

**The assessment of drought preparedness measures in urban schools of Mbabane, the
capital city of Swaziland**

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Declaration

I Qinisile Tsabedze, declare that this thesis, The Assessment of Drought Preparedness Measures of Urban Schools in Mbabane City, is my own work. All sources and quotes used have been acknowledged by means of complete referencing. I declare that I have not previously submitted this thesis in fulfilment of any degree in any institution.

Dedication

This work is dedicated to Mr Thabo Tsabedze , Wenzile Tsabedze and Nosikhumbuzo Tsabedze.

Acknowledgement

I acknowledge the help I received from the University of Free State and the University of Swaziland. The DIMTEC staff has been very supportive throughout the duration of the course. The University of Swaziland for the support they gave with acquisition of the SPSS software. I am grateful to the management of the schools that were used in this study they allowed me to use their staff and students. It has been a wonderful journey, without their dedication and commitment this piece of work wouldn't have been possible.

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Most importantly to the almighty God, for the gift of life, and family, I wouldn't have survived without their support and encouragement. Lord you make my dreams come true.

ABSTRACT

Water scarcity is the major consequence of droughts in the urban areas of Swaziland that has seen the country facing water rationing of up to two days a week. Even though we cannot prevent droughts from occurring like other natural disasters, but preparation will reduce the impact of droughts. Drought preparedness plans, drought risk reduction strategies and drought impact assessment are part of the drought management measures to be employed to reduce the impact of droughts. The study sort to **Assessment of Drought Preparedness Measures in Urban Schools of Mbabane, the Capital City of Swaziland**. The aim of the study was;

- A. To find out whether or not schools had contingency plans for droughts I order to provide safety for learners.
- B. To find out if their plans were efficient, effective and in line with their needs during the drought and the future.

The hypothesis tested by the study was;

- Strengthening preparedness measures will reduce the negative effects of the droughts in urban schools.

The hypothesis was accepted since it was discovered the schools were less prepared for the drought. Results showed 23.43% schools have alternative source of water which were efficient to some extent and 76.47% have none. This conclusion was reached based on the responses from teachers and students.

- A. Students do not learn drought preparedness in schools.
- B. Due to lack of alternative water supply students faced difficulties of lack of drinking water and poor sanitation.
- C. Teachers are not trained in drought preparedness.
- D. Schools do not have drought preparedness plans.
- E. Schools don't have the Drought Task Force.
- F. The ministry of Education does not have a policy regarding the teaching of drought preparedness in schools.

Based on the results the researcher suggested that the Ministry of education and Training should develop a policy regarding the teaching of drought preparedness in schools. Respondents mentioned that they were never trained on drought preparedness and some of

their subjects do not have that topic hence they do not teach the subject. This view suggested that teachers and administrators must be trained on drought preparedness.

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Acronyms

REO- Regional Education Office

DTF- Drought Task Force

NERMAP- National Drought Emergency Mitigation and Adaptation Plan

MoET- Ministry of Education and Training

SWSC- Swaziland Water Service and Corporation

IFC- International Finance Corporation

UN- United Nations

UNICEF- United Nation International Children Education Fund

UNISDR- United Nations International Strategy for Disaster Reduction

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Chapter 1

Methodological Framework

1.1 Introduction

Swaziland is currently (2016) affected by a severe drought, one that is exacerbated by the El Niño weather condition. This condition cause low rainfall and in turn low food production. On the 18th of February 2016 the government of Swaziland declared the drought condition a national disaster. Quickly the government launched a response plan called National Drought Emergency Mitigation and Adaptation Plan-NERMAP, (UNICEF, 2016). This plan is the country's response to the current drought situation faced by the SADC region. The plan has was designed by the different stakeholders. The plan lays a foundation for adaptation to droughts. Through using the sectorial approach, each sector of the government develops a plan of how it will participate in drought adaptation and mitigation.

The country's population is estimated around 1,2million people, of that amount 300 000 people are affected by the drought. 189,000 are school going children and 8,157 are teachers and support staff throughout the country (UNICEF, 2016:1). Schools in urban areas are hit hardest because they lack alternatives to water resources and sanitation. Learners in rural areas suffer food and water shortages at school and home, a condition that is likely to lead to negative performance at school and health problems.

Although droughts have affected the whole country, the North Western part of the country, the Lubombo and Shiselweni regions are hardest hit in the country mainly because of their geographical location. Both of the Lubombo and Shiselweni regions have always had the problem of water shortage, but now it is worse (Reliefweb, 2016). The Lowveld which covers a greater part of both regions generally receives low amount of rainfall (250mm-500mm), happens to be at very low altitude (200m) and lies on the rain shadow side of the Lubombo mountain range. In the North Western part of the country lays the catchment area of the Mbuluzi and Ngwavuma Rivers which drain the country right through the Eastern border with South Africa (Vilakati S, 2012). The drought condition has reduced water levels of these rivers hence affecting water supply in the country.

The Mbuluzi River which forms the Hawane dam that supplies water in the capital city of Swaziland has lost about 85 per cent of its water, leaving the city with no option but to rationing water supply to two days per week (UNICEF, 2016). In the past, the droughts have

been a common phenomenon in the Lowveld region as discussed earlier and to a lesser extent in the Highveld region; this is the first of its kind that the capital city runs out of water. Water dried up even in the country's five big rivers some of which pass across the country into South Africa (Times of Swaziland, 2016). The shortage of water and food has affected livelihood standards and increased the poverty rate in these regions, where farming is the main source of income for rural families the drought has caused death of livestock and vegetation in the fields.

Rural schools that depend on boreholes for water supply are also affected. About 165,000 children from the total of 189,000 children affected by drought are in Shiselweni and Lubombo regions and thirty schools in Mbabane are facing a serious water shortage (Reliefweb, 2016). This will have a negative impact on the education and health sector in the country. Had schools prepared for the drought, the problems of water shortage would have been solved before schools open in January 2016.

This research seeks to assess the level of drought preparedness of schools in Mbabane the capital city of Swaziland. It seeks to find out how prepared were schools in the city for the drought. What measures had they taken to prepare for the water shortage, food supply and sanitation? It shall reveal measures taken by schools to prepare for the drought and how effective they were in solving water crisis. Briefly, the measures are the heeding to early warnings, water conservation methods used, water storage facilities and educating learners about water shortage.

1.2 Description of study area

The research will be done in the capital city of the country, in Mbabane which is in the Highveld region located in the north Western side of the country. The region has a cool wet climate owing to its high altitude. The North Western side of the country consists of mountains and two important peaks Ngwenya and Emlembe mountains. These mountains form the North Western border with the neighbouring country, South Africa and are responsible for the formation of relief rainfall in the region. They also form the source of two important rivers that drain Swaziland, Mbuluzi and Ngwavuma Rivers and provide water in the capital city and irrigation water in the Southern part of the country respectively (Vilakati S, 2012).

The main activities in these regions because of the terrain and humidity are forestry, crop farming and stock farming. The area's lowlands have deep fertile soils ideal for crop farming and ragged terrain of the Highveld is ideal for forestry. It is in the valley of the mountains that the Hawane dam was constructed to supply the capital city with water.

Normally the area is affected by storms, hailstorms, lightning, wildfires and crime. It is for that reason why the study will focus on the current problem of water shortage caused by the current droughts. The capital city is also an administrative town of the country; the administrative chambers including the judicial are located in the city. It is assumed that in terms of disaster preparedness it is well prepared for any disaster that could occur.



Figure 1- Map of Swaziland

Source: www.mapsoftheworld.com

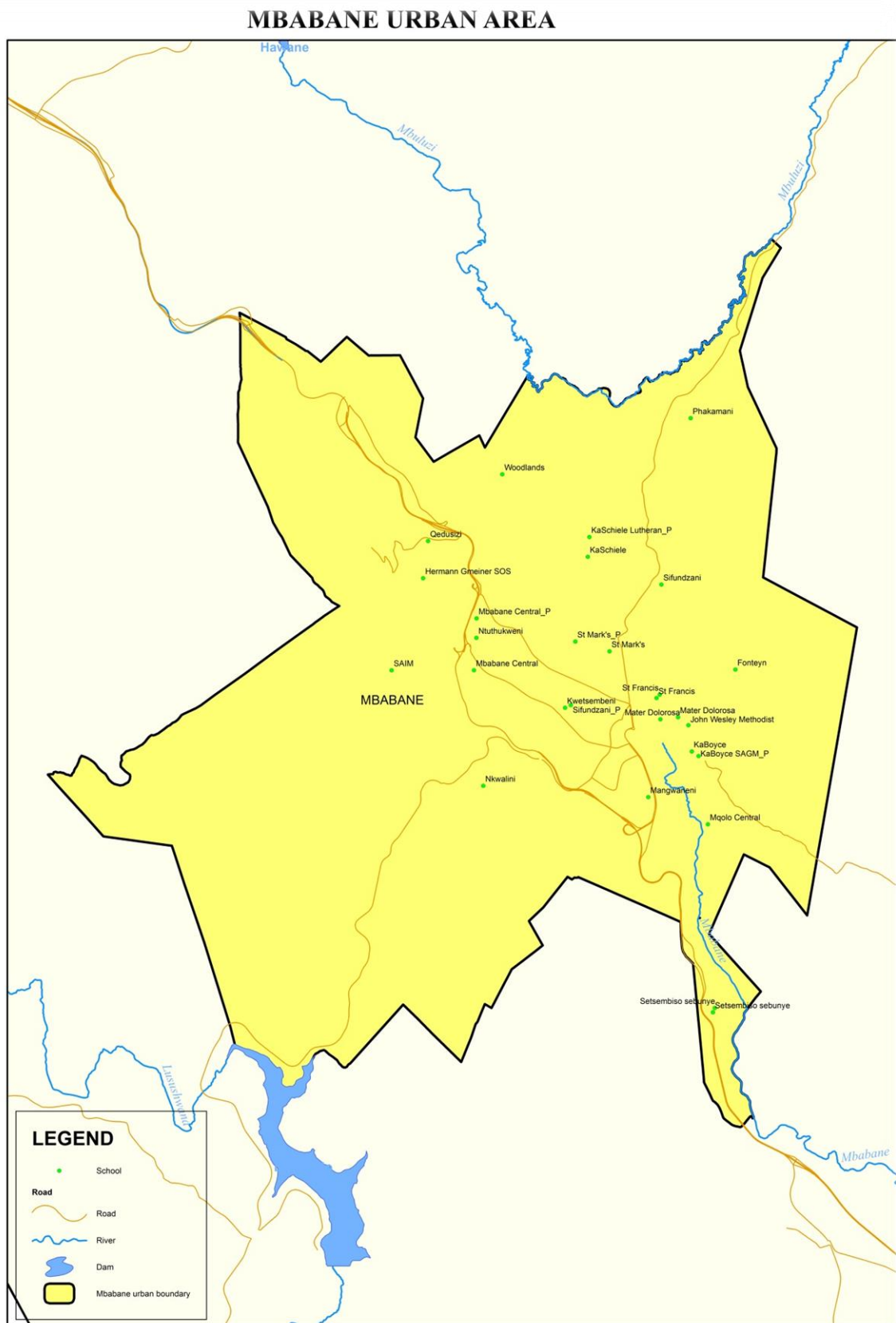


Figure 2-Schools in Mbabane

Source: Surveyor General, Government of Swaziland

1.3 Problem statement

Water scarcity is the major consequence of the drought in Swaziland that results to water being rationed to two days a week and in some urban areas including Mbabane, as boreholes, rivers and dams dry up (Reliefweb, 2016). The shortage of water in schools is a problem to students because the hygiene standards are compromised. A contributing factor is the lack of water storage facilities and serviceable boreholes. According to the National Disaster Act (NDA) of 2006, the Ministry of Education is supposed to provide water, feeding schemes and safety in schools. For that reason the association of teachers (SNAT), in January 2016 asked the government to postpone the opening of schools by two weeks in order to prepare alternative water supply methods for schools, but government did not take the advice (Times of Swaziland, 15 Jan:2015).

