Towards the development of an integrated governance mechanisms for recurrent drought in the North West Province, Republic of South Africa

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DECLARATION

I Lefa William Mothupi, hereby declare that: **'Towards the Development of an integrated governance mechanism for recurrent drought in the North-West Province'** is my work. I am fully aware of the university's code of ethics and stance regarding plagiarism. This study is an original and not a copy of someone's existing work. I am fully aware of the implication if found producing someone's property in this dissertation as outlined by the university rules

All work quoted in this dissertation, which contributed to the finalisation of the study, is acknowledged accordingly by citation and in the bibliography section.

I solemnly declare that this full dissertation is my work derived from the hard work conducted by myself and no one has ever produced a similar study to acquire the degree in this institution or somewhere else.

Signature

28 February 2020

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'*Do not fear, for I have redeemed you; I have called you by name, you are mine. When you pass through the waters, I will be with you; and through the rivers, they shall not overwhelm you; when you walk through fire you shall not be burned and the flame shall not consume you*'. – Amen Isaiah **43:1-3.**

These are wonderful words from the Almighty which kept me going to pursue my dream of being in the Masters class. Words which encouraged me to not only go out there to add numbers but to believe in myself and bring home my award.

Firstly, I would like to give my sincere thanks to my mother, who supported me through life. I was raised and nurtured by a brave woman, my mother Martha Mosele Thapedi Mothupi. She used to say there is something about me but she is not sure what that was. Well, mother, I have got the answer: you gave birth to a leader who does not mind to lead from behind, willing to be led and groomed by experts in the field.

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I acknowledge the contributions made by all participants during data collection: READ, DWS, SASSA, Social Development, ARC, AFASA, AGRI-NW, DAFF, Red Cross, PDMC, Mahikeng Local Municipality, Ratlou Local Municipality, Ngaka Modiri Moleme District Municipality and farmers. You are all part of the system and in the words of Professor Dewald van Niekerk: 'If the system runs smoothly for quite some time without any disturbance, you must get worried'. Well done, hopefully, your contribution will finally disturb the system.

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ABSTRACT

This study probed methods that might be applicable in developing an integrated governance mechanism for recurrent drought experienced in the North-West Province. Globally drought is considered a temporal and unusual behaviour of the climate that recurs in high- and low rainfall areas and cannot be prevented. In South Africa, North-West Province has proved itself to be a two-dimensional area in the manner that some regions a considered to receive normal rainfall while others are regarded as semi-desert. In many instances, such areas are affected by recurrent drought phenomenon. In essence, responding to confronting drought conditions in a particular area must be advanced by understanding its impact on humankind, farmers, sectors and the economy of the country. These require adequate governance mechanism. Numerous researchers have investigated how livelihood is affected by the drought phenomenon in the North-West Province but little attention has been devoted to integrated governance mechanism for drought.

Equally so, extant research papers determine challenges around drought and recommended mechanisms with the purpose of solving such problems. A substantial body of information has been provided in research regarding the physical appearance of drought and its impacts on social, economic and environmental space. Yet, uncertainty remains on the subject of drought principles and perspectives. Some are unable to delineate between drought and water scarcity challenges in the province, making it difficult to know what exactly is confronting the community. This is a result that not much has been invested to provide information on societal problems experienced due to drought.

Extant research has focused on the impact of drought and the response from the government to mitigate or resolve such challenges, neglecting the investigation around how ineffective governance of drought contributed to its recurrent features. North-West province was declared drought area twice within five years (that is 2013 – 2016). Even though funds were sourced from national treasury for these two declarations, the problems have persisted. Some areas such as the western parts of the province have a history of receiving below normal rainfall and are classified as semi-arid. Thus raising questions on whether responding to drought issues in such areas is addressing current challenges or those which accumulated over some time. Hence, an integrated governance mechanism is required to address responses relating to societal problems as a result of recurrent drought in the North-West Province.

Keywords

Coordination, climate change, hazard, disaster, drought, water, response, management, governance, integrated, communication, develop and mechanism

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ACRONYMS

AFASA	Agricultural Farmers Association of South Africa
ARC	Agriculture Research Council
ARSDRR	Africa Regional Strategy for Disaster Risk Reduction
AU	African Union
AWG	Africa Working Group
CBO	Community Based Organizations
CSO	Civil Society Organizations
DAFF	Department of Agriculture, Forestry and Fisheries
DARD	Department of Agriculture and Rural Development
DEA	Department of Environmental Affairs
DMA	Disaster Management Act
DoF	Department of Finance
DRDLR	Department of Rural Development and Land Reform
DRR	Disaster Risk Reduction
DRRSMDM	Dr Ruth Segomotsi Mompati District Municipality
DWS	Department of Water and Sanitation
FAO	Food and Agriculture Organisation
FEED	Finance, Economy and Enterprise Development
FSIN	Food Security Information Network
HFA	Hyogo Framework of Action
IDNDR	International Decade for Natural Disaster Reduction

IFAS	Institute of Food and Agriculture Science
ISDR	International Strategy for Disaster Reduction
MDG	Millennium Development Goals
NDMC	National Disaster Management Centre
NDMF	National Disaster Management Framework
NDP	National Development Plan
NEPAD	New Partnership for Africa's Development
NGO	Non-Governmental Organisation
NMMDM	Ngaka Modiri Moleme District Municipality
NWP	North-West Province
PDJC	Provincial Drought Joint Committee
PDMC	Provincial Disaster Management Centre
PFMA	Public Finance Management Act
PoA	Programme of Action
READ	Rural, Environmental and Agricultural Development
REC	Regional Economic Communities
SASSA	South African Social Security Agency
SADC	Southern African Development Countries
SANSA	South African National Space Agency
SAWS	South African Weather Services
SDG	Sustainable Development Goals
SFDRR	Sendai Framework for Disaster Risk Reduction
UNISDR	United Nation International Strategy for Disaster Reduction

WCDR	World Conference for Disaster Reduction
WEF	World Economic Forum
WMO	World Meteorological Organisation
WWF	World Wildlife Fund

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CHAPTER 1: INTRODUCTION AND BACKGROUND

The African continent is prone to a wide variety of natural and human-induced hazards which has a ripple effect leading to disasters. Evidence clearly shows that Africa faces climate extremes such as heatwaves, floods, high winds and widespread droughts (Mulugeta *et al.*, 2006:2). Considering this, FAO (2004:11) pronounce that countries within Southern Africa, in particular, are susceptible to climate variability which leads to major disasters including drought and that the region is being threatened by increased desertification processes, loss of biological diversity and the degradation of land and water resources. In support of this, Phakula (2016:1) indicates that climate has a severe impact on human and the natural environment throughout the Southern African region.

The ISDR (2007:1) views drought as one of the natural hazards that pose major threats to people's livelihoods and socio-economic development. This is attributed to the fact that drought is a creeping and slow-onset phenomenon in nature; thus, when it does occur, it generally affects a wider area in a few seasons or years at a time (ISDR, 2007:1). Taking that into consideration, UN (2007b:3) is of view that the resultant effects of drought are exacerbated by human activities like deforestation, overgrazing and poor cropping methods, which reduce water retention of the soil and improper soil conservation techniques, leading to soil degradation. In estimation, Masih *et al*. (2014:1) calculated that between 1900-2013, in about 642 drought episodes which were recorded around the world,12 million deaths were reported with over two billion people affected. Sharing the same sentiments, the Department of Agriculture, Forestry and Fisheries (DAFF) in South Africa reported that drought and other climate-related hazards affect 795 million lives around the world, amongst which includes live lost as a result of poverty and hunger daily (DAFF, 2006). As a consequence, justifying drought as amongst hazards which has a ripple effect on livelihood and environment.

These statistics and the concomitant impacts and personal hardships resulting from drought underscore the vulnerability of all societies to this natural hazard (Wilhite & Vanyarkho, 2000). As such, drought produces a complex web of impacts that not only ripples through many sectors of the economy but maybe experienced well outside the affected region, extending even to the global scale (Wilhite & Vanyarkho, 2000). The literature classifies the impacts of drought into economic, environmental and social impacts (Wilhite, 1992). Coping strategies for responding to and preparing for drought are numerous and range from the individual- or household- to the national level. Moreover, the types of actions taken will vary considerably between developed and developing countries and from one region to another (Wilhite & Vanyarkho, 2000).

Additionally, it is also worth noting that drought as a global problem can be addressed mainly through a strong interdisciplinary effort of the scientific community, policymakers and the cooperation of international organisations (Wilhite & Vanyarkho, 2000). A key in this process is the establishment of networks amongst all stakeholders to foster coordination. These networks are anticipated to significantly enhance the opportunities for technical cooperation among nations and between levels of government (Wilhite & Vanyarkho, 2000). Thus, it is against this background that the current study centralize attention on governance of drought in the North-West Province of South Africa.

The subsequent section discusses the demarcation of the study area

1.1 Demarcation of the study area

The North-West is an inland South African province that borders Botswana and four other provinces, namely Limpopo in the north-east, Gauteng in the east, Free State in the south-east and Northern Cape in the south-west (Survey, 2016:1). The province occupies a total area of 104882 km^2, covering 8.7% of the total area of the Republic of South Africa (Bareki, 2017:590). It is divided into four district municipalities, namely Ngaka Modiri Molema, Dr Ruth Segomotsi Mompati, Bojanala and Dr Kenneth Kaunda (see Figure 1-1). Although the province is known as the platinum province due to its underground metal wealth (Survey, 2016:1), agriculture serves as the main source of income (Botlhoko & Oladele, 2013:202). This study focused pertinently on Ngaka Modiri Molema and Dr Ruth Segomotsi Mompati districts.

Ngaka Modiri Molema district municipality (NMMD) is situated at the centre of the province and comprises of five local municipalities, namely Mahikeng, Ratlou, Ramotshere Moiloa, Ditsobotla and Tswaing. Mahikeng is a capital city of the North-West Province under the authority of the Mahikeng local municipality (Lolwana, 2017:2). The main economic activity in the Ngaka Modiri Molema district of the Northwest Province is agriculture, mostly around producing crops and farming cattle (Balarane & Oladele, 2012:578). Annual rainfall averages about 360mm with almost all of it falling during the summer months between October and April (Balarane & Oladele, 2012:578).

Dr Ruth Segomotsi Mompati district is situated at the western region of the North-West Province and is divided into five local municipalities, namely Naledi, Greater Taung, Kagisano-Molopo, Mamusa and Lekwa-Teemane (Mhula-Links *et al.*, 2013:12). Livelihood activities in the region mostly centre on communal and commercial cattle farming (Van Riet & van Niekerk, 2012:1). As such, the district is considered the largest beef cattle producing district in the country referred to

by its community as 'the Texas of South Africa (Mhula---Links *et al.*, 2013:13). The district also enjoys agricultural activities where farmers produce maize and peanuts for national and export markets (Mhula---Links *et al.*, 2013:12).

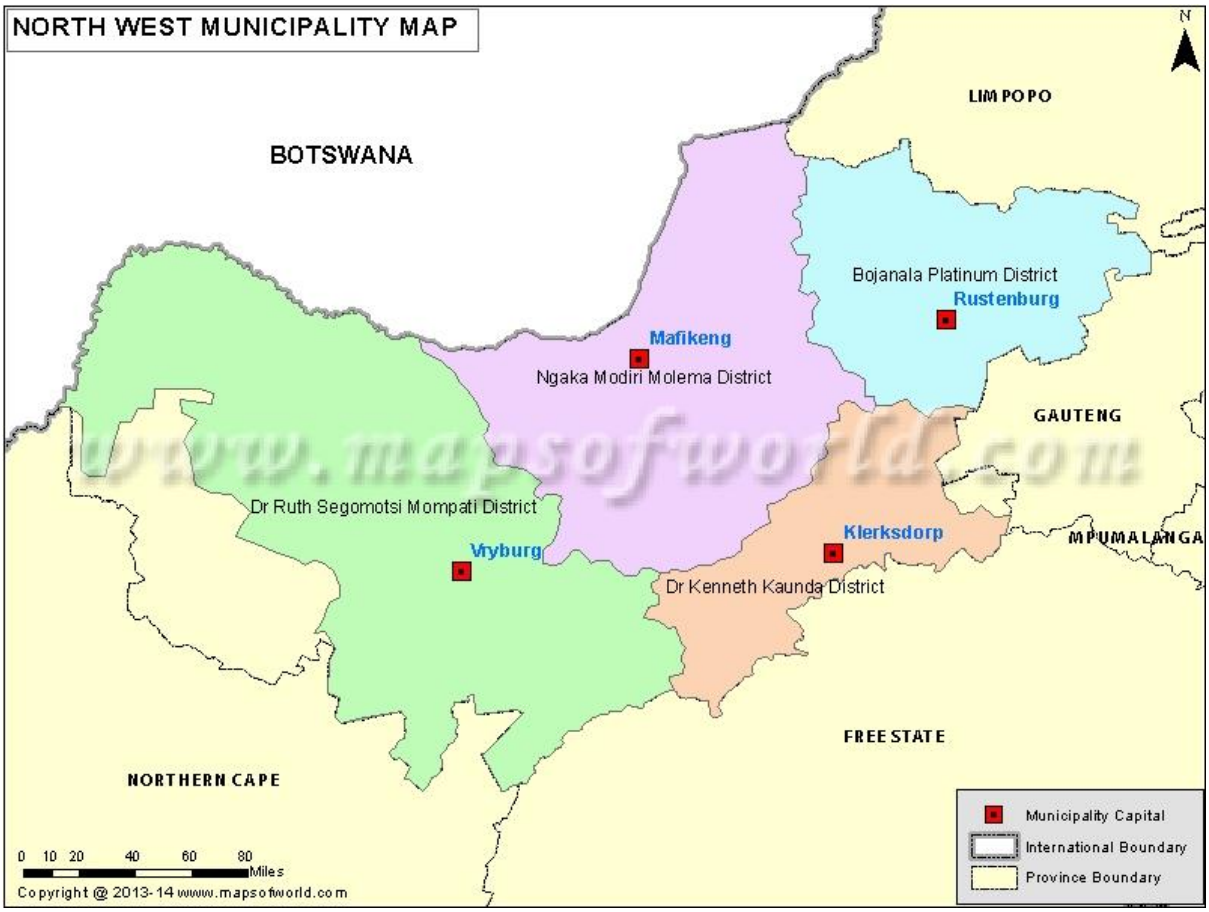


Figure 1-1: Map of North-West Province showing the four districts (*Courtesy of Mapofworld.com*)

The subsequent section demarcates the problem to be examined in the present study.

1.2 Problem Statement

The North-West Province is regarded as an area vulnerable to drought to the extent where the government is unable to meet an enormous demand of water for various activities such as agriculture, household usage and natural resource management (Rural Environmental and Agricultural Department) (READ, 2015:11). This situation prompted the Provincial Disaster Management Centre (PDMC) to submit a drought disaster declaration request to provide a relief to the affected community. For example, a drought disaster declaration was made on the 1 July 2013 after all four districts were heavily affected by water shortage (PDMC, 2013:1). Equivalently,

on 11th May 2016, North-West province evoked section 41(1) of the Disaster Management Act (Act 57/2002) again and declare drought disaster (North-West Provincial Gazette, 2016). Drawing from the two declarations, it is evident that drought is a recurrent phenomenon in the province, thus requiring the involvement of multiple stakeholders to address. As such, coordination becomes central in ensuring effective governance mechanism for drought.

Bharosa *et al.* (2010:50) affirm that the need for coordination in disaster management is undisputed, since lack of coordination results in some possible failures. Bharosa *et al.* (2010) further postulate that poor coordination and information sharing during inter-agency disaster responses has a negative influence on collective decision-making and actions. Sharing the same sentiment, Freeman and Rossi (2012:1134) argue that coordination is one of the central challenges of modern governance. Correctly so, because many areas of regulation and administration are characterized by fragmented and overlapping mandates (Freeman & Rossi, 2012). Coordination is defined by Malone and Crowston (1990) as 'managing dependencies between entities' and the need for coordination arises from constraints imposed on the performance of tasks by the interdependent nature of these tasks.

In a complex incident/ disaster such as drought, coordination is paramount because it allows different agencies to develop uniform targeted solutions based on a better understanding of the full scope of the hazard, resulting in more effective and efficient responses (State Service Commission, 2008:8). According to Verhoest *et al.* (2013:11), deviation from set targets and failure of the established committee to introduce new and innovative interventions to address such issues may weaken the involvement of social partners and stakeholders. Additionally, Wilhite (2004:4) indicates that lack of progress in drought management is as a result of confusion in scientific and policy development regarding drought characteristics.

Participation during coordination by the public sector (government agencies and political offices) as well as the private sector (NGOs, interest groups, farmers associations and companies) ensures diversity and proper utilisation of resources within a disaster environment (Warner *et al.,* 2002:13). However, Campbell and Hartnett (2005:5) ascertain that coordination among different stakeholders gives rise to challenges where each agency considers itself as a sovereign entity. Despite this, the Hyogo Framework of Action (2005:39) still maintains that effective actions during disasters are made possible by multi-stakeholders' response mechanisms supported by legislation and accompanied by the availability of the necessary resources. Thus, a partnership will not progress and achieve its objectives unless all parties can reach an agreement on how their underlying interest will be met and who will take responsibility for what actions (ODI, 2003:23).

Whereas drought has become a permanent feature of the South African agricultural sector (Ngaka, 2012), response by national, provincial and local government has been ineffective and poorly coordinated. This is so despite the National Disaster Management Act, (Act 57 of 2002) providing 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. Specifically, section 40(1) provides that the executive of a Provincial Disaster Management Centre is primarily responsible for the coordination and management of provincial disasters. Equally so, section 44(1) (b)provides for the Municipal Disaster Management Centre (district and local) to promote an integrated and coordinated approach to disaster management in their municipal area.

In light of the above, the main purpose of this study is to evaluate how poor coordination or lack of coordination affected drought response in the North-West Province of South Africa during the period 2013 – 2016 focusing on Ngaka Modiri Molema District and Dr Ruth Segomotsi Mompati District as case studies. The motive for this study was drawn from Chen *et al.* (2008) who argue that coordination in the area of disaster response, particularly drought response, has thus far received relatively little scientific attention despite its obvious significance. The study will further investigate how existing policies around drought impact on the participation of stakeholders in coordination networks. Furthermore, this study aims to recommend mechanisms which will ensure integrated and coordinated responses to recurrent drought incidents within the North-West Province. The problem under investigation will further be addressed by answering the following research questions.

1.3 Research questions

Given the problem under investigation as highlighted in the preceding section, the proposed research questions read as follows:

- What are the principles and theoretical perspectives on drought as a hazard and as a disaster?
- What are the principles and guidelines as regards to coordination and inter-departmental approaches during a disaster?
- What are the existing policies and legislative frameworks for drought management in South Africa?
- How did coordination or lack of coordination affect response to 2013 – 2016 drought in the Ngaka Modiri Molema and Dr Ruth Segomotsi Mompati district?

What are the recommendations and conclusions related to an integrated approach to addressing drought disaster?

1.4 Research objectives

- To explore the existing literature on the principles and theoretical perspectives on drought as a disaster and as a hazard.
- To explore the principles and guidelines of coordination and an inter-departmental approach.
- To determine the existing policies and legislative frameworks for drought management in South Africa.
- To understand the extent to which coordination or lack of coordination affected 2013 – 2016 drought response in the Ngaka Modiri Molema and Dr Ruth Segomotsi Mompati districts.
- To provide recommendations and conclusions on integrated and coordinated approaches to drought disasters.

1.5 Central theoretical statement

- Drought is a slow-onset natural hazard that allows different stakeholders to implement disaster risk reduction measures or mitigation strategies as highlighted in the Hyogo Framework for Action (HFA, 2005).
- Government and the public need to plan properly to implement effective mitigation and preparedness measures to reduce drought impacts. They have to understand its evolution, complexity, social implications and people's vulnerability (ISDR, 2009:8).
- Effective and efficient integrated mechanism in responding to disasters or incidents related to drought will ensure that measures are put in place to deal with the recurrence of such events in future (see Wilhite, 2000:14).

1.6 Research Methodology

Rajasekar *et al.* (2013) define research methodology as a systematic way which solves a problem to provide a work plan for particular research. Adding on that, Mouton (2001 69) is of the view that primary information in research is the researcher's data, whether you have collected it yourself or whether it already exists in one form or another, usually available in textual information (qualitative data) and numeric information (quantitative data). As such, this study employed a mixed-method research design. In mixed-method research, qualitative and quantitative approaches are used concurrently or sequentially in a single or multiple studies (Hesse-Biber, 2016). Furthermore, the complexity of research problems calls for answers beyond simple numbers in a quantitative sense of words in a qualitative sense (Creswell *et al.*, 2011:21). Thus, it is assumed a combination of both forms of data provided the most complete analysis of a problem because qualitative research design alone was deemed insufficient.

Sections below set out the research method applied in the study to address the research objectives.

- **Research procedure**

The research method discussed in this study consists of a literature review and an empirical study.

1.6.1 Literature review

Bhaskaran and Menezes (2014:1) describe a literature review as the process of gathering available literature to search specific information and identify gaps in the gathered information. The main reason for the literature review was to enable the researcher to find out what is already known from the existing body of knowledge on a subject to be investigated.

The literature study was collected using two data sets, namely primary and secondary data. Primary data was collected through existing reports, documents, meeting minutes and interviews (see Hox & Boeije, 2005). Such data was collected from a variety of participants who included government officials, NGOs, farming communities and farmers associations.

Secondary data was collected by another person for a specific purpose that might be different from primary data (Vandenbos, 2007:729). This means secondary data was collected from past research papers, journals, newspapers, publishers, and the internet.

These data collection methods played an important role in ensuring that research questions were answered in academic and scientific format.

1.6.2 Empirical study

The next section presents the research design, sampling methods and strategies applied, data-collection methods, data-analysis method used and issues of validity and triangulation of the study.

1.6.2.1 Research design

This study applied mixed-method research and specifically, exploratory sequential mixed methods design. This method provided an opportunity to use the quantitative and qualitative research design at the same time that enabled the research to answer the research questions under this study thoroughly (Teddlie *et al*., 2009:7). The advantage of using mix methods research design to investigate a certain domain of social reality can be compared with the examination of a physical object from two different viewpoints or angles (Bergman, 2008)

1.6.2.2 Sampling

In the process of sampling, a limited number of subjects or cases were selected for participating in the research (Vanden Bos, 2007:811). The process of selecting a sampling design for quantitative and qualitative studies required two distinct yet interrelated decisions: decide on the strategy to select the participants (that is, sampling scheme) and decide on the number of participants (that is, sample size), (Tashakkori & Teddlie, 2010:354). Hence sampling techniques used involved the selection of units or cases for a research study using snowball and purposive sampling strategies (Teddlie *et al*., 2009:171).

Table 1-1: Shows sampling methods used

Sampling technique	Targeted group	Target size
SNOWBALL & PURPOSIVE SAMPLING	Department of Water and Sanitation: North-West provincial government	1
	Disaster Management Centre: North-West provincial government	5
	Disaster Management Centre: Ngaka Modiri Moleme District Municipality	1
	Disaster Management Centre: Mahikeng Local Municipality	1
	Social Development: North-West Province	1
	SASSA: North-West Province	1
	Department of Agriculture: North-West provincial government	1
	Department of Agriculture, Forestry and Fisheries: North-West Province	1
	Red Cross: North-West Province	1
	Agriculture Research Council	1
	AFASA: North-West Province	1
	Agri-North-West Province	1
	South African Weather Services: North-West Province	2

	Department Community Services: Ratlou Local Municipality	1
	Communal Farmer: Ratlou Local Municipality	1
	Commercial Farmer: Tswaing Local Municipality	1
	Communal Farmer: Tswaing Local Municipality	1
	Communal Farmer: Mamusa Local Municipality	1
	Small Holder Farmer: Mamusa Local Municipality	3
	Farm Workers: Kgetleng Local Municipality	2
TOTAL SAMPLE SIZE		28

The research sample in Table 1.1 points to a variety of participants who were identified to assist the study in reaching its objectives. As indicated in the table, participants were purposively and snowballed sampled. The sample also outlines the dominance of government participant over others, pointing to the importance of government in the governance of drought. The next section shows how data was collected

1.6.2.3 Data collection

Qualitative and quantitative data was collected. Semi-structured interviews were chosen to collect qualitative data. Whereas, a self-administered questionnaire was used as a tool to obtain and gather data and evidence relating to recurrent drought in the North-West Province. The process to collect data involved consultation with farmers, farmers unions and senior managers from government and private sector.

1.6.2.3.1 Semi-structured interviews

De Vos *et al.* (2011:342) refer to interviews as a social relationship designed to exchange information between the participants and the researcher. As such, the process of interviewing people assists with diverse and competing views, especially when the problem is complex. Semi-structured interviews were used as a method of data collection in this study. During these interviews, participants were asked open-ended questions that guided the process of the interviews and allowed everyone to express themselves by opening up.

1.6.2.3.2 Questionnaires

A structured questionnaire prepared in English was developed and used to collect data enabling the interviewer to interact with the stakeholders and targeted participants. A maximum of 25 questionnaires were developed and presented to the participants within the province to respond to questions regarding their understanding of governance of drought in the North-West Province.

1.6.3 Data analysis

The study used a mixed-method data analysis approach to interpret and present the data that was collected from semi-structured interviews and questionnaires. Vanden Bos, (2007:257) define data analysis as the process of applying the graphical, statistical, or quantitative technique to a set of data (observations or measurements) to summarize it or to find the general pattern. However, Onwuegbuzie and Combs (2011) describe data analysis in mixed method research as consisting of analysing the qualitative data using qualitative method and the quantitative data using quantitative methods. The collected data through semi-structured interviews and questionnaires were used in analyses to formulate facts as regards the integrated governance mechanism for the recurrence drought in the North-West Province. This was followed by the development of themes and subthemes. The process of analysing data involved several steps, which are: organizing data, coding data, organising themes, representing data and overall forming an interpretation (Creswell, 2013:179).

Therefore, the study used findings on qualitative analysis and compare with quantitative findings.

1.7 Validity

The goal of examining research validity especially around the mixed-method approach was to make justified qualitative, quantitative and integrated claims (Johnson, 2014:57). Hence, the study employed different methods (interviews, questionnaires and literature study) to gather and analyse data to ensure reliability and validity of the study.

1.8 Ethical consideration

Fouka and Mantzorou (2011:4) indicate that research ethics involve the protection of participant's dignity and the publication of information in the research. According to Arifini (2018:30), the concern of ethical issues becomes salient when conducting face to face interview with a vulnerable group of participants. They may potentially become stressed while expressing their feelings during the interview session. The following codes of ethics were considered:

1.8.1 Respect for anonymity and confidentiality

De Vos *et al.* (2011) stated that every individual has the right to privacy and it is his or her right to decide when, where, to whom and to what extent his or her attitudes, beliefs and behaviour will be revealed. As a result, before the commencement of the interview process participants were provided with signed forms that validate anonymity.

1.8.2 Informed consent

According to de Vos *et al.* (2011), informed consent ensures the full knowledge and cooperation of subjects, while also resolving, or at least relieving, any possible tension, aggression, resistance or insecurity in the subject. Considerations was taken especially in the areas where permission was required from the respective area of responsibility.

1.8.3 Cooperation with contributors

De Vos *et al.* (2011) identify contributors as normally the colleague and students that participate in the research process, whether it is as equal partners who will also be named as authors or people who only contributed, for instance, towards entry into the field or data gathering and who will only be acknowledged in the publication. The research contributed in developing a mechanism that will be of utmost importance to be utilised by government, NGOs, farming community and organised labour and therefore all role players were viewed as contributors of the end product.

1.9 Limitation of the study

According to Simon & Goes (2013:1), limitations are matters and occurrences that arise in a study and are outside the researcher’s control. Adding on that, this limits the extent to which a study can go and sometimes affect the end and conclusions that can be drawn. When accessing the participants' area of work or responsibility, the researcher needed permission from the highest authority. Whereas, other limitations related to the participants unwilling to provide information with the fear of exposing their field of work. The study also required finance for travelling especially to remote areas such as the town of Delareyville in the Ratlou Local Municipality for face to face interviews.

1.10 Significance of the study

This study will assist North-West province and affected district municipalities such as Ngaka Modiri Molema and Dr Ruth Segomotsi Mompati to develop an integrated governance mechanism for drought. The study also outlines the importance of various stakeholders in responding to drought especially considering their scope of work.

1.11 Provisional chapter layout

Provisional chapter layout of this study is as follows:

Chapter 1:

- **Overview of the study**

This chapter is the guiding tool to our study. It provides orientation regarding what the study plan to investigate. The chapter include the problem statement on actually why this investigation need to be carried out. The chapter provide the question to the study and objectives that relate to provided questions. Furthermore, the chapter provide the methodology that will be applied to reach research objectives. The chapter gives also the background of the area where the study will be conducted, including an overview in relation to the problem.

Chapter 2:

- **Theoretical perspectives on drought as hazard and disaster**

This chapter will focus on giving theoretical orientation of drought, its impact and role player's existing response mechanism. It indicates a need for multi-disciplinary response in approaching drought incidents. The chapter will also introduce the principles and guidelines of drought coordination

Chapter 3:

- **Disaster risk management: policies, strategies and frameworks: international perspectives**

This chapter is to provide DRR strategies and frameworks established at the international and regional levels that are aimed at reducing the risk of disasters

Chapter 4:

- **Drought disaster management in South Africa: legislation, planning and coordination**

This chapter in the study will consider and build on number of existing policy frameworks and legislation developed to deal with the response to disasters, especially emphasising the need for an integrated approach by different stakeholders.

