents have contracts with chicken farm owners to obtain chicken litter when the chicken farmers clean their chicken coops/pens. These chicken coops/pens can be used to feed grass to grow even when there is insufficient water for growth. A representative from Organised Agriculture noted that they put out newsletters every second week and

they have a journal that is released three times a year. These communications resources are used to send important information to the farmers relating to issues in farming communities. In one of the focus groups, the respondents mentioned that they have access to emails and cell phones and they have been trained to read the early warnings from the government.

In discussions with the government, most respondents indicated that there is a disaster management plan that emphasises that farmers should make use of early warnings so that they can either use water sparingly, or buy feed in time. The government officials have also indicated that one of the problems that exacerbate drought impacts is the unwillingness of farmers to follow the procedure the government has put in place. The government officials highlighted the fact that farmers do not necessarily take ownership in mitigating the problem, and this increases the problem when the government takes too long to respond or provide relief. Some respondents indicated that the government usually assists farmers before drought occurs. The government has regular workshops for farmers and they have different awareness programmes regarding droughts and other hazards (Agricultural Disaster Risk). Officials are appointed in every district in the North West Province who conduct agricultural risk assessments with extension officers throughout the province.

6.8 Government roles and responsibilities

Most respondents from the community have indicated that the government roles and responsibilities during drought are as follows:

- provide fodder for livestock;
- provide food and clothes for relief;
- assist farmers who lost everything as a result of drought by buying them cows;
- disseminate information such as weather reports and rainfall reports;
- provide better ways of getting water; and
- provide skills and mitigation measures to farmers

In other interviews, the respondents noted that the government should only assist with farmers by providing fodder relief and financial aid, because this may relieve the problems of the farmers during drought without the government taking too much responsibility on their own.

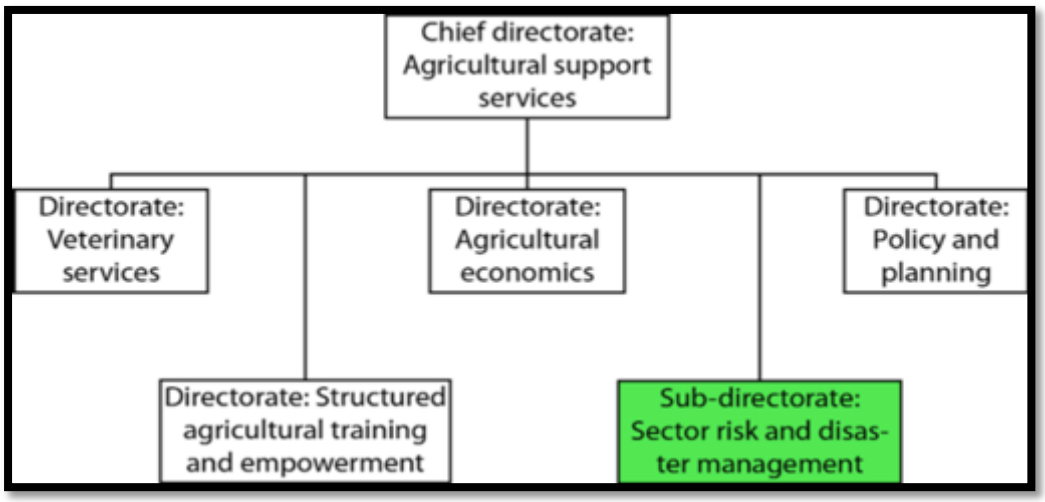


Figure 14: Institutional Arrangements of Agricultural Disaster Risk Management (North West)

During the interviews with government officials, most respondents indicated that Department of Agriculture plays a leading role in drought response and relief mechanisms. Figure 14 above shows the institutional arrangement in the Department of Agriculture in the North West Province (***see*** Chapter 4, section 4.3.4). The respondents added that the sector for risk and disaster management is found in the lower level of the provincial structure. Government respondents noted that institutional arrangements do not necessarily have powers to take other decisions regarding assistance for the farmers. However, they have to act immediately to respond to issues affecting the farmers. Their placement in the organisation complicates timely drought response. According to government officials, there are several processes that should be followed before any drought relief can be provided. The office of disaster management indicated their roles and responsibilities during drought episodes as follows:

Process 1: The North West Provincial Disaster Management Centre (PDMC) starts by identifying the relevant stakeholders, does situational and needs assessments, and then coordinates drought relief from a central point. These assessments are rolled out in affected areas with the help of a leading sector. The PDMC is also responsible for the declaration of a state of disaster as referred to in the DMA (***see*** Chapter 4, section 4.3.5). During a drought event, the PDMC communicates through radio and sends the message informally to the farmers regarding the anticipation of drought.