This water crisis has a massive impact on all sectors of the society and schools inclusively thus affecting hygiene and sanitation. In the 2007 drought there was an acute shortage of safe water supply especially the Hhohho region (UNICEF, 2007). It is assumed that after the 2007/2008 drought schools and the Ministry of Education and Training (MoET) established a contingency plan for droughts to use in schools. The urban schools are hardest hit when it comes to sanitation since they do not have pit toilets and boreholes. Thirty schools in Mbabane are currently affected by water rationing.

Two weeks before schools opened in January 26, 2016, the Swaziland Water Services Corporation (SWSC) announced that water levels of Hawane dam have dropped down and water available will only last for four days. It looked as if schools and government had not prepared for the drought in spite of the warning from the meteorology station (Times of Swaziland, 2016). According to UNICEF report (2007) children are among the most affected segment of the population during droughts especially the under 5 years and the orphaned and vulnerable children.

Table 1, presents a drought emergency response, mitigation and adaptation plan-budget summary. It shows that the country is currently running at shortfall of the budget. The education sector has a gap of E33, 706,503 Million since the available funds are E10, 831,450 million yet the total cost is E44, 537,953 million. The urban water and sanitation sector has a shortfall of E108, 377,434 million, with a budget of E169, 768,434 million (NERMAP,2016).

The main cities of the country are running low in water supply, rivers and dams are drying up and efforts has to be made to supplement water supply. A drought preparedness plan would have made it possible to cut response and mitigation budget low.

Table 1-Drought Emergency Response , Mitigation and Adaptation Plan-Budget Summary

Sector	Activity	Total Estimate Cost	Available Budget
Education	Augmenting school feeding, water and sanitation on schools	44,537,953	10,831,450
Urban Water and sanitation	Augmenting water harvesting & availability in Mbabane, Ngwenya, Matsapha & Manzini cities	169,768,434	61,391,000

Source: NERMAP, 2016

The outcomes of this study will help the ministry of education to improve their planning for disasters especially droughts since they are a common phenomenon in the Southern African Region. It will help schools to prepare for droughts by making plans for water supply during droughts. It is also believed that educating learners about drought conditions will make them better prepared for the situation since the occurrence of droughts in Mbabane is not common. Learners will draw strength from lessons on droughts preparedness in schools (UNISDR, 2005).

1.4 Aim

The aim of this study is to find out from schools in Mbabane whether or not they had contingency plans for the drought in order to provide safety for learners. If their plans were

efficient, effective and in line with their needs during the drought and what could be adopted as a responsive behaviour in the future to reduce the negative impact.

1.5 Objectives

The following objectives are proposed for the study

1. To assess the level of preparedness for droughts in schools, in terms of education and training on drought response, the number of tanks, functional boreholes, pit toilets, and supply of other sources of water.
2. To assess the degree of effectiveness of measures taken during the droughts.
3. To make recommendations for the future.

1.6 The primary research question

To narrow down the scope of the research the main question the study will focus on, is finding out how prepared schools in Mbabane were for water shortages during the drought. It will seek responses on what measures were taken by schools in preparation for droughts.

- Were schools prepared for water shortages?

1.7 Secondary questions

Secondary questions include:

- Has the area ever experience water shortage during droughts before?
- What is the water source used in the schools?
- What are the effects of water shortages?
- What are the health hazards caused by water shortages?
- What are the solutions to water shortages?

1.8 Significance of the study

The study is important and special in its nature since it is important for schools to prepare for disasters, droughts in schools especially in the Highveld region of the country where there is normally enough rainfall (Vilakati S, 2012). The capital city has never experienced a problem of water scarcity to this extend before. The last drought of 2008 was not as severe the 2015 /2016 drought. Schools curriculum does not cover disaster preparedness as a result schools do not have a contingency plan for droughts. Some schools do not have alternative toilets (pit toilets) and alternative water sources such as boreholes.

The study will help policy makers at Ministry of Education and Training (MoET) realise that it is important to make preparations for droughts in the city even though they do not occur frequently. It will also help policy makers to prepare emergency policies to follow during droughts in order to provide timely assistance to schools in times of need.

According to the Yokohama principles of 1994, disaster prevention and preparedness are important in reducing the need for disaster relief (UNIDR, 2002). Schools teach the types of disasters but not prevention and mitigation, preparedness and response United Nations(2013). This study shall help schools prepare, mitigate and respond to droughts in the future to minimise effects and casualties during droughts. According to the United States Department of Education, (2008), schools must have contingency plans for droughts in the city as a way of preparedness and educate learners about droughts since it is recurrent phenomenon in this region, and its effects will have a negative impact in their education and health.

1.9 Hypothesis

According to (Mushoriwa, 2009) a hypothesis is an educated guess, an assumption. Therefore, the hypothesis of this study is;

Strengthening preparedness measures will reduce the negative effects of droughts in urban schools.

1.10 Research Design

The research design is a practical plan of how data will be generated, (Kitchin R, 2000). The study has used survey research design. This design is appropriate for this study because surveys allow the use of relatively large samples as was the case with this study has a sample size of 68 respondents from 17 schools making the study more reliable and representative of the whole population (Mouton, J, 2009). Furthermore, the survey design allows the researcher to have direct contact with respondents and their environment. However, the limitation would be the sample based data and lack of cooperation from respondents making data less reliable.

1.11 Methodology

This chapter outlines the overall structure for the approach and procedures that the researcher will follow in conducting the study and how data will be collected and analysed (Mushoriwa, T.D, 2009). This is the methodology of assessing drought preparedness measures taken to

mitigate effects of droughts in urban schools. The chapter shall focus on the procedure used to collect data and the tools used to collect the data (Leedy and Ormrod, 2009) it shall further on explain how qualitative and quantitative data will be gathered. For quantitative data, the researcher shall use the random and systematic sampling methods to gather information from the local schools both primary and secondary schools. The benefits of this method are that it gives equal chance of selection to all respondents and minimise biasness. It also gives equal representation of all categories of schools found in Mbabane (Kitchin R, 2000).

Data will be gathered from primary and high schools around the city. According to the ministry of education records there are thirty 35 schools in the city, 18 are primary schools and 17 are high schools. Qualitative data will be collected from students and principals or deputy principals from selected schools and the researcher with help of research will conduct the face to face interviews. The benefit of this method is that it will allow the researcher to interact with the people and experience what they go through their day to day lives considering the current situation of water crisis due to the drought, (Mouton, 2013). It will also speed up the process of data collection and provide clarity to respondents as they answer questions.

1.12 Sampling procedure

From the thirty five schools in Mbabane, a total of seventeen schools shall be sampled systematically according to categories. This system of sampling will ensure full representation of all categories. (Mciza T et al, 2008). Selection will be done from primary schools and high schools within the city and city boundary from all direction. A selection of eight primary schools and eight high schools will be done to collect a quantitative data. This decision was reached in consideration with the available funds, human resources and time allocated to do the study. All the names of schools will be written down in pieces of paper and place in bags, one for primary schools and one the other for high schools. The researcher then made a draw of 8 primary schools and 9 high schools. Qualitative data was gathered from students, teachers and school administrators using the random sampling method. Selected individuals will be interviewed face to face using a questionnaire.

1.13 Reliability and validity

A questionnaire will be used to collect qualitative data; it shall be administered through face to face interview, this viewed as the best method since it allows a one on one close contact with the respondent, (Babbie, E & Mouton, J 2003:15). This questionnaire will be written in simple English and short questions will be asked. The interviewer will interpret the questions for respondents to make it easier to answer. Interviews will be conducted on the learners and the administrators of schools (principals, deputies and school's managers)

1.14 Ethical considerations

Respondents were aware of confidentiality of the information. On the questionnaire, there were no names asked and there was a thorough analysis of questions which was aimed at avoiding sensitive questions to respondent's selection of respondents was done randomly regardless of gender. The researcher wrote a letter to the Regional Education Office of Mbabane (REO) seeking permission to conduct the survey in the selected schools.

1.15 Pilot survey

A random sampling method was done to select a school for pilot survey in town to test the questionnaire and identify problems before the actual survey, (Olse, W. 2004). The principal of the school, one teacher and one student will be interviewed by the research assistant to test the questionnaire. Afterwards interviews will be done in all the selected schools over period of five days.

1.16 Data collection tools

Structured questionnaires will be used to administer a one on one interview to collect qualitative data from learners, school's managers and principals or deputies. The benefit of this method is that it enables the interviewer to have close contact with the interviewee (Mushoriwa, 2009). , newspapers and journals will provide secondary source of data.

1.17 Data collection procedure

From the selected thirty schools, fifteen principals or deputies, forty teachers and seventy five learners will be selected randomly to have a face to face interview in order to fill the questionnaires, due to the low level of literacy of students, this method made sure that answer questions correctly, Babbie & Mouton (2003:249) . Where possible, school's managers were

asked to complete the questionnaires as well. Thirty four students will be interviewed by three research assistants over a period of five days.

1.18 Definition of terms

Mitigation: These are measures taken to limit adverse impact of natural hazards and environmental degradation and technological hazards (UNISDR, 2002). The adverse impact of hazards often cannot be prevented fully, but their scale or severity can be substantially lessened by various strategies and actions. Such strategies include amongst other, engineering techniques.

Preparedness: These are activities taken in advance ensuring active response to the impact of disasters. These measures must be taken timely and effectively including the evacuation of people and issuing of early warnings (UNISDR, 2002). Preparedness also means readiness. It is aimed at building the capacities needed to efficiently manage all types of emergencies. Preparedness is built on sound analysis of disaster risk and early warning systems. and

Vulnerability: These are conditions that increase the susceptibility of a community to the impact of hazards. The conditions may rise from social, economic, environmental and physical factors (UNISDR, 2002: 24).

Hazard: This is an event that has a potential of damaging, injuring, disrupting and degrading the environment (UNISDR 2002: 24).

Risk: The probability of harmful consequences or expected loss as a result of natural or community human induced hazards and vulnerable conditions (UNISDR, 2002).

Drought risk: drought risk is a product of a regions exposure to the natural hazard and its vulnerability to extended periods of water shortages (Wilhite.2000).

Response: Measures taken during or immediately after a disaster in order to bring relief to people and communities affected by the disaster (Disaster management act 57 of 2002).

Capacity Development: the process by which people, organizations and society systematically stimulate and develop their capacities over time to achieve social and economic goals, through improvement of knowledge , skills, systems, and institutions (UNISDR,2009).

Climate change: This is a change in the state of the climate that can be attributed directly or indirectly to human activities. It alters the composition of global atmosphere and which is in addition to natural climate variability observed over comparable time periods (ISDR, 2010).

Contingency plan: it is a management process that analyses specific potential events or emerging situations that might threaten society or the environment and establishes arrangements in advance to enable timely, effective and appropriate responses to such events and situations. Based on scenarios of possible emergency conditions or disaster events, it allows key actors to envision, anticipate and solve problems that can arise during crises. Contingency plans need to be regularly updated and exercised (UNICEF, 2010).

Disaster: a serious disruption of the function of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources (S.A, Disaster Management Act,2002).

Disaster Risk Deduction: a document prepared by an authority or organisation comprising of a set of goals and specific objectives for reducing disaster risk together with related actions to accomplish, such documents are guided by the Hyogo framework (UNESCO,2007).

Early warning systems: a set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organisations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss (UNISDR, 2002). A people centred_early warning system necessarily comprise of four key elements namely, knowledge of the risk, monitoring, analysing and forecasting of the hazards, communication or dissemination of alerts and warnings, and local capabilities to respond to the warnings received.

Ecosystem services: these are the benefits people and communities obtain from ecosystems, such as regulation of floods, droughts, land degradation and diseases. The integrated management of land, water and living resources that promotes conservation of ecosystem services (UNISDR, 2009).