Chapter 5

- **Empirical findings of the study**

This chapter of the study offers the empirical findings also, based on qualitative and quantitative research design (mixed–method). It includes analysing of theories, interviews, and questionnaires.

Chapter 6:

- **Recommendations and conclusions on integrated response mechanism to drought**

Based on the findings of the study, this chapter will provide solutions to our problem. This chapter will assist the North-West province and the affected municipalities to develop it integrated response mechanism to drought. It will also provide recommendation as regards stakeholder participation in the forums established to mitigate the impact of this phenomenon.

CHAPTER 2: THEORETICAL PERSPECTIVES: DROUGHT AS A HAZARD AND DISASTER

2.1 INTRODUCTION

In providing an overview of the study, the previous chapter systematically provided circumstances which are confronting several stakeholders in response to drought phenomenon. The literature in chapter one specify that, notwithstanding the internationally acknowledged piece of legislation (Disaster Management Act 57 of 2002), responding to drought has always been reactive (Baudoin *et al.*, 2017:131). The chapter also observed recurrent drought disasters in South Africa in particular within the North-West Province. Therefore, the discussions in the preceding chapter regulated the blueprint which guided the investigation throughout the study.

Appropriately, the current chapter comprehensively presents theoretical perspective of drought as a hazard and disaster. According to Gray (2004:16), engaging in theoretical perspectives, sometimes occur before undertaking the research (deductive approach) and sometimes after the research (inductive). Nevertheless, the composite structure and elements in this chapter provides sufficient information in understanding the concept of drought. The first section makes provision for an understanding of drought concept around the world. Hence drought presented itself as a phenomenon which occurs over most of the world, including in areas which has wet and humid conditions (Dai, 2011). Central in this chapter is the second section which is a synthesised debate regarding the conceptualization of drought as a hazard or disaster. Whereas section three discusses the effect of climate change on drought. This section also look into how does aridity concerning a specific region relate to drought episodes.

In section four, the literature point to different classes of drought. These illustrated four types of drought with a diagram to highlight how they interlink with each other. Section five briefly identifies and discusses drought vulnerability. The angle of this section outline the importance of determining what exactly is vulnerable to drought and to measure on how vulnerable they are. This section attest to the importance of bringing into line issues of food security, agriculture and water when discussing vulnerability to drought. Section six expands on the impact of drought which were thoroughly discussed in the previous section. This section identifies and measures the impact of drought on livelihood, emphasising economic-, environmental- and social aspects. Lastly, section seven concentrate on the paradigm shift as regards to drought management. In this section, more emphasis is put on drought planning preparedness, prevention, mitigation and response. Thus, showing the significance of knowledge on past drought for current responses to establish gaps and progress made.

Considerably, this chapter essentially reviewed drought theoretical perspectives and probed on how they complement or influence each other to alleviate confusion as regard to its complexity. Hence, Nemakonde (2016:20) raised a point that there is a variety and variations of theoretical perspectives that engender a complex and confusing picture and is difficult to comprehend and produce an overview.

2.2 DEFINITION OF DROUGHT

Drought is a deficiency of precipitation over an extended period usually a season or more (Folger & Cody, 2015:3). This definition is regarded as the simplest amongst multiple terminology used for drought. Several scholars are of the view that drought differs from other natural hazards in that there is no universal definition (Hayes *et al.,* 2004; Wilhite *et al.,* 2007:764; Mishra & Singh, 2010a:104). Besides, Wilhite *et al.* (2007), postulate that drought has multiple definitions because it must be defined according to the characteristics of each climatic regime and the specific impact sector or application to which the definition is being applied. These views were supported by Hayes *et al.* (2004) that drought needs to be defined specifically by region and activity. However, Mishra and Singh (2010b) believe that differences in hydro-meteorological variables and socioeconomic factors, as well as the speculative nature of water demands in different regions around the world, have become an obstacle to having a precise definition of drought.

Equivalently, multiple drought definitions make it difficult for scientists and policymakers to develop a clear strategy for drought planning (Thurow & Taylor, 1999:413; Wilhite, 2000:5). For instance, Wilhite & Glantz, (1985) have identified more than 150 drought definitions. On that account, Wilhite, (2000:4) allude to the fact that lack of a precise universally accepted definition adds to the confusion about the existence of drought and its degree of severity. Furthermore, the lack of clearly agreed definitions makes it difficult to implement preparedness measures, to apply timely mitigation measures when a drought occurs or to adequately evaluate drought impacts (Hamdy, 2004). Hence, drought planning relates to its identification, measurement, preparedness, mitigation and responding to its impact including who should bear the associated cost (Folger & Cody, 2015:3). Consequently, as Quiring (2009:1217) indicates, a uniform method for defining and monitoring drought conditions and quantifying the severity of drought does not exist.

As a result, the World Meteorological Organisation (WMO) (2006:8) distinguished two major groups used to classify drought definitions, namely conceptual definitions and operational definitions.

2.2.1 Conceptual definitions of drought

Monacelli (2005:8) label conceptual definitions as those who facilitate understanding of drought concept and are most significant in the establishment of drought policies. Such definitions are formulated to determine the boundaries of drought concept (Wilhite & Glantz, 1985:4). According to Wilhite (2000a:8), conceptual definitions are considered as the dictionary type. These are some of the conceptual definitions of drought:

- Drought is viewed as a long period when there is little or no rain (Hornby, 2010).
- Drought is a protracted period of deficient precipitation resulting in extensive damage to crops, further resulting in loss of yield (Monacelli, 2005:8).
- Drought is a natural and recurrent feature of climate that originates from a deficiency of precipitation over an extended time (Bordi *et al*., 2009:1521).
- Drought is a normal part of the climate that affects all countries; its impacts are felt mostly in those countries located in arid and semi-arid areas (Hosseini *et al*., 2009:195).
- Drought is considered an insidious, slow-onset natural hazard that produces a complex web of impacts that ripple through many sectors of the economy (Wilhite *et al*., 2007:764; Mishra & Singh, 2010a:104).

Drawing from the above definitions, Wilhite (2000a:8) is of opinion that they are useful for further descriptions of drought phenomenon, and cannot be used to detect its onset because are not specific.

2.2.2 Operational drought definitions

Dogondaji and Muhammed (2014:52) view operational definitions of drought as those that often help to determine the onset, severity, spatial distribution and cessation of drought condition. However, a study of the Institute of Food and Agricultural Science (IFAS., 1998:1) is of opinion that no single operational definition of drought works in all circumstances. In the same vein, Wilhite & Glantz, (1985:4) regard such definitions as those which requires data on hourly, daily, monthly or seasonal moisture deficiency or yield departure from normal to identify the occurrence of drought. Equally so, Awass (2009:23) consider that operational definitions of drought typically require quantification of ‘normal’ or ‘expected’ conditions within specified regions and variations in societal conditions. Adding on that, Monacelli (2005:8) indicates that operational definitions usually are made by comparing the current situation to the historical average, often based on 30 years of record (according to World Meteorological Organization recommendations).

Drawing from the above discussions, Hisdal and Tallaksen (2000:1), allude to the fact that operational definitions are important since they play a vital role as the first step in drought analysis.

Therefore, Monacelli *et al.* (2005:8) outline operational definitions of drought as follows:

- Meteorological drought is defined based on the degree of dryness and the duration of the dry period.

- Agricultural drought links various characteristics of meteorological (or hydrological) drought to agricultural impacts, focusing on precipitation shortages, differences between actual and potential evapotranspiration, soil water deficits, reduced groundwater or reservoir levels.

- Hydrological drought is associated with the effects of periods of precipitation shortfalls on surface or subsurface water supply (that is, streamflow, reservoir and lake levels and groundwater).

- Socio-economic drought occurs when physical water shortage starts to affect people, individually and collectively or, in more abstract terms, most socio-economic definitions of drought are associated with the supply and demand of an economic good.

All four of these categories of drought will be discussed in (section 2.5) in this chapter.

The next section synthesises debates in the literature about drought as a hazard and a disaster. This is prompted by debates between several authors: scientists, engineers, professionals and decision-makers, who often do not agree on whether to regard drought as a hazard or a disaster (Hamdy, 2004:13).

2.3 CONCEPTUALIZATION OF DROUGHT AS A HAZARD AND A DISASTER

The literature in the preceding sections distinguished drought as different from other natural hazards in a variety of ways. For instance, Eriyagama *et al.* (2009:1) are of the view that, despite significant drought research, studies that deal with the global picture of drought, patterns and its impacts are limited. Over and above, Traore (2016:8), presume that understanding the different concepts of drought would help in the planning and development of models that seek to understand drought concept and patterns. This includes the differentiation of drought as a hazard or disaster (see Figure 2.1)

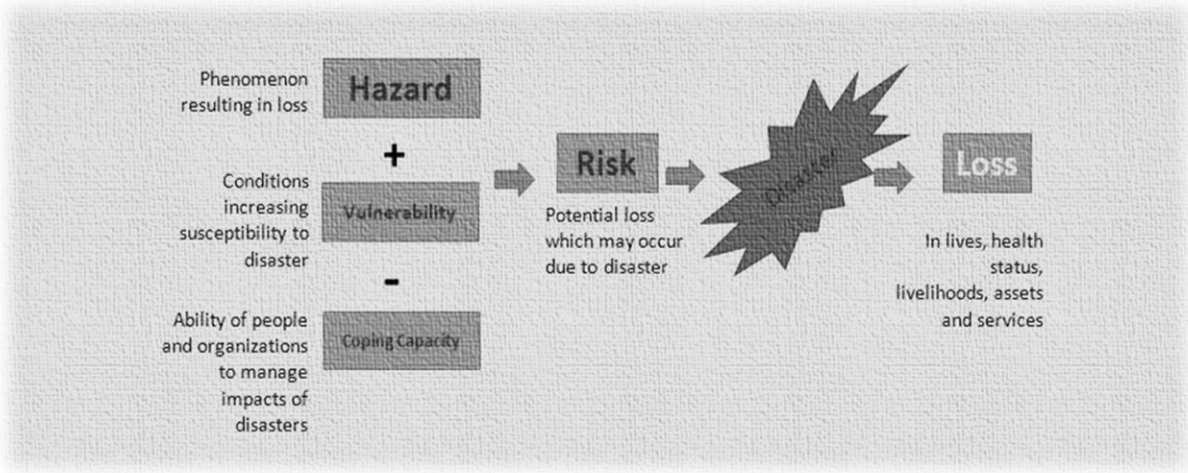


Figure 2-1: Hazards versus Disaster. Source: Asian Disaster Preparedness Centre (ADPC)

Mulugeta *et al.* (2006:3) define a hazard as any event, phenomenon or human activity that may cause loss. Whereas, Benson and Twigg (2004:8) describe a disaster as the occurrence of an abnormal hazard that impacts on vulnerable communities or geographical areas, causing substantial damage, disruption and possible casualties and leaving the affected communities unable to function normally, requiring outside assistance. By its very nature, drought can be classified as a hazard and a disaster (Pereira *et al.,* 2002:6*).* Bearing in mind that drought is less predictable for initiation and termination as well as severity (Pereira *et al.*, 2002:6). As a hazard, drought is a natural incident of unpredictable occurrence (Hamdy, 2004:14). Whilst, as a disaster drought, corresponds to the failure of the precipitation regime, disrupting water supply to the natural and agricultural ecosystems as well as to human and social activities. (Hamdy, 2004:14)

2.3.1 Drought as a hazard

Edossa *et al.* (2014:3) and Solh and Van Ginkel (2014:63) regards drought as a climatic event that cannot be prevented, but interventions can be made to (a) be better prepared to cope with drought; (b) develop resilient ecosystems to recover from drought, and (c) mitigate the impacts of droughts. However, Zamani *et al.* (2006:3) observe drought as a hazard for events that may have disastrous outcomes in the long term such as famine while drought would not be classified as disastrous because its occurrence is not abrupt and not concentrated in time and space. The main argument is that the underlying causes of disasters such as famine are primarily rooted in social and political-economic relations and processes but not in extreme weather events such as droughts (Hassen, 2008:2). Furthermore, Wilhite *et al.* (2005:11) estimate that for drought to occur requires a considerable time, about 2 to 3 months, though it can continue for months or years.

Hence, regarded as a 'slow-onset' hazard and a creeping phenomenon (Maybank *et al.*, 1995:195; Zamani *et al.*, 2006:4). Accordingly, once noticed, drought allows time to consider and address factors that exacerbate its impacts such as understanding people's vulnerabilities and identifying unsafe conditions (ISDR, 2007).

In the same argument, Wilhite and Buchanan-Smith (2005:4) postulate that drought by itself is not a disaster and for it to develop into a disaster will depend on its impact on local people and the environment. Subsequently, The Institute of Food and Agriculture Science, (IFAS, 1998:1) underlines that drought develops into disaster when farmers and community demand greater water supplies.

Some view the interplay of drought and other factors such as famine as the cause for turning drought into a disaster (Hassen, 2008:78). However, having a different view, Mulugeta *et al.* (2006:7) regard drought as the cause of famine, though drought and famine are not sudden natural hazards that result in disasters, but rather, the result of long term degradation of the environment due to poor land use and deforestation. Thus, Aysan (1993), as cited by (Curwen, 2012:32), suggests that drought becomes a disaster when it occurs in a vulnerable conditions.

2.3.2 Drought as a disaster

In pursuance of a disaster Sena (2006:1) points out that is engendered by certain communities or groups forced to settle in areas susceptible to the impact of hazards. According to Bonsal *et al.* (2011:322), while many other disasters have direct and immediate impacts, drought disasters are indirect and spread over long durations and large areas. As a result, drought is recognised as an environmental disasters that have attracted the attention of environmentalists, ecologists, hydrologists, meteorologists, geologists and agricultural scientists (Alam *et al., 2014:53 and* Traore, 2016:5). Similarly, drought is considered climatological disasters that continue to claim many victims, especially in Africa (Lukamba, 2010:478). Risk associated with drought remains a major hazard that might lead to disaster, causing huge damages to humanity, the environment and the economy (Masih *et al.*, 2014:3635). Swain and Swain (2011:48) consider the risk associated with drought episodes as the product of drought hazard and drought vulnerability relative to a variable that proxies coping capacity.

Shamano (2010:19) advocates that, for drought to become a disaster, an interaction of vulnerability and hazard must occur. This was supported by Wisner *et al.* (2003), that it is impossible to have a disaster if there is a hazard but no vulnerability or vice versa. According to Botha and Van Niekerk (2013:4) vulnerable people, are those susceptible to the effects of extreme hazards like drought due to physical, social, economic and political factors. Whereas Tadesse

(2016b:1) has a strong view that the social dimension of drought is the factor that turns drought into a disaster.

Drawing from the above discussion, naturally, drought can be regarded as a hazard rather than a disaster. This argument is based on characteristics of drought which allows it to develop slowly over time. Thus providing sufficient time to prepare for and put measures in place to prevent or mitigate its impact on society. In other words, drought is not sudden, meaning that the time it develops, there are resources and capacity available to prevent it from spreading leading to a disaster. Disasters are said to be rapid and sudden occurrences that exceed the ability of the affected area to address its impacts using available resources. Drought can only become a disaster when its effect is felt on socially and economically deprived regions. Therefore, drought can be prevented from becoming a disaster when the causes are identified and addressed at an early stage. Hence ISDR (2007:6) states that the effects of drought are a product of the physical nature of the hazard and the ability to manage risk. The next section presents the causes of drought.

2.4 CAUSES OF DROUGHT

Having conceptualised drought as a hazard and disaster pointing to complexity in planning and prepare for, what is key is effective drought risk reduction and establish factors heightening associated risk. Under the circumstances, such factors centres around the causes of drought.

Nourani *et al.* (2011:528), are under the impression that droughts remain a certainty and only their severity and frequency are unknown. Equally so, most droughts experienced in the past remained a subject of debate (Mulugeta *et al*., 2006:6). Nonetheless, Otkin *et al.* (2015:1073) are certain that the combination of low rainfall, high temperature and strong winds are frequent causes of severe drought that affect most of the communities. By its nature, the delays in the start of rainy seasons or timing of rains concerning principal crop growth stages (rain at the wrong time) are the possible cause of drought (Hamdy, 2004:9). This, according to Oxfam (2012b:6), was the case during the Sahel drought of 2011 that was associated with the total failure of the October–December 2010 rains and the poor performance of the March-May 2011 rains, resulting in crop failure and animal deaths.

Sharing the same view, Awass (2009:24) classifies the major causes of drought with the anomalies in the weather or climate that lead to less precipitation than normal for meeting water demands in agriculture, industry, households and hydropower generation. In this fashion, as a rainfall dependent phenomenon drought undergoes the influence of atmospheric teleconnections,

which are defined as the linkage between climate anomalies of two widely separated regions (Ujeneza, 2014:14)

2.4.1 The effect of El Niño Southern Oscillation (ENSO) on drought

Hosseini *et al.* (2009:190) associate drought with recent global warming effects and climate change which has become a major concern of humanity. According to Giannini (2010:95) and Mulugeta *et al.* (2006:7) the connection between drought and the warm phase of ENSO, is a dominant pattern of variability at global scale. The predominant sinking motion of air (subsidence) that results in compression warming or high pressure, which inhibits cloud formation, results in lower relative humidity and less precipitation causing drought (Folger & Cody, 2015:6). These, affect food security and nutrition, as well as health and water, sanitation and hygiene (O'Brien, 2016). Musetha, (2016:10) views agriculture as an economic activity that is highly dependent upon weather and climate to produce the food and fibre necessary to sustain human life. As such, these conditions are expected to make agriculture vulnerable to climate variability and change (Musetha, 2016:10). Such extreme weather conditions are higher than normal for a sustained period, drawing water off in the form of evaporation (Hosseini *et al*., 2009:190), additionally, Kilandis and Diaz (1989:1075) associated such weather with large departure of water from the soil in the form of precipitation. Such conditions in which the world experience further increase in temperature with a decrease in rainfall or the strengthening of ENSO events, enhance drought occurrence and intensity (Araujo, 2014:46)

However, during the 2011 severe drought in Texas, the cause was linked to La Niña conditions (cold phase of ENSO) in the Pacific Ocean (Folger *et al*., 2012:1). Thus, Folger *et al.* (2012:1) point to the fact that cooler than normal temperature can also be associated with drought.

Drawing from the above arguments, it is evident that drought is associated with both the warm phase (El Niño) and cold phase (La Niña) of ENSO

2.4.1.1 Relationship of ENSO and drought in South Africa

Baudoin *et al.* (2017:128) associate the severe drought experienced in South Africa in 2015-16 with an El Niño event. In the same view, the Department of Environmental Affairs (DEA, 2011:20) associated the recurrent drought that occurs in the arid west and northwest of South Africa to variable rainfall caused by the El Niño event. This is because South Africa has a generally dry climate, especially towards the northwest, (the focal point of the study), with an average annual rainfall of about 450 mm (compared to a world average of about 860 mm per annum) (DEA, 2011:20). However, Vogel (2000:108) thinks that, even though ENSO is associated with drought events in South Africa, not all drought events in the country can be explained by these

connections. Hence, drought events that relate to ENSO only account to approximately one-third of regional rainfall variability (Vogel, 2000:108).

Over and above, Mishra and Singh (2010:203) stipulate that the effects of climate change are now recognized as one of the major threats for the planet earth in the twenty-first century.

2.4.2 The influence of arid and semi-arid area on drought

Pereira *et al.*, (2002:6) suggest that in arid regions rainfall is low all the year-round and is particularly lacking during the dry season, which may last for several months. In accordance, Sivakumar *et al.* (2011b:15) are of the view that such regions which experience dry land are susceptible to recurrent drought years. Under the circumstances, semi-arid and arid areas are ordinarily vulnerable to the impacts of droughts, hence there is already a shortage of resources (Nyaga, 2016:1).

Such conditions result in an unstable or critical economic and human state of affairs, requiring national or international emergency support (Acosta-Michlik *et al.*, 2005:5).

2.5 CLASSIFICATION OF DROUGHT

Figure 2.2 below shows four classes of drought: meteorological, agricultural, hydrological and socio-economic, as categorized by Wilhite and Glantz (1985). As indicated in the figure, Shoroma (2014:14) believes that all droughts originate from a deficiency of precipitation or meteorological drought, whereas other types of drought cascade from this deficiency. Making a point, Alam *et al.* (2014:54) suggest that, the first three classes deal with ways to measure drought as a physical phenomenon whereas the last deals with drought in terms of supply and demand, tracking the effects of water shortfall as it ripples through socioeconomic systems. Subsequently, Sivakumar *et al*. (2011b:15) affirm that in most cases these types of droughts may coexist or may occur separately.

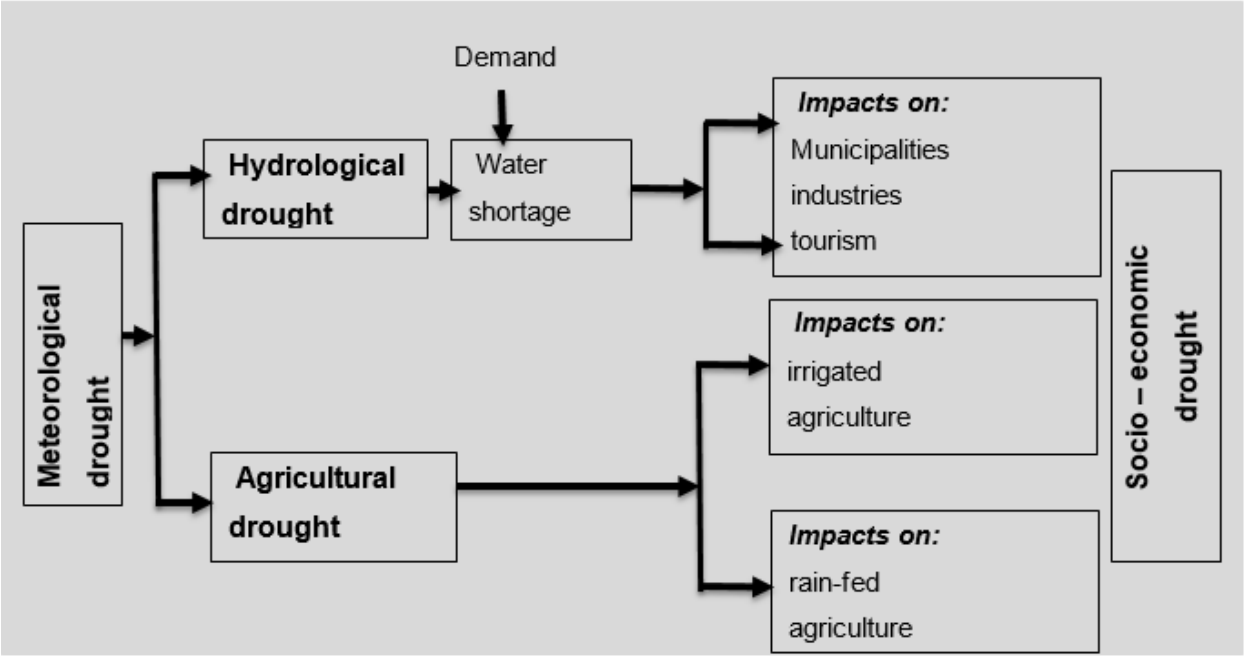


Figure 2-2: Development of drought (Wambua et al., 2014)

2.5.1 Meteorological drought

Conjointly, labelled as climatological drought. Alam *et al.* (2014:54) and Zamani (2006:3) stipulate that meteorological drought is defined based on precipitation's departure from the normal average over a certain period and region. This type of drought is characterised by hot weather and extremely sunny days (Shoroma, 2014:19), which according to Beaudoin (2002:233) will primarily have an impact on water supply. Meteorological factors are considered to play an important role in the initiation and development of drought (Hisdal & Tallaksen, 2000:3).

By way of explanation, meteorological drought persists for a long period and decreases the soil moisture including river flow, in most cases, it triggers the other types of droughts (Yuan *et al.*, 2016:1). Nevertheless, Nyaga (2016:6) views meteorological drought as the least severe form of drought when managed properly. Sharing the same sentiments, Alam *et al.* (2014:54) and Folger and Cody (2015:8), are of opinion that when defining meteorological drought, it must be region-specific since the atmospheric conditions that result in deficiencies of precipitation are highly variable from region to region.

Thus, below-average precipitation causes insufficient soil moisture, runoff and water supply that lead to agricultural and hydrological droughts (Madadgar, 2014:10).

2.5.2 Hydrological drought

Zamani *et al.* (2006:3) define hydrological drought as deficiencies in surface and subsurface water supplies due to shortfall in precipitation. Alam *et al.* (2014:54) indicate that hydrological drought is mainly concerned about how this deficiency affects components of the hydrological system such as soil stream-flow, moisture, groundwater and reservoir levels. However, in certain regions where water supplies mainly depend upon river diversions, when dealing with a regional drought it may be necessary to consider not only precipitation but also stream-flow (Hamdy, 2004:16). In non-agricultural sectors, drought impacts on areas such as tourism and recreation, public utilities/ municipalities, horticulture and landscaping services, navigation and other industries/ businesses that have significant water consumption (Ding *et al.*, 2011:438).

In the case of tourism and recreation sector, Charalambous *et al.* (2012:1) point to the fact that tourism is directly or indirectly dependent on water, whether it is winter tourism, agro-tourism, wildlife tourism or 'sun and sand' tourism. Additionally, in many parts of the world, tourism/ recreation is a critical economic sector and evidence is mounting linking economic losses in the tourism sector to drought, even though the connection is minimally studied or not systematically documented. Therefore, it is evident that drought can bring critical losses to tourism businesses, especially in drought-stricken areas (Ding *et al.*, 2011:438).

Concerning municipalities, Dey *et al*. (2011:95) report that drought affects the quality of water by contaminating existing water sources, mostly rivers and stagnant ponds. Where water shortage is experienced within these municipalities, Baudoin *et al.* (2017:128) indicate that water restrictions are implemented. These are done by restriction of certain water uses such as watering of domestic gardens or allocating users a certain volume of water per day and penalising those who exceed this allocation (Mukheibir, 2007:1271). There was the case during the drought of 2015/2016 in South Africa, where 26 municipalities and two metropolitan cities (Johannesburg and Cape Town) implemented water restriction (Baudoin *et al.*, 2017:128). Water restrictions strategy can be successful provided that, additional personnel and funding are available for an educational campaign to inform users of the new measures and make them aware of water-saving practices (Mukheibir, 2007:1271).

Hydrological drought exerts secondary impacts attributed to the interactions and transactions among industries and sectors (Ding *et al.*, 2011). Hence, Sivakumar *et al.* (2011b:15) think that as droughts extend from one season to another and from one year to another, potential impacts are magnified since surface and subsurface water supplies continue to be depleted and larger number of users are affected. Moreover, Garrido (2014:11) states that drought can also have a direct impact on water-dependent economic sectors such as hydroelectricity production and Agro-

industry. Meanwhile, reliable forecasts of the hydrologic extreme events play a significant role in developing appropriate policies to allocate the available water resources among different users (Madadgar, 2014:8). Otherwise, hydrological droughts and streamflow shortage would decrease the inflow to hydropower reservoirs causing small energy production and socioeconomic droughts (Madadgar, 2014:10)

2.5.3 Agricultural drought

Hisdal and Tallaksen (2000:3), Nyaga (2016:6), WMO (2006:8) and Zamani *et al.* (2006:1) define agricultural drought as the availability of soil water to support crop and forage growth in terms of the departure of normal precipitation over some specified period. This, according to Hamdy (2004:14) usually makes agricultural drought the first sector to experience the devastating effects of drought in most areas. As a result, Ding *et al.* (2011:440) view agricultural activities as highly sensitive to weather variability. For example, AGRI-SA, (2016:5) indicate that in South Africa during the extremely high temperature in 2015-16, the temperature affected agriculture (including irrigation areas), which resulted in lower yields. This is viewed by Garrido (2014:11) as the direct impact of drought on agriculture.

Drawing from the above diagram Figure 2.2, according to Madzwamuse (2010:6) reduced rainfall negatively impacts on large-scale agriculture, which relies on irrigation, small-scale farmers and poor rural households that practice rain-fed agriculture. This was indicated by the severe drought of 2016 where natural grazing was seriously depleted leading to death or forced slaughtering of livestock citing fodder unavailability (AGRI-SA, 2016:5). Apart from this, Madzwamuse (2010) is of opinion that this situation of shortages of water will continue to have devastating effects on the agricultural sector, which is by far the largest water user, accounting for 62% of the national water allocation.

2.5.4 Socio-economic drought

Socio-economic drought occurs when human activities are affected by reduced precipitation and related water availability (Shoroma, 2014:20; Tadesse, 2016a:14). Socio-economic drought correlates the supply and demand of goods and services with the three above-mentioned types of drought (Nyaga, 2016:7). Nyaga also indicate that precipitation causes drought and has an impact on surface water (lakes, dams, rivers and reservoirs). However, in this instance, the demand for water and the amount of supply determine water shortages to municipalities, industries and tourism.