Process 2: The relevant sector department (DAFF) has outlined the role and process of government as follows during drought events:

- send early warnings to the farmers (throughout the year);
- send out drought evaluations through extension officers to the farmers (to determine if the farmers can cope or cannot cope with drought). However, this drought evaluation will focus on the number of livestock and the availability of feed;
- then the assessment forms are sent to the most affected farmers;
- the consumption units are calculated per farm;
- after that, if it exceeds a certain amount, PDMC is consulted to declare a state of disaster;
- the budget is organised to calculate the amount needed per agricultural production;
- therefore, the declaration of drought is made with the necessary information to the NDMC.
- funding will be made available from the National Treasury; and
- funding will be used to buy fodder for farmer's livestock.

The mandate to establish recovery plans for the post-period of drought is undertaken. The government officials further mentioned that the recovery plan is developed and updated at regular time intervals by the Department of Agriculture and Rural Development. The recovery plan is the shared responsibility of all the

relevant departments of government who are involved during the onset of a disaster and after the disaster event.

It can be deducted from the above that the community and the government agree to some extent on drought mechanisms. This shows that to some degree government is on the right track to address drought issues in the area. However, the mandated government department still faces issue in terms of their level of authority. This issue of authority hampers their ability to fully carry out their mandate to reduce drought risk and respond to drought situations. The institutional structure of both the PDMC and the Department of Agriculture should be clearly outlined in their policies and frameworks. These structures can only be effective if there is strong capacity. This can be achieved by training Disaster Risk Managers through Higher Education Institutions. However, the government has the responsibility of planning, implementing and mitigating. Even the SLF suggests that for the government to be effective, sufficient training is necessary so that projects are well-planned. This can lead to a contingency plan during a disaster or to safeguard the livelihoods of the community (***see*** Chapter 3, section 3.5). The government is supposed to have developed rapid strategies that will be timeous and provide feedback/services to the community in an efficient way.

6.9 Stakeholder management

Most respondents from the community did not mention any stakeholders involved during drought assistance or drought response and relief. During the interview with international aid organisations, respondents pointed out that they have a large number of challenges regarding drought relief to the farmers. In some instances, when they ask government to provide transport, the government takes too long to provide them with such assistance and in some cases the government would not even provide them with transport as was promised. Funding is either limited or there's no funding at the time when it is needed. This prohibits NGOs from assisting the government in communities and to help safeguard the livelihoods of the community (***see*** Chapter 3, section 5).

One of the respondents from the government indicated that the two leading government role players in drought is the Department of Agriculture and Social Development. This has been confirmed by Organised Agriculture, stating that the leading sector (READ) have working relationships with them throughout the year. In an interview, one respondent stated that there are different challenges that affect all the role players. Communication or dissemination of information was viewed as a major problem and as a result of this challenge, many role players duplicate responsibilities. This leads to the process being prolonged before the farmers can be assisted with the necessary fodder they applied for. The drought management plan of South Africa stipulates how the process of assisting farmers during drought should work. However, the lack of mutual agreement among role players when they provide services to the community shows that they do not have sufficient capacity (***see*** Chapter 4, section 4.3.6). Since the Department of Agriculture and the Provincial Disaster Management Centre are the two leading sector departments in drought management, they have provided a list of role players in the government.

Table 4: Role players involved during drought management

Role player(s)	Purpose during drought management
South African Weather Services	Sends weather reports to alert the farmers about the extreme temperatures
Agricultural Research Council	Conducts assessments (support function)
Department of Water Affairs	Provides water resources
Department of Agriculture, Forestry and Fisheries	Provides funding, develops policies and implementation in agriculture
National Treasury	Provides funding
Humanitarian Aid: Red Cross Society	Provides food and clothes (Farm workers)
SASSA	Providse food aid to the affected families
Department of Labour	Assists the retrenched farm workers
Traditional Councils	Owners of Communal land
Department of Health	Disease outbreak
Organised Agriculture	Support to farmers

These role players have their own responsibilities during drought. Some role players who are indirectly involved may have been omitted from the above list.