El Nino- southern oscillation phenomenon: this is a complex interaction of the tropical pacific ocean and the global atmosphere that results in irregularly occurring episodes of changed ocean and weather patterns in many parts of the world, often with significant impacts over many months, such as altered marine habitants, rainfall changes, floods, droughts, and

changes in storms patterns. Basically it refers to the higher ocean temperatures that occur along the coast of Ecuador, Peru and northern Chile and eastern equatorial Pacific Ocean (UNISDR, 2009).

Forecast: In meteorology it refers to a future condition (GFDRR, 2010).

Adaptation: the adjustment of natural or human systems in response to the actual or expected climate change (Sphere Project, 2011). It also applies to none climatic change factors such as land degradation.

1.19 Summary

This chapter laid out the introduction to the study, the research problem and the hypothesis which are critical in this document. It also gave out the research design and data collection procedure to follow when collecting the data.

Chapter 2

Review of Related Literature

2 Introduction

The chapter will discuss theories related to disaster preparedness and review existing literature on the topic. It shall attempt to theorise and conceptualise issues related to drought preparedness in schools. It shall give a detailed analysis of droughts preparedness measures and related theories on disaster preparedness. This shall be achieved through the adoption of the disaster management cycle where disaster preparedness is discussed as one of the phases in the pre-disaster phase.

Safety in schools according to the IFC, (2010), handbook school safety is a responsibility of the entire school community which consist of the school administrators, teachers, and parents, the support staff, students and the neighbouring communities. For that reason, it is important for schools to form disaster management committees that consist of the above mentioned stakeholders. These representatives will develop, adapt, implements disaster management plans.

The aim of disaster management is to reduce or avoid loss from potential hazards to provide appropriate assistance to victims of disaster and to achieve rapid and effective recovery (Blaike, et al, 1999). Disaster management is an on-going process through which the Government, schools and neighbouring communities plan for to reduce disaster impact. Planning involves the shaping of Governments policies and plans to provide necessary infrastructure for the effective operation of disaster management plans.

Countries may look at droughts in ways, first, as a random natural disaster, where by planning is termed as Ad hoc- response oriented. Secondly, they may look at droughts as a recurring phenomenon that has an impact on the population and the economy. Hence the approach is proactive, dealing with assessment and early warnings and monitoring (Wilhite. D, 2000). The vulnerability to droughts is influenced by a number of factors such as, population growth urbanisation, government policies, regional changes in total population figures and other natural environmental practises.

2.1 Education for Sustainable Development Policy (ESD) Rational for Swaziland

According to the MoET in the Kingdom of Swaziland sustainable development means ‘seeking to meet the needs of the present generation without compromising those of the future generation. It is vision of development that encompasses populations, animal, plant species, ecosystems, natural resources and it integrates concerns such as the fight against Poverty, gender equality, human rights, education for all, health, human security, intercultural dialogue, etc. Education for sustainable development aims to help people to develop attitudes, skills and knowledge to make informed decision for the benefit of themselves and others, now and in the future, and to act upon these decisions’, MoET,(2011:22-23).

It goes on stating that for sustainable development to be achieved in Swaziland the education system needs to reflect a view of the world as a holistic socio-cultural, economic and ecological system, characterised by constant change. Thus this policy is an essential link in the poverty reduction, health, and environmental protection chain. This view of the ESD policy accommodates the teaching of drought preparedness in schools. Education should teach students holistically, taking care of every aspect of life now and the future. Drought preparedness will education in schools will address environmental concerns, poverty reduction and a positive attitude as students are equipped with resilience towards droughts and a safer environment is developed.

‘

2.2 The Disaster Management Cycle

The four phases of disaster management cycle that are discussed here do not take place insolation they often overlap each other, (Blaike, P.T. et. al, 2004). Mitigating the effects of droughts requires the use of all components of the cycle. Figure 2, below presents the disaster management cycle and it is be discussed below.

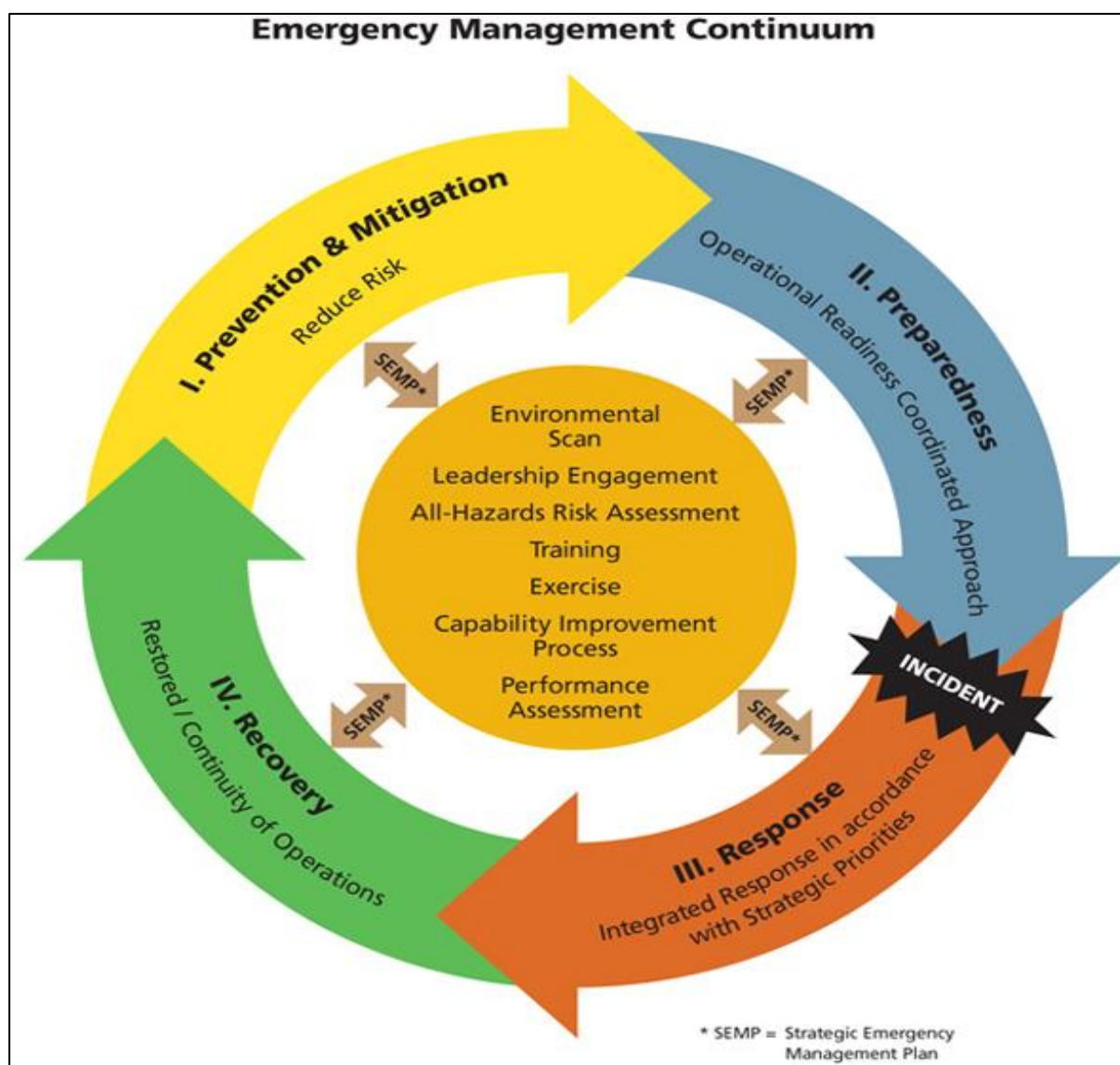


Figure 3-The Disaster Management Cycle

2.2.1 The Prevention and Mitigation phase

Mitigation activities minimise the effects of disasters and to some extent reduce the probability of the occurrence of unavoidable disaster. It may be achieved through the use of proper Government planning, the shaping of policies and safety codes, health and safety, (downing, T. 2004). This phase links all the other phases in disaster management cycle. The viability of its policies determines the success of the other phases. The next phase is linked to this phases because it develops the mitigation policies in readiness for action.

2.2.2 Preparedness

Even though it may not be possible to plan for all disasters, preparation is vital to saving lives if a disaster strikes. Planning and preparing for disasters is something every educational institution must consider regardless of its size and location (UN, 2013). At this stage governments and stakeholders plan how to respond to disasters. Most, if not all disasters can be prepared for even if their time may not be estimated. During this phase Governments plan to respond to disasters and minimise disaster impact. In some countries the disaster risk is successfully lowered through the use of appropriate technologies, wide spread awareness raising, preparedness and effective response mechanism. In Australia for instance, after many years of droughts, farmers have been able to adapt to changing circumstances (Wilhite, D.2000).

The disaster preparedness Processes are;

- Warning systems
- Establishing emergency communication systems
- Evacuation plans and training
- Resource inventories
- Providing an emergency personnel/ contact list
- Mutual aid agreement and public information.

Preparedness may also mean the strategic provision of water and food reserves these are the measures this research seeks to assess in the local urban schools to determine the level of readiness of schools for droughts. According to (FAO, 2013) the drought plans have the following components;

2.2.2.1 Monitoring and early warning and information delivery

This is integrated monitoring of key indicators by disaster management department and stake holders to make sure that timely warnings are sent to people to save life. Such include weather focus reports and the use of appropriate indices to assist in delivery of information and decision making. However, research has shown that there shortcomings of the Early Warnings Systems. According to Wilhite, D.A. (2000), the following short comings are noted:

- There is an inadequate data sharing within government sectors and the high costs of data limit its application in drought preparedness, mitigation and response.
- The data and its application are not user friendly, lack of expertise in the use and application of these systems have negative impact in decision making.
- Unreliable seasonal forecast limit the use of the forecast information in planning.
- Tools and indices for detecting the early onset and end of droughts are not adequate.
- The lack of impact assessment methodology hinders impact estimates.
- Delays on delivery of data and information on droughts.

2.2.2.2 Risk impact assessment

A risk or vulnerability assessment and monitoring is essential to assess the amount of damage that is likely to happen.

2.2.3 Mitigation and response

These are measures taken to increase the coping capacity of the affected communities. According to (FAO, 2013) mitigation plan is designed for long and short term purposes.

The table2 below Presents how that could be achieved the long term goals aims at developing resilience, while the short term measure aim at response and mitigation of droughts. To implement these long term goals, organisations need to develop programmes regularly and continuously. In short term planning, the implementation framework uses a drought plan before, during and after droughts to respond to droughts

Table 2- Mitigation Response and Recovery Strategy

Categories	Mitigation Long-term	Mitigation Short-term	Response and Recovery
Objectives	Resilience building	Drought mitigation	Impact reduction
Implementation framework	Regular Development Programme	Drought Plan	Response within drought plan
Implementation Time	Continuous	Before, during, after droughts	During and after Droughts

Source: (FAO, 2013)

The long term goal of preparedness procedure involves building resilience among the affected communities through reducing water uses and losses. FAO, (2013) highlights that another important procedure to follow is to instil knowledge in schools about drought preparedness and through reviewing education curricula. Schools can adopt conjunctive use of surface and underground water to increase water sources. The short term goals of drought mitigation are achieved by proving drilling machinery for boreholes, locating new standby resources of water during emergency in form of water tanks in schools and exploiting high cost water (FAO, 2006). The response phase is linked to the mitigation and preparedness phases because it puts their plans into action.

The efforts to minimise effects of a hazard taken by the government and stakeholders include provision of transport to transport the affected people to clinics and other safer places,

provision of temporal homes, clothing and food. The main focus is to provide immediate needs to the affected until a permanent solution is found (UNISDR, 2002). The humanitarian groups play a major role at this stage through bringing service to the needy. In response to droughts the following services would be expected to be delivered to the affected people; the provision of bottled water, food parcels, and fodder for livestock, distribution of water tanks and health education. This phase extends into the recovery phase which begins during the response phases with the aim of providing sustainable response and recovery activities to the affected communities.