In this case, when the supply is less than the demand, the government will have a challenge to render services to communities and for business use. Hence, Jenkins (2011:2) associates

drought with large indirect economic losses due to the dependence of many industrial sectors on water for production and the importance of water for providing services and recreation. Unlike the hydrological drought, when precipitation leads to agricultural drought, it affects food production.

Nyaga (2016:7) emphasises that when the supply of some goods or services such as water and electricity are weather dependent, then drought may cause shortages in the supply of these economic goods.

In conclusion, Sivakumar *et al*. (2011b:15) assume that the existence of different types of drought confuses scientists, policymakers and the public as to whether or not drought exists and its severity.

2.6 VULNERABILITY TO DROUGHT

Vulnerability to drought is dynamic and influenced by a multitude of factors, including increasing and regional shifts in population, urbanisation, technology, government policies, land use and other natural resource management practices, desertification processes, water use trends and increasing environmental awareness (Wilhite, 1992:2). These factors play an important role in measuring the overall impact of a drought on a given country and its ability to recover from the resulting human and material damage (Tadesse *et al.*, 2008:265). For instance, according to Tadesse, (2016a:2), the rapid population growth in Africa is an enormous concern for vulnerability reduction efforts.

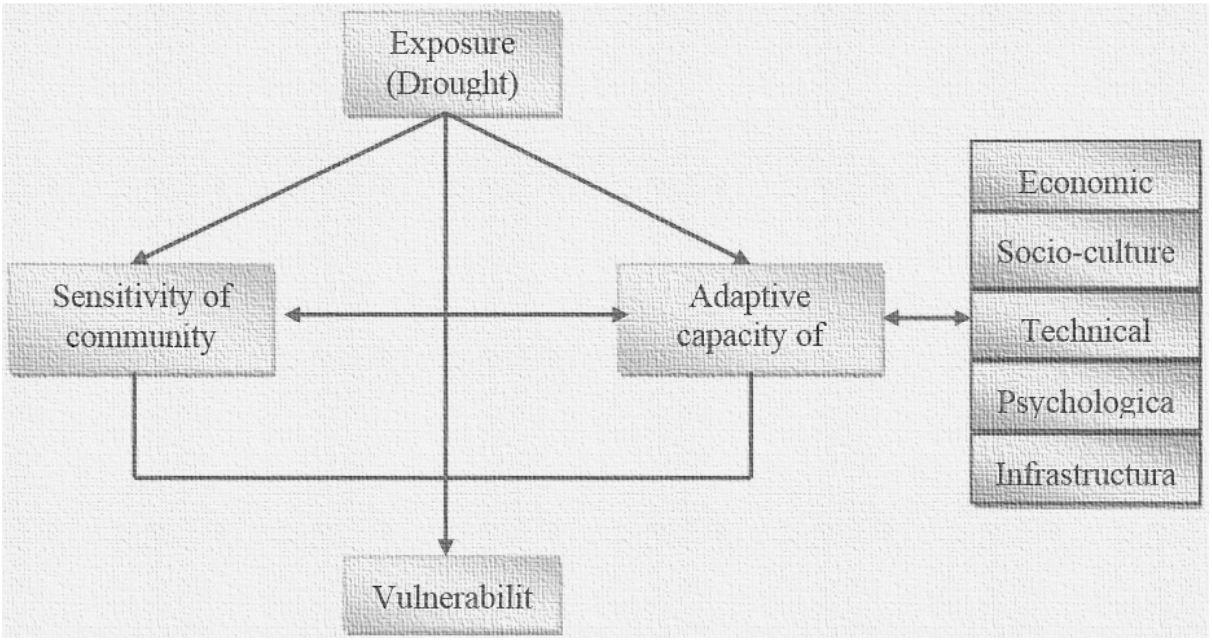


Figure 2-3: Conceptualizing vulnerability in the context of drought (Zarafshani *et al.*, 2016:6)

As demonstrated above in the Figure 2.3, vulnerability is a function of three major drivers, namely exposure, sensitivity and adaptive capacity.

According to Jenkins (2011:3), developing countries are considered especially vulnerable as they do not have the same financial, institutional, or infrastructural settings to adapt or protect themselves from drought risks. It is therefore very important to rigorously estimate the adaptive capacity of a country to help prepare responses during or post-drought recovery (Brown *et al.*, 2016:163). Also, Jenkins (2011:3) suggests that it is very important to assess the consequences of drought in more than just economic terms to get a true representation of the vulnerability of a region and the impacts.

In contrast, the National Disaster Management Guideline (NDMG, 2010:18), views drought vulnerability as a product of a region's risk of water shortage and the exposure of the communities to the problems arising thereafter. In particular, concerns of countries vulnerable to drought are centred largely on issues of food security and meeting the nutritional needs of the population, environmental degradation and a retardation of the development process (Wilhite & Svoboda, 2000:2). Equally so, Makoti, (2014:30) warns that food insecurity may expose vulnerable populations such as children, women, the elderly and people with disabilities to negative coping mechanisms. Besides, Vicente-Serrano *et al*. (2012:472) submit that, even though these measures are very necessary from a humanitarian point of view, they are of limited effect in the long term since they can only respond to specific catastrophes; they hardly contribute to reducing the vulnerability of the affected societies to drought. Thus Zamani *et al.*, (2006:13) suggest that drought interventions should first act to prevent resource loss at community level, in particular by raising community awareness and by developing community strategies.

2.6.1 Vulnerability of the South African Agricultural Sector to drought

Agriculture is the dominant form of land use globally involving major economic, social and cultural activities and providing a wide range of ecosystem services (Shiferaw *et al.*, 2014:67). However, because of its nature agriculture remains highly sensitive to climate variations. Madzwamuse (2010:6) is of the view that rising temperatures, reduced rainfall and water scarcity collectively impact on the agricultural systems in South Africa. Similarly, impacts of drought result in the reduction of land suitable for arable and pastoral agriculture, the reduction in the length of the growing season and a decrease in yields, particularly along the margins of semi-arid and arid areas (Madzwamuse, 2010:6). As such, addressing this issue of food and poverty, the government of South Africa places particular importance on subsistence agriculture (Baiphethi & Jacobs, 2009:474).

Altman (2009:355) suggests that poor households that engage in own food production are not necessarily food secure. They engage in these activities for recreational purpose or the indication of deep poverty and the implementation of survival strategies (Altman *et al.*, 2009:355). As a result, South African government has advanced a variety of food security policies, each assigning a different emphasis to the role that smallholder agriculture can play in addressing the problem of food insecurity (Kepe & Tessaro, 2012:4). Chapter 4 focuses on the policies for DRM in South Africa. Besides, Kepe and Tessaro (2012:4) argue that a review of the history of food security policy in South Africa reveals a clear lack of concern for land issues in areas where land reform is taking place or where land rights remain unclear. This attitude is concerning since food security has an impact on political violence and conflicts (Brinkman & Hendrix, 2010:2). For example, in isolated cases, this unrest had lasting political consequences, including the resignation of Haitian Prime Minister Jacques-Édouard Alexis and the 2009 coup against President Marc Ravalomanana of Madagascar (Brinkman & Hendrix, 2010).

2.6.2 Drought and food security challenges in South Africa

According to Rojas *et al.*, (2011:343) drought may lead to famine, malnutrition, epidemics and displacement of large populations from one area to another. Consequently, rising food prices and food insecurity constitute serious threats to human security (Brinkman & Hendrix, 2010:2). By their nature, food insecurity and low-income households are vulnerable to food price shocks because they spend a higher share of their incomes on food (Altman *et al.*, 2009:351). Thus, Baiphethi and Jacobs (2009:461) note that efficiency of marketing and distribution systems, household purchasing patterns, the ability to produce own food and access to public transfers (food subsidies or food aid) or private transfers (exchange with rural relatives) are some of the most important factors affecting the cost of food, especially for urban households.

The Food Security Information Network, FSIN (2017:15) estimated that, globally in 2016, 108 million people faced crisis level, food insecurity or worse. In most cases, countries at risk are those where poor farmers are unable to compete on the world market for reasons of quality, production volume or price, while the agricultural sector constitutes the major and often only export sector and hence few other employment opportunities exist (Fresco, 2009:383).

Makhura (1998:578) identifies three key food security challenges facing South Africa:

1. *Ensuring enough food is available at a macro level, now and in the future*. Constraints: macro-economic constraints, expanding demand, variable climate, inappropriate technology and inefficient farm production, weak farmer support system, past policies, trade restrictions.

2. *Matching incomes and prices to ensure access to food for everyone*. Constraints: chronic poverty, variable and declining real incomes, food price increases, limited employment opportunities, inefficient food distribution system.
3. *Enabling consumers to make food choices for optimal health and nutrition*. Constraints: inappropriate education and knowledge on food use and nutrition, lack of awareness of food safety issues, social restrictions, cultural norms.

Altman *et al.* (2009:345) and Baiphethi and Jacobs (2009:472) point out that, while South Africa may be food secure as a country, large numbers of households within the country are food insecure. This is because access to adequate food at a household level increasingly depends on how food markets and distribution systems function rather than only on total agro-food output (Altman *et al*., 2009:346). Adding on that, what prohibits accurate estimation of food security and food security trends in South Africa is the lack of comparative studies and time-series data sets (Hendriks, 2005:109). Subsequently, food security is multidimensional, making accurate measurement and policy targeting a challenge (Altman *et al.*, 2009:346). Besides, food insecurity is intensified by adverse weather conditions and droughts that impact negatively on farm level food production throughout the region (Van Rooyen, 1998:492).

Fresco (2009:383) urges that vulnerability of food systems is not limited to developing countries like South Africa, but it is most pervasive among the poor who have no resource buffers (land, savings or food stocks) or funds to escape food system failure. However, Moller (2016:17) states that varying degrees of vulnerability to drought conditions occur within the agricultural sector according to the size and nature of one's farming operation.

According to Ericksen *et al*. (2009:374), food systems can be described as comprising four sets of activities:

(i) producing food;
(ii) processing food;
(iii) packaging and distributing food; and
(iv) retailing and consuming food.

In the meantime, Makhura (1998:578) provides some pointers to the food security situation in South Africa:

- Approximately 14 million South Africans are vulnerable to food insecurity. Among these, women, children and the elderly are particularly vulnerable.

- One in four children under the age of 6 years (some 1.5 million) are stunted due to chronic malnutrition. Deficiencies in micronutrients such as vitamin A and iron are also widespread and have negative consequences for children's growth and development.
- Food insecurity and malnutrition are highest in provinces with large rural populations in the Northern and Eastern Cape Provinces.
- Food insecurity is highest among the African population but also affects many brown households.
- Urban and rural households adopt diverse livelihood strategies to maintain food security, including food production, local employment, migrant labour and reliance on social security benefits and local support systems.
- Many deficit producers in the rural areas of the former homelands are net consumers of food and are particularly vulnerable to food insecurity. Urban households exposed to low and unsustainable incomes are equally vulnerable.
- Rapid changes in macro-economic, trade and agricultural production policies to promote growth with equity may have a negative impact over the short to medium term on availability and access to food in certain regions and among particular groups.
- Inappropriate management of droughts and other disasters has exacerbated food insecurity.

The South African food security situation is closely correlated with and linked to the Southern African region.

2.7 IMPACTS OF DROUGHT

Although drought impacts exist in a variety of sectors, most impact studies are focused on the agricultural sector or sub-sectors (Ding *et al.,* 2011:440). Equally so, drought affects other activities that depend on water, with a devastating impact on a large proportion of households, private enterprises and public agencies, including far-reaching consequences throughout the economy (Benson & Clay, 1998:9). Thus, Hamdy, (2004:9) underscores that the impact of drought hits hardest when the demand is too high concerning water supply. In the same manner, the aftermath of drought events produces diverse and complex impacts especially since many sectors depend on water for producing goods and providing services (Wilhite *et al.,* 2007:764). Keshavarz *et al.* (2010:416) indicate that drought impact increases dramatically, although it is difficult to quantify the trends precisely because of the lack of reliable historical estimates.

However, Wilhite (2002:1) relates the impacts of drought with an indicator of unsustainable land and water management practices. If not monitored, these impacts may escalate well outside the affected region, extending to the global scale (Wilhite, 2000:4). A good example is the devastating

drought of 1991-1992 in Southern Africa, where the Southern African Development Community, SADC (1992), as cited by Wilhite (2000:3), estimates that it recorded approximately 20 million people who were affected and a deficit cereal supply of more than 6.7 tons.

Keshavarz *et al.* (2010:416) further indicate that the impacts of drought are diverse and can be classified as being environmental, economic and social. Similarly, Wilhite *et al. (*2007:765) classify such impacts as being direct (first-order) or indirect (second-order). To be specific, Rakib *et al.* (2015:2) affirm that droughts are directly or indirectly responsible for the reoccurrence of social crises like malnutrition, famine, conflicts. See Figure 2.4 below reflecting a summary of the impacts of drought:

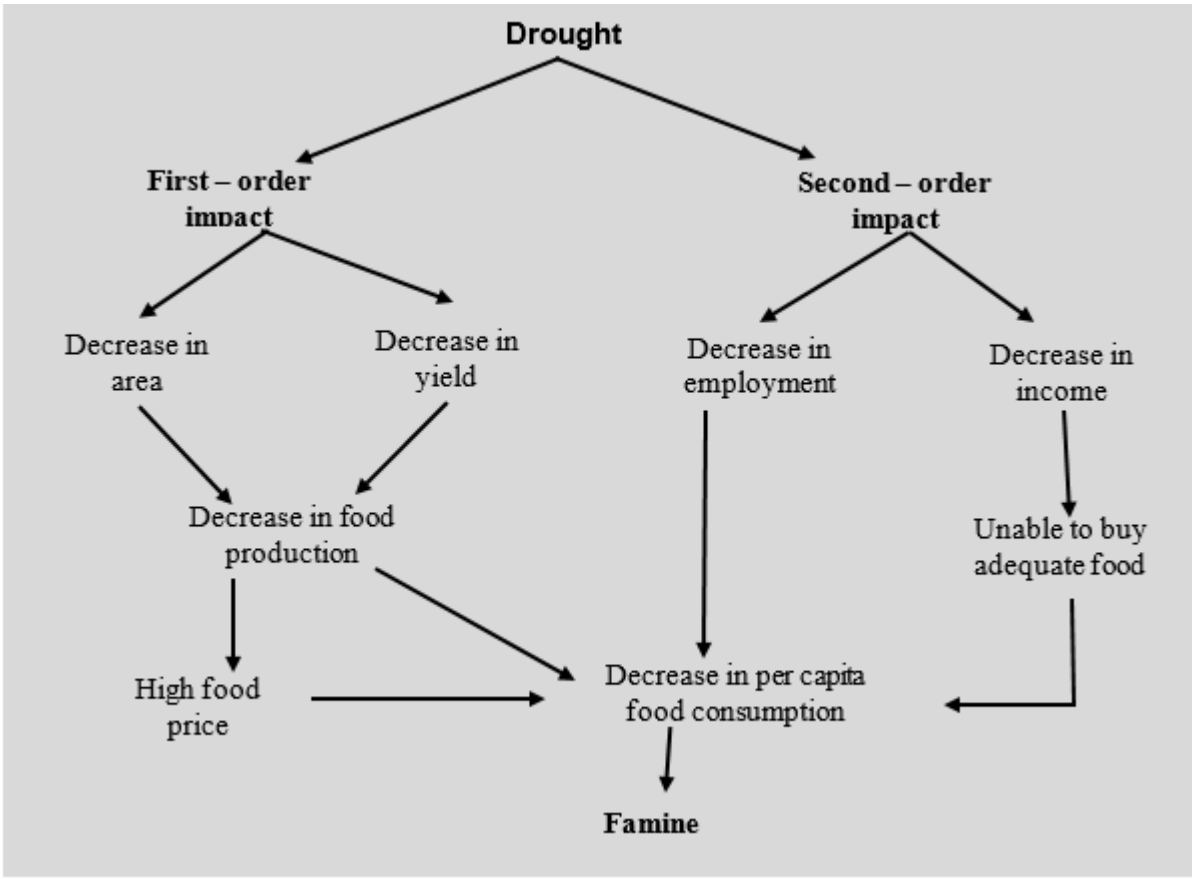


Figure 2-4: Drought impact (Source, Paul, B.K (1995)

2.7.1 First-order impacts of drought

Zarafshani *et al.* (2016:3) identify first-order drought impacts as those that take the form of decreased food production via a reduction in cultivated area and/ or crop yield in a society where agriculture is the primary economic activity. However, Benson and Clay (1998:15) express a view

that it is very difficult to deal with direct (first-order) impacts on agriculture. First-order impacts of drought, as illustrated in this diagram, affect society in the following manner:

- *Decrease in area*

Drought is one of the major constraints affecting food security and livelihoods of more than two billion people that reside on dry areas that constitute 41% of the world's land surface (Solh & van Ginkel, 2014:62). According to Wilhite (2000a:5), even though drought impacts are perceived to be non-structural, they spread over a larger geographical area affecting the environment in various ways including degradation of landscape quality, thus reducing the areas available for productive farming. Similarly, Manderson *et al.* (2016:9) indicate that drought damage ecosystems, wetlands and biodiversity through soil erosion, dust, reduced vegetation coverage, in the end reducing the productive potential of the land.

- *Decrease in yields*

Drought impact that decreases production yields and limits market supply, directly influences market prices for those products, which creates additional spill-over effects on export quantities and domestic consumption prices (Ziolkowska, 2016:8). Moller (2016:8) reports that irrigated crops continue to be vulnerable due to a lack of sufficient water and high temperature. Thus, the direct effects of drought come in the form of reductions in output and lost revenues for agricultural producers (Bauman *et al.*, 2013:62).

- Decrease in food production

According to historical records, drought has proven to occur cyclically, thus creating a factor of uncertainty for agricultural production as well as the entire state economy (Ziolkowska, 2016:2). The impacts of the droughts in Southern Africa included reduced agricultural production, increased unemployment, further heightened government expenditure burdens and reduced industrial production due to curtailed power supply (Clay *et. al.,* 1998). Droughts have devastating effects on water supply, crop production and rearing of livestock (Rojas *et al.*, 2011:343). Similarly, drought puts most of the irrigation system under severe stress when drying most of the shallows and tube wells and this poses a serious threat to food grain production (Dey *et al.*, 2011:89). These resulted in most farmers resorting to irrigation during severe droughts to overcome the deficiencies in rainfall (Dube, 2008:7). Hence, because of crop failure and animal losses, there will be reduced surplus produce for sale (Dube, 2008:6). For example, the SA Sugar Cane association reports that sugar cane crushed by the mills reduced from 20 million tonnes in 2013-14 to 17.7 million tonnes in 14-15 and was expected to drop further in 2015-16 (Willemse *et al.*, 2015:6).

- *High food prices*

According to Willemse *et al.* (2015:3), the threat created by the drought is that basic food prices, that is, those of maize meal, vegetables, doubled in price. In other words, the rate of food price increases are accelerating as the drought is persisting.

2.7.2 Second-order impact of drought

Second-order drought impacts include a decrease in employment and income (Zarafshani *et al.*, 2016:3). Moller (2016:20) states that farm incomes have decreased due to drought, with operating expenses of farmers remaining high and debt service costs increasing significantly since 2014. Similarly, the cost of the measures implemented to mitigate, prevent or alleviate the impacts of drought can also be attributable to the economic cost of the drought (Garrido, 2014:10).

- *Decrease in income*

Toulmin, (1985:11) stipulate that drought brings about important changes in the distribution of wealth and access to income among those affected. This is due to the unequal incidence of drought and the differing capacities of producers to protect themselves and their assets in a time of crisis (Toulmin, 1985:11). Most farmers experience less income due to reduction in crop productivity, which ultimately increased unemployment (Sivakumar *et al.*, 2011a:2). Similarly, in that situation, livestock farmers find themselves in a position where they have to use their cash savings to buy feed to get the animals in a condition to sell (Willemse *et al.*, 2015:2). Therefore, this leads to an increase in households without income, people's health, well-being and the quality of life affected (Zamani *et al.*, 2006:3). Besides, most people and communities are left in crisis without financial and emotional support (Alston, 2007:429). For example, Moller (2016:16), estimates that total farming debt across the globe at the end of June 2015 amounted to R125 billion has increased at an average annual rate of 14% from 2005.

- *Decrease in employment*

According to Dube (2008:6), increased unemployment is caused by reduced employment opportunities in the agricultural sector due to drought. Moller (2016:15) suggest that the agricultural sector is the main employer in rural areas employing 897 000 people, which represents 4.2% of the South African labour force. Therefore, during drought situation, farmers seek to save money by reducing their expenditure and farm inputs, which automatically reduces employment opportunities because of the diminished need for weeding, harvesting and other agricultural work (Keshavarz *et al.*, 2010:416). For example, regarding the drought of 1991-1992

in South Africa, Vogel (1998:99) estimated that most jobs that were lost were in the agricultural sector, with about 49 000 jobs compared to 20 000 non-agricultural jobs.

- *Unable to buy adequate food*

As reflected in this discussion, people lose jobs due to drought, which results in lack of income and ultimately hunger (Devereux, 2007:50; Pinstrup-Andersen & Cheng, 2007) indicate that farmers who produce inadequate food to achieve production self-sufficiency must resort to other sources of entitlement to feed their families. Hence, Young *et al.* (2001:10) recommend that, if people are unable to meet their immediate food needs and their lives are at risk, the first task is to increase their access to food and rehabilitate the malnourished. In most cases, this is done by providing food aid and feeding programmes (Young *et al.*, 2001:10).

- *Decrease in per capita food consumption*

The loss in household income can also result in a decrease in consumption by poor people, whose consumption levels are already low (Pandey & Bhandari, 2009:12). Subsequently, these impacts have far-reaching consequences for national food security and the national economy (Madzwamuse, 2010:6). As such, Dube (2008:7) is of the view that these impacts prompts affected parties to adopt various coping mechanisms to survive. This includes reducing consumption to the minimum food required for survival (Dube, 2008:7).

- *Lead to famine*

Masih *et al.* (2014:3635) specify that drought affects humanity by causing loss of life, crop failures, food shortages, malnutrition, health issues and mass migration. Additionally, Meque (2015:6) points to the fact that drought can cause famine and deepens poverty if not addressed in time. For example, Oxfam (2012a:1) states that the drought of 2011 that affected dry-lands such as Ethiopia, Somalia and Kenya, has placed more than 13 million people at risk of starvation. Thus, this may lead to people starting to eating wild plants not normally consumed (Dube, 2008:7).

2.7.3 Factors that exacerbate drought impacts

Masih *et al*. (2014:3645) suggest that a lack of established causes of drought, especially in Africa, require further research. On the other hand, Folger and Cody (2015:12) cite key variables such as air and sea interactions, topography, soil moisture, land surface processes and other weather system dynamics, continue to make it difficult to predict droughts. In holding a similar view, McCabe *et al.* (2007:1) urge that the non-static nature of drought increases uncertainty in monitoring and prediction of the hazard in many locations.

The resultant effects of drought are exacerbated by human activities such as deforestation, overgrazing and poor cropping methods, that reduce water retention of the soil and improper soil conservation techniques, that lead to soil degradation (UN, 2007a:3). Another factor compounding the drought problem is the growing population that is placing increasing pressure on already limited water resources (Dube & Jury, 2003:201). Hence, Sivakumar *et al.* (2011b:15) are of the view that population increases pressure on natural resources and people are also forced to reside in climatically marginal drought-prone areas. In light of that, the numbers of people uprooted by the environmental change are projected to reach 25.5 million by the year 2010 and reach several hundred million by 2050 globally (Rain *et al.*, 2011:6).

Thus, in providing advice, Wilhite (1992:1) suggests that the impacts of drought, like those of other hazards, can be reduced through mitigation and preparedness. Mitigation and preparedness form part of the discussion in the next section.

2.8 PARADIGM SHIFT IN DROUGHT MANAGEMENT AND RESPONSE

Managing drought will require human intervention that can reduce vulnerability and drought impacts within the community (Wilhite, 2000a:14). Figure 2.5 outlines the three stages of activities within the drought cycle that are useful to manage drought risks as pre-drought activities, during drought activities and post-drought activities.

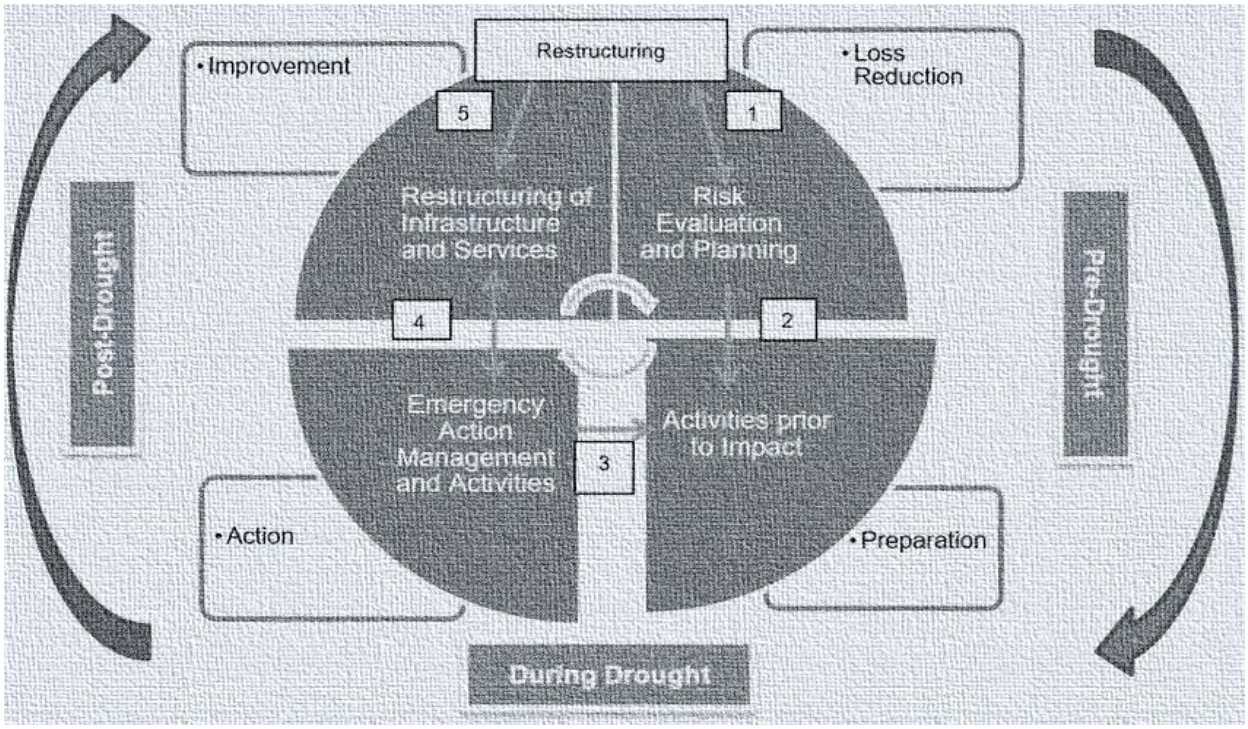


Figure 2-5: Drought impact (Source, Paul, B.K (1995)

2.8.1 Pre-Drought activities

A critical component of planning for drought is the provision of timely and reliable climate information, including seasonal forecasts, that aids decision-makers at all levels in making critical management decisions (Wilhite & Svoboda, 2000:2). In planning for drought, Hamdy (2004:25) suggests that proactive approach were, the primary concern is water shortage and most of the planned activities aimed at reducing the effect of such shortage, through measures taken before, during and after drought.

In terms of this figure (Figure 2.5), the findings of Khan *et al.* (2008) confirm the illustration adapted from (Tuncok, 2016:30) that pre-disaster activities are those taken for *loss reduction* caused by potential hazards resulting from drought. Also, Sayers *et al*. (2015:107) suggest that to reduce drought risk strategic actions should be taken during non-drought conditions when there is time to develop innovative strategies and implement long lead time solutions. On top of that, pre-drought activities aimed at reducing these losses should include activities before the impact such as risk evaluation and planning.

The importance of pro-actively addressing disasters is stipulated by Akhand and Akhand (2015:4) who postulate that normally risks associated with the aftereffect of disaster result in a negative impact, rather than the primary disaster itself. In supporting this statement, Jordan (2006:5) states that either one acts on a situation such as a drought or it will act on you. Hence, Alam *et al*. (2014:54) suggest that, in planning for drought, it is important to have a good understanding of historical droughts in the region and to know how they impacted on the exposed communities. Most importantly, it is important to observe early warning signs, study trends, socio-economic and political indicators to be able to plan based on a well-informed perspective (Chatora, 2007:24).

Confusion about the characteristics of drought has resulted in the lack of progress in drought preparedness in most of the world (Wilhite, 1992:1). And according to Wilhite *et al.* (2005:95), this contributes to great anxiety, especially about recurrent drought. Therefore, to solve these problems, policymakers and bureaucrats, as well as the general public, must be educated about the consequences of drought and the advantages of preparedness (Wilhite, 1996:159). Hence, Fu and Tang (2013:61) argue the importance of integrating drought preparedness into local land use planning that is increasingly recognized as a key to reducing drought risk. However, Edossa *et al.* (2014:2) demonstrate that the success of preparedness and management depends, among other things on how well the drought are defined and drought characteristics are quantified temporally as well as spatially. additionally, measuring preparedness to face droughts, characteristics of drought should reflect aspects such as quantification of drought hazards and vulnerability of water sources systems (Eriyagama *et al.*, 2009:1).