The discussion indicates that role players are part of transforming structures involved in the process of safeguarding the interest of community (***see*** Chapter 3, section 3.4.2). Over and above the capacity building of officials to be trained about the process of sharing responsibilities to assist the farmers is needed at all times. These structures should be visible to the community and the Traditional Council should be empowered on issues related to drought, since the community has knowledge about government's role and responsibilities. However, the strong relationship between all the stakeholders is necessary in reducing drought risks.

6.10 Future drought mitigation strategies

Most respondents indicated several mitigation measures that can be employed by the government and the community. The respondents from the community proposed that the government should make water accessible in Setlagole village through maintenance of boreholes and installation of new boreholes to access deeper underground water to be used by farmers during droughts period. They added that government must also establish control management systems for borehole use by the farmers. Additionally, respondents indicated that the government should build more dams in the province to capture more precipitation water that can be used during drought periods. In another interview, organised agriculture respondents were of the viewpoint that the policy on saving water should be established to encourage farmers to conserve water resources. The respondent from an NGO also added that government should educate farmers, especially emerging farmers on what types of bushes should be planted to support their cattle during drought periods.

In the discussions with the government officials, participants mentioned that government should ensure the maintenance of windmills in the area. In a discussion with the leading sector, they proposed a new system that entails a scheme that can be explained as follows:

The government should develop drought assistance schemes as follows:

Scheme 1: Payment of cash to the farmer:

- the scheme is straight forward and amounts is calculated by the unit, based on assessment form information will be paid to the beneficiary.

Scheme 2: Using Agricultural Companies

- A credit facility per farmer at his nearest agricultural company will be credited through the system or in the debit card that will be administered by the companies. The farmer will then be able to buy animal feed at the company.

Scheme 3: Using service provide:

- The scheme will supply fodder and transportation to beneficiaries based on predetermined volumes.

It is clear that both the community and the government show the need for mitigation process in drought situations. However, the community members noted that they need more water supply and structures. Investing in water supply and structure will address the livelihood of the community. However, the government wants better funding provision for drought phenomena. Mitigation requires planning and preparedness, this implies disaster management plans and shared contingency plans with better communication channels should be prioritised.

6.10 Conclusion

From the above analysis, it is clear that drought mitigation in South Africa only exists in governmental policy documents such as Drought Management Plans and Drought Management. Moreover, the lack of a disaster management plan in Setlagole makes it difficult to prepare for drought. Inadequate relationships between farmers and the government also makes it difficult for farmers and the government to provide data that has a sense of shared vision and mission for drought alleviation. One most prominent issue that makes drought so severe is the process of relief; it takes too long for the government to give assistance to the farmers. This shows that mitigation measures are needed to prepare both the farmers and the government regarding drought. The next chapter makes general recommendations to address the issues that emerged from the analysis.

CHAPTER 7: RECOMMENDATION AND CONCLUSION

7.1 Introduction

This chapter provides a brief summary of chapters 2, 3, 4, 5 and 6. It also revisits the research objectives and gives an overview of the context and the way in which each research objective has been achieved. Lastly, the chapter provides some recommendations that can be employed by the Department of Agriculture (Setlagole fillage) and farmers who are based in the Setlagole village.

7.2 Overview of chapters

The primary aim of this study was to review experiences about previous droughts and to recommend new mitigation measures that can be employed in the North West Province, using Setlagole village as a case study.

Chapter 1 paid attention to the introduction, the problem to be investigated, research questions and objectives regarding the problem, methodology and procedures that were followed and the tentative outline for other chapters of the study.

Chapter 2 provided a literature study on drought as a natural hazard. The chapter also focused on the causes, implications and vulnerabilities of drought. Lastly, the chapter elaborated on the coping and mitigation measures that are indicated in the literature.