In the past disaster management focused on response to the aftermath of sudden onset large scale events such as earthquakes, volcanoes. Whereas, the escalating numbers of deaths, suffering and destructions are caused by the slow onset of hazards, such as droughts, diseases and invasive species (Wilhite, 2000).

2.2.4 Recovery phase

This is a process of returning the community to normal condition is an on-going process that begins soon after disaster breaks. This is achieved by establishing a smooth transition from response to recovery phase to provide sustainable redevelopment of infrastructure and psychosocial support. There is always the urge to try and restore the broken infrastructure and to assist the affected community. Recovery activities include; distribution of information and health education, data collection with an aim to rebuild infrastructure and documentation of the event (UNISDR, 2005).

According to Wilhite, (2002) progress on drought preparedness has been slow owing it to the slow start of droughts. Basically its start and finish is not easily noticed hence the process of closely monitoring its progression in affected areas and their recovery takes time, it is an on-going process.

2.3 The effect of droughts in schools

In 2006 at the area of Gode, Somali region in Ethiopia, Ayan, a student of a school had to swap her books for daily drudgery of a housemaid, the situation was not good for young **children such that they had to sell their valuable possessions to survive the dry weather** conditions, UNICEF (2006). At Dolal primary school of the same village children

whose parents were pastoralist farmers dropped out of school to look after their livestock in a different region. The principal of the school commented that students who are hungry cannot understand anything of their lessons.

In the 2016 drought, according to (Reliefweb: 2016), close to six million students are likely to be affected by Ethiopia's worst drought. The root cause of school drop outs is shortage of safe water supply, food and child malnutrition.

In Wajir South in India, the education officer stated that 72 secondary schools are facing very tough challenges since parents cannot afford to pay the school fees due to loss of livestock that is meant to be their source of income (IRIN:2012).

Chambers and Conway (1992), argues that drought and water shortage is a contributing factor to child drop out from school. They stressed that the access to water influences school enrolment.

At Puntland, displacement and decreasing enrolment have closed a third of schools in drought affected areas in the country. They face severe water shortages and high water prices forcing many children to walk long distances fetching water instead of going to school (UNICEF, 2016).

2.4 Drought response

The education system of Ethiopia was under stress, there was an inadequate supply of everything needed in schools such as furniture, textbooks and qualified teachers. The government together with UNICEF provided water supply, vaccination, food and health specialists to villages in the region (IRIN:2012).

UNICEF has set up programmes that offer child protection through health, nutrition and water supply. If children are given free access to education during times of droughts, especially one that incorporates disaster preparedness and adaptation they stand a chance of developing their full potential of coping and adapting to future droughts (UNISDR,2002). Thus, education empowers children by allowing them to bear a positive impact in their communities socially, politically and economically. UNICEF, (2010), further states that, schools have power to sustain and protect children during droughts and should play a role in mitigating the impact of cyclical droughts on the development of the child.

The government of India in the 2011 drought introduced mobile school teaching program for children whose parents are pastoral farmers. This programme followed the nomadic children in remote grazing areas providing them with education. The ministry of education and aid agencies provides food to schools for school feeding programmes as an effort to keep children in school for the whole year (IRIN:2012).

With the development of the Millennium Development Goals of the year (2000), the UN made a declaration confirming the importance of disaster risk reduction. 'Protect our common environment' develop poverty eradication', we resolve therefore to adopt all environment actions a new ethic of conversation and stewardship and reduce the number of natural and manmade disasters.

2.5 Drought Management Plans Objective

A drought management plan aims at minimizing the negative impact of droughts on the economy, social life and environment. European Commission, (2007) observes the following objectives:

- Guarantee water availability in adequate amounts to meet basic human needs.
- Minimise the impact of droughts on water quality, the flow of rivers and underground water quantities.
- Minimise negative effects of economic activities on rivers.

The operational component

The operational component of drought management according to European Union (2007) is to identify both long and short term actions to prevent and mitigate drought impacts. It is composed of five components namely:

- Preparedness and early warning
- Establishing priorities to be respected during water shortages due to droughts.
- Threshold defined by drought indices and indicators.
- Define actions.
- Evaluate the process to implement the actions.

2.5.1 The importance of a drought plan in schools

A school drought plan or even a disaster plan is work-in-progress, a never finished document. However, school safety and educational continuity requires a continuous process initiated by the management, teachers, students and the local community. Below are the aims of disaster management in schools according to IFC, (2014);

- i) To protect students and staff against physical harm.
- ii) To minimise disruption and ensure continuity of education for all children.
- iii) Develop and maintain culture of safety.
- iv) Drought plans provide the framework for improved coordination between schools and government's levels (Wilhite, D.A, 2000)

The IFC, (2014) goes on stating that education is a human right therefore it is important for communities that education should not be stopped or get suspended because of disasters and emergencies. For that reason, planning and preparing for disasters is something that every institution must consider.

2.5.2 The methodology of drought preparedness plan

The United States has seen rapid development of drought plans and Colorado, New York and Dakota are some of the states that have been able to put up drought plans (WMO, 2000). Drought planning in United States gained momentum in the past two decades and the focusing more on mitigation approach than the response approach.

In 1999 a 10 step planning process was established as a methodology for drought preparedness plans to be followed by the States. This process was intended to develop the mitigation tools to reduce the impact of droughts. It is a dynamic planning process that reflects changing Government policies, technologies and natural resource management. Below are the 10 steps of the drought planning process used in preparedness phase.

Step 1- *Appoint drought task force*

Step 2- *state the purpose of the drought preparedness plan*

Step 3- *seek stakeholder participation and resolve conflict*

Step 4- *inventory resources and identify groups at risk*

Step 5-*develop organisational structure and prepare for the drought*

Step 6-*identify research needs and fill institutional gaps*

Step 7-*intergrate science and policy*

Step 8-*publicise the drought preparedness, build public awareness*

Step 9-*teach people about droughts*

Step 10-*evaluate and revise drought preparedness plan*

Steps 1-2 focus on the development of a drought task force, a body that will coordinate and supervise the development of drought plans. Steps 3-4 focus on making sure that the selected task force and stakeholders are able to formulate goals and objectives to achieve, that they work towards achieving their goal and they gather enough data to make reasonable decisions to improve policies. They will activate and implement the mitigation and response plans and make policy recommendations. The task force is composed of senior policy makers from different government ministries and representatives from NGOs these are people who are in better position to make decisions, recommendations and request for assistance through various programmes. Duties of the task force extend to assessing drought conditions, developing mitigation actions and programmes to reduce risk in advance of droughts and develop cheaper and sustainable response actions (ISDR,2006). The aim should be to minimise the effects of droughts and limit conflicts over the use of resources more especially water. In order for the task force and stakeholders to minimise risk they must identify areas at high risk first and provide mitigation or response first.

2.5.3 Components of a drought plan

In step 5, the established organisational structure for drought preparedness plan have three component; first the monitoring and early warning committee, secondly a risk and impact assessment committee and lastly the mitigation and response committee. Each committee shall have its objectives and duties but effective communication shall keep all committees with same understanding. The mitigation and response committee depend on decisions taken by the first two committees.

2.5.4 The Primary Objectives of the monitoring/early warning committee's

The monitoring/early warning committee is responsible for data collection for the following indicators, precipitation, temperature, evapotranspiration, seasonal weather forecast, and soil moisture stream flow, and groundwater, reservoir and lake levels (Wilhite, 2005). The committee shall gather data, store it and disseminate information to the public. The need for early warning and monitoring systems cannot be over emphasised, in the United States the drought watch section has been set up by the National Drought Management Centre (NDMC) for purpose of providing rapid access to climate data, (Wilhite et al: 1999). Discussed below are the objectives of the monitoring /early warning committee.

- a) Define droughts in a way that shall determine its severity considering emergency measures.
- b) Establish drought management areas-subdivision.
- c) Develop a drought monitoring system- data collection system for monitoring the climate and water supply.
- d) Develop and modify current data delivery systems. Data must be delivered on timely bases on print and world wide web.

2.5.5 Risk and impact assessment Committee

The impact of droughts to the community is a combination of the probability of occurrence and a number of factors such as the environmental, social and economic factors. Assessment and planning is the starting point of all thoughtful mitigation and safety efforts (AIACC, 2004). Therefore, to reduce risk before droughts it is important for the risk/ impact assessment committee to assess the economic sectors, social groups and ecosystems that are at risk as a result of drought.

After identification of areas at risk, the committee will then suggest appropriate and reasonable mitigation measures to address these risks (Dr Basabe & Dr, Knutson.2007) This information on vulnerability to droughts and the impact of droughts will make them respond to drought impact efficiently. To work effectively the committee will have to form sub-committees that will assess the economic sector, the social or population at risk and ecosystems.

The membership of the working groups shall consist of technical specialist in each sector. Each sub-committee will have a chairperson who will report to the main committee, the risk and impact assessment committee (Wilhite et al: 2000). Information gathered by the working groups and their recommendations on mitigation measures will be submitted to the Drought Task Force for implementation.

2.5.6 Mitigation and Response Committee

It is the duty of the task force to provide a mitigation and response plan for drought impact for all affect sectors and for those at risk. As stated earlier, each sub-committee of the early warning and monitoring committee and the risk and impact assessment committee shall comprise of technical specialist in drought mitigation and response in all sectors (FAO.2006) Their technical know-how shall be used by the task force in changing policies, drought management plans and making recommendations on drought mitigation.

Stage 6-7 of the drought methodology plan focuses on formation of research team to conduct an on-going research on droughts in the area. The task force shall coordinate between the scientist and policy makers with regard to finds and predictions (Wilhite et al, 1999). This team of researchers shall make recommendations and possible solutions to mitigate the effects of droughts.

In stage 8-9, the plan states the importance of testing the plan before droughts. The task force shall implement the plan, first through educating the public about drought readiness, the expected condition of the drought how people should respond to the drought (iSDR,2010). It stresses the importance of rising public awareness and the responsible action to take during droughts. Without awareness campaigns it shall be difficult for the nation to respond uniformly and responsibly towards the droughts and it shall be difficult to take the mitigation plan to the vulnerable members of the society. It is believed that for every plan to be successful the vulnerable people must own the plan first, understand it then they shall follow it (Wilhite et al: 1999). The task force must engage the local community in its early planning phase and follow the local procedure of communication in order to reach out to all levels of the society.

In stage 10 of the plan, is an important stage normally taken in post disaster phase where the task team sits down with responsible committees to discuss the aftermath of the drought in relation to the plan at hand. They revisit and revise the plan to keep it relevant, effective and

reliable in all sectors. The purpose is to evaluate its usefulness and effectiveness in current cases. After this meeting recommendations and amendments are made in post drought period.

2.5.7 A proposed plan for empowerment of school's disaster and emergency committees

Since schools' safety is the job of the entire community, its success depends on the active involvement of school administrators, local community leaders and students (IRC&UNICEF, 2010). According to Wilhite et al, (1999) the schools' drought management committee should consist of a key political leader to initiate the planning process.

In urban schools of Swaziland this could be the town mayor, the minister of Urban and Town Planning, Regional Education Officer (REO), the school's principal, school manager, teacher's representative, student's representative, and the non-teaching staff employed by the school.

According to UNICEF, (2011) if schools are to save their purpose which is, providing quality education and ensuring a safe learning environment, they should play their part in disaster management. Students spend most of their time at school if their learning incorporates disaster management their understanding of disasters besides droughts would change.

The goal of drought risk management is to increase the coping capacity of the community thus leading to greater resilience and reduced need government interventions, Inglesias.A, Garret, L Cancelliere.A, Cubillo.F, Wilhite, D. (2009:4) in essence therefore; schools that have an active Drought Task Force (DTF) have a better chance of resistance to the impact of droughts. It is important to form drought plans that will action timely and systematically to deal with the extended periods of water shortage.

In stage 2 of the drought plan the role of the task force is to define the purpose of the plan by defining boundaries of their duties and expectations. Its focus shall be on providing the following:

- A structure and a delivery system that ensure that information flows from higher level of the hierarchy to the lower level.
- Define duties and responsibilities of all subcommittees responsible for droughts.
- Maintain an inventory of all government programmes used in assessing and responding to droughts.