2.8.2 During drought activities

As reflected in this discussion the literature emphasises the importance of pre-drought planning and mitigation, which defines among other things during drought activities. According to Makoti (2014:29), the degree to which a population can be affected by drought depends largely on various response or coping options available to them, or their degree of vulnerability which, in turn, can be decreased by adequate pre-drought planning and mitigation of effects during the event or the lack of it.

However, in responding to drought, Wilhite (2008:144) reveals that making the transition from crisis to drought risk management has always been difficult because governments and individuals typically address drought-related issues through a reactive approach and very little institutional capacity exists in most countries for altering this paradigm. For example, besides provision of fodder to feed livestock in South Africa, further provision is made for the repair of water infrastructure such as boreholes and dams (DAFF, 2007:1, as cited in Ngaka, 2012:2). This approach of providing relief or emergency assistance to the affected areas or sectors became a traditional mind-set of most governments globally (Hamdy, 2004:16; Tadesse *et al.*, 2008:270). According to Gupta *et al.*, (2011:1800) such drought assistance or relief measures provided by governments and donor agencies are the ones that exacerbate the societal vulnerability to drought and also move societies away from their traditional wisdom and pro-active risk management approach. Subsequently, such emergency actions decrease self-reliance and increase dependence on government and donors (Wilhite, 1992:3).

Van Zyl (2006:12) point to the need of taking population growth, economic and environmental losses due to drought into consideration when approaching drought of the 21st century. Similarly, as cited from Alam *et al*. (2014:54), when interrogating previous drought response measures at various scales, Vogel (2010:10) points to the fact that weaknesses, strength and lessons learned in responding to drought can be derived. Take the case of Horn of Africa as an example, one of the reasons why the international system was so slow in responding to drought early warning, was lack of media and public attention, as was the case during the crisis (Oxfam, 2012a:3). This shows the importance of pre-drought activities during drought response. Besides, waiting for a situation to reach crisis point before responding is the wrong way to address chronic vulnerability and recurrent drought (Oxfam, 2012a:4).

Thus, the inefficiency of reactive approaches and crisis management strategies led to a call for a paradigm shift in managing drought, which according to Zarafshani *et al.* (2016:3), includes activities intended to improve the coping ability undertaken before the impact of drought.

2.8.3 Post-drought activities

Ahmed *et al.* (2002:39) point to the fact that the post-drought recovery phase comes between the drought period and the period where there is enough relief for recovery. Besides, post-drought evaluates documents and analyses the assessment and response actions of all role players (public and private) and implements recommendations for future improvements (Wilhite, 2000b:16). For example, public-sector support for further development, maintenance and rehabilitation of small and minor irrigation schemes could make them effective in mitigating drought (Pandey & Bhandari, 2009:38). Thus, the changes reflect significant gaps in water supply but also indicate a dynamic approach to deal with the climatic uncertainty and the threat of drought by disseminating new water production technologies, water treatment and advanced management tools (Pandey & Bhandari, 2009:38). Similarly, lessons learned from emergency conditions contribute to the effective development of communication strategies and planning of activities before the impact (Tuncok, 2016:32).

Nonetheless, Ouma *et al. (2012:93)* mention that it is difficult to discuss post-drought recovery strategies without first talking about drought coping strategies. According to Hassen, (2008:2), risk reduction or coping with crisis amount to material stocks, assets as well as formal and informal safety nets that can be mobilized by individuals, groups or communities. Correctly so, as a result of market failures, farmers attempt to 'self-insure' by making costly adjustments in their production practices and adopting conservative measures to reduce the negative impact in a drought year (Pandey & Bhandari, 2009:12). Therefore, households' or communities' capacity to buffer against shocks or disasters is highly dependent on the availability of and access to productive resources and informal/ formal safety nets (Hassen, 2008:2). With that, even small mistakes in land management can be devastating, with little chance of recovery (WWF). Hence, Marangos & Williams (2005:590) go on to say that all stakeholders need to weigh the uncertainties about drought to carefully formulate suitable policies for the future development of agricultural production.

Ahmed *et al.* (2002) allude to the fact that after droughts household recovery strategies include asset recovery through the purchase of breeding stock with own saving, livestock, or financial support obtained from relatives or friends. Accordingly, during this period, rehabilitation could mean restoring particular systems of production practised by people to their former level of operation by, for example, replacing those factors of production (livestock, seed, equipment) that have been lost as a result of the drought (Toulmin, 1985:6).

2.9 CONCLUSION

The quest for appropriate management of risk associated with drought is far from over at all levels of communities (that is, international, regional, national and local). The literature in this chapter demonstrates that the definition of drought plays a critical role in ensuring that correct drought policies and strategies that focus on risk reduction are developed.

The chapter addressed the second objective of the study by theoretically providing the perspective of drought as a hazard and disaster. Adding on that, it also underlines the importance of analysing drought according to the place of origin and identifying the cause. As a consequence, the effect of ENSO and aridity was thoroughly discussed as the cause of the drought. The chapter not only distinguished between four classes of drought but identified the relationship among all four of them. Moreover, the chapter discussed the vulnerability of drought to get clarity as to who or what is vulnerable, how it is vulnerable and to what it is vulnerable. The literature in this chapter points to the fact that South Africa, like many countries, is yet to realise a paradigm shift from drought crisis management to drought risk reduction. As such, the next chapter will focus on DRR strategies and frameworks developed internationally.

CHAPTER 3: DISASTER RISK MANAGEMENT: POLICIES, STRATEGIES AND FRAMEWORKS: INTERNATIONAL PERSPECTIVES

3.1 INTRODUCTION

The previous chapter provided an in-depth understanding of drought concept as a hazard and a disaster. Moreover, the chapter provided a global overview of the complexity of drought, drought impacts and the process of preparedness and response to drought-related issues. In particular, the previous chapter illustrated the diverse impacts of drought which are classified as being environmental, economic and social. These impacts can further be categorised as first and second-order impacts. Benson and Clay (1998:16) argue that the precise nature of drought impacts depends on existing policies and related response mechanisms which, according to Alam *et al*. (2014:53), include understanding of respective governance processes and structures to successfully manage issues related to drought. However, the development and implementation of drought policies is constrained by the fact that drought lacks a universal definition and is a slow onset event (Wilhite *et al.*, 2005:95). Besides, several policies, strategies and frameworks have been developed internationally to reduce the risk of disasters including drought.

The purpose of this chapter is to provide DRR strategies and frameworks established at the international and regional levels aimed at reducing the risk of disasters. This is done to lay a foundation for the discussion on drought legislative and policy frameworks for South Africa to follow in Chapter 4 of this study. Pelling and Holloway (2006:12) indicate that it is important for DRR to have a clear policy identity that differentiates itself from pre-existing disaster risk management work oriented towards response and relief. Additionally, Mendoza (2014:24) views the perceptions on disasters as those that inform the strategies and policies undertaken by different stakeholders, national and other local actors. Therefore, central to the discussions in this chapter will be existing strategies, policies and frameworks at the international and regional level that served as a guide for the development of policies for disaster risk reduction in South Africa.

3.2 INTERNATIONAL STRATEGIES AND FRAMEWORKS ON DISASTER RISK REDUCTION AND MANAGEMENT

Reducing the risk of disasters is perceived to be at the forefront of disaster management discourse globally. Experiences of various countries around the world have proven that national programmes and actions could benefit from an integrated disaster risk management approach in reducing identified risk at international level (UNESCO, 2014). Moreover, coordinated actions by the international community are vital and urgent to address the root causes of disasters and to significantly increase regional, continental, national, local and community capacities in reducing

disaster risk and vulnerabilities (ISDR, 2007). Integration of structures, strategies and frameworks is not a panacea for solving all disaster risk-related issues, it only contributes to the reduction of disaster risk (Nemakonde, 2016:18). Van Riet and Diedericks, (2010:157) substantiate that disaster risk reduction requires a broad range of activities, including vulnerability and risk assessment, capacity building, establishing safer physical, social and economic infrastructures and the use of early warning systems. Therefore, when planning and implementing disaster policies and strategies, it is important to have a good understanding of the history of the event, its impact on the region and long-term effect thereof (Alam *et al.*, 2014:54).

Van Niekerk (2005:52) maintain that although various United Nations agencies have to a certain extent been involved in response to disasters, which normally translated into humanitarian crises in the past, no agency was dedicated to purely focus on issues relating to disasters. This means that agencies are only active when disasters strike and provide a temporary relief rather than the provision of long term solution. For example, Oxfam (2012:3) alludes to the fact that the failure of the international system, humanitarian and development during 2011 drought in the Horn of Africa was as a result of lack of effective response. In contrast, the International Federation for Red Cross (IFRC, 2007:2) indicates that past and current disaster response operations have demonstrated several times that international relief can be significantly delayed or impeded in the absence of specific laws, rules or policies. Thus, the legislation provides a yardstick to measure whether the government has met its declared rules and standards (Williams, 2011:26). As such, legal frameworks are also an important aspect of building resilience within society, assisting in providing legal (that is, policy and acts) background and capacity to manage and adapt to any disturbance (Sayers *et al.*, 2015:149).

Manyena *et al.* (2013:1787) promulgate that disaster legislation have not been evolving in a vacuum. Disaster risk management concept includes all forms of strategies, policies, plans and activities aimed at minimising disaster impacts on individuals and society (EU., 2017:446). Existing legislation creates a context for reform and that many countries that do not have DRR legislation do have some positive sectoral policies (Pelling & Holloway, 2006:11).

As already indicated regarding Manyena *et al.* (2013:1786), disasters have become a policy problem for global and local concern by requiring effective legislative frameworks. An efficient strategy to deal with disasters is required for suitable policy and legislative frameworks (Rossi, 2009:446). Conversely, human activities, in the normal course of lives response to disasters, are not only leading to the vulnerability of communities but results in policy problem (Comfort *et al.*, 1999:39). Therefore, many countries around the globe have realised the need to institutionalise disaster risk management by joint international initiatives that reinforce the development of policies and legislation in disaster risk management and disaster risk reduction (Louw & van Wyk,

2011:12; Tau *et al.*, 2016:346). These disaster risk reduction policies deal with the course of action adopted by governments and civil societies in understanding hazards, assess vulnerability, evaluate risk and adopt measures for reducing risk (Bendimerad, 2003:62).

Therefore, the next sub-sections discuss some of these policies assembled by international structures to develop a holistic approach towards disaster reactive response paradigm shift to disaster risk reduction. These international policies and frameworks include the following: International Decade for Natural Disaster Reduction (IDNDR), the International Strategy for Disaster Reduction, the Hyogo Framework of Action, the Sendai Framework of Action, the African Regional Strategy and the SADC strategy on DRR.

3.2.1 International Decade for Natural Disaster Reduction (IDNDR) 1990-1999

In developing an integrated mechanism to prevent unnecessary loss of life due to natural hazards, the international community decided to assign a full period of ten years to encourage global cooperation in dealing with disasters. This saw the adoption of resolution 42/ 169 in 1987 by the United National General assembly that proclaimed the years 1990-1999 as the International Decade for Natural Disaster Reduction (IDNDR, 1994). This was built under the theme 'building a culture of prevention'. The objective of this decade-long effort is to encourage coordinated and integrated effort among international communities dedicated to reducing loss of life, property, livelihoods and social and economic disruption caused by recurrent disasters. This, according to the IDNDR (1994), is to promote a shift from a reactive approach towards disasters caused by natural hazards such as drought to that of proactive planning and prevention. Therefore, to mainstream efforts with IDNDR theme, it is important to build a culture that will move from a historical approach to disasters to minimize the loss. Thus IDNDR' set its goals around the following:

(i) improve the capacity of each country to mitigate the effects of disasters caused by natural elements, paying special attention to assisting developing countries in the assessment of disaster damage potential and in the establishment of early warning systems and disaster-resistant structures when and where needed;

(ii) develop appropriate guidelines and strategies for applying existing scientific and technical knowledge, taking into account the cultural and economic diversity of different countries;

(iii) foster scientific and engineering endeavours aimed at closing critical gaps in knowledge to reduce the loss of life and property;

(iv) disseminate existing and new technological information related to measures for the assessment, prediction and mitigation of natural hazards and disasters; and

(v) develop measures for the assessment, prediction and mitigation of natural hazards and disasters through programmes of technical assistance and technology transfer, demonstration projects and education and training, tailored to specific disasters and locations and to evaluate the effectiveness of those programmes (IDNDR, 1994:1).

Introducing IDNDR has asserted that death in disasters caused by natural hazards is no longer justified (IDNDR, 1994:1). In the same view, IDNDR was dealing with the conceptions that disasters are inflicted by supernatural forces and to prevent or weaken them, steps of a religious nature have to be taken (Quarantelli, 1998:2). However, Baker (2009:114) believes that the declaration did not preclude natural and social forces from rendering further devastation. Hence, the decade ended with more deaths that resulted from an increase in disasters, involving greater economic losses and increased human dislocation and suffering than when it began (UNISDR, 2004). In many cases, such losses were due to a lack of coherent disaster reduction strategies by international and regional organizations, governments and decision-makers and the development of a culture of prevention among the public at large (UNISDR, 2004).

Besides that, Van Niekerk (2005:59) believes that IDNDR laid a solid foundation for the development of other strategies aimed at reducing disaster risk. Equally so, the declaration of the IDNDR helped raise the profile of discussions surrounding the social and economic causes of disaster risk (UNDP, 2004:17). Thus, IDNDR managed to put in motion an irreversible and positive political and social process (UNISDR, 2004).

Therefore, central to the discussion above, the next chapter (Chapter 4) of this study looks into how developing country such as South Africa has managed to align itself with global communities and use IDNDR as a foundation and a route map towards disaster risk reduction. The focus would be on drought noting that is one of the natural hazards that recorded devastating cases during the 1990 – 2000 period. About that, drought of 1991-1992 in South Africa was ranked as the worst disaster experienced in the country by the Department of Environmental Affairs (DEA., 2016:22). The following sections will discuss strategies and frameworks that were built on the IDNDR foundation (see Van Niekerk, 2005:59).

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

The Yokohama Strategy and Plan of Action for a Safer World involves multi-sectoral, integrated efforts by global communities that was adopted in 1994, with the purpose of self-reflecting on the progress made by IDNDR (UNISDR, 1994:1). The strategy was developed as a response to

concerns that, even though the IDNDR was introduced, the world was still experiencing human suffering and disruption of development caused by the disaster as a result of natural hazards (UNISDR, 1994:1). The strategy serves a big purpose because it adopted two principles that is, **Strategy** and **Plan for Action**. The strategy also encourages and acknowledges community involvement in DRR (Tozier de la Poterie & Baudoin, 2015:130).

Therefore, the strategy served as a call of action that mapped the plan for the rest of the decade and beyond by strengthening effort to reduce disaster risk by prioritising developing countries, island and land-locked countries. The strategy also recognises that each country has the sovereign responsibility to protect its citizens, infrastructure and national, social or economic assets from the impact of disasters such as drought (UNISDR, 1994:1; UNISDR, 2004:9).

The basis for this strategy is for societies to recognise their traditional strength and explore new ways of living with risk and acknowledge the fact that uncontrollable, deadly phenomenon will remain within communities for years to come. Hence, the following principles were agreed upon:

- Risk assessment as a required step for disaster reduction policies and measures;
- Disaster prevention and preparedness are of primary importance in reducing the need for disaster relief;
- Disaster prevention and preparedness should be considered integral aspects of development policy and planning at national, regional, bilateral, multilateral and international levels;
- The development and strengthening of capacities to prevent, reduce and mitigate disasters is a top priority area to be addressed;
- Paying attention to early warnings of impending disasters and their effective dissemination using telecommunications, including broadcast services, are key factors to successful disaster prevention and preparedness;
- Recognising that preventive measures are most effective when they involve participation at all levels, from the local community through the national government to the regional and international level;
- Recognising that vulnerability can be reduced by the application of proper design and patterns of development focused on target groups, by appropriate education and training of the whole community;

- Recognising the need to share the necessary technology to prevent, reduce and mitigate disaster;

- Viewing environmental protection as a component of sustainable development consistent with poverty alleviation is imperative in the prevention and mitigation of natural disasters; and

- Demonstrating as far as the international community goes, strong political determination required to mobilise adequate and make efficient use of existing resources, including financial, scientific and technological means, in the field of natural disaster reduction, bearing in mind the needs of the developing countries, particularly the least developed countries.

These steps reaffirm the importance of having adequate and successful policies that serve as a guide to conduct disaster risk assessment to reduce the impact of natural hazards on society. Hence, according to Tozier de la Poterie and Baudoin (2015:130), to facilitate an easy and fast recovery process, the Yokohama Strategy values the knowledge and experience in managing emergencies that exists among at-risk communities. Therefore, it is important to build capacity and advocate for participation at all levels from the local community to the international level to have effective plans in place.

The Yokohama Strategy aims to support and use traditional knowledge in disaster risk management for better decision-making and ensure sustainable development including proper implementation of risk management measures (ISDR., 2008:4). The strategy recognises the fact that livelihoods are placed at increased risk because of conditions such as poverty, declining natural and land resources and other economic and social pressures linked to global development patterns, the attractions of urban life and rising pressure in international markets (UN, 2004:6). Moreover, relating to drought, the projection is that the conditions are likely to intensify. Besides that warning, the debate in the international level focused on what the long term impact will be and how best to tackle the problem (UN, 2004:5). Thus (UN, 2004:6) maintains that such conditions, that normally deepen vulnerability and increase risk, continue to be tolerated despite existing knowledge, policies and technical abilities. Therefore, to recognise values embodied in the strategy it is important to have a full distribution of drought risk profile to facilitate integrated efforts in prevention and planning process.

3.2.3 International Strategy for Disaster Reduction

The International Strategy for Disaster Reduction (ISDR) was established after Resolution 56/ 195 that was adopted by the UN General Assembly succeeding IDNDR in 2000. The UN International Strategy for Disaster Reduction (UNISDR) was developed to foster the agenda of managing disaster risk, putting focus on the processes involving risk assessment and awareness

(UNDP, 2004:18), which centre on the guiding elements that shift the primary focus from hazards and their physical consequences to involve incorporation of physical and socio-economic dimensions of vulnerability into the wider understanding, assessment and management of disaster risks (UNISDR, 2004:11). Taking that into consideration, an agreement was reached during United Nation millennium declaration in 2000, that different states need to demonstrate the political will to carry out commitments and to implement existing strategies (UNISDR, 2001:6). The objectives of the International Strategy for Disaster Reduction (ISDR) as they appear in the disaster risk management framework are structured as follows (see Figure 3.1):

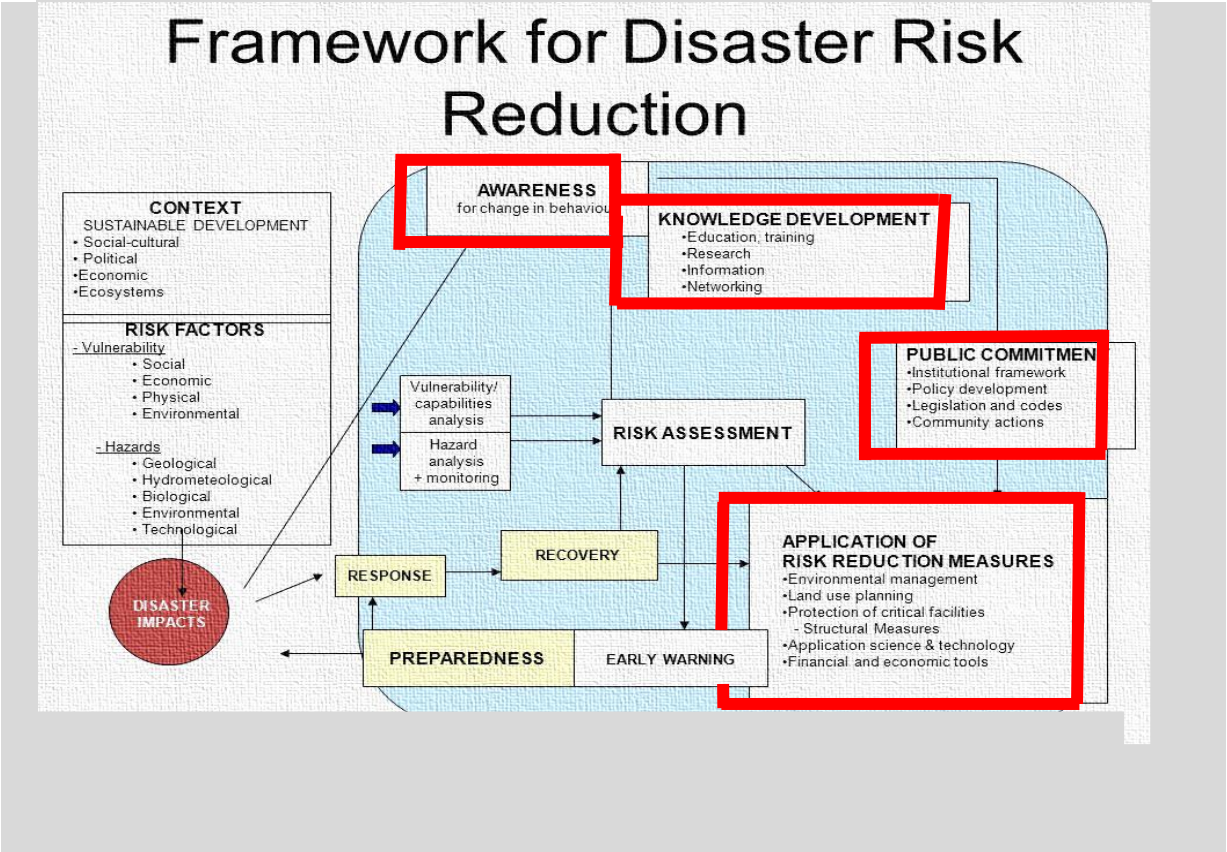


Figure 3-1: ISDR global review on disaster reduction: Source, UNISDR (2001)

3.2.3.1 Public commitment

Obtaining political commitment from public authorities needs to be addressed through increased inter-sectoral coordination at all levels, the adoption of risk management strategies and the allocation of appropriate resources, including the development of new funding mechanisms (UNISDR, 2003:12). This emphasises the need for institutional arrangement in disaster risk management, the role of different spheres of government in disaster management, including the funding model to carry out programmes relating to risk assessment and awareness campaigns.

The UNISDR (2003:12) is of the view that disaster reduction should be dealt with as a primary policy issue for which public authorities should assume responsibility and be pursued as a cross-cutting issue aimed at ensuring policy integration among various sectors and across topics such as agriculture, food security, health and education.

3.2.3.2 Awareness

Increasing public awareness and public participation to reduce vulnerability to hazards involves programmes related to formal and non-formal education and should be addressed through public information, education and multidisciplinary professional training (UNISDR, 2003:12). This encourages collaboration among different role players in the sharing of resources and prevention of duplication of programmes focusing on capacitating communities. The media, schools and higher education systems, as well as organizations such as the Red Cross and Red Crescent and locally-based NGOs around the world, have a crucial role to play (UNISDR, 2003:12). Hence, these role players are significant in the dissemination of information and primary response at the local level and most of them have direct interaction with societies on daily basis such as Community Development Workers, Ward committees and NGOs.

3.2.3.3 Knowledge development

Fostering better understanding and knowledge of the causes of disasters through the transfer and exchange of experiences and by providing greater access to relevant data and information is important (UNISDR, 2003:12). The issues to be addressed in this context are the assessment and analysis of gender-specific socio-economic impact of disasters; the construction of databases on disasters; the formulation of suitable coping strategies for different social groups; the introduction of early warning systems; and the promotion of relevant scientific research that takes into account indigenous or traditional knowledge and the development and transfer of new knowledge and technologies (UNISDR, 2003:12). This is very important in the sense that it addresses the concern of incomplete recording of risk exposure and it also assist in measuring trends of catastrophic events such as drought. Hence applying past information of drought with the current one is important to develop a suitable mechanism to ensure preparedness. Additionally, the UNISDR (2003:12) encourages efforts to link natural resource management with disaster reduction.

3.2.3.4 Application of risk reduction measures

Stimulating interdisciplinary and inter-sectoral partnerships, as well as the expansion of risk reduction, is of paramount importance. As stated in the above paragraph, this will encourage resource-sharing, transfer of best practices among role players and a common approach to deal

with drought events. However, the UNISDR (2003:12) ascertain that this will require effective coordination mechanisms such as appropriate institutional arrangements for disaster management, preparedness, emergency response and early warning, as well as the incorporation of disaster reduction concerns in national planning processes.

According to the UNISDR (2003:12), objectives derived from IDNDR, provide integrated action and serve as a guide for ISDR. Hence, Pelling and Holloway (2006:7) suggest that it is through ISDR support that many countries started to establish national platforms for disaster management within their communities. For example, the establishment of the Disaster Management Act (57/ 2002) and subsequently the Policy framework of 2005 (NDMF 2005) by the South African government (see the next chapter 4). Ironically, disaster management policy framework in South Africa was developed in the same year with the Hyogo Framework of Action.

Above all, the ISDR set aside 13 October of each year to conduct the World Disaster Reduction Campaign that is well known as International Day for Disaster Reduction (IDDR). According to ISDR (2002:2), the purpose of this day is to increase public awareness, worldwide and across all professional sectors, about the measures that can be taken to reduce risk and vulnerabilities of societies and communities to the negative impacts of natural hazards (ISDR, 2002:2). The theme of 2016, 'live to tell', aims to raise awareness due to the increase in mortality rate caused by natural hazards such as drought (see section 3.2.5) (UNDP, 2016:1).

3.2.4 The Hyogo Framework of Action

Following the landmark guidance provided by 'Yokohama Strategy and Plan of Action', where two principles were adopted (Strategy and Plan of Action), the World Conference for Disaster Reduction (WCDR) adopted the Hyogo Declaration and the Hyogo Framework for Action 2005-2015: 'Building the Resilience of Nations and Communities to Disasters', hereafter referred as the 'Framework for Action' (UNISDR, 2005:1). The Conference provided a unique opportunity to promote a strategic and systematic approach to reducing vulnerabilities and risks to hazards (UNISDR, 2005:1). WCDR set the following five objectives:

- to conclude and report on the review of the Yokohama Strategy and its Plan of Action, to update the guiding framework on disaster reduction for the twenty-first century;
- to identify specific activities aimed at ensuring the implementation of relevant provisions of the Johannesburg Plan of Implementation of the World Summit on Sustainable Development on vulnerability, risk assessment and disaster management;

- to share good practices and lessons learned to further disaster reduction within the context of attaining sustainable development and to identify gaps and challenges;
- to increase awareness of the importance of disaster reduction policies, thereby facilitating and promoting the implementation of those policies; and
- to increase the reliability and availability of appropriate disaster-related information to the public and disaster management agencies in all regions, as set out in relevant provisions of the Johannesburg Plan of Implementation of the World Summit on Sustainable Development (UN, 2005:8).

The following diagram provides a detailed summary of the HFA steps:

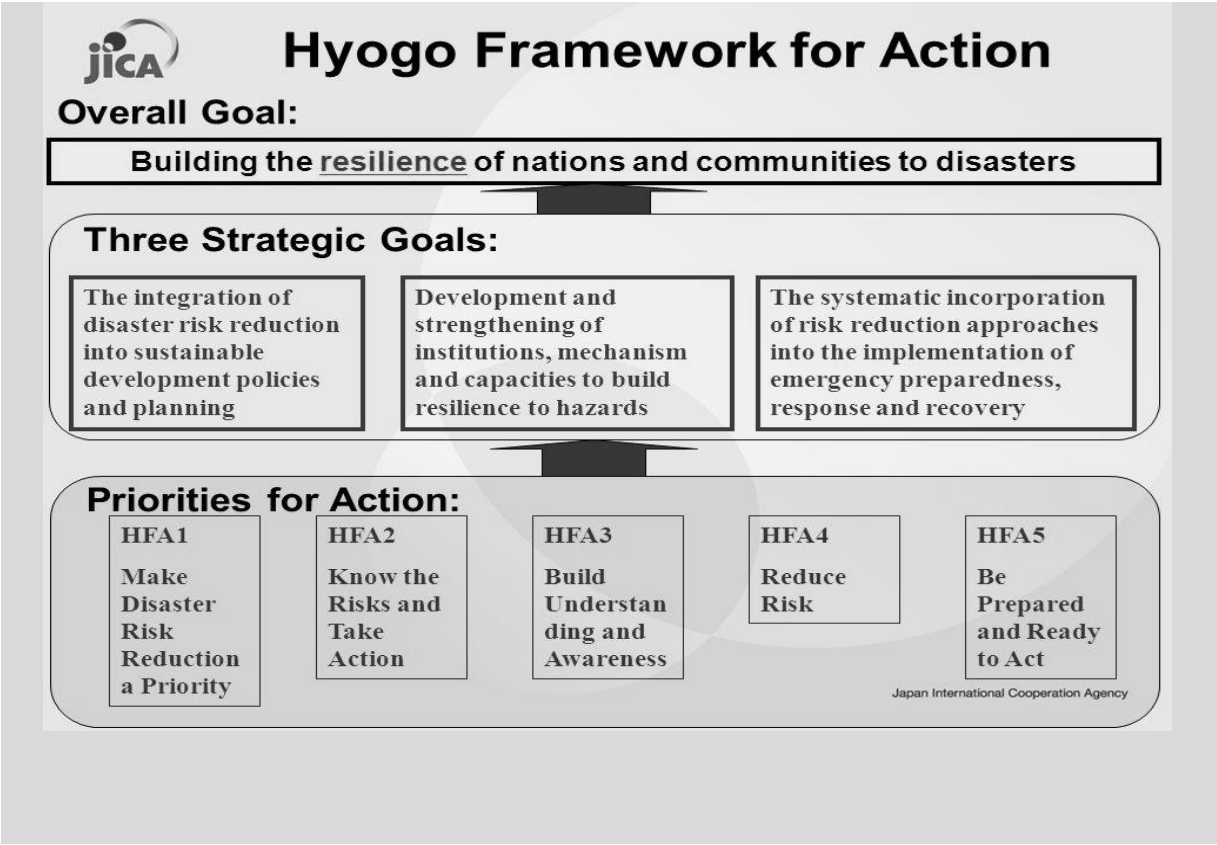


Figure 3-2: Hyogo Framework for Action, Source: Japan International Cooperation Agency (2013)

The Hyogo Framework for Action priorities are set for achieving strategic goals;

- ***Make disaster risk reduction a priority***

Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation. Hence, AU (2014) cite limited knowledge about best practices, institutions and networks of practitioners in disaster risk reduction.