Chapter 3 provided the guidelines and principles of the Sustainable Livelihood Framework (SLF) and the framework was explained thoroughly with the use of examples. The reason for the SLF was also provided, and how was it going to be used to measure the overall livelihoods of Setlagole village was addressed. The objective was partially achieved.

Chapter 4 explored the existing policies, acts and legislative frameworks for disaster risk reduction and drought management in South Africa. A brief historical study regarding drought was also provided.

Chapter 5 focused on the methodologies that were followed by the researcher when conducting data collection in the field.

Chapter 6 presented the empirical findings on drought mitigation as a requirement for farmers to cope with the adverse impacts of the phenomenon. The chapter illustrated the use of coping mechanisms as not sufficient enough for farmers to cope. The collected data from the field shows that mitigation measures are needed to reduce the impacts of drought in the communities.

7.3 Research objectives

This section reflects on the extent to which the research objectives have been realised as indicated in Chapter 1

7.3.1 Objective 1: To explore the existing principles, practices and guidelines to mitigate the effects of drought in South Africa

The following research questions were asked in Chapter 1:

- What are the existing principles, practices and theoretical approaches to mitigate the effect of drought?
- What are the causes of droughts and what implications do they have for the livelihoods of community members of Setlagole village?

This research objective was successfully achieved in the literature review analysis in chapter 2 and 3. The views from various authors were considered as a response to the research objective. Chapter 2 outlined a theoretical overview of drought, including the classification of droughts, causes, vulnerability and impacts of droughts. The discussion illustrated that drought is usually caused by the El Niño phenomena, which is not a normal feature of climate in the context of South Africa. Drought has a severe impact that makes communities vulnerable. Additionally, the literature discussion analysed drought impacts in a more specific and general manner. The literature revealed that impacts of drought vary as per sector and household. Lastly, the review of literature also focused on drought coping mechanisms that are used when a household has resources and the capacity to mitigate the drought phenomena. These coping mechanisms include traditional coping strategies and modern coping strategies.

In chapter 3, the model of the Sustainable Livelihood Framework was presented. The guidelines and principles of the model were explored and discussed. The chapter described and explored the Sustainable Livelihood Framework (SLF) as an important tool that can be used to determine risk and that enables the community to create new resilient strategies and provide feedback to assess the expected outcomes. SLF was useful because it was found to be an integral tool that is future-oriented that places the community's needs before everything. The data taken from the community was measured by using SLF to determine whether the new livelihood strategies are achieved and offers the community a better future. However, the usage of measuring empirical findings using the SLF model was partially achieved.

7.3.2 Objective 2: To determine the existing policy and legislative framework for drought management in South Africa

The following research question was posed in Chapter 1 of the study:

- What are the existing policy and legislative frameworks for drought relief management in South Africa?

This objective was achieved in Chapter 4. The Chapter explored the existing policies, acts and legislative framework of drought management in the South African context. A legislative framework entails acts, policies and plans that are used by different departments, disaster management units and the community as a whole to minimise/reduce the risk of drought in the society. The analysis of the legislation was to review the act as they are the guiding tool that assists all the role players that are involved in minimising the risk of drought. However, most sections of the legislation are difficult for the officials to implement and it becomes difficult for the government be accountable for the actions that should have been taken. This, in turn, also makes it difficult for the community to cope with drought phenomenon.

7.3.3 Objective 3: Conduct empirical findings to explore the cause and implications of droughts on livelihoods of the community members of Setlagole village

The following research question was posed in Chapter 1 of the study

- What are the causes of droughts and what implications does this have for the livelihoods of community members of Setlagole village?

This objective was achieved through conducting empirical findings. Focus groups interviews and semi-structured interviews were conducted during data collection data from the field. The data collected from the field was compared to SLF (***see*** Chapter 3) literature review (***see*** Chapter 2) to formulate scientific recommendations. The finding's summary was outlined in the section below.

7.3.4 Objective 4: To determine the preparedness and relief mechanisms used in the Ngaka Modiri-Molema District to mitigate the effects of drought n the area

The following research question was posed in Chapter 1 of the study

- What preparedness and relief mechanisms are being utilised in the Ratlou Municipality to mitigate the effect of droughts in this area?