- Identify mitigation action that can be used to address vulnerability and reduce drought impact.
- Keep the school updated about current response actions taken in providing relief and mitigating the effects of droughts.
- Highlight challenges faced by the mitigation plan and make suggestions on how to overcome those challenges in-order to conduct response activities in the future.
- Establish a procedure to follow when evaluating the plan in future for smooth operation of the plan.

In stage 3, the committee must make sure that it uses all its resource personnel in the planning phase. Socio-economic and environmental activities normally clash when it comes to water supply during times of droughts (DMTP. 1992). Schools often find themselves in that mess of competing for water supply with other government sectors.

Drought risk management plan in schools should deal main with water management. According to Von Kotze, A and Holloway, A. (1999), water management policy should encompass the repairing water pumps for efficiency, deepens wells to reserve more water, harvest rain water from roof tops into water tanks and establish rules regarding the use of dam water.

The taskforce has a responsibility of making sure that the school gets enough water daily even on days of water rationing for the smooth operation of the school. It is important for the team to have membership from government sectors that responsible for drought planning. Involving government members will help schools and their immediate neighbours with water issues. To avoid increasing vulnerabilities leaders should identify capabilities in order to know what strengths lies within the society (Anderson,M.B &Woodrow, P.J. :101998). Bringing together all neighbours to discuss water related issues, problems and possible solutions clears all concerns and allows all affected citizens a chance to prepare and respond positively to the drought.

Stage 4 - inventory resources and identify groups at risk. To identify risk, the drought committee must first identify schools that are at high risk of being affected by droughts so that measures may be taken to reduce the effects of droughts and save life. To able to do that, it is important to define risk. Risk is defined as the exposure of the location of the school to

droughts and the vulnerability of the location to periods of drought induced water shortages (Blaike et al., 1999).

Exposure is the period of drought of various intensities in the various parts (schools) of the country to the drought or hazard (Blaike et al., 1999). Some schools are highly at risk than others. Whereas, vulnerability on the other hand is affected by the social factors such as urbanisation, water use trends, government policies, changes in land use, cultural diversity, population growth and migration trends.

An inventory of resources that are vulnerable to periods of water shortage is compiled by the taskforce. These resources can be natural, biological and human resources. The most important natural resource is water, its location, quality and its accessibility. Biological resources are forest, wildlife and grasslands. Human resources include the expertise in water technology and human resource personnel who will handle peoples complains and to be able to give a positive feedback.

It may be difficult to ascertain the high risk and low risk areas to droughts but the simple equation explain earlier on will help to identify high risk and low risk areas in terms of exposure and vulnerability. These issues of risk and inventory resources must be dealt with early during the planning phase to give the other sub committees direction with their work.

Stage5 - Establishing and writing a drought plan for schools. This step has three components namely,

- (a) Monitoring and early warning and prediction
- (b) Risk impact assessment
- (c) Mitigation and response.

Two sub-committees will be formed for these tasks, one for monitoring and early warning, the second for risk assessment. Mitigation and response will be done by the task force.

A) Monitoring and early warning and prediction committee

Members of this committee shall work very closely with agents responsible with observing the weather and water supply (Wilhite., et al, 1999). Information gathered from these agents should help the committee's evaluation of water situation and outlook. Drought early warning

systems designed to identify climate and water supply changes are some of the measures that must be studied to detect the likely occurrence of droughts.

However it has been noted that communities with this system may underreact to a forecast or downplay the likelihood of disaster (Wilhite, D.A:2005). It would benefit urban schools to monitor weather forecast in preparation of droughts and other disasters.

The chairperson of this committee shall be a permanent member of the task force and shall timely give information the drought committee about situation of the drought and water supply. Its main objectives are;

- i) To define droughts in terms of available water supply, the short term and long term projections. Recommend to the task force how to improve water supply and storage facilities in order to make sure water is enough. In long time look into upgrading water supply systems.
- ii) Develop drought monitoring systems by working with the meteorology station to collect analyse and disseminate data to the school about weather patterns especially rainfall quantities.

B) The risk assessment committee

The responsibility of this committee is to assess sectors in the school that are likely to be impacted by the drought.

Firstly, Sectors such as health and sanitation, academic performance and reasonable mitigation measures to address these risks.

Secondly, it shall assess the impact of drought to learners and resources used during droughts. Direct impact would be depletion of water sources, secondary impact in schools includes the spread of water borne diseases, poor performance of learners, increased rates of absenteeism.

Lastly, identify mitigation actions to be followed to reduce impact of droughts in schools. This task is done by the sub-committee and recommendations are made to the drought task force

C) Mitigation and response committee

Working closely with the other sub-committees, the drought task force will draft a drought plan. The plan will be dynamic show all mitigation plans for all sectors in schools not a static document. The task force should evaluate all government programmes available that could provide assistance during droughts. The assessment will focus mainly on the ability of the programmes to provide the short term and long term response services.

In Nepal, to reduce the risk of drought and increase access to water the installed shallow tube wells, improved wetlands and systematised water distribution practice, (ISDR, 2010:37)

In summary, therefore, drought planning maybe defined as actions taken by the government or individuals ahead of droughts aiming to mitigate its effects (Waugh, JR & Hy, R.J, 1990). It includes amongst other activities the flow of information between levels of government on drought declaration and procedures. The appropriate drought assistant programmes and their implementation procedure is part of the plan.

Stage 6 - Identify research needs and fulfil institutional gaps. The drought task force must monitor the deficiency that exist in drought management and make recommendations to close those gaps in through drought planning. A comprehensive drought plan must cater for all drought preparedness measures and make sure they are put in place prior to droughts (Wilhite et al, 1999). That includes amongst many early warning on water levels and available alternative sources of water supply, rapid updates on the current weather forecast especially rainfall and temperature.

Step 7 - Integrating science and the policy of drought management. A good relationship must be established between the scientists and policy makers since in most cases scientists have little knowledge about drought policies yet their work may have a negative impact on the government policies. A team of scientist and policy makers could include the principal of the school, the school's manager, the mayor of the town, water technicians, the meteorological officer etc. If all these members work

together from the initial stage of planning and develop good communication a good comprehensive plan shall be accomplished.

Step 8 - publicising the drought plan. It cannot be over emphasised how important it is for the drought committee to coordinate and facilitate the implementation plan that engages all stakeholders successfully. According to the US department of education, (2008), careful involvement of all government officials enables the easy rollout of the drought plan to the public and to affected schools. Below are themes the task force should consider when making public announcements pertaining water management before and during droughts.

Themes of drought planning

- i) Explain how the drought plan will be of benefit to the local schools and surround communities.
- ii) Explain how the schools and local surrounding may have to change the way they use water, such as watering the lawn and flowers, washing cars and watering the gardens.
- iii) Keep the public informed about pertinent issues on water management.

Step 9 - Develop education programmes that will accommodate all people of different age-groups. Develop detailed programmes for pre-schools children, primary school, high school and tertiary students and the immediate communities. The task force may also develop presentations and educational material for events held by the school or the municipality on water resource management in the community and school to raise awareness on water issues during droughts.

Step 10 - Revise and evaluate the drought plan, it is important to create and set of steps for follow when evaluating a drought. These steps must be divided into two, the on-going evaluation and the post-drought evaluation.

The on-going evaluation plan

This is an on-going evaluation plan that is taken during the cause of drought, mainly it is meant show how a change political power may affect the process of drought planning (Wilhite et al, 1999). Other changes that may directly or indirectly have an influence on the drought plan are the use of new technology, new research and new laws that are implemented

by the government. This changes must be accommodated in drought planning constantly hence the process of drought planning is an on-going exercise.

Post drought evaluation

This exercise analyse the assessment and response actions taken by the government and school committees in reducing the effects of droughts to local communities. The post drought assessment shall cover the impact of the drought on teaching and learning in schools, the academic performance of learners during and after droughts, social and economic impact on learners and their learning environment.

This drought plan is a planning process that can be used by schools and communities to develop a mitigation procedure to follow in order to reduce the impact of droughts. In the past reactive process have been used to respond to droughts through crisis management, but this drought plan discussed here is different because it focuses on drought preparation and response, mitigation and adopting mitigation actions.

The risk assessment methodology is developed to guide schools and affect communities on how to evaluate and prioritise the impact of droughts. Furthermore, risk assessment helps the task force to identify the mitigations and tools that can be used to reduce the impact of droughts in future occurrences of drought.

Drought planning must be viewed as an on-going process where constant evaluation of impact and response measures is taken to reduce risk and drought impact. The process of drought planning should involve government's officials, non-government agencies, local communities and schools for smooth operation in the planning and implementation stage.

2.6 The importance of drought preparedness in schools

Children are vulnerable they have special needs prior to, during and after droughts. Their special needs place them at increased risk when droughts occur. According to (Bullock, J.A, Haddow,G.D,Coppola,P.D;2011) children have less fluid reserves and are likely to get dehydrated if vomiting occurs, a situation that is common during droughts.

Drought preparedness provides teachers with information on symptoms of children's stress reactions and how to handle their fears and concerns. It also equips teachers on how to take care of themselves first, by attending to their needs first in order to be able to attend to others.

Schools provide a safe haven for children during the day. By providing a safe environment for the children, schools help children control their thinking and reaction towards droughts. Basically schools shape children's perceptions of droughts and how to cope with their impact. Reliefweb, (2016), observed that if children in Ethiopia continue to attend school during droughts and gain knowledge on drought preparedness and adaptation, they will gain their full potential and capacity to cope and adapt when faced with drought in the future.

2.7 The impact of urbanisation on water resources in times of climate change

Urbanisation is a process of changing the natural earth into a landscape of concrete surfaces to manage storm flow. This process has reduced evapotranspiration and increased run-off of storm water into drainage network that have been constructed which eventually results in flooding. This urbanisation process results in reduced infiltration into soil and less recharge to underground water increasing the potential for droughts (Sheffield, J. & Wood E.F: 2011). Furthermore, the increasing population in urban areas increase the demand of water supply thus increasing the impact of droughts.

Urban areas are able to grow and prosper when they have an adequate supply of water, sanitation, power, communication and transport. In some developing countries about 20% of the population does not have access to safe drinking water, 50% lack access to sanitation, (Matthias, R. & Maria,E.I:2009). According to Roland, V.G & Jose, C.E, (1982) drought transforms a bad relatively bad situation into a worse case. In essence therefore, these less developed countries that are currently facing a bad situation of shortage of safe drinking water will become worse if droughts are not successfully mitigated.

In 2005, South Africa made three important decisions concerning climate change. These decisions were taken in the South African climate change conference, first, was to acknowledge that climate change is real. Secondly, to develop climate change response policy, lastly to set up mitigation scenarios (Raubernheimer. S: 2011). The latter got the country together in meetings where they looked at long term mitigation scenarios in preparation for climate change that could manifest in droughts. The aim of the scenario approach was to give the Government options rather than prescription plans.

According to Rosenzweig, C et al (2011), urban water systems namely, water supply, conveyance, distribution, reuse, treatment, and disposal elements are all vulnerable to climate change. In many cities the quantity and quality of water supply is affected by droughts and

flooding. In Lagos about 60% of the population use informal distribution system which is more vulnerable to droughts.

2.8 Drought risk assessment

Drought by itself does not trigger an emergency. Whether it becomes an emergency or not depends on its effects on local, people, community and society, and this, in turn, it depends on their vulnerability to the stress of the drought. The ability to cope with droughts varies from country to country and from one region to region.

Drought risk assessment must consider improved understanding to natural hazard and human exposure to the phenomenon and understanding of the micro and macro context of people vulnerability to droughts UNISDR (2009:15). If this understanding is reached drought mitigation, preparedness and response measures can be identified and implemented to create a new drought resilient society. Figure 4 presents the difference between a society at risk, without resilience to drought and a society that is resilient to drought.