- ***Know the risk and take action***

Identify, assess and monitor disaster risks and enhance early warning. The ability of people to take informed actions to secure their safety during disasters also depends on the availability of timely and targeted information on disaster risk reduction (AU, 2014:6).

- ***Build understanding and awareness***

Use knowledge, innovation and education to build a culture of safety and resilience at all levels.

- ***Reduce Risk***

Reduce the underlying risk factors.

- ***Be prepared and ready to act***

Strengthen disaster preparedness for effective response at all levels.

Overall, the UN, (2015:11) points out that the Hyogo Framework for Action has provided critical guidance in efforts to reduce disaster risk and has contributed to the progress towards the achievement of the Millennium Development Goals. Having the same view, Kim *et al.* (2016:3) give the Hyogo Framework credit of achieving progress by raising awareness and guiding various stakeholders in effective disaster risk management. Likewise, Botha and Van Niekerk (2013:1) indicate that, through HFA, a 'Global Network for Disaster Reduction' was formed to support the goal of 'Building the resilience of nation and communities to disasters'. Thus, upon the success of HFA a new framework for disaster risk reduction was adopted to enhance the efforts of sustainable development, that is, The Sendai Framework of Action.

3.2.5 The Sendai Framework for Disaster Risk Reduction 2015 – 2030

The Sendai Framework for Disaster Risk Reduction 2015–2030 was adopted at the Third United Nations World Conference on Disaster Risk Reduction, held from 14 to 18 March 2015 in Sendai, Miyagi, Japan (UN, 2015:9). The implementation of the (SFDRR) is guided by a set of principles while taking into account national circumstances and consistent with domestic laws as well as international obligations and commitments (UN, 2015:9).

The Sendai Framework aims to achieve 'The substantial reduction of disaster risk and losses in lives, livelihoods and health and the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries' by 2030 through progress monitored with indicators against seven global targets. These targets aim to reduce: (a) mortality, (b) the number of affected people, (c) economic losses and (d) critical infrastructure damage; and increase; (e) the number of national and local disaster risk reduction (DRR) strategies, (f) level of international cooperation and (g) availability of and access to multi-hazard early warning systems and disaster risk information and assessments.

According to the UN (2015:14), the Sendai Framework for Disaster Reduction identified a need for focused action within different sectors at local, national, regional and global levels. The following four priority areas were identified:

Priority 1: Understanding disaster risk.

It must be noted that countries are at different stages in the development of institutional frameworks for comprehensive disaster risk reduction because some embraced the need earlier, others are yet to understand the implications, while others cannot design them (AU, 2014:6). To achieve the priority of understanding disaster risk, all areas can't record the same or identical disaster risk. Hence, it is important for disaster risk policies and plans be drafted where they would be implemented, which should be at the local level. According to the UN (2015:14), policies and practices for disaster risk management should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment.

Priority 2: Strengthening disaster risk governance to manage disaster risk.

In referring to the strengthening of disaster risk governance, the priority relates to what is being alluded in the preceding section that it is important to have an institutional arrangement across all spheres. Governments have a key responsibility to create a facilitating environment in which people can be empowered to prevent or reduce natural disaster risks (AU, 2014). Hence, the UN (2015:17) indicates that disaster risk governance at the national, regional and global levels is of great importance for an effective and efficient management of disaster risk. Additionally, every institution must have a clear mandate for disaster risk reduction. Hence, this will provide clear vision, plans, competence, guidance and coordination within and across sectors, as well as the participation of relevant stakeholders, are needed (UN, 2015:17)

Priority 3: Investing in disaster risk reduction for resilience.

Public and private investment in disaster risk prevention and reduction through structural and non-structural measures are essential to enhance the economic, social, health and cultural resilience of persons, communities, countries and their assets, as well as the environment (UN, 2015:18). This includes rolling out capacity building programmes such as Community Based Disaster Risk Assessment (CBDRA), awareness campaigns, conducting emergency drills etc. Besides, such measures are cost-effective and instrumental to save lives, prevent and reduce losses and ensure effective recovery and rehabilitation (UN, 2015:18).

Priority 4: Enhancing disaster preparedness for effective response and to 'Build Back Better' in recovery, rehabilitation and reconstruction.

Efforts to improve disaster risk reduction can be enhanced by coordinating them within an integrated framework (AU, 2014:12). In addition to investing in disaster risk reduction resilience, the UN, (2015:18) is of the view that enhancing disaster preparedness for effective response, will integrate disaster risk reduction in response preparedness and ensure that capacities are in place for effective response and recovery at all levels. It is also important to note that community participation plays an important role in incidents around them especially when they are empowered with the knowledge of their area.

Aitsi-Selmi *et al.* (2015:165) believe that the Sendai Framework for Disaster Risk Reduction resulted from the need to ensure DRR policy reflects an evolved understanding of the complexity of disaster risk in the twenty-first century. Sharing the same sentiments, Weichselgartner and Pigeon (2015:107) indicate that SFDRR addresses knowledge-related issues and provides the opportunity to highlight the critical role of knowledge in disaster risk reduction.

The Sendai Framework for Disaster Risk Reduction 2015-2030 and the New York 2030 Agenda for Sustainable Development, serves as proof that member states have made efforts to integrate disaster risk reduction and sustainable development.

3.2.6 2030 Agenda for Sustainable Development

This Agenda is a plan of action for people, planet and prosperity. The Agenda sets 17 Sustainable Development Goals and 169 targets. Built on the Millennium Development Goals (MDG), Sustainable Development Goals (SDGs) aim to continue with the plan set by the MDG (see figure 3.3 below).

Figure 3-3: Sustainable development goals

In this section, four goals that relate directly to disaster risk management and particularly drought, poverty, hunger, action on climate change and sustainable ecosystems are briefly discussed.

a) Poverty

The agenda encourages all countries and all stakeholders, acting in collaborative partnership, to implement the plan to shift the world on to a sustainable and resilient path. The plan also seeks to free the human race from the tyranny of poverty and want to heal and secure the planet. Shillington *et al.* (2009:1) state that, those living in poverty have a standard of living that is 'unacceptable' because it is unjust.

The agenda recognises that eradicating poverty in all its forms and dimensions, including extreme

poverty, is the greatest global challenge and an indispensable requirement for sustainable development. According to Pantazis *et al.* (2006), poverty is widely used and meaningful concept in all countries in the world, however, its definition is often contested. For example, the Food and Agriculture Organization (FAO, 2005:2) describes poverty as a concept that is not self-defining. In the same way, Shillington *et al.* (2009:1), associate poverty with a social problem that will remain with society for many years to come.

Nevertheless, Maxwell, (1999:4) proclaim that the definition and measurement of poverty are not the start of addressing its challenges. Instead, understanding the root cause of poverty is important to design, implement and evaluate interventions (Maxwell, 1999:4). Otherwise, eradication of poverty is a moral and ethical imperative, rooted in the principles governing the affected nation (UN, 2010:5). According to UNDP, the human rights-based approach to poverty reduction espouses the principles of universality and indivisibility, empowerment and transparency, accountability and participation. Thus, Oxfam (2006:4) points out that a major investment in tackling the root causes of poverty could work and it will cost the world far less in money and human lives (Oxfam, 2006:4).

b) Hunger

Furthermore, Oxfam (2006:3) believes that, if food crises are to be averted, much must be done to tackle the root causes of hunger. This, according to the Food Security Information Network (FSIN), includes high poverty rates and the impact of prolonged drought on agriculture (FSIN, 2017:25). These are viewed as the main causes of poor and extremely poor household, thereby contributing to acute food insecurity (FSIN, 2017:25). However, the links between food and freedom may at first appear to be rather remote to policymaking and far from central to practical concerns (Sen, 1987:1). This is because, to understand household food security status, it is necessary to investigate how the workings of the food distribution system and resources of a household determine its access to food (Altman *et al.*, 2009:345). Similarly, understanding the severity of food insecurity is essential for determining the best type of response (Young *et al.*, 2001:4).

c) Climate change

Syaukat (2011:41) believes that all those countries that already contend with chronic food problems, change will intensify the existing hunger and food insecurity problems since it can greatly increase the risk of crop failure and the loss of livestock. Climate change is set to drastically increase poverty and hunger that will eventually pursue governments to intensify their efforts to reduce emissions of greenhouse gases (Oxfam, 2006:4). However, if climate prediction

is applied successfully, it may be able to help guide responses in populations at risk to reduce vulnerability to climate stress (Archer *et al.*, 2007:287). Hence, climate stress, in particular, can compromise the ability of the region's agricultural sector to sustain production (Archer *et al.*, 2007:288).

d) Ecosystem

According to (Gupta & Nair, 2012:14), to promote DRR and climate change adaptation, with the overall goals of achieving sustainable development, ecosystem management provides the unifying base. Environment and disasters interact with each other in many ways. Disasters cause massive damage to the environment, while degraded environments exacerbate disaster impacts (UNEP, 2014:4).

Another point is that human activity poses a significant impact on the biodiversity of world ecosystems, reducing their resilience and capacity (Gupta & Nair, 2012:1). Sustainable ecosystems management is therefore increasingly viewed as an effective approach for achieving disaster risk reduction and climate change adaptation priorities. Even though UNEP(2015:13) indicated that the role of ecosystems and ecosystems management in reducing disaster risk is not yet clear.

3.3 REGIONAL DISASTER RISK REDUCTION FRAMEWORKS AND STRATEGIES IN AFRICA

African countries have made progress regarding disaster risk reduction by formulating and implementing national policies, strategies and plans (UN, 2007a:20). This, according to the UN (2007a:20) was to align itself with the efforts made globally to manage disaster risk. Nonetheless, disasters continue to impact on the region (AU, 2016:5). Thus, questioning the effectiveness of these plans and policies in stemming the tide of increasing vulnerability to the impacts of disasters (AU, 2014:3).

The following sub-section discuss such efforts

3.3.1 The African Regional Strategy for Disaster Risk Reduction (ARSDRR) 2004-2015

This strategy underscores the fact that Africa is the only continent where the regional share of reported disasters in the world has increased over the past years (AU, 2014:5). The strategy points to the fact that disasters occur most pervasively and account for most of the people affected by hazards in Africa, particularly hydro-meteorological hazards such as drought (AU, 2014:5). In that regards, during 2004 African Union Heads of State and Government adopted a regional strategy to become a route map in reducing disaster risk in the region.

The Africa Regional Strategy for Disaster Risk Reduction (ARSDRR) strategic directions imply an initial set of programmatic interventions necessary for disaster risk reduction (AU, 2014:4). Nevertheless, it must be noted that the strategy does not serve as a replacement for existing efforts to combat disasters risk. Instead, the strategy was built on existing disaster risk reduction institutions and programmes available in African countries. This was done to enhance efforts developed by the African region to adopt and implement mechanisms that will focus on disaster risk reduction. Besides, one of the challenges identified by (AU 2014:7) is that disaster risk reduction mechanisms suffer from similar governance weaknesses as development interventions, particularly low compliance and enforcement of policies, laws, regulations, standards and codes (AU 2014:7).

Thus, ARSDRR aims to mainstream disaster risk reduction effort in national and regional development strategies in support of efforts to attain sustainable development goals in Africa. The strategy provides a wide range of strategic directions that countries can select from to suit their respective contexts and needs (AU, 2014:7). Furthermore, AU (2014:7) indicates that ARSDRR aims to close the gaps that were identified about the (ISDR) framework regarding the following: political commitment and institutional development; risk identification and assessment; knowledge management; risk management applications and instruments; and preparedness and emergency management (see section 3.2.3). Therefore, the following strategies were set to promote the achievement of objectives:

- Increase political commitment to Disaster Risk Reduction

The strategy advocates for the strengthened lobbying for political leadership in developing policies that focus on Disaster Risk Reduction. This will also allow easy access and participation of community members at the local level; hence, most of the politicians are leaders within these communities. Additionally, a committed political leadership can facilitate the mobilization of resource investment by communities and the private sector in disaster risk reduction. Furthermore, the resourcing of disaster risk reduction is a shared responsibility between the State and other stakeholders. Meanwhile, to facilitate this increased resourcing commitment, political leaders and investors need to be convinced of the developmental benefits of investing in disaster risk reduction (AU, 2014:9)

- Improve Identification and Assessment of Disaster Risks

The strategy acknowledges that greater knowledge of hazards and vulnerability enables communities and countries to better understand and anticipate future hazards and can help them minimize the risk of disasters. However, this will need integrated efforts from different

stakeholders. Hence effective risk assessment and identification through human-centred and participatory approaches help identify available strengths and capacities that can reduce disaster risks. Accordingly, to help fill the gap of inadequate risk identification and assessment, it is necessary to strengthen risk analysis capacities, promote integrated vulnerability and capacity assessment, upgrade data monitoring stations and capacity for early warning and improve loss assessment.

- Enhance Knowledge management for Disaster Risk Reduction

The strategy indicates that to perfect the transition of disaster management practices towards a disaster risk reduction approach will not materialize if knowledge of disaster risks and risk reduction options is not generated and disseminated effectively to all partners. Hence, a proposal was put forward that emphasises the need to strengthen disaster risk reduction information services and public communications mechanisms, including space technology and geographical information systems. For example, South Africa has established a space agency institution (South African National Space Agency) to provide information on vulnerable areas due to disaster risk. Moreover, information provided by South African National Space Agency (SANSA) is useful in providing satellite information on at-risk area which, in turn, will provide useful information for development and reduce disaster risk in an area.

- Increase public awareness of Disaster Risk Reduction

The strategy points out that responding to disaster only is not sufficient to capacitate the affected communities. Hence the increasing public awareness of disaster risks and risk reduction options is central to the empowerment of people to protect their livelihoods against disaster risks. It must also be noted that, in empowering communities, it is important to provide risk reduction information in good time, precise, prompt, reliable and actionable. At the same time, disaster risk reduction interventions must be informed by local survival strategies to promote risk-neutral or risk-reducing survival strategies.

- Improve governance of Disaster Risk Reduction

The strategy indicates the importance of encouraging governments to accelerate the decentralization of disaster risk reduction mechanisms, particularly local-level risk management interventions. This will channel resources at the local level for risk reduction since most disasters begin at local level before they can escalate to the national level. Therefore, to achieve this, harmonizing national policies and legislation can be facilitated by providing forums for countries to discuss disaster risk reduction concepts and policies, by supporting the dissemination of best

practices and standards in institutional development and by monitoring progress in the implementation of national and sub-regional institutional frameworks

- Integrate Disaster Risk Reduction into Emergency Response

Emergency assistance, together with post-disaster rehabilitation and reconstruction, is necessary but not sufficient for disaster risk reduction. This is particularly important in post-disaster situations when the opportunity exists to reduce prospective risks through development interventions. This includes cash for relief instead of food, voucher-based seed programmes at seed fairs, small-scale water harvesting and integrated food, health and functional education programmes.

3.3.2 Programme of Action for the Implementation of the Sendai Framework 2015 – 2030 in Africa

The African Union Heads of State and Government expressed their strong commitment to the implementation of the Sendai Framework as a means of sustaining the momentum generated by the Extended Programme of Action (AU, 2016:6). It is noteworthy that the ARSDRR was developed before the HFA was adopted as the global framework on disaster risk reduction (AU, 2016:6). The Sendai Framework provides the opportunity to implement the new global framework for Disaster Risk Reduction that strengthens efforts to increase resilience that will drive poverty reduction, sustainable development in line with Sustainable Development Goals (SDGs) (AU, 2016:6).

A two-steps process was undertaken to develop a Programme of action for the Implementation of the Sendai Framework in Africa and they are: (a) assessment of the status of implementing the extended PoA in line with the HFA in Africa and (b) modification of the Extended Programme of Action for the ARSDRR (AU, 2016:6).

The process for formulating a continental disaster risk reduction strategy started with a NEPAD Workshop on Disaster Management in April 2003 (AU, 2014:3). In realising the need for a strategic approach to improving and enhancing the effectiveness and efficiency of disaster risk management in Africa by emphasizing disaster risk reduction, African countries developed a New Partnership for Africa's Development NEPAD (AU, 2014:3). The strategy recognises the fact that indeed strengthening and expanding the existing practices and mechanisms for disaster management will not adequately address the disaster risk problem in Africa: what is required is a transformation of the basic mind-set and practices of national authorities; the disaster management community; the public and development partners regarding the reduction of disaster risks (AU, 2014:3).

The Programme of Action (PoA) is the strategic plan for the implementation of the Sendai Framework in Africa. It is intended to provide guidance and direction for actions by all at the continental, regional, national and sub-national/ local levels in Africa to prevent and reduce the risk of disasters for resilience in line with the Sendai Framework. The PoA comprises and integrates strategic DRR elements to be carried out over the 15 years of the Sendai Framework. It also includes a five-year action plan comprising priority activities as Phase I of the PoA within the Sendai Framework timeframe. The strategic direction is contained in the strategic areas of intervention of the PoA while the specific activities of the five-year programme are guided by the Sendai Framework and prioritized based on continental, regional, national and sub-national/ local strategic needs identified through the consultation processes of the Africa Working Group on DRR (AWG). The specific activities address priorities of Africa over the next five years necessary to achieve the Sendai Framework outcome on the continent.

The PoA seeks to achieve the global outcome in Africa as outlined in the Sendai Framework: The substantial reduction of disaster risk and losses in lives, livelihoods and health and the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries'. To attain the expected global outcome in Africa, the PoA seeks to pursue the following goal: 'Prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery and thus strengthen resilience.' The PoA aims to guide multi-hazard reduction and management of disaster risk in development processes at all levels as well as within and across all sectors in Africa, in line with the Sendai Framework. It seeks to strengthen DRR in Africa and its integration into policies of the African Union, RECs and the Member States in line with the Sendai Framework. The specific objectives of the PoA are to:

- Strengthen coherence and integration between disaster risk reduction, climate change adaptation and mitigation, ecosystem management, conflict and fragility and other development imperatives to contribute to the implementation and achievement of the goals and aspirations of the Agenda 2063, the Sustainable Development Goals, the Paris Agreement, the Addis Ababa Action Agenda, the New Urban Agenda and the outcomes of the World Humanitarian Summit, including through related instruments, frameworks, programmes and processes adopted by African Union Policy Organs, RECs and Member States.

- Strengthen long-term capacities, including coordination mechanisms, at continental and regional levels to support the implementation of the ARSDRR and the Sendai Framework and to systematically contribute to building resilience to disasters, with special focus on the most vulnerable groups;

- Strengthen mechanisms, frameworks and capacities at national and sub-national/ local levels for mainstreaming, implementing and coordinating gender-sensitive disaster risk reduction strategies and programmes that also address risk drivers such as poverty, public health, climate change and variability, poorly managed urbanisation, conflict and migration, environmental degradation;

- Embed a holistic approach to systematically incorporate risk reduction measures into design and implementation of disaster preparedness, response and recovery programmes;

- Develop practical tools and mobilize resources to contribute to the implementation of DRR programmes and projects.

The PoA will foster the implementation of the ARSDRR and contribute to the attainment of the global targets of the Sendai Framework, contextualized as appropriate below:

- Substantially reduce continental disaster mortality by 2030, aiming to lower the average per 100,000 continental mortality rates in the decade 2020–2030 compared to the period 2005–2015;

- Substantially reduce the number of affected people continentally in Africa by 2030, aiming to lower the average continental figure per 100,000 in the decade 2020–2030 compared to the period 2005–2015;

- Reduce direct disaster economic loss to continental gross domestic product (GDP) by 2030;

- Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030;

- Substantially increase the number of countries with national and sub-national/ local disaster risk reduction strategies by 2020;

- Substantially enhance international cooperation in developing countries through adequate and sustainable support to complement national actions for implementation of the Sendai Framework by 2030;

- Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030.

The PoA collates and integrates the priorities and actions to be undertaken by all stakeholders involved in DRR in Africa to realize the outcome of the Sendai Framework on the continent. Consequently, the PoA applies to the AU and other relevant organs of the African Union, Regional Economic Communities (RECs) and national ministries, agencies and departments responsible for DRM, as well as their sub-national/ local structures. Further, while the overall responsibility of the PoA implementation rests with the Member States, non-State stakeholders play a key role as enablers in providing support to States. At the level of States, the PoA provides elements of and guidance for national DRR programmes that countries can benefit from. Therefore, the PoA is not a replacement of regional and national initiatives and plans but seeks to support them by identifying continental, regional, national and sub-national/ local priorities needed to strengthen those actions. Civil Society Organizations (CSOs), including Non-Governmental Organizations (NGOs), women-led Community-Based Organizations (CBOs), children and youth and the private sector, other partners and stakeholders, are encouraged to align their DRR strategies and programmes to the PoA to ensure coherence of DRR in Africa. The PoA covers the risk of small- and large-scale, frequent and infrequent and quick or slow-onset disasters caused by natural and/ or human-induced hazards.

3.3.3 SADC strategy on DRR

The formation of SADC started back in 1992 when the Treaty of the Southern African Development Community (SADC) was signed. These, according to Holloway (2007:254) is to formalise a framework for future development cooperation, moved far beyond the vision of its predecessor, the Southern African Development Coordination Conference (SADCC). SADCC was established in 1980, had formerly provided a relatively unstructured forum for other southern African countries to reduce their economic dependence on South Africa (Holloway, 2007:254).

The region of Southern African Development Countries (SADC) is one of the African Union's seven Regional Economic Communities. It comprises 15 Member States: twelve (12) in-land and three (3) island states of the southwest Indian Ocean (SADC, 2016:9).

However, Member States are mindful that, even with best of prevention measures, disasters are inevitable, including those that are transboundary, which have become increasingly common in the region

The purpose of the establishment of SADC regional economic communities is to translate the African DRR strategy into action. Hence the development of the Regional Disaster Preparedness and Response Strategy and Fund by (SADC) Secretariat (SADC, 2016:12).

3.3.4 SADC Disaster Preparedness and Response Strategy and Fund: 2016 – 2030

Disaster preparedness and response planning has become compelling in the SADC region as there is overwhelming evidence that the region is increasingly exposed to risks as a result of multiple vulnerabilities combined with multiple hazards prevalent in the region. The SADC Disaster Preparedness and Response Strategy and Fund 2016 – 2030 aims to facilitate a coordinated support for the SADC Member States when they are overwhelmed by a disaster event. The Strategy and Fund have three priorities: understanding risk and disaster management information systems; strengthening disaster preparedness and response planning and establishing the regional disaster preparedness and response fund.

In light of this, according to Baker (2009:20), sustainable models of disaster reduction policies will recognize that the networks of actors in the market that includes government, all share the burden of risk and experience of vulnerability. The next chapter will look into the efforts initiated by the South African government to align itself with the global communities.

3.4 CONCLUSION

The focus of this chapter was to outline the existing policies, strategies and legislative framework within the world in implementing disaster risk reduction. The chapter recognises the effort by global communities in ensuring that there is a collaboration of many countries in ensuring efforts to build resilient communities and a safer environment. The discussions in this chapter centred on the acknowledgement that though much efforts were made in reducing disaster risk, more people are still suffering due to poverty. Moreover, the discussions in this chapter showed the importance of linking DRR strategies with planning to ensure sustainable development. These was emphasised by an intertwining of DRR and developments in achievements of sustainable developments goals.

It is important to note that, though much efforts were done to encourage countries to develop DRR strategies, not all are in the same level with the process of development and implementation. However, what is of utmost importance is how policies, strategies and frameworks have managed

to manoeuvre from international via regional and national to local levels. Hence, part of the discussions in the chapter was centred on African regional strategies in aligning with global agreements. In the same light countries are encouraged to follow the good practices in the development of policies, plans and strategies to address disaster risk around vulnerable communities. Thus, the next chapter will look into existing policies and plans in the South African context to address risk associated with drought

CHAPTER 4: DROUGHT DISASTER MANAGEMENT IN SOUTH AFRICA: LEGISLATION, PLANNING AND COORDINATION

4.1 INTRODUCTION

The discussions in the previous chapter provided an international perspective on managing disaster risk. The chapter focused on international frameworks developed to reduce disaster risk globally and regionally. The chapter has taken into account the fact that disaster risk reduction and development are integral components of sustainable development.

This chapter focuses on the broader policies and legislative frameworks for reducing disaster risk in general terms and specifically for drought-related issues in South Africa. The chapter addresses the third objective of the study, which is to determine the existing policies and legislative frameworks for drought management in South Africa. The first section of this chapter provides an in-depth international perspective by analysing existing policies that focus on disaster risk management. This chapter will examine the constitutional mandate of the South African government and the existing policies and legislation that can be utilised to manage drought-related issues. The remaining sections will discuss the importance of coordination between government and different role-players during planning for drought phenomena and implementation of drought policies.

4.2 LEGISLATIVE FRAMEWORKS THAT GUIDE DROUGHT RISK MANAGEMENT IN SOUTH AFRICA

Disaster risk reduction efforts 'must be systematically integrated into policies, plans and programmes for sustainable development and poverty reduction (Manyena *et al.*, 2013:1786). As such, an effective and efficient strategy to deal with risk arising from disasters such as drought requires a suitable legislative framework (Rossi, 2009:446). This is because legislation can establish and determine how resources are used and by whom and organise the way data and information is used for drought management (Sayers *et al.*, 2015:149). Though drought is regarded as a slow on-set and creeping phenomenon, William (2011:23) is of the view that it can also be forecast and failure to ensure adequate preparedness against such predictable risks would indicate obvious negligence on the part of the government, expose leaders to heavy criticism and thus create uncertainty.

South Africa's efforts to establish legislation to promote disaster risk reduction have unfolded in an incremental process as part of a larger effort to re-orientate institutions of government in the post-apartheid era (Pelling & Holloway, 2006:4). According to Ngcamu(2011:61), previous

attempts by the South African government to have a legislative framework for managing disasters and hazards was extremely confusing because of the many levels at which decisions were taken. He further indicates that there was no clear authority as to who assume primary responsibility and which criteria to follow in declaring a disaster. This refers to the Civil defence act (39/ 1966) that was adopted to respond to any kind of disaster. However, as Manyena *et al.* (2013:1787)uncover, the Act adopted a command-and-control model derived from a militaristic system, which involves a top-down approach of disaster response with increased clarity of responsibility at the national level but less clarity at the local levels. This prompted the South African government to accelerate the effort to ensure that risk caused by natural and manmade hazards is reduced. Therefore, to regulate everyone including all institution in the country, there is a need to establish the supreme law of the country that addresses disaster issues, proactively.

4.2.1 Constitution of South Africa (108/ 1996)

The Constitution of South Africa (108/ 1996) was adopted in 1996 to be the supreme law of the Republic of South Africa. The purpose of adopting the constitution as the supreme law of the country was to improve the quality of life of all citizens and free the potential of each person. Chapter 2 of the Bill of rights accentuates that everyone has the rights to life and that the onus of ensuring health and safety of the citizens lies with the Government of South Africa. This is also the case during drought, hence the likelihood of disease outbreak is high and the government must ensure that it has measures in place to prevent or mitigate such outbreaks.

The constitution further states that everyone has the right of access to any information held by the state, and any information that is held by another person and that is required for the exercise or protection of any rights. Therefore, the constitution encourages those who have knowledge and information about the drought to disseminate such information and educate the community about the hazards and how they can protect themselves.

The constitution is also very clear that if South Africa is threatened by natural hazards that might end up as disasters, the president of the country is empowered to declare a state of emergency. Declaring of state of emergency will enable South African government to avail national resources and seek intervention from international communities

Above all, the constitution encourages co-operation with one another in mutual trust and good faith by co-ordinating actions and legislation with one another. It also encourages co-operation between the national government and provincial governments to support and strengthen the capacity of municipalities to manage their affairs, to exercise their powers and to perform their functions.

In light of this, the following sections will outline legislation and policies that were developed guided by the Constitution of South Africa (108/ 1996).