In chapter 6, the empirical findings were presented according to the identified themes. The objective was successfully achieved through data analysis in chapter 6. Some of the key issues in the analysis were that drought mitigation in South Africa only exists in governmental policy documents such as Drought Management Plans and Drought Management. Moreover, the lack of a disaster management plan in Setlagole makes it difficult to prepare for drought. Inadequate relationships between farmers and the government also makes it difficult for farmers and government to provide data that has a sense of shared vision and mission for drought alleviation. Recommendations are formulated in the sections below.

7.3.5 Objective 5: To suggest recommendations to mitigate the effect of drought in Setlagole village

The following research question was posed in Chapter 1 of the study

- What recommendations can be made to mitigate the effect of droughts in the Setlagole village in the Ratlou Municipality?

This chapter concludes by offering suggestions that can enable the community to manage drought risk. The objective was achieved through the mitigation measures that were suggested for consideration towards possible implementation by government and the community of Setlagole village based on the results of empirical findings.

7.5 Summary of findings

The following section is a summary of the findings:

- Drought is a major hazard in Setlagole village and has adverse impacts on the community and on sustainable livelihoods. The feature of the hazard has been outlined by the community during the data collection. This was supported by organised agriculture that the impacts of drought have severe impacts to the community. Therefore, drought events make community livelihoods susceptible to other risks related to drought.

- Water shortage is severe in the area, which exacerbates the devastating effects of drought in Setlagole village. This increases the vulnerability context of the community and as a result makes the community's ability to reduce risk difficult since they do not have sufficient access to water and proper rural water infrastructure.

- The community in the village does not trust the government to assist them with the consequences and impact of drought on their livelihoods. There were several issues with which the government did not assist the community, instead they made empty promises. In other instances, government did not provide the community with enough fodder for relief purposes, which the community was dependent for a reduction of drought impacts. This caused the community to loose trust in the government.

- The effects of drought in Setlagole results in a decline in agricultural productions in the area. During drought episodes, livestock mortalities increase significantly and low crop yields prevail for a long period. However, since agricultural production is the main employer in the study area, as a

result of drought most farmers lose agricultural production and lay off some of their employees. This makes it difficult for farmers to earn income and provide for their families.

- The government is not aware of the hazards that the community of Setlagole is exposed to. The study area lacks hazard and vulnerability assessment to identify the hazards in the area. This in turn makes it difficult for the government to plan mitigation measures for the community.

- Inadequate relationship between farmers and the government also makes it difficult for farmers and government to work together. The communication channel between the community and the government is not fully functioning. The community seems not to be well informed about the necessary operations of the government regarding drought. The government do not have full social access to the community. This becomes a problem during emergency situations such as dealing with drought impacts effectively.

- The level of relief and response provided by the government are not sufficient and the communities need attention from the government to reduce these impacts, rather than to calculate the results of the episodes without any funding provision. The government conducts assessments in order to make funding provision for the community. However, that funding might not be sufficient for all the farmers. As a result some farmers do not necessarily receive assistance from the government.

- The government process of drought relief is not ideal and it takes too long before the farmers get assistance. The process can take up to two years after the drought episodes. This drought relief process might be available to farmers when they have already lost their agricultural production.

- The government does not have enough funding provision for drought related issues. Funding provision for drought is made available when the affected municipality/province requests it. However, in previous episodes of drought, the government was unable to provide all the farmers with enough fodder.

This made some farmers request assistance from government while other farmers were losing their livestock and crops.

- The government (district) does not have a disaster management plan that can be used to identify the issues relating to droughts. Some government officials dp not see drought as a hazard, although the community has indicated drought as the most prominent hazard in the area. This is because the district municipality does not have a disaster management plan or scientific risk assessment for the area.

- There is a lack of disaster risk reduction practices. The community does not necessarily make use of disaster risk reduction strategies for drought episodes. This can be ascribed to the lack of a disaster management plan and knowledge because disaster risk reduction practices can be recommended when there is an existing plan for the area.

- There is a lack of knowledge regarding droughts from both the government and the community. The causes of drought are known by certain officials and community members. However, the community does not have the necessary knowledge regarding drought and coping mechanisms. The government cannot classify the difference between drought phenomena. This in turn makes it difficult for government to provide what is necessary to reduce the risk of drought and safeguard the livelihood of the community.