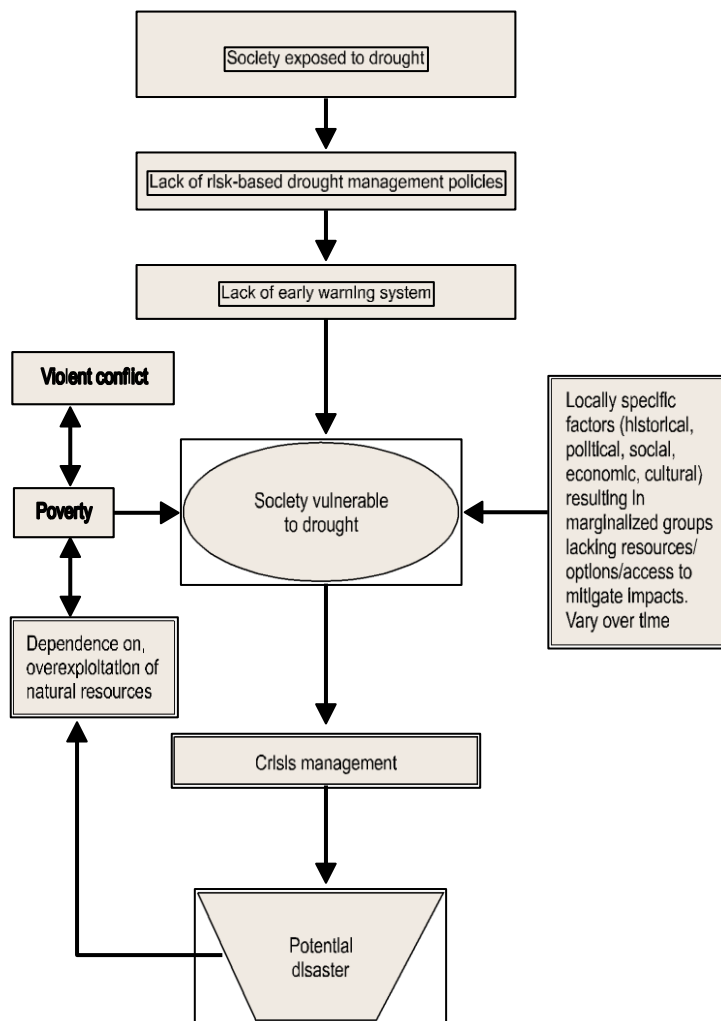


Figure4-a

Source: Drought: Leaving at Risk, UNISDR, 2003

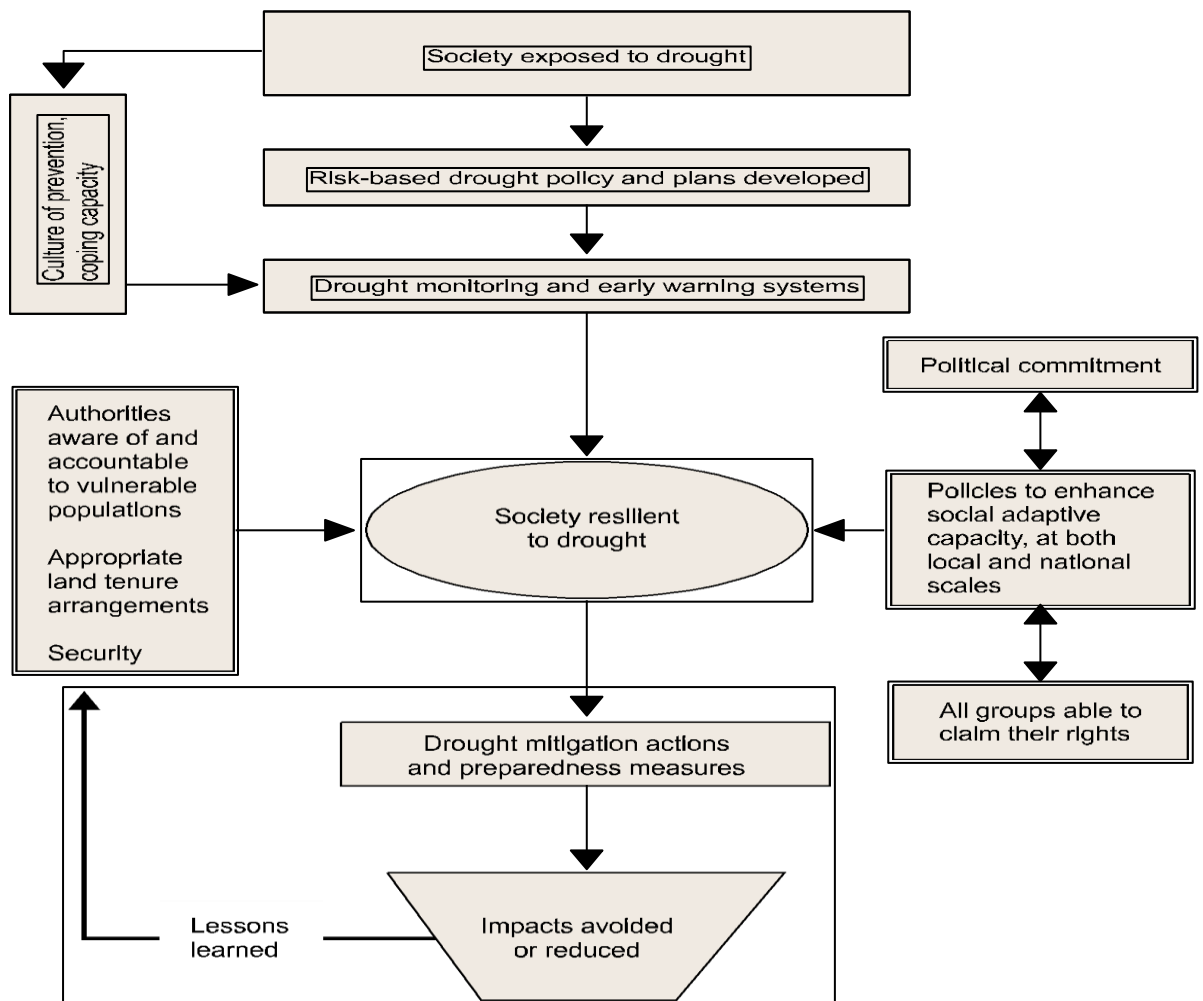


Figure 4b

Source: Modified from Drought: Leaving with Risk, International Strategy for Disaster Reduction, UNISDR, 2003

Drought management responsibilities

Cumming, R, Dinar, A, Olson, D. (1992) improved water resources management may provide a sound economic alternative through increasing their available quantity and quality. Droughts may affect the country's economy and the people's lives at all levels. The extent of the impact depends on the nature and duration of the drought. Since the timing, severity and duration cannot be predicted, each level of government is responsible for the preparation of the drought management plan in advance to effectively manage every conceivable type of drought condition, (Frederiksen, H, 1992)

Steps of drought management plan

1. Define available resources
There are several sources of water that could be used to meet the demand of water such as ground water and transferring water from areas of lower demand to where demand is high.
2. Define demand
It is important to define quantity, quality and location of demand for water to be able to manage water supply.
3. Describe possible shortfalls in supply.
4. Describe management measures for potential events.
These are the measures taken to meet the supply and demand based on the shortfalls
5. User and public involvement
The drought management plan depends on the support of users, depending on the extent of the drought.
6. Securing legislations agreement, rules and procedures
New legislation on water use is necessary for drought management plan, which include laws against pollution,
7. Drought management event plan

3 Chapter 3

Research methodology

3.1 Introduction

The chapter will describe the research process used in this investigation. It entails the methods used and the procedure followed to access the drought preparedness measures taken by schools in the city of Mbabane to mitigate negative effects of droughts.

3.2 Research design

According to (Kitchin R, 2000), research design is a practical plan on how data will be generated and analysed by the researcher. Therefore, it is a complete strategy used by the researcher to collect data and analyse it. In this research, the researcher will use both qualitative and quantitative data. Quantitative data will be gathered from primary and high schools in the urban area using the systematic sampling. Qualitative data will be collected from teachers, students and school's administrators such as school's managers in the absence of principals and deputies. The benefit of this method is that the face to face interviews allow close interaction with the respondents and speeds up the data collection process.

3.3 Sampling procedure

The simple random sampling method was used to sample primary schools and to sample high schools. The advantage of this method is that it shall allow coverage of all categories, both Primary schools and High schools. Primary schools both private and government schools shall be listed and names put in a hat for a raffle draw. A total of eight primary schools shall be selected for the survey. The same procedure was followed for High schools and nine High schools shall be selected. This gives a total of seventeen schools that shall be interviewed using the face to face interviews method.

The random sampling method was used to select teachers, students and schools administrators in order to collect qualitative data. From each school one member of administration will be interviewed, three teachers and five students will be interviewed using the face to face interview. The selection was done from a list of teachers, students and administrators from each school.

The researcher used both qualitative and quantitative research methods in gathering responses from teachers and students. Creswell, (2009) noted that using a mixed method will balance the strength of each method. The quantitative data was coded and analysed using the Statistical Package for Social Science (SPSS).

3.4 Data collection

Valid and reliable data was collected using face to face interviews by three interviewers using a structured questionnaire. The benefit of this method is that it shall allow close interaction with the respondents Kitchin,R. & Tate, N. (2000). Hence assist them in filling in the questionnaire and provide clarity on the questions when need arise.

3.5 Questionnaires

Questionnaires will be used as a data collection tool for this research. They shall be administered by three interviewers in all selected schools. The purpose of using interviewers is to speed up the data collection process and to assist interviewees when filling in the questionnaires. Interviewers will be asked to fill in the questionnaire first to make sure they understand it and are able to administer it before going out field. Most of the questions shall be close ended to enable analyses process and for easy data capturing. The interviewer will fill in the questionnaire during the interview, to make sure all questions are answered correctly. A total of sixty-eight questionnaires will be distributed to seventeen schools in Mbabane. Thirty four will be distributed to schools administrators and teachers, thirty four shall be distributed to students. In summary each school will have four questionnaires.

The pilot survey was conducted in one of the schools within the city to test the reliability of the data collection tool. The pilot study was conducted by the researcher. One principal, one teacher and two students will be interviewed.

3.6 Data analysis

The researcher sort assistance from the University of Swaziland. The Geography and Social Science departments played a role in acquiring the SPSS software that was used in data analysis and presentation methods. The drawing of tables, charts and graphs are some of data presentation methods the researcher hopes to apply in this study.

3.7 Reliability and validity

The questionnaire used to collect data will be written in simple in English by the researcher. Questionnaire was approved by the supervisor before pilot survey and some questions were corrected. The research assistants will clarify the questions to make sure that respondents give the valid responses to the questions. After the pilot study the researcher went through the questionnaires and improved their presentation and edited some of the questions..

3.8 Ethical considerations

Prior to data collection the researcher sort permission from the Regional Education Office (REO) to conduct the research in the selected schools of the city. Furthermore, permission was sort from the administration of each school to do the research in their schools (see appendix A & B). The researcher ensured confidentiality by making sure that the identity of the respondents or name of school is not reflected on the questionnaires. Respondents will not be forced to take part in the research and only their response will be recorded.

3.9 Data management

Responses of the questionnaire from the close-ended questions were coded and entered into the statistical package for social science (SPSS) version 20 for data analysis and presentation. Open-ended questions were summarised and presented in the boxes. All the data was collected was analysed and presented in pie charts, graphs especially bar graphs and tables.

3.10 Limitations of the study

Limitations of the study include financial constrains to conduct research as a result a smaller sample size was interviewed. The limited time to do the research limited the size of study area; the research was carried out only in schools found in Mbabane city excluding other cities. The research focused only on schools preparedness and not rest of the urban community.

3.11 Delimitations

Due to shortage of time to embark on a larger area, the study did not make an effort to study other urban areas in the country. It did not even make an effort to investigate risk deduction strategies of other disaster that have taken place in the area. The data collection method of administering the questionnaire was only suitable for the sample size obtained from schools. The immediate community that includes government officials were not catered for by this study.