4.2.2 Disaster Management Act (57/ 2002) as amended in 2015

The Disaster Management Act (57/ 2002) is a piece of legislation used by relevant institutions including the presidency to declare a state of disaster in South Africa. The development of the Act started during 1998 when the South African government released a Green paper on Disaster Management to set out the roles in ensuring that national government meet certain objectives for managing disasters (South Africa, 1998a). Subsequent to that, a white paper was released in 1999 to set out the South African government's disaster management policy which, according to Van Zyl (2006:48), applies to all government institutions and other role players, as well as all activities related to disaster management in South Africa.

In 2002 South Africa adopted the Disaster Management Act (57/ 2002), placing it at the forefront of a global paradigm shift from a purely response-oriented approach to disaster management to a proactive approach encompassing Disaster Risk Management (van Riet & Diedericks, 2010:156).

The Disaster Management Act (57/ 2002) provides for 'an integrated and co-ordinated 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'. The Act recognises the wide-ranging opportunities in South Africa to avoid and reduce disaster losses through the concerted energies and efforts of all spheres of government, civil society and the private sector (South Africa, 2002). However, it also acknowledges the crucial need for uniformity in the approach taken by such a diversity of role players and partners.

The Disaster Management Act (57/ 2002) is the legislation mandated to be used for the declaration of the state of drought disaster in South Africa. Thus, regarding drought, the Act provides powers to all spheres of government to promote an integrated and coordinated approach to drought disaster management in all levels, with special emphasis on drought prevention and mitigation.

The Disaster Management Act encourages all spheres of government to liaise their activities among themselves, including horizontal interactions between government, private sector and NGOs. For example, when a drought disaster event is occurring in the North-West Province, the province must inform national government and local government and form a drought response committee with other sectoral departments and role players such as municipalities. Informing the

National Disaster Management Centre will also assist with regards to classification of drought disaster, whereas a committee that will include the majority of role players must ensure that it provides specific drought contingency plan and monitor capacity in terms of resources.

Even though the Act advocates for diversity in responding to drought incidents, it also admitted that there is a gap with a holistic, uniform approach to drought disasters. Therefore, the establishment of the National Disaster Management Framework is intended to address such challenges.

4.2.3 National Disaster Management Framework (NDMF, 2005)

The National Disaster Management Framework was promulgated in 2005, after policy proposals calling for the development and implementation of regulations for national standards in disaster management including multi-agency responses (South Africa, 2005). This policy provides a clear direction to different organs of state with regards to the importance of establishing an integrated institutional capacity, conducting comprehensive disaster risk assessments, developing disaster risk reduction initiatives and ensuring effective responses and recovery, known as Key Performance Areas (KPAs) (Van Riet, 2009:199). The National Disaster Management Framework of 2005 also includes enablers that would create easier methods for dealing with disasters (Austin, 2008:90). The key performances areas and the enablers are as follows:

- **Key performance area 1** is to establish an integrated institutional capacity within the national sphere that will enable the effective implementation of disaster risk management policy and legislation. Hence, government has established a National Disaster Management Centre (NDMC) as a formal structure aimed at the management of disasters such as drought; it acts under the auspices of the provincial- and local governments while the National Department of Agriculture chairs the Inter-Departmental Working Group on Drought (Department of Agriculture, 2005:13).

- **Key performance area 2**is to establish a uniform approach to assess and monitor disaster risk in different areas such as drought monitoring and assessment that will inform disaster risk management planning and disaster risk reduction undertaken by multiple organs of state and other role players. Thus all role players must be aware of risk and actions to be taken beforehand and various mechanism should be made available in their planning (Department of Agriculture, 2005:13).

- **Key performance area 3** ensures that all disaster risk management stakeholders develop and implement integrated disaster risk management plans and risk reduction programmes and projects under their approved frameworks. This includes efforts by government and other

stakeholders in addressing various causes of drought or factors that exacerbating the impacts of drought (Department of Agriculture, 2005:14).

- **Key performance area 4** ensures effective and appropriate disaster response and recovery by all relevant stakeholders. This will be achieved by addressing issues such as appropriate research plans; drought predictions; early warning and monitoring systems; decision support tools for drought management; establishment of soil-crop-climate norms for agriculture in a reasonably homogeneous farming area; establishment of norms and standards for veld and animals; development of responsive farming plans; improvement of research, including that on climate change and determination of the impact of global environmental change on drought disaster characteristics and agricultural production (Department of Agriculture, 2005:14). However, in the meantime, affected people will be assisted with provision of relief such as fodder for livestock, drilling of boreholes and tanking of water for human consumption.

- ***Enabler 1*** guides the development of a comprehensive information management and communication system and establishes integrated communication links with all disaster risk management role players. Hence the first step in drought mitigation is the development of information and its dissemination to political decision-makers, administrative officials and individuals vulnerable to drought. The public should be kept informed of current and forecast conditions and the required response actions by the provision of accurate, timely information to the print and electronic media (TV, radio, newsletters, information centres and the internet) (Department of Agriculture, 2005:15).

- ***Enabler 2*** supports education, training, public awareness and research, with appropriate and relevant tools. Hence, the Department of Agriculture (2005:15) indicates that support for farming communities could include grants to individual farm management teams to improve skills and plan their business professionally and the provision of advice and training on risk, financial and natural resource management, marketing and sustainable farming

- ***Enabler 3*** provides a database that contains data relating to all funding matters including funding mechanisms for different aspects of disaster risk management, budgets, applications for funding, approvals and spending of allocated funds that need to be recorded to ensure that proper usage and management of available funding are maintained. Each provincial department of agriculture and municipality should provide for disaster in their annual budget or Medium Term Expenditure Framework projections. If the disaster is of such a magnitude that a provincial department of agriculture or municipality cannot handle it, assistance may be requested from the National Department of Agriculture (Department of Agriculture, 2005:15).

Also, in keeping with international best practice, the national disaster management framework places an explicit emphasis on the disaster risk reduction concepts of disaster prevention and mitigation as the core principles to guide disaster risk management in South Africa.

The national disaster management framework also informs the subsequent development of provincial and municipal disaster management frameworks and plans required to guide action in all spheres of government.

4.2.4 National Development Plan (NDP 2030)

The National Development Plan (NDP 2030) was adopted in 2012 by the South African government. This, after the appointment of the National Planning Commission (NPC) in May 2010. The purpose of this committee is to draft the country's vision and national development plan. The NDP is viewed as the current long-term strategy adopted by the South African government to emulate other countries such as the Far-East Asian countries around their rapid economic growth plans for emerging economies around the world (Penderis & Tapscott, 2014:5). However, a diagnostic report in June 2011 by the NPC as regards achievements and shortcomings since 1994, identified failure to implement policies and an absence of broad partnership as the main reason for the slow progress of growth in the country. Surprisingly, out of nine challenges that were set by the report, none of them identified disaster risk reduction as one of the main challenges in the country, even though South Africa has been in the forefront of aligning itself with the international players as regards development of policies aiming to reduce disaster risk in the country. The following challenges were identified

- Too few people work;
- The quality of school education for black people is poor;
- Infrastructure is poorly located, inadequate and under-maintained ;
- Spatial divides hobble inclusive development;
- The economy is unsustainably resourced intensive;
- The public health system cannot meet demand or sustain quality;
- Public services are uneven and often of poor quality;
- Corruption levels are high;
- South Africa remains a divided society.

The National Development Plan (NDP) stresses the need to address the twin challenges of poverty and inequality where the state needs to play a transformative and developmental role. Poverty was covered in detail in the preceding chapter (see Chapter 3). Nevertheless, as Pieterse (2007:1) notes, South Africa's rapid integration into the global economy has made these identified challenges even more acute. This is because, years after political freedom, South Africa remains profoundly marked by very high levels of inequality, underpinned by stubbornly high levels of unemployment and pervasive poverty.

The agriculture as a sector is mostly affected by multiple hazards that include droughts while these usually have devastating effects on water supply, crop production, rearing of livestock, famine, malnutrition, epidemics and displacement of large populations who search for opportunities from one area to another(Rojas *et al.*, 2011:343). Even though the NDP has identified lack of policy implementation as one of the shortcomings in growing the economy of the country, the plan is not clear as to how it is going to facilitate the implementation of disaster risk reduction policies in the country, thus relating to the preceding chapter that has focused on the relationship between disaster risk reduction and development.

The plan emphasises agriculture because it is seen as an important sector in the South African economy given the contribution from commercial agriculture to the GDP of South Africa (Van Zyl, 2006:15). However, the plan does not go into details as to how it is going to protect the sector from hazards in the long run. Most importantly, the plan does not have a dedicated section on disaster risk management. This, even though the country faces some hazards that frequently turn into disasters. The plan only mentions disaster preparedness in passing in chapter 5 where it states that by 2030 'adaptation strategies in conjunction with national development strategies are implemented including disaster preparedness and programmes to conserve and rehabilitate ecosystems and biodiversity assets'. The plan further gives policy direction that 'the National Disaster Management Centre should include climate change risks in the national disaster management plan and its communication strategies'. The omission of proactive measures for disaster risk management in South Africa is worrying as the National Development Plan sets the priorities of government until 2030.

4.3 DROUGHT DISASTER MANAGEMENT: PLANNING AND COORDINATION IN SOUTH AFRICA

The literature as consulted in chapter 2 has indicated that South Africa is an arid or semi-arid country particularly in the western parts and that are likely to experience recurrent drought conditions. As such, the country's experience of water scarcity is a norm that cannot be viewed as the cause of people's vulnerability to drought. Since South Africa is used to the condition of

below normal rainfall, one would have thought that by now society would have built capacity to cope and adapt to drought conditions. However, Fu and Tang (2013:60) provide an important view that fast-emerging factors such as growing population, changing climate and urbanization make droughts destructive and spatially extensive and that it is urgent to enhance drought preparedness planning across the nation to meet these increasing challenges from droughts.

Government in South Africa plays a central role as regards planning and coordination of drought responses. Hamdy(2004:16) in his research, found that most governments' traditional mind-set in dealing with drought is reactional rather than proactive. South Africa responds to drought by making assistance available only when procedures are followed in line with the provided legislation Disaster Management Act, (Act, 57/ 2002). The Act makes provision as to the classification of drought disasters by taking into consideration extent and impact. However, in the past, criteria for state intervention were based on the magnitude of the events instead of the needs of the communities affected (Department of Agriculture, 2005:9).

The experience is that, in most cases, drought in South Africa triggers the response of provincial and national government. This is because Part A, Schedule 4 of the Constitution of South Africa, indicates that disaster management is the concurrent function of the provincial and national government in South Africa (South Africa, 1996). Despite these provisions, it must also be noted that in South Africa, drought management is a shared responsibility of all levels of government, including the farming community, the private sector and civil society (Department of Agriculture, 2005:7). However, the national, provincial and the Municipal Disaster Management Centres play strategic roles in integrating disaster management frameworks, plans and actions between the three spheres of government and across sectors and other role-players within each sphere (Van Zyl, 2006:60).

4.3.1 Roles of different levels of government and government departments

This section identifies and presents roles of different levels of government and related role-players for managing drought in South Africa.

4.3.1.1 National Level

National government is empowered to ensure that disaster management is implemented as required by the Constitution of South African and within the prescription of the Disaster Management Act. On that basis, the national government in South Africa has got primary responsibility for the coordination and management of drought disasters, irrespective of whether a national state of disaster has been declared or not. However, if the need arises, in terms of

Section 27 of the Disaster Management Act (57/ 2002), the national government through the minister by notice in the Gazette may declare a national state of drought disaster, provided that:

- Existing drought legislation and contingency arrangements do not adequately provide for the national executive to deal effectively with the disaster. For instance, the need to evoke section 16 and 24 of the Public Finance Management Act (PFMA), which provides powers to procure in an emergency without following supply chain processes.

- Other special circumstances warrant the national state of disaster. For example, when more provinces are affected by the disaster and such provinces are unable to cope using their resources.

Carter (2008:150)points to the fact that planning for managing hazards (such as drought) at national level is broadly concerned with coordination, mobilization and deployment of national resources, requests for international assistance and so on.

In coordinating drought South Africa activated the Joint Operation Centre and established a drought task team that included different role players such as the National Disaster Management Centre, Provincial Disaster Management Centres, Department of Agriculture and Rural Development (DARD), Department of Water Affairs, The Department of Environmental Affairs, Department of Social Development Women Children and People with Disabilities (DSDWCPA), Agricultural Unions, South African Weather Services (SAWS), National Treasury. Expectation from these role-players is that each must provide their respective drought contingency plan or business plan in responding to drought.

The role of the task team is to conduct drought impact assessment and to monitor the conditions. After the process of collecting data to determine the extent of drought condition, the drought task team decides on whether to request further assistance when available resources are limited. Such resources may include reserves in the form of fodder to distribute to affected areas or water tankers to assist with the distribution of water in affected areas. Therefore, national treasury will allocate a drought relief fund which, in most cases, will be used to mitigate the severity of drought by purchasing fodder for livestock, providing water for human consumption in tanks and drilling of boreholes as per assessment carried out in respective provinces.

4.3.1.2 Provincial government

Likewise, the provincial government is also mandated to ensure that disaster management is implemented as required by the Constitution of South African and within the prescription of the Disaster Management Act. Therefore, the executive of a province is primarily responsible for the

coordination and management of provincial drought disasters that occur in the province, irrespective of whether a provincial state of drought disaster has been declared. Section 41 of the Disaster Management Act (57/ 2002) prescribes the role of the provincial government to declare a provincial state of disaster provided that:

- Existing legislation and contingency arrangements do not adequately provide for the provincial executive to deal effectively with the disaster; or

- Other special circumstances warrant the declaration of a provincial state of disaster. Such circumstances may include two or more district are affected or services affected are provided by the provincial government. Thus, this will be done to deviate from the procurement process and use emergency procurement.

The province is obliged to establish structures established at the national level. For example, since the national level has established a national drought task team, the respective provinces must also establish provincial drought task teams to coordinate efforts at the provincial level. Role players in such a task team include the Provincial Disaster Management Centre, Provincial departments of (Agriculture, Water, SASSA, Social Development, Finance, DAFF and SAWS), District Municipalities, Local Municipalities, Farmers Associations, Farmers Unions and Traditional Leaders. The role of this task team is to report on the drought impact assessment carried out by their different sector departments at local municipalities, whereas municipalities will provide a detailed report on the progress of drought monitoring at the local sphere of government. This is discussed later in the chapter.

The Provincial Department of Agriculture must use their resources (capacity and funds) to coordinate and monitor drought activities (Department of Agriculture, 2005:10). The role of the provincial sphere of government is spelt out in legislation: it should play a facilitating and coordinating role for the implementation of national government policy within provinces (Pelling & Holloway, 2006:9; Van Niekerk, 2005:140). For example, the Department of Local Government and Traditional Affairs in the province took initiatives in the declaration of a drought disaster in 2013 (dlgta, 2013:1). Furthermore, the North-West Province submitted a request to declare a drought disaster in 2016 where eight provinces were classified under the national drought declaration. Thus, DM act 57/ 2002 prescribed a provincial government mandate as providing a supporting role to municipalities within their jurisdiction as regards ensuring full compliance with the National Disaster Management Framework (South-Africa, 2003).

4.3.1.3 Municipalities

Local government is primarily responsible for the coordination and management of local drought disasters that occur in its area. The role of local government is to declare a local state of drought, in terms of section 55 of the Disaster Management Act (57 of 2002), provided that:

- Existing legislation and contingency arrangements do not adequately provide for that municipality to deal effectively with the disaster or;
- Other special circumstances warrant the declaration of a local state of disaster. Such recommendation may be whether the affected department is the competency of local municipality, provincial or national government.

The municipality will also be required to establish a drought task team with local role players and assign responsibilities as regards drought impact assessment and drought monitoring. For example, the local agriculture sector and farmers associations can collect data relating to drought impact assessment and provide it to local disaster management centre. However, local disaster management centres will have to ensure the validity and reliability of such information and monitor the situation to ensure adequate resources as regards planning and response. Though all levels of government are generally involved in disaster risk management, the role and actions of local government in reducing disaster risk are particularly critical (Col, 2007:114), because they are required to play a key role in making communities resilient to disasters as they are rooted at the local level where disasters happen (Malalgoda *et al.*, 2016:702).

In light of this, Jordaan *et al.* (2013:56) suggest that, since normal dry periods that lead to drought events will continue in South Africa, all parties should plan for drought to prevent the dependency syndrome where farmers expect from government to assist them during every dry period.

4.3.1.4 Department of Agriculture and Rural Development (DARD)

The Department of Agriculture and Rural Development (DARD) views the declaration of drought as limited to natural hazards. In conducting a drought impact assessment, the national Department of Agriculture depends on the information from agriculture advisory services and local communities during provincial impact assessment. Anderson (2008:2) views agricultural advisory services as vital among the array of market and nonmarket entities and agents that provide critical flows of information that can improve farmers' and other rural peoples' welfare. During the assessment, the main focus area centres on key determinants such as veld, livestock, fodder and crops, weather and climatic conditions and water supply systems to ascertain whether the disaster was beyond the farmers' control or not (Department of Agriculture, 2005:20). Correctly so,

because to evoke Section 56 of Disaster Management Act (57/ 2002), national treasury will approve deviation from supply chain management process or allocate funding for a declared drought disaster only in terms of the following considerations:

- Whether any prevention and mitigation measures were taken and if not the reasons for the absence of such measures;
- Whether the disaster could have been avoided had mitigation measures been taken;
- Whether it is reasonable to expect that prevention and mitigation measures should have been taken in the circumstances;
- Whether the damage caused by the disaster is covered by adequate insurance and if not the reasons for the absence of insurance or inadequacy of insurance cover;
- The extent of financial assistance available from the community, public or other non-governmental support programmes and

The magnitude and severity of the disaster, the financial capacity of the victims of the disaster and accessibility to their commercial insurance.

4.3.1.5 Department of Water and Sanitation (DWS)

Drought management from a water resources perspective is concerned mainly with mitigating the effects of prolonged periods of lower-than-average runoff in streams and rivers, by providing water to users from storage dams. However, because the duration of droughts cannot at present be predicted with any certainty, water in storage dams must be used judiciously and it may be necessary to impose restrictions on water use when drought continues longer than expected. Where restrictions are necessary, water to meet basic human needs will always receive priority in allocations, followed by strategically important uses such as power generation and key industries. In general, water for irrigation is restricted first. However, recognising the negative impacts of such restrictions, the Department will aim to provide notice to organised agriculture of their need as early as possible. The Department will, therefore, co-operate with the national Department of Agriculture to engender a drought working group established by the National Disaster Management Centre to develop measures aimed at mitigating the effects of drought. The Department's interest in this regard lies particularly in the area of information management (see below). It is anticipated that the working group will clarify the institutional responsibilities for dealing with the various dimensions of droughts. (National Water Resources Strategy, 2004:109).

4.3.1.6 The Department of Environmental Affairs, Forestry and Fisheries

The preceding section (4.2.1) discusses the supreme law of the South African government that has mandated several entities to develop measures in ensuring compliance. Section 24(b)(iii) of the Constitution of the Republic of South Africa, 1996, state that, everyone 'has the right protected environment, for the benefit of present and future generations, through reasonable legislative and other measures that secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development (South Africa, 1996). Consequently, in planning for drought that is regarded as one of the hazards that impact on environment, the Department of Environmental Affairs through the Minister may make model by-laws aimed at establishing measures for its management within the jurisdiction of a municipality that may be adopted by a municipality as municipal by-laws (South Africa, 1998b). These by-laws must be able to

- Mitigate adverse environmental impacts by drought;
- Facilitate the implementation of decisions taken and conditions imposed as a result of the authorisation of new activities and developments, or through the setting of norms and standards in respect of existing activities and developments;
- Ensure effective environmental management and conservation of resources and impacts within the jurisdiction of a municipality in cooperation with other organs of state;
- Introduce measures for environmental management that may include (a) auditing, monitoring and ensuring compliance; and (b)reporting requirements and the furnishing of information(South Africa, 1998c).

Thus, Starr (1987:29) suggests that understanding that drought-induced impoverishment has its roots in the differential ability to bear risks linked to environmental variability, it is important to formulate sound policies to ensure protection to the environment (Starr, 1987:29).

4.4 CONCLUSION

The focus of this chapter was to look into the existing legislative framework in South Africa to implement drought risk reduction and drought risk management. The chapter also focused on how different spheres of government in South Africa use the prescribed legislation to inform their respective planning and response to drought disaster. The chapter aligned itself on the foundations set by international standards in responding to drought incidents (see Chapter 3). Even though South Africa has one of the best constitutions (108/ 1996), including world

recognised legislation in Disaster Management Act (57/ 2002), the study shows that a lot needs to be done to ensure implementation and compliance to this piece of legislation.

One of the challenges addressed in this chapter is the difficulty encountered by policymakers in developing drought-related policies and, also, that responding to drought differs from region to region. The chapter emphasised the importance of an integrated and coordinated approach in drafting drought policies, that is, drought does not affect government institutions only and it also affect private institutions. The chapter thoroughly discussed the role of different sector departments in preparing and responding to drought incidents, especially towards ensuring that policies developed to motivate the transition from crisis management to risk management.

In the end, the chapter discussed the role of different spheres of government in dealing with drought and the importance of coordination between these three spheres of government in ensuring that service reach the community on the local level. The chapter also emphasises the fact that policies of government must complement each other to avoid confusion when it reaches the lower level of government.

CHAPTER 5: EMPIRICAL FINDINGS AND ANALYSIS

5.1 INTRODUCTION

The previous three chapters provided considerable information from the literature that shapes research on drought. Chapter 2 of the study provided a comprehensive review of the literature regarding perspectives on drought issues relating to its physical attributes as well as economic, social and environmental impacts. Chapter 3 provided DRR strategies and frameworks established at the international and regional levels aimed at reducing the risk of disasters. Chapter 4 focused on the broader policies and legislative frameworks for reducing disaster risk in general terms and specifically for drought-related issues in South Africa. Emerging from these chapters are clearly defined strategies and efforts as expounded by different role players in realising integrated governance mechanisms for drought in the North-West Province, thus providing a base for the empirical findings in this study.

This chapter commences by summarising the research methodology applied in the study, as outlined in detail in chapter 1. Outlined in the research methodology section is the justification for the choice of mix method research design. This is followed by providing the reader with sampling techniques and then a discussion of data collection tools selected for the study after which a brief description of how data was analysed and presented will be outlined. The large part of this chapter is dedicated to presenting and analysing the findings of the study. The last section of the chapter provides the discussion of the findings and the conclusion drawn.

5.2 RESEARCH METHODOLOGY

Research methods are an integral and essential part of any research project as they determine its success, validity and reliability (Alshenqeeti, 2014:39). As already indicated in section 2.1 of this study, there is a clear indication that drought as the main subject under investigation is a complex phenomenon, hence past studies used approaches to provide resolutions on addressing societal challenges. It must also be noted that most of those studies focused mainly on the causes, effects and impact of drought on livelihoods. Thus, the present study focused on addressing elements of coordination when responding to drought, providing a basis for the choice of research method to develop an integrated governance mechanism for drought.

5.2.1 Research design

This study applied mixed-method research and specifically an exploratory sequential mixed methods design was chosen. Teddlie and Tashakkori (2009:7) view mixed method as an alternative to the quantitative and qualitative tradition in the sense that it advocates the use of

methodological tools required to answer the research questions of a given study. Whereas Bergman (2008) believes that the advantage of using a mixed-method research design to investigate a certain domain of social reality can be found in parallel with the examination of a physical object from two different viewpoints or angles. In a mixed-method research design, the researcher has an opportunity to conduct face-to-face interviews and quantify the response from the decision-makers in this case, within the government of Province, farmer's association, NGOs, academia and the communities including farmers and farmworkers.

5.2.2 Sampling

The study employed purposive and snowball sampling techniques to collect data. This was a result of recruiting respondents who have garnered vast experience regarding drought and its effects in their field and life history in general. Taylor and Bogdan (1998:34) indicate that the unique feature of 'life history' is that they are recorded in the first person's own words and not translated into the language of the person investigating the case. As such, Tongco (2007:148) accentuates that researchers deliberately choose purposive sampling as a result of the qualities the informant possesses. The key informants purposefully selected referred the researcher to other potential respondents who could add value to the findings of the study, thus bringing in the snowball sampling technique. Handcock and Gil (2011:369) view snowball sampling as a method that allows those identified to also identify other members of the population for constructing a frame from which to sample. For example, in this study, some of the respondents were identified by the PDMC, which is primarily responsible for Disaster Management in the North-West Province (SA, 108/ 1996).

The sample size in the study was determined based on theoretical saturation during data collection. Mark (2005:5) views data saturation as the point in data collection when new data no longer bring additional insights to the research questions. A total of 28 respondents participated in the study. The following sampling size was achieved (see Figure 5.1).

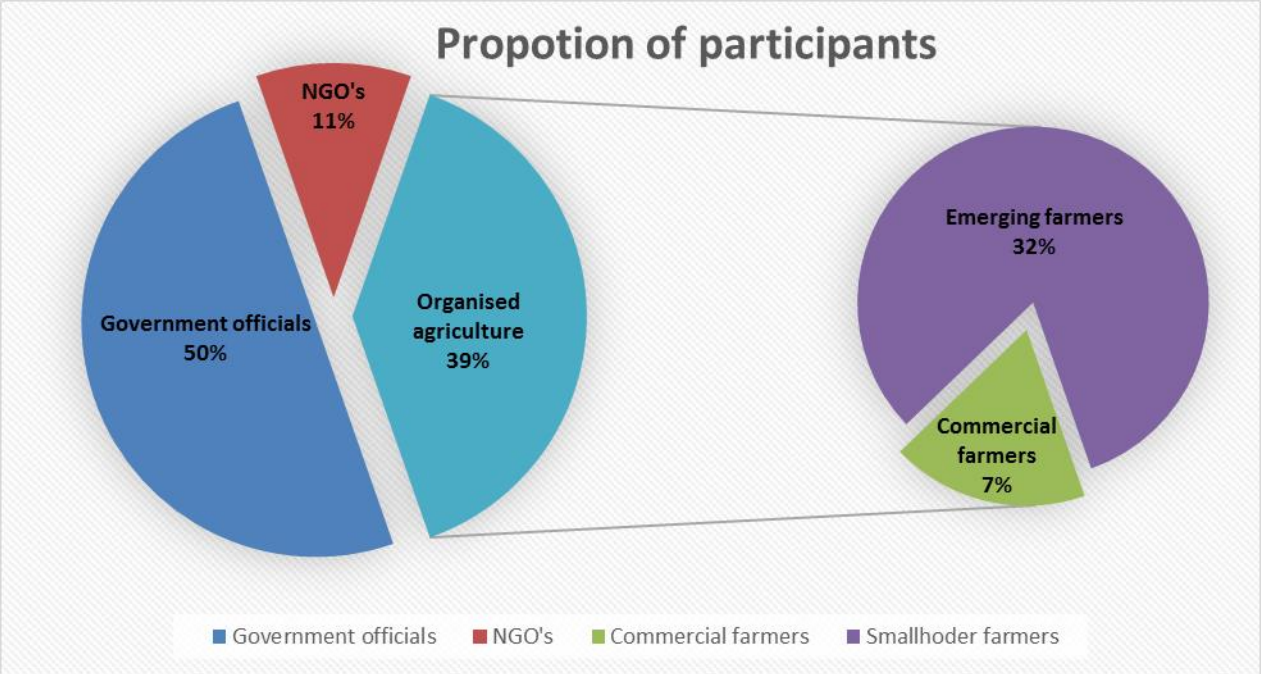


Figure 5-1: Representative of the participants in drought research North-West Province

Figure 5.1 above shows a sampling size during the data collection process in this research. As reflected in Figure 5.1, most respondents (50%) originated from government departments at provincial, district and municipal levels within the North-West Province. This includes departments such as South African Security Services Agency (SASSA), Department Social Development, Women, Children & People with Disability (DSDWCD), Department of Agriculture and Rural Development (DARD), Department of Water and Sanitation (DWS), Department of Agriculture Forest and Fisheries (DAFF), Department of Finance (DoF), Provincial Disaster Management Centre (PDMC), Mahikeng Local Municipality, Ngaka Modiri Molema District Municipality and Ratlou Local Municipality. Thirty-nine percent (39%) among the representatives were respondents from organised agriculture including commercial farmers represented by farmer's unions such as Agri North-West (Agr-NW) and Agriculture Farmers Association of South Africa (AFASA); emerging farmers including small scale- and communal property association (CPA) farmers and farmworkers. Eleven percent (11%) of total respondents were from the NGOs which includes entities such as the Agricultural Research Council (ARC), South African Weather Services (SAWS) and the South African Red Cross.

Thus, the representatives were participants who were directly affected by drought in the North-West Province. In other words, among the mentioned participants, some were on the receiving

end of the effects of drought and those who implement measures to address or mitigate the impact of drought.

5.2.3 Data collection

The study used questionnaires and face-to-face interviews with all participants. During the interviews, a recording device was used to store the data to retrieve such information later during transcription. Further data that was crucial was presented in the form of documents that indicate past drought intervention strategies used by different departments, including data that showed rainfall patterns and dam levels in the province.