- Mitigation measures are not functioning as a result of lack of maintenance and new installation of boreholes in the area. Since the study area is susceptible to water shortage, some mitigation measures that are suggested by the government are not viable. The community needs full access to water to sustain their livelihoods and to follow proposed measures by the government.

- The community does not have necessary skills to help themselves during drought episodes, they rather depend on the government for assistance. The community does not take ownership when coping with drought. The responsibility for drought phenomenon is not only lies with the government,

but the community also has to take the necessary steps to reduce the impacts of drought. This increases dependency syndrome, while the community loses livestock and crops.

- Social media can be used as fast way to reach out for assistance from other farmers in neighbouring provinces. Farmers use other platforms, such as Facebook and Twitter, to get assistance from other farmers. This practice helps farmers to reduce the impact of drought on their farms.
- Farmers do not follow the advice given by the government. This comes as a result of farmers who have lost trust in the government. Farmers do not think the government is being supportive throughout the process. However, this in turn increases farmers' susceptibility to drought losses.

7.6 Recommendations

The aim of this study was to ensure that mitigation measures are suggested for consideration towards possible implementation by government and the community of Setlagole village. Based on the results of empirical findings, the following are the recommendations for the proposed study:

Recommendation 1:

Government should increase funding provision for drought episodes to sustain the agriculture production in South Africa. During the previous drought episodes, funding was not sufficient for all the farmers and this caused some farmers not to depend on the government (***see*** chapter 6, section 6.6 and 6.4).

Recommendation 2:

Government should conduct a Community Based Disaster Risk Assessment in communities most at risk of drought impacts. The assessment will give the community an opportunity to know which risks they are exposed to, and they will assist the government in reducing the impact of those risks.

A disaster risk management plan should be developed for the Dr Ngaka Modiri Molema District Municipality, and all its local municipalities. The establishment of a disaster management plan may assist the government in the planning process of mitigation measures that can be employed before drought episodes prevail in the specific area (***see*** Chapter 6, section 6.3).

Recommendation 3:

Government should make water accessible in Setlagole village through maintenance of boreholes and installation of new boreholes to access deeper underground water to be used by farmers during a period of drought. The government must establish control management systems for borehole use by the farmers.

Government should also ensure the maintenance of windmills in the area and build more dams in the province to capture more precipitation water that can be used during drought periods.

Policies should be drafted to save water to encourage farmers to conserve water resources. The current water management system is problematic and dysfunctional in Setlagole community. This in turn makes drought prevalence very high (***see*** Chapter 6, Section 6.3).

Recommendation 4:

Capacity building should be prioritised both in the community and the government in terms of drought as a risk factor in the community to give them necessary skills. Research should be done on how to increase breeding of livestock in drought periods as well as fertilizers that can increase water holding potential of soil.

Government should also educate farmers; especially emerging farmers on what types of bushes should be planted to support their cattle during droughts period (***see*** Chapter 6, section 6.7).

Recommendation 5:

Emerging farmers should organise themselves to access cattle feed from other provinces in times of drought. The study showed that farmers in organised agriculture managed cope better since they have access to a network of farmers in neighbouring provinces. However, this requires having membership in organised agriculture and making use of social media platforms (***see*** Chapter 6, section 6.6).

Recommendation 6:

The government should advise farmers to keep the minimum number of livestock when heading into drought periods. Farmers who do not necessarily have control over their number of livestock sustain losses as a result of a large number of livestock (***see*** Chapter 6, section 6.6).

Recommendation 7:

The government should develop structures within the community and engage with them on a quarterly basis. The roles and responsibilities of the government may not be known to the community, as is evident from the study. However, there are certain similarities. This suggestion may strengthen the relationship between the community and the government. This government structures may assist the community to know what to expect from the government and the procedures that have to be followed by the government to provide services to the community (***see*** Chapter 6, section 6.6).

Recommendation 8:

The government should advise farmers to invest in drought resistance crops that can assist them as feed during drought episodes. The study shows that low crop yield prevail during drought episodes. This can be as a result to the type of crops that are planted by the farmers. This crop might not necessarily survive during drought episodes (***see*** Chapter 6, section 6.4).