3.12 Conclusion

The researcher designed the questionnaire and divided it into close-ended and open-ended questions. The questionnaires were administered by the researcher and two other research assistants who helped with data collection from students especially from primary schools.

The sample characteristics consisted of school managers, principals, deputies, teachers, and students. They all made a sample size of 68 respondents. One of the schools was used for pilot study after that study some questions were restructured to make them relevant to the survey. The researcher sort permission from the REO and school's administrators to conduct the study. The SPSS software was used to analyse and present data in tables, pie charts and bar graphs. Open ended questions were summarised and present in text boxes. To protect respondents ensure confidentiality respondents were not allowed to write their names or school's name

4 Chapter 4

Data Analysis and Interpretation

4.1 Introduction

This research was designed to assess drought preparedness measures in urban schools of Mbabane in Swaziland. In this chapter data is analysed, presented and interpreted to investigate the following issues:

1. Whether or not schools were prepared for the droughts.
2. If teachers knew how to teach drought preparedness in schools.
3. Whether or not schools need a policy regarding teaching and learning of drought preparation.
4. What measures were taken by schools to prepare for droughts?

Furthermore, the questions below served as the main guidelines for the study.

1. Did schools receive prior warnings from the Regional Education Office (REO) concerning preparation for droughts?
2. Did schools have safety / preparedness plans for droughts and drought task force (DTF)?
3. Did those plan help alleviate drought impact for those who had them.
4. How did teachers teach drought preparation?
5. Those who did not teach students about drought preparation, why did they fail to do so?
6. Describe the sanitary condition at your school.

Questionnaires were administered to both students and teachers, these questionnaires had both close-ended questions where respondents ticked his or her suitable response and open-ended questions that allowed respondents to express themselves.

4.2 Data analysis and presentation

Sample for the study was taken from both males and females from both sets of data, teachers / administrators and students. The aim of the researcher was to get views from both teachers and students concerning drought preparation in schools. To achieve this, the researcher though haphazardly chose the sample it represented both males and females. However, figure 5 presents a fairly balanced representation of gender that 52.94% were female students and 47.06% were male students.

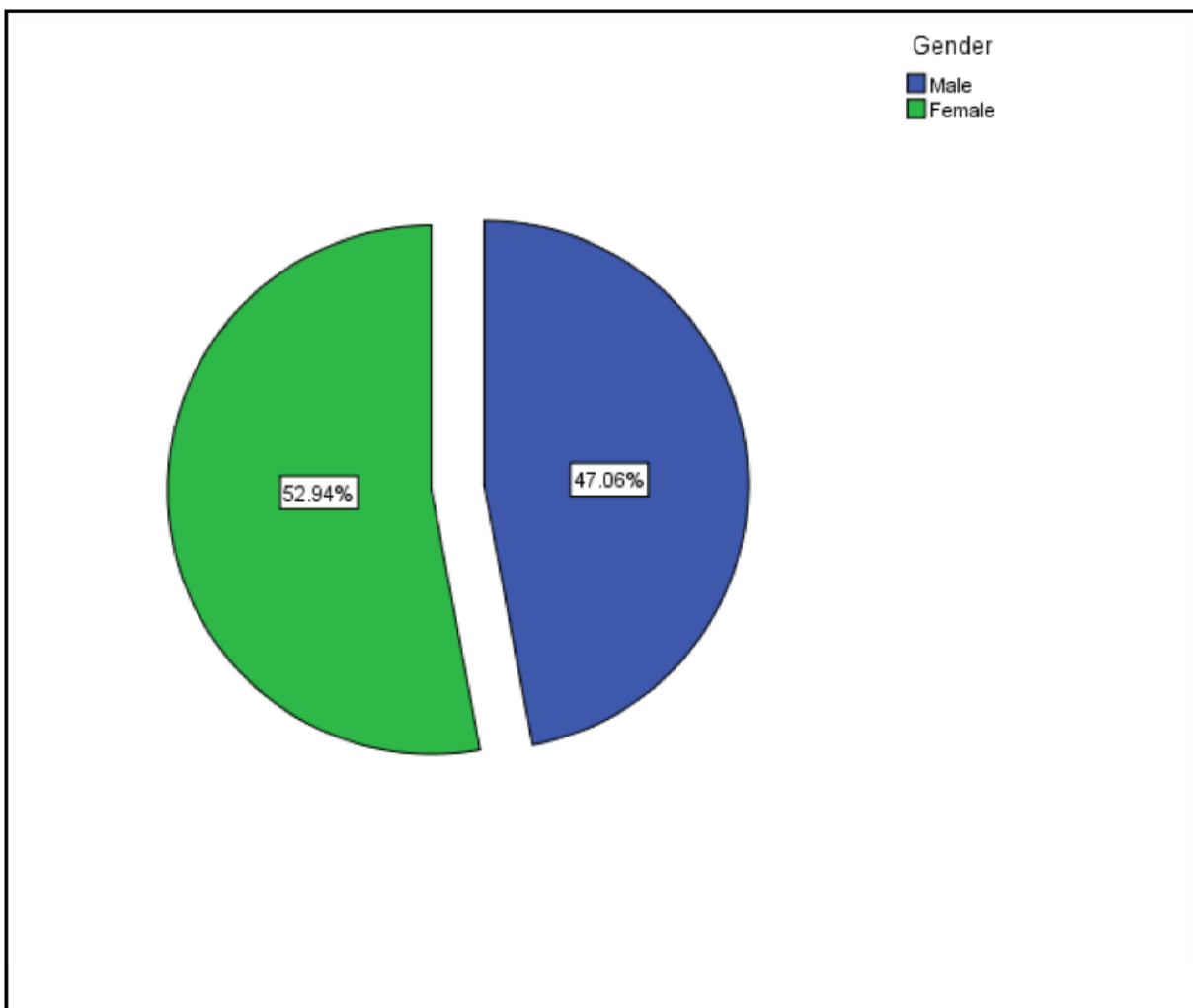


Figure 5-Student representation of gender

Figure 6 show a representation of teachers and administrators, again they picked randomly a method that gave everyone an equal chance to be selected. 41.2% were males and 58.8% were females.

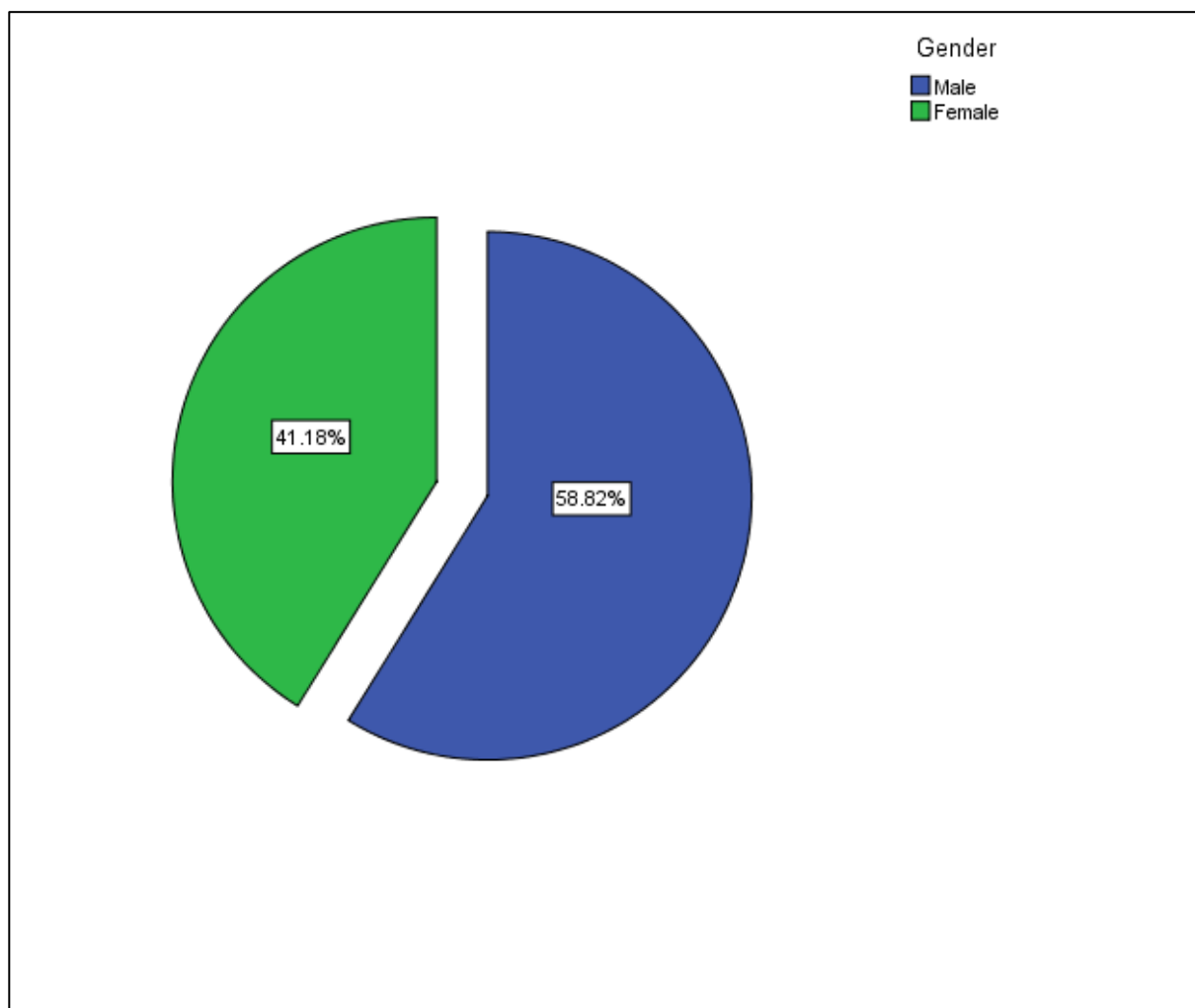


Figure 6-Teacher and Administrator's Representation by Gender

The study targeted both primary and high schools, table 1 show the number of schools sampled. There were 8 primary schools and 9 high schools of these schools some were Government schools and some were private schools.

Table 3- Types of Schools

SCHOOL	TOTAL
High school	9
Primary school	8
TOTAL	17

Source; Field Work

Figure 7 below shows the data of age distribution of respondents. For students the age groups begin from 7 -10 to 19 years and above. The highest number of respondents for this study was students between the ages of 11-13, mainly because they were available during the time of survey and they were on either their last stage at primary or beginning high school.