5.2.4 Data analysis

Vanden Bos (2007:257) defines data analysis as the process of applying graphical, statistical, or quantitative techniques to a set of data (observations or measurements) to summarize it or to find general patterns. Since the study used a mixed-method research design, Onwuegbuzie and Combs (2011) are of the view that data analysis should consist of analysing the qualitative data using qualitative methods and the quantitative data using quantitative methods. The data collected through semi-structured interviews and questionnaires were used in analyses to formulate facts as regarding integrated governance mechanism for the recurrence drought in the North-West Province. This process involved several steps including organizing data, coding data, organising themes, representing data and forming an overall interpretation (Creswell, 2013:179).

The next section discusses the findings of the study, thematically presented.

5.3 FINDINGS AND DATA ANALYSIS

This section presents the findings of the study from data collected through face-to-face interviews and questionnaire conducted with research participants. Interview responses were transcribed verbatim with a Microsoft tools, Doc tool. Thereafter, Excel was used to analyse questionnaires and interviews to identify the core themes emerging from the study. The findings of this study as presented below are outlined according to the identified themes as listed in Table 5.1 below.

Table 5-1: Shows themes and sub-themes of the study

No.	THEMES	No.	SUB-THEMES
5.3.1		5.3.1.1	Definition of drought

No.	THEMES	No.	SUB-THEMES
	Respondents' perspective of drought in the North-West Province	5.3.1.2	Causes of drought
		5.3.1.3	When drought becomes a disaster
5.3.2	Vulnerability of North-West Province to drought	5.3.2.1	Factors that make the province vulnerable • Climatic conditions • Man-made • Political factors
		5.3.2.2	Vulnerability of Agriculture sector
		5.3.2.2	Vulnerability of water sector
5.3.3	Impacts of drought in the NW province	5.3.3.1	Main sectors affected by drought
		5.3.3.2	Environmental impacts
		5.3.3.3	Social impacts
		5.3.3.4	Economic impacts
5.3.4	Integrated governance mechanism for drought	5.3.4.1	Role players in addressing drought
		5.3.4.2	Available systems in addressing drought
		5.3.4.2	Coordination and communication enhancement

5.3.1 Thematic area 1: Respondents' perspective of drought in North-West Province

Information that contributed to the development of this theme emanates from the respondent's general understanding of the concept of drought. The main objectives were to find out respondents' perceptive on drought, with the insight their understanding of drought in the province, its causes and impact on the society at large and how it becomes a disaster.

5.3.1.1 Respondents' definition of drought

A substantial number of respondents' definitions of drought were region-specific and the debate centred on the importance of water for livelihood. Respondents are of the view that drought is the effect of climatic variability resulting in a lack of rainfall for a prolonged period. Equivalently, non-climatic factors such as exploitation and depletion of above-ground- and underground water resources were observed as contributing to lack of food and water scarcity for human consumption, irrigation and livestock. The statements below present one or two definitions provided by respondents:

'Drought is dryness of land where crops and trees are unable to grow as a result of water shortage posing a devastating effect on livelihood and livestock' (farmer respondent)

'Drought is lack of rainfall which is currently the recurring feature in the North-West Province. Its devastating impact on ordinary people and the economy require proper planning' (government respondent)

Respondents demonstrated that acquired knowledge of drought was built on the substantial experience gathered from the drought of the past years; 1976, 1987, 1992, 1999, 2000 and 2015/ 2016. In essence, generally, respondents propose that this past drought episode should be used as a benchmark that helps to prepare and plan for future drought in the province.

5.3.1.2 Respondents' perspective on the causes of drought

Emerging information in the preceding section served as the basis of understanding the origin of drought in the North-West Province. Thus, providing respondents' perspectives regarding the cause of the drought. Respondents point to four essential factors as primarily causing drought in the North-West Province, namely semi-arid conditions, poor rainfall water loss, climate change and the human factor. The statement below captures the essence of factors causing drought in the province:

'Distribution of rainfall in the North-West Province differs with regions. For example, drought-stricken areas such as the western part and some of the central parts of the province record below normal rainfall regularly' (NGOs respondent)

'A region such as Ratlou in Setlagole and most western parts of the North-West Province are regarded as semi-desert area, hence experiencing recurrent features of drought' (government respondent)

'*As we speak there is a high volume of water losses in our infrastructure. Around 35% of water is lost in our Municipalities as a result of water leaks*' (government respondent)

'We have experienced drought in the past but the current ones are extreme as a result of climate change, contributing to its recurrent features' (farmer respondent)

One of the factors perceived as critical in the cause of drought is water loss within municipalities. DWS as primary role player in the provision and regulation of water across the North-West province raised a serious concern regarding the substantial amount of water lost as a result of dilapidated and ageing infrastructure by numerous municipalities. In consequence, such water loss escalated water shortage and drought element to areas where favourable amount of rainfall is recorded. The statement below covers this concern:

'Although Kgetleng Rivier municipality is situated in an area favourable to rainfall, the area is experiencing manmade drought due to old infrastructure. Drought is severe in Kgetleng Rivier where municipal dams are dry and need rehabilitation' (government respondents)

The results in quantitative findings as reflected below in Figure 5.2, are in line with the above mentioned qualitative findings.

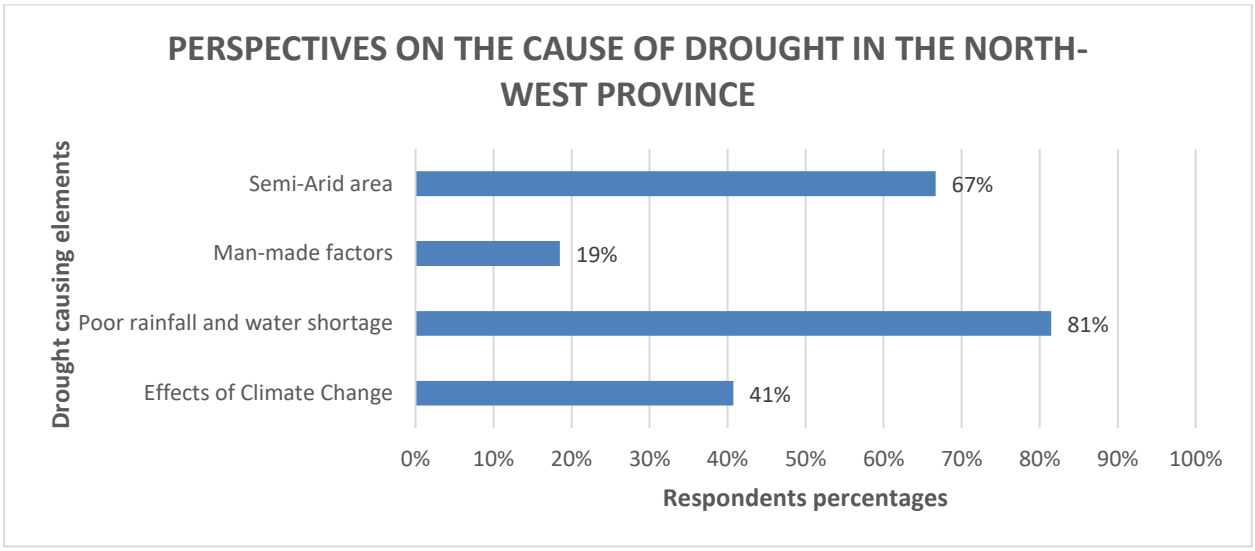


Figure 5-2: Proportions of respondents on the perceived causes of drought in the North-West Province

The results reveal that poor rainfall and water shortage (81%) and the semi-arid conditions (67%) are the highest main causes of drought in the North-West Province. This is followed by the effect of climate change (41%) and manmade factors (19%) respectively.

Thus the findings reveal that uneven rainfall distribution in different parts of the North-West Province resulted in some part of the province experiencing water deficiency and this lead to drought.

5.3.1.3 Perspective on drought becoming disastrous

There was a high level of consensus amongst respondents that, the ability of drought to manifest itself in a large portion of the province makes it disastrous. According to some respondents information at their disposal serves as a proof that recent drought collapsed food production and water supply in some western and central parts of the North-West Province, making it one of the most disastrous events ever. Respondents were critical regarding the capacity of North-West province in managing drought. As a result, prolonging drought episode and exacerbate the impact on ordinary community who in most cases depend on government as an alternative for quick response in provision of relief. The response below confirms this:

'Drought becomes disastrous when there are no alternatives at all and that is whereby there is loss of lives both livestock and human' (government respondents)

'*Drought becomes disastrous when it is continuous and it affects the supply in terms of the food chain, including when people are unable to be self-sufficient regarding food production* ' (government respondent)

'Drought becomes disastrous when a large area of the province is affected and the province cannot cope whereby it resorted to declaration of drought disaster' (government respondents)

Regarding water supply, the general view is that the province experience disastrous drought when rainfall measures less than 350mm per annum. These correspond with data received from SAWS (see Figure 5.3) which illustrate that amongst nine provinces North-West Province was the second last to receive below-normal rainfall during 2006-2015 season.

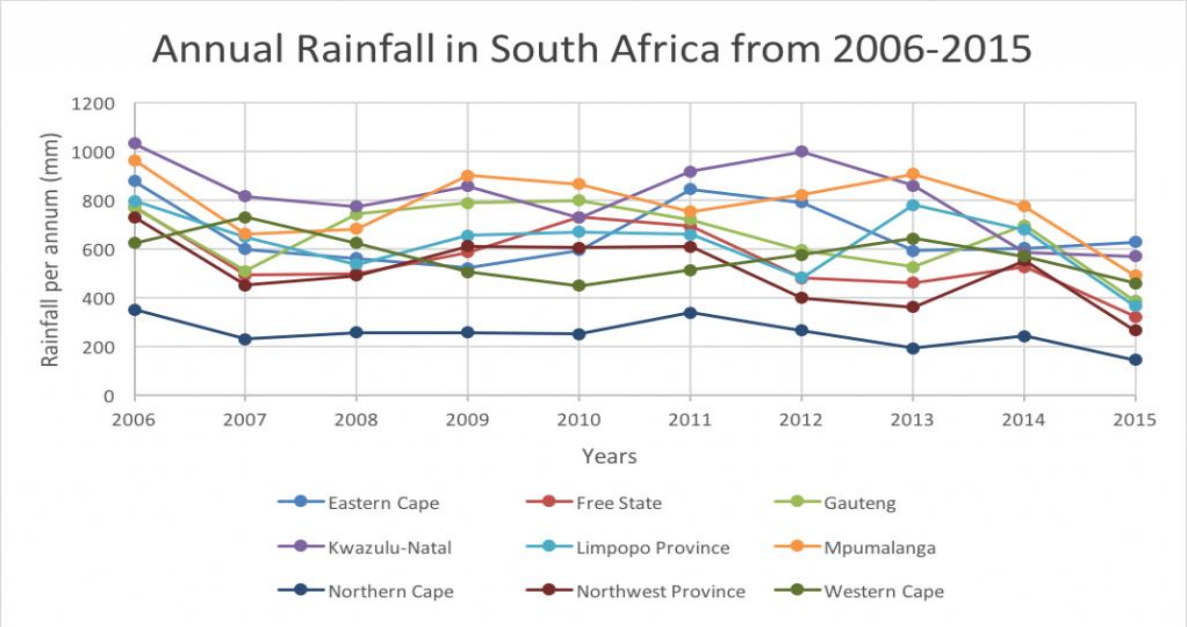


Figure 5-3: Annual Rainfall in South Africa 2006-2015

The results on (Figure 5.3) show that during the drought of 2015/2016, North-West Province recorded the lowest amount of rainfall (below 350mm / annum) than other provinces. Such below par rainfall possesses a severe impact on water resources and food production, hence considered catastrophic. The statement below reflects this finding:

'*When annual rainfall average is less than 350mm in the province, it's a recipe for disaster*' (farmer respondent)

Consequently, respondents noted a tremendous role displayed by climate change in ensuring that elements of drought in the North-West province manifest itself to become disastrous. Subsequent to that, the semi-arid nature of North-West province makes it vulnerable to the effects of climate change.

5.3.2 Thematic area 2: Vulnerability of North-West Province to droughts

This theme revolved around the respondents' opinion based on their experience and knowledge of the effect of drought in the North-West Province. A variety of factors regarding the vulnerability of the province to drought were cautiously identified. Some of the responses are captured in the following statements:

'North-West Province will always have drought, it is a recurring thing and has been part of the Province for years'(farmers respondent)

'*North-West Province is affected by agricultural and hydrological droughts and affect mostly farming community'*(government respondent)

'*North-West Province is not that bad when coming to drought in the eastern and central part but the main problems are in the western part of the province*' (SAWS respondent)

One of the contributing factors behind the vulnerability of the province to drought related to arid conditions is some of the regions such as western and central areas. Such conditions had a tremendous effect on the two main sectors (agricultural and water).

5.3.2.1 The vulnerability of the agricultural sector to drought

The general perception of respondents is that the agricultural sector is at the epicentre of drought in the North-West Province. When affected by drought, the agricultural sector contributes to a high level of poverty and hunger within the province and is thus viewed as an essential sector in the province, particularly maize production.

'*North-West Province is known for maize production in South Africa, hence when drought affect production of maize the whole South Africa is affected*' (farmer respondent)

Respondents point to one of the factors which is regarded as a driving force and critical to agricultural drought vulnerability. This factor is *land use.*

Approximately all those who participated registered a serious concern regarding a huge gap between small scale- and commercial farmers. Respondents' perspectives concerning the most vulnerable group within the agricultural sector is the emerging farmers. Correctly so, because commercial farmers own a considerable size of land for agricultural purpose, whereas a large number of the emerging farmers are tenants or do not own a piece of land. Some of the responses are captured in the following statements:

'*Drought possesses a devastating effect mostly on smallholder farmers, of which significant amount are blacks. These farmers falls a victim of drought for the reason that, they are situated on the communal land of which they do not have control over*' (farmer respondent)

'Almost *farms which are acquired through Communal Property Association (CPA) experience a problem of trading commercial though were used for commercial farming in the past. For that reason, these farms, are unable to sustain themselves, hence farmers lack knowledge in the field of farming'* (government respondent)

Critical for farming in CPA areas is that farmers are clustered in one property and are expected to share little resources available. As a result, putting dependence on government to provide relief during a drought period. Unlike commercial farmers, the uttermost part of them are sole owners of a huge portion of land and can use their property as an insurance when borrowing money and mitigate the drought impact.

5.3.2.2 Vulnerability of water

According to Beinart (2003), dryness was not so much a product of failing rains but was the result of a combination of natural factors and failed conservation practices (such as overstocking), resulting in the inability of the ground to absorb water. General view from respondents is that some part of North-West province receive normal rainfall, enabling farmers to harvest rainwater in case of a poor season. However, regions which are in the western and central parts of the province receive below normal rainfall, resulting in all those who are dependent on rain vulnerable. The statements below support this arguments:

'*Even though drought affect the whole North-West Province, Ipelegeng is worst, water is a challenge in Ipelegeng we have three weeks without water*' (Farmer respondent)'

'*Our region is mostly affected by drought because is semi-desert. It is difficult for vegetation to grow because our soil is sandy and prone to drought*' (Government respondent)

'*The water levels in Ratlou are very weak and differ when comparing the South and the North. For instance, to dig a borehole in Setlagole is 100m deep whereas in Ratlou South is 30m deep*' (Government respondent)

Most areas around the CPAs and villages were identified by respondents as lacking the infrastructure to harvest and conserve water. Such areas are vulnerable to drought since they are dry at all times and depend on rainfall to irrigate their crops, with little water storage facilities.

Vulnerability of water supply was also identified in areas where favourable rainfall is recorded, this, as a result of dilapidated and ageing infrastructure. For example, Kgetleng Rivier and Ventersdorp were viewed as drought-stricken areas, although a substantial amount of rainfall is recorded in those areas.

5.3.3 Thematic area 3: Impacts of drought in the North-West Province

Though respondents pointed to diverse impacts of drought in the North-West Province, impacts on various sectors were also identified:

5.3.3.1 Main sectors affected by drought

Even though respondents share the same view that drought possesses a devastating impact on different sectors, two sectors were identified as affected the most by drought in the North-West Province. These sectors are the agricultural and water sectors.

- *Agriculture sector*

Predominant part of the respondents subscribe to the fact that the agricultural sector in the North-West Province is sensitive to drought phenomenon than any other sector. Respondents consider agriculture as one of the commodities that play a significant role in the economy of the North-West Province. As a result, the disturbance on agriculture sector operations exerts secondary impacts on other sectors. The principal part of the agriculture sector that endure the effect of drought include field vegetation and livestock. The following statements are some of the responses from the respondents:

'During drought, there is less agriculture production due to dry field, thus, affect animals grazing land and food security' (government respondent)

'Drought affects many lives and livelihood especially emerging farmers who rely on the Department of Agriculture to be sustainable' (farmer respondent)

'Drought leads to high demand and less supply of food due to agricultural business that closed shop, affecting farmers' (government respondent)

- *Water sector*

Respondent's perspective is that the water sector is one of the major part to be affected by drought, even though recognised as a sector that provides a variety of options with regards to sourcing of water. These include water from boreholes, dams and rivers. According to respondents, for these water sources to be sustainable, the province rely on the average amount of rainfall intended for the province. The following responses are in support of this statement:

'During drought dams, boreholes and catchment areas were depleted and water level going down drastically' (NGOs respondent)

'There is a need to maintain catchment areas for rainy seasons; catchment areas can store water until the next rainy season' (government respondent)

'Lack of rain lead to a shortage of water in our dams which are used for domestic and commercial use. As such, water is unable to meet basic requirements and serve ordinary people and farmers' (government respondent)

Consequently, major part of the respondents are of the view that the impact of drought on sector departments and society are diverse but not common. Such impacts are environmental, social or economic.

5.3.3.2 Environmental impact

Deteriorating animal grazing fields were viewed as one of the contributing factors in the environmental impact caused by drought. Views from some of the respondents is that such conditions are realised mostly in CPA areas especially in the central and western parts of the North-West Province. Respondents indicate that, when continuing to graze livestock in areas where grass does not grow as normal, will destroy the field and there is a possibility that grass will never grow again, even during the rainy season.

'Drought in some parts of North-West is severe in such a way that after the drought episode there is a need to re-plant grass again to increase the production of fodder' (NGOs respondent)

'The biggest challenge we experience during drought is that livestock have no choice but to graze grass to the roots making it difficult to grow again' (government respondent)

Additionally, another concern is the lack of systems within various municipalities in protecting the environment, thus leaving the environment vulnerable to hazards such as fire and air pollution. These are some of the responses from respondents to support this statement:

'Here in Ratlou, we are experiencing a devastating fire damages during drought episodes, as a result, our livestock are suffering due to destroyed grazing land' (government respondent)

'Fire department is experiencing difficulties in fighting fires due to lack of water' (farmer respondent)

Emerging from that, some share the same perspectives that in fact, veld fires also contribute to the cause of droughts in the North-West Province. This impacts the environment by keeping the land dry and leaving most farmers suffering due to a lack of grazing land.

In regards to pollution of environment, respondents point to dying animals, birds and fish as the main contributing factors. Similarly, the experience has shown that this species are the main cause of water pollution, thus posing a threat to disease outbreak.

'During drought most cattle are trapped in shallow dams trying to drink water and are unable to pull themselves out of the mud due to weakness' (government respondent)

Such cases were encountered by government officials around Mahikeng where livestock was trapped in Ntontonyane river trying to survive thirst. Similarly, contamination of water in most dams and rivers poses danger to biodiversity. Some of the respondents indicated the following:

'It is important to look after our dams during drought to protect biodiversity' (government respondent)

'*Drought impact very much on the environment when animals and fish start to die due to diseases. The smell from these dams impact on the air we breathe'* (government respondent)

5.3.3.3 Social impacts

Overwhelming response indicated that drought impact on animal grazing land resulted in farmers looking for an alternatives means of survival throughout the drought episodes. This includes migration to areas which have favourable climate to provide food and water for livestock.

'The impact of the drought is so severe in such a way that some of the emerging farmers relocated their livestock to areas where there is less effect of drought' (government respondent)

'Drought leaves farmers with no option but to forcefully reduce their livestock, as such emerging farmers are unable to grow and reach the status of commercial farming' (government respondent)

These conditions are mainly experienced by emerging farmers, hence commercial farmers have built a solid relationship among themselves and can assist each other during drought.

5.3.3.4 Economic impacts

There was a clear acknowledgement as regard to the prominent role played by both agriculture and mining sectors as drivers of the economy in the North-West Province. However, respondents are of the view that experienced recurrent drought produce a devastating impact on food security in the province, resulting in communities which are unable to sustain themselves or store enough food for the duration of drought episodes. Such conditions are realised around Ratlou municipality where farmers from the villages and CPAs around Setlagole are unable to advantage of Silos inherited through the land reform process. Hence Ratlou municipality is in the semi-arid region, farmers used this silos to store enough food, particularly maize to prepare and mitigate drought conditions. The statements below capture the essence of this argument:

'*Here in Setlagole, we have silos which used to store food but not anymore including those in the neighbouring villages are empty*' (farmer respondent)

'*We are experiencing challenges with farms acquired through CPA, they are not productive like before, competition for resources in these farms poses financial implication on farmers*' (government respondent)

Even though farmers in the CPAs are beneficiaries of the land reform process, view from the respondents is that most of them are new entrants in the farming field. In essence, commercial farmers are well established in the farming and are more resilient to drought conditions. Besides, they can adapt easily since they use their properties as security to borrow money from banks and mitigate drought impacts. The indication is that during drought more money is spent on feed and water due to reduced agricultural production. Thus, contributing to a huge impact on the economy of the whole of South Africa. Some of the responses are reflected in the statement below:

'Drought results in high demand and less supply of food leading to high food prices. In general, water shortage have a devastating impact on job creation and also on the development of economy' (government respondent)

Equivalently, perception is that those farmers who suffered economically, a large number of them have planted more crops with the expectation of making more returns. Their crops were affected by drought resulting in less food production and loss of revenues. As such, increasing food prices which exert a devastating economic impact on farmers and ordinary people. Hence, the statement from one of the respondents is that:

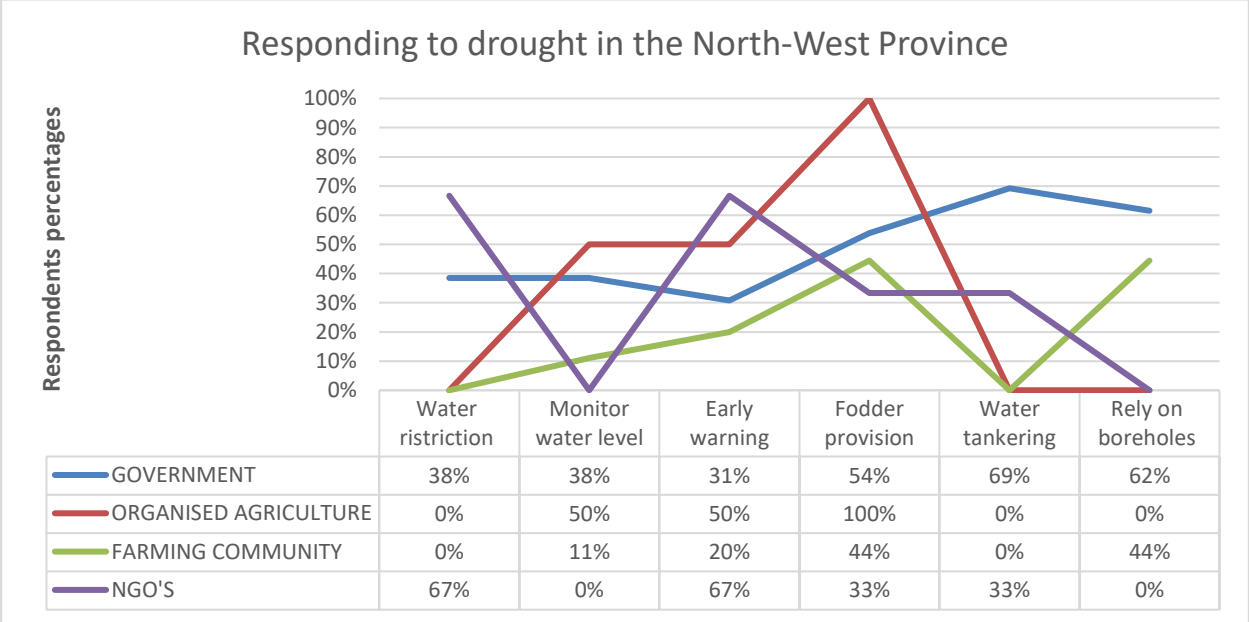
'involvement in drought must make sure it saves the economy of the province not to buy fodder to specific people' (farmer respondent)

Moreover, the indications are that once emerging farmers encounter losses economically, it becomes difficult to recover, hence the impacts are so severe that they exceed the amount of relief provided by the government.

5.3.4 Thematic area 4: Integrated governance mechanism for drought

This section forms the basis for understanding the role played by different role players in ensuring that drought is addressed in an integrated manner within the North-West Province. Respondents' opinions about mechanisms used to cope with drought point to a vast knowledge of drought existences across all the regions within the North-West Province. Nevertheless, the respondents

point to specific areas where drought is intense, requiring urgent attention of different role players. As such, the responses from participants provided the base to the transition of a paradigm shift in managing drought in the province. Some of these measures are presented in the below diagram (see Figure 5.4).



	Water ristriction	Monitor water level	Early warning	Fodder provision	Water tankering	Rely on boreholes
GOVERNMENT	38%	38%	31%	54%	69%	62%
ORGANISED AGRICULTURE	0%	50%	50%	100%	0%	0%
FARMING COMMUNITY	0%	11%	20%	44%	0%	44%
NGO'S	67%	0%	67%	33%	33%	0%

Figure 5-4: Proportion of strategies used to respond to drought in the North-West Province

The results in the above figure (Figure 5.4) show various mitigation strategies as perceived by respondents to deal with drought in the North-West province. These include implementation of water restrictions by government or water service authority, constant monitoring of water levels from water resources such as groundwater (boreholes) and open source (dams), provision of early warning, provision of water using tanks, drilling and maintenance of boreholes and declaration of drought disaster.

5.3.4.1 Systems put in place to address drought

The results in Figure 5.4 show that various role players have put systems in place to address drought in the North-West Province. However, view from respondents is that some of the systems are deemed to be ineffective and needs to be reviewed. Additionally, little information was shared with the general public regarding the implementation of drought mitigation systems.

- Drought monitoring

Significant to drought monitoring, common view is that monitoring instruments installed by SAWS to detect and measure average rainfall by region are of much importance. Respondent from SAWS, affirms that readings from such instruments will indicate based on the intended average rainfall whether the province is on the risk of experiencing a drought situation. In general, the system issue a warning to those at risk and the expectation is that farmers and relevant departments will adhere and apply mitigation measures. The statement below supports this statement.

'Stakeholders are advised to take advantage of early warning to monitor all water resources around the province and conserve water' (NGOs respondent)

On the contrary, PDMC, DWS and CISR were also recognised as playing an important role in monitoring water levels from dams and boreholes every month across the province.

'Monitoring of drought include measuring of water levels across the province, this also includes water from underground sources which serves as the main water supply to most rural areas' (government respondent)

According to respondent from the PDMC, emanating from drought monitoring process, red flags are issued to water users when there is a sign of below-average rainfall, thereby requiring the implementation of mitigation measures. However, to communicate correct information, data received from multi-hazard dashboard tools are sent to various municipalities to verify. Municipalities will then conduct site visits to identified dams and recapture readings on installed monitoring devices, after which a report is sent back to PDMC. The statement below justify such practice:

'The model which we use to monitor drought is satellite-based tool and is a collective effort by the department of water, CISR and PDMC' (government respondent)

Comparably, respondent from ARC indicates that to provide assistance to farmers and cope with the climatic condition by mitigating drought risk, Agri-cloud Application was developed. This App is useful to farmers in the sense that it issues climatic warnings and provides planting time and techniques to vulnerable farmers. The following statement registers some of the concerns from respondents:

'To cope with drought there is a need to provide planting method of crops and time to plant in prevention to crop losses' (Respondent from Social development)

In light of this, depletion of water from open and underground resources poses a negative impact on businesses and livelihood, thus requiring strict measures from all affected. As such, water restrictions are introduced by water service authorities and the municipality.

'There is a need to embark on weekly restriction of water use from dams, to prevent extraction of all water from the source in the protection of biodiversity, hence municipalities and businesses rely on surface water to sustain themselves' (respondent from DWS)

The indication is that general water use for irrigation, washing of vehicles using hosepipes and watering of lawns with sprinklers and pipes are normally discouraged during drought.

- Drought risk management: provision of feed and water

An overall view is that those affected by drought are highly depended on the government for relief. Accordingly, traditional mind-set by government to mitigate drought impact is by providing relief to the affected farmers and society at large. However, such relief does not reach affected parties in monetary value, it mainly focused on consumables such as feed and water. Concerning feed, respondents from departments such as READ indicated that their focus was based on the provision of relief in the form of fodder to farmers, specifically for livestock. Whereas a department such as SASSA has introduced a poverty alleviation programme that focuses mainly on the provision of food vouchers to the affected families. The following responses support this statement.

'During drought, our department provides farmers with fodder for animals to have something to eat' (Respondent from READ)

'We have a programme called Inter-community Relation Outreach Programme (ICROP), which mainly focuses on poverty-stricken families as a result of drought. During this programme, we issue those affected with food vouchers and refer them to other sectors for further assistance' (Respondent from SASSA)

However, some respondents indicate that, as much as they appreciate the efforts from READ, the relief does not solve their problem. These respondents argue that the type of relief is made compulsory to all farmers irrespective of individual farmers' needs.