Recommendation 10:

Existing legislation and contingency arrangements do not adequately allow the Dr Ngaka Modiri-Molema district to deal effectively with the drought disaster. The government should develop drought assistance schemes. These schemes are proposed by the Agricultural Department and include the following:

Scheme 1: Payment of cash to the farmer, which entails:

- A scheme that is straight forward that calculates the number of livestock per unit, based on the information from the assessment form, and funds are paid to the beneficiary.

Scheme 2: Using Agricultural Companies

- A credit facility per farmer at his nearest agricultural company is credited through the system or in the debit card that will be administered by the companies. The farmer will then be able to buy animal feed at the company.

Scheme 3: Using service providers:

- The scheme will supply fodder and transportation to beneficiaries based on predetermined volumes (***see*** Chapter 6, section 6.9).

Recommendation 11:

The government should have fencing and camps that farmers can use. The study showed that farmers usually over-graze. This in turn becomes a problem when drought prevails, because there is not sufficient grass for livestock to feed on. Grazing camps and fencing will provide control management systems that can be employed by farmers before the event occurs. This will allow farmers to have their own space for grazing, which means they will no longer have to fight over grass with other farmers (***see*** Chapter 6, section 6.7).

Recommendation 13:

The government should increase their carrying capacity for transporting fodder to farmers. The government should develop fodder banks that can be used to store fodder to be used when an episode of drought prevails. According to the study, the provision of fodder from the government is not sufficient for all the farmers. This in turn might assist the government to prepare for drought phenomenon as they will have transport and feed to give farmers during drought episodes (***see*** Chapter 6, section 6.7).

7.7 Conclusion

The chapter outlined the summary of the entire study and summarised the findings from other chapters. Based on the findings, different conclusions were suggested and several recommendations were made. There were several prominent issues that hamper the current and future mitigation strategies. Failure to address these may allow future drought episodes to have significant or increased impact on the community. One main issue that may hamper mitigation measures is the lack of a disaster management plan for the district that is found in the study. This is an issue for the government as they will not be able to prioritise drought and water scarcity as hazards in the area of Setlagole. However, the government can either conduct a community-based disaster risk assessment (CBDRA) or develop a disaster management plan that can inform them of necessary services in the community.

The second most prominent issue that has been found in the study is funding provision for drought relief. The funding model that is currently in use does not assist the farmer in time. The process seems to be taking too long before farmers can be assisted and this, in turn, increases the impact of drought on the community. For mitigation measures to be effective, funding provision has to be effective and efficient. This will assist the government not to depend on the assessments that are conducted after a number of months. In order for government to be prepared and assist farmers timeously, a better funding method is necessary.

The third most prominent issue is the influence of traditional councils on the whole system. These traditional leaders do not want the farmers to introduce farming skills they do not know, and this in turn increases the effects as farmers are not permitted

to use the land without consultation. In addition, traditional council values and traditions actually seem to increase the impact of the drought since these traditional structures are also a transforming structure (as noted in chapter 3) in a society as the decision by the tribal council directly affects the livelihood of many farmers. Thus, it is clear that transforming structures can increase impacts of droughts in the community. Furthermore, these structures can increase vulnerability and risks in the community, especially when there are no plans for such hazards.

This study attempted to contribute in the knowledge regarding drought mitigation in the North West Province and gave necessary recommendations to be employed. This dissertation was completed in the hope that the findings and suggestions will permeate into the decision-making processes of both the governments and the farmers.

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ANNEXURES

Annexure A

Letter of consent

NORTH-WEST UNIVERSITY
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NOORDWES-UNIVERSITEIT
POTCHEFSTROOM CAMPUS

ACDS
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09th September 2014

Dear Sir/Madam,

To whom it may concern

You are invited to participate in the research described below. Your participation is completely voluntary and anonymous.

This consent form is for those willing to participate in the research on "**Mitigation of recurrent droughts: The case of Setlagole village**"

Title of the Study: Mitigation of recurrent droughts: The case of Setlagole Village, North West Province

Researcher: Lesego Bradley Shoroma MA. Student Management and Development Studies, Student number: 18016758 (bradley.shoroma@nwu.ac.za)

Supervisor: Mr. Christo Coetzee, Senior Researcher, African Centre for Disaster Studies, Faculty of Arts, Social Transformation (Tel: 018 299 1006)

Co-Supervisor: Prof. Dewald Van Niekerk, Director, African Centre for Disaster Studies, Faculty of Arts, Social Transformation (018 299 1620)

Focus of the Study: The research focuses on the mitigation of the effect of recurrent droughts on the community of Setlagole village.