'Farmers received 14 bags of fodder as a donation which is not enough. These will last for only two days when you have 20 cows' (Respondents from organised agriculture)

'A Farmer is issued fodder whereas needs a water pump, maize or mix' (Respondent from Organised agriculture)

About the provision of water as part of a drought relief strategy, respondents have acknowledged efforts by DWS and municipalities in ensuring that affected communities have access to water. Respondents from DWS indicated that their primary responsibility is to provide water and ensure that all water resources are in good condition. Therefore, during drought, the department's main focus is the provision of water for human consumption using water tanks in urban, rural and remote areas such as villages. In addition to that, DWS embarks on borehole and dam's refurbishment or drilling of new boreholes

'Only a few municipalities have water tanks trucks. Some they don't have a budget for water resources. As a result we also assist in those areas where municipalities are unable to cope with water provision' (respondent from DWS)

However, another view which is critical to the provision of relief is that some people take advantage of drought situations in the province to pursue their unlawful activities. The responses below reflect this sentiment.

'*Some people are misusing the current system of drought relief to make sure that they benefit many times more than others. For instance one register in four different places either by using different names but same id number*' (NGOs respondent)

'*Experience has shown that not real farmers are assisted during drought some disguise as farmers and keep relief for officials*' (farmer respondent)

'*Drought disaster declaration allocated funds to our province, however, in many occasions this is viewed as an opportunity to make people rich and that relief does not reach people it intended to*' (NGOs respondent).

'*During drought relief distribution event organised to carry out such function use more money that relief materials issued*' (government respondent)

5.3.4.2 Primary role players during drought

Several organisations have been identified as the main stakeholders involved during drought, as reflected in Table 5.4 below. However, respondents are of the view that some of these role players are nowhere to be found during drought assessment, they emerge during the relief process. This also resulted in duplication of effort by certain sectors.

Table 5-2: Role players and responsibility during drought

Role player	Roles and responsibility
READ	Provision of livestock feed
DWS	Provision of water for human consumption using water tanks and drilling of boreholes.
SASSA	Provision of food parcels for human consumption
SAWS	Drought monitoring and provision of early warning
ARC	Drought detection and advise farmers on type of crops to plant and right the right time to plant
DRDLR	Provision of feed and water for livestock
Municipalities	Provision of water for human consumption to communities
PDMC	Establishment of drought coordinating committee, assist and advise municipalities regarding drought prevention and mitigation, declaration of drought disaster and monitoring of drought relief process

Table 5.2 above shows a summary of responses from participants regarding different role players 'responsibilities in responding to drought in the North-West Province. The results show that the main focus by the role players is based on the provision of feed and water, whereas, in the case of drought disaster declaration, the prerogative lies with PDMC

5.3.4.3 Coordination and communication during drought

Ordinarily, a variety of methods as regards to drought coordination and communication within specific sectors in the North-West Province were outlined. Such efforts were developed in principle to build capacity within sectors in managing drought risk.

- *Extension Services*

These services which are mainly utilised by READ and SASSA are identified as vital for the purpose in mitigating and reducing drought impacts in the province. According to the respondents,

these two sectors have championed the use of extension services across all corners of the North-West Province.

'During drought communication with both commercial and small scale farmers in the province is through agriculture extension officer' (respondent from READ)

'There are very strong extension services in the most rural part of the North-West Province such as SASSA pay points' (Respondent from ARC)

However, some of the respondents' perceptions regarding extension services indicate the need to improve such systems and empower it with skilled and passionate extension officers who will play an important role in communicating information. Some of the responses to support this statement are reflected below.

'Department of agriculture extension officers not visible on the ground and provide no information' (Respondent from organised agriculture)

'I am not sure about the role of agriculture extension officers. Their role must be clarified especially in educating farmers about the effect of drought' (government respondent)

Nevertheless, some acknowledge extension services provided by SASSA as a programme to alleviate poverty and provide food security to needy families.

'We have a programme in which we conduct an assessment across the whole province in which we identify poverty-stricken communities and organise integrated outreach programme to remedy the situation' (Respondent from SASSA)

- Establishment of JOC (Joint Operation Centre)

The general view from respondents is that the Provincial Disaster Management Centre (PDMC) plays a critical role in identifying relevant role players needed to manage drought across the North-West province. To achieve that, respondents indicate that a Joint Operational Centre is established.

During the drought we establishment a JOC and task teams together with relevant stakeholders to resolve identified challenges around drought response' (government respondent)

However, some of the role players concede that based on the information which is being shared during JOC little drought information is being disseminated within the local sphere of government. The following advice was shared:

'It is important for the Municipal Disaster Management Centres to communicate drought information to council' (Respondents from DWS)

Respondents are of the view that Disaster Management must be a standing item in all council meetings. In doing so, whatever resolution relating to disaster management that emanates from the council meeting will be binding and must be implemented.

'Disaster management office must be resourced to report on progress made and challenges regarding disaster risk such as drought' (Respondent from DWS).

Respondents believe that resourcing disaster management centres across the province will provide ground for the development of drought integrated support plans that will strengthen reporting. After that, to improve coordination and communication during drought, stakeholders need to submit plans that are going to guide the development of provincial disaster management plan

5.4 Discussions

Based on the results in the preceding section, it is clear that there is a convergent of qualitative and quantitative data. This is summarised below.

In thematic area 1, the analysis shows that the majority of respondents have experienced recurrent feature of drought and understand the ripple effects brought about by this phenomenon. The fact that drought affects humans, ecosystem and water supply in the entire North-West Province is not viewed as a hazard but as a disaster affecting livelihood and the economy of the province. These is consistency with the literature in section 2.3.2, which states that risk associated with drought remains a major disaster, causing huge damages to humanity, the environment and the economy.

However, the North-West Province is viewed by many as a semi-desert region with variation in the amount of rainfall per region. This stresses the need for measures to be put in place as coping mechanisms. This is in line with the literature in section 2.3.2 that drought provides sufficient time to prepare for and for measures to be put in place to prevent or mitigate its impact on society. Similarly, drought is not sudden; it provides ample time to organise resources and capacity to prevent it from becoming a disaster.

In thematic area 2, the results section shows that drought elements are not foreign in the North-West Province. This is because out of four districts found in the province, two are regarded as the most vulnerable. However, the mere fact that other parts of the province that receive normal rainfall also experience water shortage exacerbates drought episodes. In support of this, section

2.6 in the literature regards drought vulnerability as a product of a region's risk of water shortage and the exposure of the communities to the problems arising thereafter.

However, though the agriculture sector has been recognised as being vulnerable to drought in the province, the results show that commercial farmers are always resilient than emerging ones. In particular emerging farmers which are found in the CPA areas, are viewed as enormously vulnerable to drought. According to the literature in section 2.6.1, a clear lack of concern for land issues is realised in areas where land reform is taking place or where land rights remain unclear. Farmers in such areas have no powers to borrow money using the property as a security. Similarly, the vulnerability of the water sector is felt mostly by the poorest communities from affected villages and CPA than those in urban areas.

In thematic area 3, the results show that, although the agricultural sector is one of those affected by drought, for many years drought has threatened water supply in the municipalities across the North-West Province. Section 2.7 has underscored that the impact of drought hits the hardest when people depend too much on water supply and the aftermath of such drought events produce diverse and complex impacts in the sense that many sectors depend on water for producing goods and providing services. These impacts are mostly felt by poor people in the villages of the province in the sense that the area itself is semi-desert, there is limited water and population is increasing. However, the results indicate few contingencies measures which are put in place by responsible agencies, however, does not address societal problems relating to drought impacts. Such measures are regarded as being outdated in the sense that are unable to mitigate severe drought impacts. As such, resulted in social impacts where people and livestock migrate from drought-stricken areas (rural areas) to urban areas to look for a better environment to make a living. Thus compromising efforts of drought planning. In support of this, section 4.3 advised that urbanization makes droughts destructive and spatially extensive and that it is urgent to enhance drought preparedness planning across the nation to meet these increasing challenges from droughts.

In thematic area 4, the results point to a well-organised system put in place to govern drought in the North-West Province. This refers to JOC which serves as a drought coordinating committee. Composition of the committee is orchestrated by identifying some stakeholders responsible for drought governance in the province. Emanating from that, a variety of methods in responding to drought in the province were used by respective stakeholders. However, though some respond point to collaborative efforts among responsible agencies, gaps regarding drought governance were realised. The literature in section 2.8.2 suggests that making the transition from crisis to drought risk management has always been difficult because governments and individuals typically address drought-related issues through a reactive approach. Similarly, the results found

in the present study bring to light that during drought reliance is on government for the provision of relief. These approach of providing relief or emergency assistance to the affected areas or sectors became a traditional mind-set of most governments (section 2.8.2).

Though the result point to the knowledge of drought existence which is dominated by water shortage across the province, there is lack of adequate planning regarding the remedial actions and integration thereof, thus contributing to outcry from the communities concerning its recurrent features. The literature in section 2.8.1 outlines that planning for drought requires a proactive approach in which the primary concern is water shortage and most of the planned activities aim at reducing the effect of such shortage, through measures taken before, during and after drought. Additionally, section 4.2 points to the fact that since drought can be forecast ahead, failure to ensure adequate preparedness against such predictable risks would indicate obvious negligence on the part of government, exposing those responsible to heavy criticism and thus creating uncertainty.

5.5 Conclusion

Based on the findings in this chapter, it is evident that all responsible parties acknowledge the existence of drought in the North-West Province. Many are of the view that drought can no more be regarded as a hazard since its causes are mainly natural and possess a devastating impact on livelihood. Even though the study has found that there are systems and processes relating to managing drought risk in the province, the study identified some gaps regarding mechanisms for drought governance. These gaps relate to poor integration among sector departments, especially during drought coordination. The study has identified duplication of effort and communication breakdown in responding to drought in the North-West Province. Some of which are brought by reliance on the PDMC to oversee all processes of drought by those department (READ and DWS) who are supposed to resume primary responsibility. Sectors departments are unable to differentiate between coordinating activities and assuming primary responsibility during drought response. These resulted in frustrations voiced by such department that the PDMC does not have the manpower to successfully coordinate drought episode in the entire province. Sectors are of the view that this delay in drought coordination is because PDMC plays a player and a referee at the same time. Thus, resulting in the North-West Province unable to contain and manage an episode of drought which ultimately led to its recurrent features.

However, besides concerned raised about coordination challenges by the PDMC, there are some gaps identified regarding parallel structures within sector departments which are established for drought response. When sector departments in the province experience effects of drought, funds from national departments are reprioritised and channelled to specific departments to mitigate the

impact. However, the same departments benefit from the money allocated to the province through the declaration process, resulting in parallel response structures. Similarly, there is a lack of monitoring by provincial sector departments on their established structures at local level, thus proving the lack of intergovernmental relations.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

Drought has manifested itself as a recurrent hazard in the North-West Province in the last two or so decades. These led to many challenges for the broader communities in the province, as drought affect production, livelihoods and drinking water, thus requiring attention from different stakeholders within municipalities, province and national to mitigate its impact. Due to the recurrent nature of drought in the province, this study sought to provide an integrated governance mechanism to address drought. It is argued in this study that using integrated governance mechanism provide sustainable solutions to managing the risk of drought. With the proceeding chapter providing the findings of the study, this chapter provides the conclusions and recommendations of the study. The chapter opens by summarising the chapters of the dissertation after which it is demonstrated on how each objective was achieved. This is followed by a summary of the major findings of the study after which the major recommendations of the study are presented. In closing the limitations of the study and the areas for future research are identified before the concluding remarks are made.

6.2 Summary of Chapters

Chapter 1 of the study provided an orientation and an overview of the study. Most importantly, the problem statement, objectives and research questions are outlined in this chapter. A detailed account of the research methods applied in the study is outlined in this chapter. The chapter also addresses the ethical issues and provides a summary outline of the chapter.

Chapter 2 outlined an overview of drought as a hazard or disaster, the causes of drought, drought vulnerabilities, classification, drought impacts and paradigm shift in responding to drought

Chapter 3 of the study focused on the concerted efforts by World leaders in developing strategies and frameworks for reducing the risk of disasters. Such efforts are important in guiding efforts at regional and national levels to develop policy and legislative frameworks for disaster risk management including drought risk management.

Chapter 4emphasises on the policy requirements regarding the governance of drought in South Africa. The role of different all three spheres of government in managing drought risk was also elaborated.

Chapter 5 provided the empirical findings of the study and their discussion. The chapter started by summarising the research methods applied in the study as presented in further detail within in

chapter 1. The findings of the study are presented thematically. **Chapter 6** provided the conclusion and recommendation of the study, summarizing the chapters of the dissertation, demonstrate how the objectives were achieved and summarising the major findings. The chapter also summarises the recommendation of the study.

6.3 ACHIEVEMENT OF THE OBJECTIVES OF THE STUDY

This study set out to investigate how poor coordination or lack thereof affected drought response in the North-West Province of South Africa during the period 2013 – 2016 using Ngaka Modiri Molema District municipality and Dr Ruth Segomotsi Mompati District municipality as case studies

To probe, five research objectives were constructed:

(i) To explore the existing literature on the principles and theoretical perspectives on drought as a disaster and as a hazard.

(ii) To explore the principles and guidelines of coordination and an inter-departmental approach towards drought governance.

(iii) To determine the existing policies and legislative frameworks for drought management in South Africa.

(iv) To understand the extent to which coordination or lack of coordination affected the Ngaka Modiri Molema and Dr Ruth Segomotsi Mompati district municipality during the 2013 – 2016 drought event.

To provide recommendations and conclusions about an integrated and coordinated approach to drought disasters.

6.3.1 Objective 1: To explore the existing literature on the principles and theoretical perspectives on drought as a hazard and a disaster

The first objective was addressed in chapter 2 of the study. In chapter 2 an overview of the drought was outlined concerning drought as a hazard or disaster, the causes of drought, drought vulnerabilities, classification, drought impacts and paradigm shift in responding to drought. The discussion associated drought with a combination of below normal rainfall, high temperature and strong winds in a certain area. In some areas such weather conditions even though are perceived as the cause of drought, they are exacerbating an existing situation. For example, naturally arid areas will always become vulnerable to drought under those circumstances. Moreover, the literature reveals that the El Niño phenomenon, which is not a normal feature in South Africa, also causes drought. The literature shows that drought impacts are diverse in the sense that they affect different sectors and livelihood. The findings of the present study confirm these views.

6.3.2 To explore the principles and guidelines of coordination and an inter-departmental approach towards drought governance

This research objective was achieved during a thorough analysis of the literature in chapter 2 and 4. The literature study in chapter 2 has advocated that to coordinate drought activities the focus must be on pre-drought-, during-drought and post-drought activities. The literature elaborates on an inclusive approach in managing drought risk with the main focus in proper planning to prevent, mitigate and respond to drought. These were outlined in chapter 4 were the literature point to the need for different role players to coordinate their efforts and develop drought management plans which are inclusive. According to the literature South African government plays a central role with regards to planning and coordination of drought in the country. At the centre of drought response, communication was viewed as the main tool to develop integrated governance mechanism. These indicate that to have an effective communication there is a need to have pre-disaster ties and a common approach in communicating drought. These include the involvement of communities in communicating drought, hence coordinated actions by community are vital and urgent to address the root causes of drought and to significantly increase area's capacities to reduce drought risk and vulnerabilities.

6.3.3 To determine the existing policies and legislative frameworks for drought relief management in South Africa

This objective was achieved through the literature in chapter 3 and 4 of the study. The chapters outline various legislative and policy frameworks from global to regional and national specific for South Africa. Particularly for South Africa, developments of such policies and legislation were to ensure that everybody who lives in South Africa is protected from environmental hazards as stipulated in the constitution of South Africa. These efforts include the development of the Disaster Management Act (Act 57 of 2002) that was amended in 2015 and the National Disaster Management Framework of 2005. As indicated in section 4.2.2, the Disaster Management Act will provide for an integrated and co-ordinated drought management policy that focuses on preventing or reducing drought risk, mitigating the severity of drought, emergency preparedness, rapid and effective response to drought disasters and post-drought recovery. Consequently, the literature in section 3.2 justifies that drought disaster relief can be significantly delayed or impeded in the absence of specific laws, rules or policies. Thus, legal frameworks are an important aspect of building resilience within society, assisting in providing legal background and capacity to manage and adapt to any disturbance (section 3.2). Equally so, disaster risk reduction efforts 'must be systematically integrated into policies, plans and programmes for sustainable development and poverty reduction (section 4.2)

6.3.4 To understand the extent to which poor coordination approach had affected the North-West Province during the 2013 – 2016 drought event

The findings in chapter 5 responded to this objective. The findings show that there are systems and structures in place to coordinate drought in the North-West Province, though many challenges were encountered in the implementation process. In coordinating drought PDMC assumes primary responsibility by establishing drought coordinating committee. Members of the committee include provincial sector departments, NGOs, business and all municipalities in the province. These were viewed as one of the reasons that caused poor coordination of drought management. Respondents were of the view that such a structure is too big to be managed by a centre which has its challenges in terms of human and resources. This resulted in poor communication and delayed or lack of monitoring of drought response by sector departments. The findings also show that there is a lack of planning in terms of provision of relief during drought response. Some respondents felt that during drought relief there is a communication breakdown in that PDMC is working directly with sector departments only. However, it was found out that during drought response sector departments establish parallel structure with farmers and issue relief without knowledge of the established drought coordinating committee, resulting in duplication and other farmers receiving assistance multiple times whereas others receive no relief at all.

6.3.5 To provide recommendations and conclusions concerning an integrated approach to drought disasters response

This objective was achieved in chapter 5 where recommendations were made concerning drought coordination and communication. This is consistent with the theory offered in section 4.3, which indicates that fast-emerging factors such as the growing population and changing climate and urbanization, which make droughts destructive and spatially extensive. It is urgent to enhance drought preparedness by planning across the nation to meet these increasing challenges. These require integrated governance mechanism in managing drought risk. In the findings, it was found that all sectors and community resort to responding to drought rather than planning to reduce the risk. It was also discovered that even though drought warning is issued in some instances, there are difficulties to abide by such warning when you are in the shared property. For instance, emerging farmers in the villages, communal properties, townships have no control over the land, some are controlled by chiefs and not everyone adheres to any kind of warning. The findings show that it is difficult to mitigate drought by reducing livestock in such areas especially when other farmers do not abide to such warning. Similarly, methods of rotational grazing in such areas is not achievable, everyone is competing for grazing land, therefore little time is put to focus on conserving the environment so that it can be sustainable.

6.4 SUMMARY OF THE FINDINGS

The following section is a summary of the findings

- North-West Province has and will always experience recurrent drought. These are attributed to the fact that the province particularly the western parts are semi-arid in nature and record below normal rainfall. As a result, its impacts are felt by everyone, ranging from ordinary citizens, the farming community and responding agencies. There is consensus among all the respondents that lack of rain provokes existing and visible drought elements which has emerged for years. It has become even difficult to differentiate whether a particular drought is ongoing or it is a new event. This was the case when the province declared drought disaster during 2013 and 2015, recorded rainfall measured below 400ml and 350ml respectively. Respondent indicated that rainfall below 400mm per annum is an indicator of looming drought situation, whereas below 350ml stipulate worse drought condition.

- The impact of drought is mostly felt by ordinary citizens and emerging farmers because the province is dominated by villages and Communal Property Associations (CPA) farmers who lack resources and access to financial instruments like insurance. Ironically, most of the emerging farmers are found in these areas because the majority of people resort to farming for a living.

- The findings also show that one of the dominant causes of the drought was exorbitant amounts of water loss in municipalities. The findings present North-West as registering a substantial amount of water lost to the range of 35% of total water in the province. This includes water loss from dilapidated bulk water storages such as dams and leaking water infrastructures within various municipalities. In addition to that, lack of regulations led to a substantial amount of water being lost through fraudulent activities. Areas such as Mahikeng have got natural water resources where water pops out continuously in all climate weather. However, such water does not reach communities due to diversion by businesses and commercial farmers. Such activities deprive poor communities of the only resources available during hard times.

- There is an acknowledgement of the existence of a well-established structure created for drought coordination in the North-West Province. The structure is being coordinated from a central point by the Provincial Disaster Management Centre (PDMC). All stakeholders are registered as members of this structure called 'Drought Coordinating Committee', whereby farmers are represented by their respective farmer's associations and relevant sector departments such as READ, DAFF and DRDLR. However, the indication from respondents is

that the structure is poorly coordinated and as a result delays responses to drought that ultimately exacerbate the impacts of drought.

- The findings illustrate that diverse methods are used by different role players in coordinating and communicating drought in the North-West Province. For example, READ uses the services of extension officers to coordinate and communicate drought in the province. A total of 218 personnel is scattered all over the province with each district receiving field officers. However, allocation of these field officers in some areas leaves much to be desired hence does not reflect knowledge of drought hotspot in the province. For example, even though the western and central parts of the province are most affected by drought the number of extension officer allocations does not differ that much; Bojanala district (59). Ngaka Modiri Moleme (64), Dr Ruth Segomotsi Mompati (47) and Dr Kenneth Kaunda (19).

- The findings indicate that when responding to drought, READ focus only on the provision of relief in the form of water and fodder for livestock and nothing for human consumption including for farmworkers. On the other hand, SASSA focuses on the provision of relief in the form of food vouchers and food parcels for farmers and farmworkers. In addition to that social development's main focus is poverty alleviation by procuring food and school uniforms for affected communities. However, in some cases, SASSA also make provision for procurement of school uniforms to affected learners. On the other hand, DWS is responsible for overall water provision to affected communities either by using water tanks, drilling of new boreholes, refurbishing the existing boreholes, or repairing and maintaining of dams to ensure that the province is sustainable. Equally so, DRDLR intervene by drilling and maintaining of boreholes, provision of fodder for livestock and relocation of livestock that is in danger due to drought. Some respondents feel that in responding to drought priority must be on saving the economy of the province.

There is an acknowledgement that South Africa is having the best constitution and numerous policies and legislation to support it, however, the challenge is the implementation part of it. These findings associate lack of capacity in government with poor implementation of good policies and legislation. The findings also recognized the lack of synergy between various policies and legislation. For example, what is prescribed in the National Disaster Management Framework to set aside a certain percentage of money for disasters is not supported by the processes as prescribed by the treasury. A budget system does not allow to set money aside for contingencies because if there will be no disaster and money is not utilised, is regarded as non-compliance on the part of the treasury. Another finding is the lack of knowledge or capacity in applying some sections of PFMA during emergencies. Section 16 and 25 of PFMA allows a government entity to re-prioritise their funds when confronted by hazards that may lead to emergencies situation.

However, affected municipalities and the province resort to declaration process before exhausting all other available avenues. The findings show that those who are familiar with a process of reprioritising money, are reluctant to implement these measures, hence officials are misusing it. These officials indicate that when systems are loose they invite elements of corruption and fraud.

6.5 STUDY RECOMMENDATION

This study aimed to ensure that integrated governance mechanism for recurrent drought is suggested towards ensuring that proper coordination is implemented by all stakeholders within the North-West Province. Therefore, the following are the recommendations for the proposed study as derived from the results of its empirical findings:

Recommendations 1:

PDMC, as mandated by the Disaster Management Act, should take into consideration some regions of the NW province are characterised as being semi-arid. These include the western parts of the province and some of the central region. Such areas experience water challenges in nature, trying to overcome those challenges by declaring drought disaster will result in recurrent drought disaster declaration. Citizens in such areas are resilient and have in the past relied on indigenous knowledge as the means of survival. This includes sharing manually operated boreholes as a means of survival. These boreholes were discontinued by the democratic government citing health risk.

Recommendation 2:

It is also of paramount importance to regulate the use of water from all the resources including natural one. Municipalities must develop by-laws regarding usage of water from such resources and impose sanctions on irregular activities aimed at fraudulent diversion of water. Proper management of water includes harvesting of rainwater in those regions that receive enough rainfall must be encouraged. There is also a need to strengthen inter-governmental relations within the province whereby water transfers can be expedited easily from one area to another, thus ensuring that water-rich regions feed areas regarded as semi-desert.

Recommendation 3:

The PDMC should ensure that when establishing drought coordinating structure the focus must be on the affected areas, hence other areas take advantage of the process and misuse it for existing water shortage problems that accumulated for some years. These will ensure that money is directed to assist correct beneficiaries and will also eliminate misuse of the system.

Stakeholder's roles and responsibilities should be clearly defined to avoid existing duplication of efforts and parallel structures, especially during drought relief.

Recommendations 4:

Municipalities and sector departments should ensure that they have capable personnel to implement disaster management legislation and policies framework as stipulated. That treasury ensures that disaster management budget is aligned with requirements as set out in the National Disaster Management Framework. Municipalities to develop by-laws that will regulate adherence to drought warnings in the province especially in those areas regarded as drought hotspot.

Recommendations 5:

The PDMC should develop an integrated drought management plan aligned to the national drought plan. These plans will ensure that in the event of drought disaster declaration, the coordination process will have timelines on when does the process start and when it should close. Hence when is prolonged that is where is subjected to misuse by officials and recipients. The reason being, it allows ample time for those who have corrupted mind to study the system and come up with plans to defraud it. Therefore, it is advisable to have timelines and measure performance.

Recommendations 6:

PDMC should serve as a central point for communication of drought in the province. These will avoid parallel structures that normally confuse the whole process. However, information sharing should be continuous with the integration of services between various sectors such as taking advantage of other sector's events to educate communities about drought. This also includes scheduling appointments with departments such as clinics, hospitals, SASSA, home affairs, social developments, hence in most cases people queue for service in such areas. Another method is to include drought information in the municipal bills sent to households so that communities are cautioned about water conservation. Above all, social media has proved to be a popular platform where people engage with each other. Therefore, strengthening of such communication medium will also allow researchers to use innovative methods to collect such data and understand the type of drought affecting the community by analysing what is being communicated.

6.6 LIMITATION OF THE STUDY

The scope of the study which embraced the entire North-West Province was always going to be time-consuming. Nature of the province that is regarded as partially semi-desert and experiencing variation in the distribution of rainfall provided a challenge in selecting research settings to

understand why some areas that receive normal rainfall attracted much interest from drought committee.

Furthermore, the research had to focus on two variables that is, drought as a phenomenon and drought response, as such trying to balance between existing challenges of water scarcity and drought. The main focus of the study was on Dr Ruth Segomotsi Mompati and Ngaka Modiri Moleme district municipalities. Therefore, it would have been absolute to understand in detail why are there drought elements in areas such as Dr Kenneth Kaunda and Bojanala district, hence are regarded as areas that receive normal rainfall.

Thus, to address some of the outlined limitations, the next section provided recommendations for future research.

6.7 FUTURE RESEARCH

Based on the findings and this limitation of the study, it is very clear there is a need for future research to be conducted on the field of drought in the North-West Province. As indicated, the main focus of the study was on two district municipalities regarded as the most affected in the province. As a result, it is proposed that similar study be carried out in the remaining two districts (Dr Kenneth Kaunda and Bojanala District municipalities) specifically on the following fields:

- Drought management strategies used by North-West Province in the past regarding small scale farming and commercial farming
- Management of water as an important commodity in the North-West Province particularly in the urban areas
- Infrastructure development to curb drought and water shortage in the North-West Province, the case of Bojanala district and Dr Kenneth Kaunda District.
- Evaluating drought impact in the province to have accurate data to justify investment in mitigation strategies.

Governance mechanism as a framework in respond to encountered challenges around drought in South Africa.

6.8 CONCLUSION

Given the recurrent feature of drought and numerous challenges experienced during response, it is imperative to not consider an integrated mechanism for drought governance. It is evident in the

literature that numbers of efforts were introduced by local, national and international communities to manage drought risk. However, still its ability to manifest itself in a large area, unclear onset and ending and have an extended duration makes it to be more challenging to determine its impact. There are various policies, frameworks, legislation and resolutions across the world but the drought is still posing as a deadly phenomenon globally. This was supported by Halbac-Cotoara-Zamfir(2015)that, although there is a 'flood' of information regarding different aspects of regional drought management, there is a scarce of coherent and integrated package of reliable scientific and practical information for interested stakeholders, mostly from the socioeconomic field, drought scientific definition and management.

The focus of the study was to develop an integrated governance mechanism towards recurrent drought in the North-West Province of South Africa. The empirical findings indicate that drought is a recurring phenomenon in the North-West Province. The biggest challenge is that none of the stakeholders be it, farmers, NGOs private sector or government are prepared for such a hazard resulting in the disaster declaration. These are because of drought impact on grazing land, crop production and water provision.

As a result, the literature review and the empirical research pointed to need for an integrated approach in managing drought risk to have common goal of ensuring that the communities live in a healthy and safe environment as prescribed by the constitution. This is also encouraged in various efforts by international and regional authorities to build resilient communities less vulnerable to drought hazards.

In the limitation of the study, it was pointed out that not much has dwelled into regarding what exactly is the focus of response in other areas that receive normal rainfall but subjected to drought as well. As such, the study recommended that in some instances where the study was unable to reach, additional research need to be conducted. The study identified gaps within the established committee used to coordinate drought in the North-West Province and made recommendations on how to strengthen such formation by fostering for establishment of integrated governance mechanism. The study managed to achieve this goal and provided recommendations towards integrated governance mechanisms for recurrent drought in the North-West Province

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