Purpose of the Research: The research purpose is to review previous experiences of droughts and to recommend new mitigation measures that can be employed in the North West Province.

Procedure: Your participation will consists of answering interview questions about the past experiences with recurrent droughts in and around Setlagole village.

Voluntary Participation

Your participation in this is entirely voluntary. You are free to choose if you want to participate or not. If you decide to participate you are at all times free to end your participation at any given time.

Anonymity

The information collected from the study will be archived after use and will be used anonymously.

Thank You

Kind regards and best wishes

[Bradley L. Shoroma]
[Senior Research Officer]: African Centre for Disaster Studies
North-West University
South Africa

Annexure B:

Guidelines for Focus Group Interviews

1. What does drought mean to you?
2. Do you view drought as a challenge in terms of your livelihoods in this district?
3. How many drought episodes have occurred in this district in the previous decade?
4. How did those drought episodes impact on the community (commercial and emerging farmers)?
5. What strategies are mostly used by most food insecure households?
6. What mitigation strategies do you commonly use in this community during periods of drought?
7. During droughts, which stakeholders do you have the most contact with? (Probe for programmes conducted by these stakeholders)
8. What are your roles and responsibilities during a drought episode?
9. What community support structures currently exist to assist households to cope with drought?
    - Can you tell us about these and how well they work?
10. When looking at the emerging farmers, in what ways do community leaders and communities in this area currently support and include a person who practices subsistence farming?
    - Please give examples where possible.
11. What are the other agencies that are actively involved in drought mitigation in this district?
12. Can you describe their key programmes in the communities?
    - What is the impact of these programmes, if any?
13. What are the major challenges that these agencies have to overcome?
14. What do you think can be done better by this community and other stakeholders to mitigate the impact of drought?
15. What are the financial implications of these recurrent droughts?
16. What financial resolutions does the Unit for Disaster Management assist the farmers with?

Annexure C:

Key Informant Guidelines

1. Do you see drought as a challenge for livelihoods in this district?
2. How many of the past five years in this district have been drought years? Which one was the most severe?
3. How do you support the emerging farming households to improve their farming practices during drought episodes?
4. During drought, which household member/s do you have the most contact with? (Probe for the head of household, male/female, age, etc)
5. Which mitigation strategy is usually employed by farmers (commercial or emerging) during periods of drought?
6. Which mitigation strategies are used more by the emerging farming households?
7. What community support structures currently exist to assist both commercial and emerging farmers to cope with drought? Can you tell us about these and how well they work?
8. When looking at the emerging farming households, in what ways do community leaders and communities in this area currently support and include people from the most food insecure households? Please give examples where possible.
9. What other agencies are actively involved in drought mitigation in the district?
10. Can you describe their key programmes in the communities and their impact if any?
11. What are the major challenges that these agencies face?
12. What do you think can be done better by these communities and other stakeholders to mitigate the impact of drought?

Annexure D

1. Do you see drought as a challenge to your livelihoods?
2. How many of the past five years in this district have been drought years? Which one was the most severe?
3. Do you get enough support to improve your farming practices during drought episodes?
4. Which member of your household has had the most experience regarding drought? (Probe for the head of household, male/female, age, etc)
5. Which mitigation strategies are usually employed by the household during periods of drought?
6. Can you indicate which mitigation strategy is best suited for the phenomena of drought in your household? Why?
7. What community support structures currently exist to assist both commercial and emerging farmers to cope with drought? Can you tell us about these and how well they work?
8. When looking at the emerging farming households, in what ways do community leaders and communities in this area currently support and include people from the most food insecure households? Please give examples where possible.
9. What other agencies are actively involved in drought mitigation in the district?
10. Can you describe their key programmes in the communities and their impact if any?
11. What are the major challenges faced by these agencies?
12. What do you think can be done better by these communities and other stakeholders to mitigate the impact of drought?
13. Do you receive any financial support after a drought episode? If yes, what do you use it for?