At this stage, students must have learnt about drought preparation at primary school. The second highest group was the 14-16 groups, who are at middle of high school and should give sound knowledge of drought preparation. Though the selection of the sample was done haphazardly; but it shows a fair representation of students at all age groups.figure7 presents the distribution of respondents

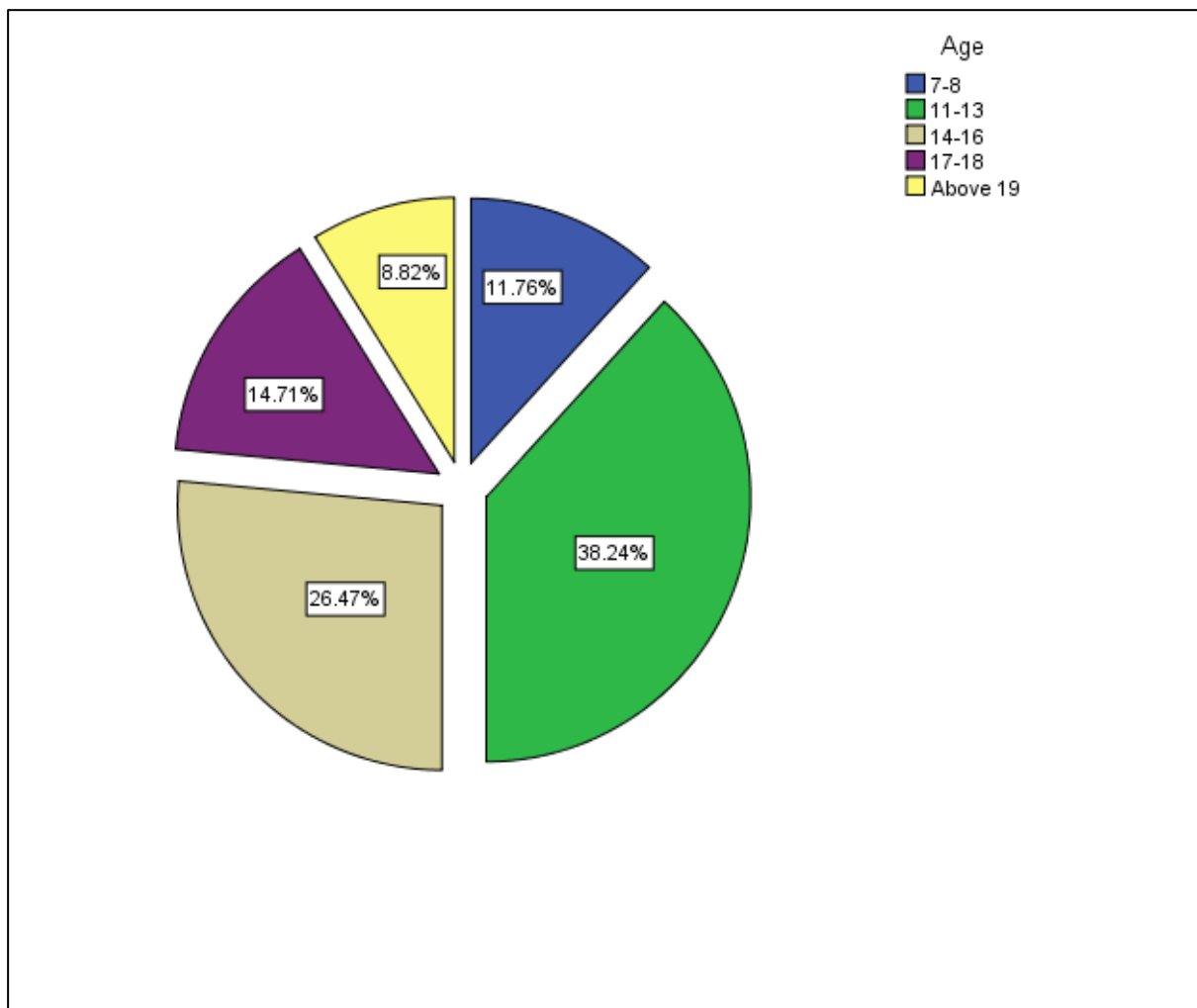


Figure 7. Age Distribution of Students

The following section will discuss information gathered from learners regarding knowledge about disasters and specifically drought.

Table 3 below, shows the age group of students who have learnt about droughts and those who have not. There is larger number of students who have learnt about disasters in age group 11-13, 39.2% and age 19 and above only 8.8% students have learnt about disaster. Most students at this age are more aware of what they know, to them it is no longer enough to talk about disasters without caution, it is for that reason that even though they are at their last stage of school but they are able to say they have not learnt about disasters, the topic was very shallow in preparation for disasters.

Table 4- Age Groups of Students and Knowledge of Disasters

Knowledge of disaster	7-8yrs	11-13yrs	14-16yrs	17-18yrs	19 & above	total	Percentage (%)
Yes	0	12	5	1	0	18	52.9%
No	4	1	4	4	3	16	47.1%

Source: Fieldwork

Question7 of the student questionnaire, 'have you learnt about drought preparedness', figure 8 presents responses to that question. Most of the students answered that they have not learnt about drought preparedness only 35.3% said yes we have learnt about drought preparedness.

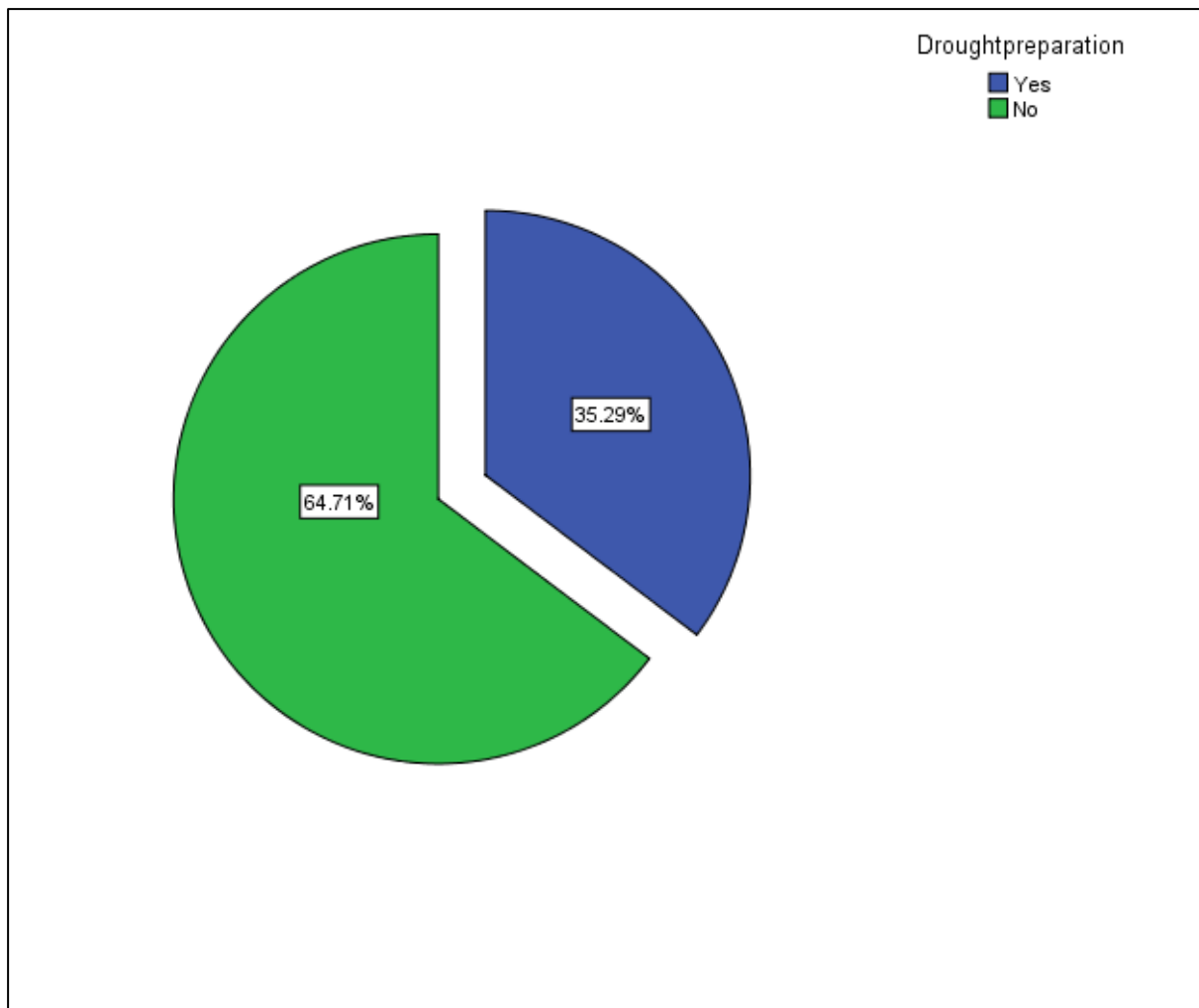


Figure 7-Student's Knowledge on Preparedness

Figure 9, presents information of students has learnt about drought preparation at school. Moreover, the results show that 25% of students are aware of disasters and gained

information through media while 75% of them received the knowledge from teachers. Next, information from teachers will be discussed to determine teacher's knowledge on drought preparedness and what measures schools took to prepare for droughts.

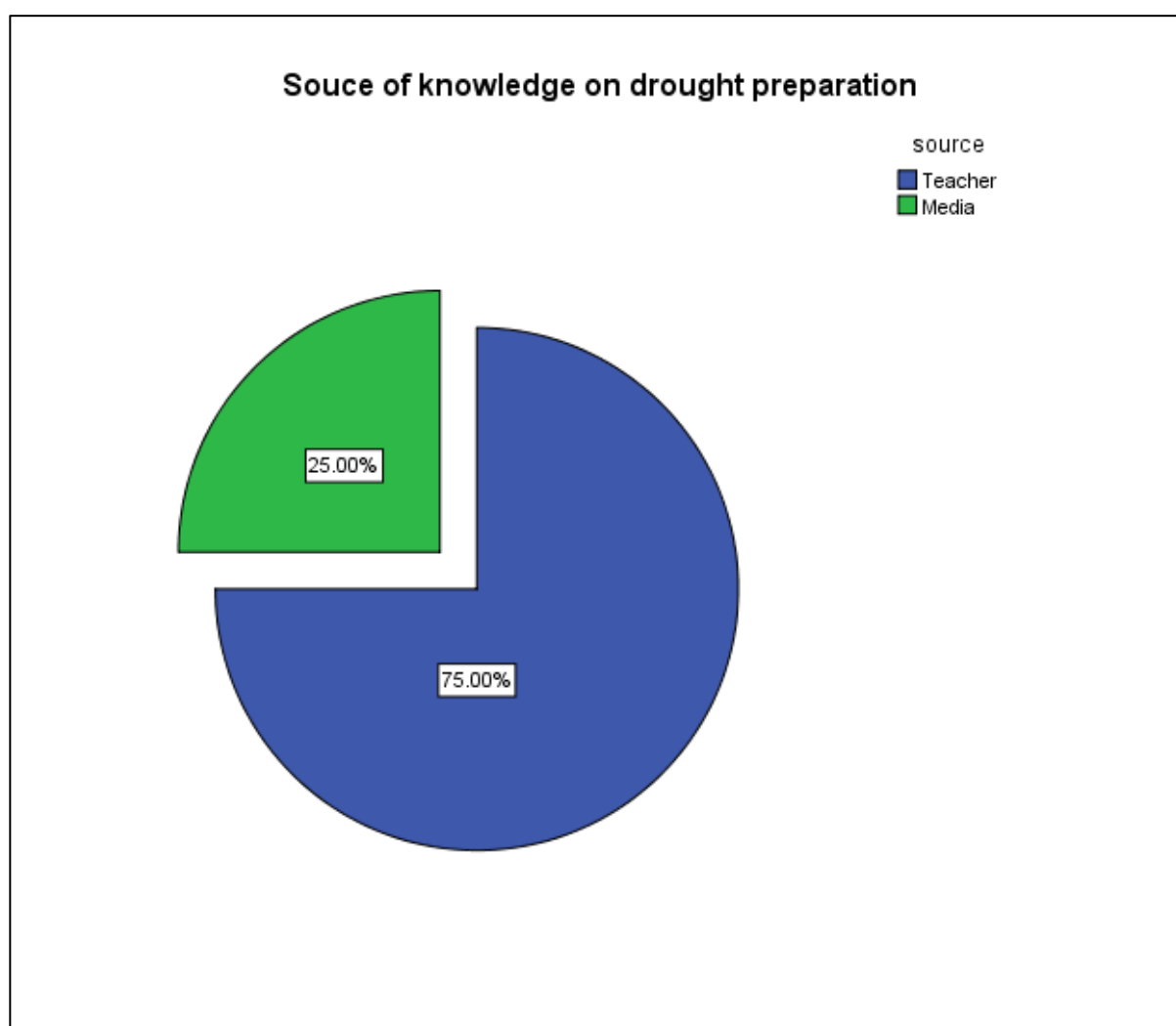


Figure 8 Shows Student's Sources of Knowledge on Drought Preparedness

The sample structure below shows the number of teachers who knew what drought preparedness is and could teach students. The number of teachers that said yes we can we teach was 23.5 % those who said no was 76.5%, as shown table 4. There are very few teachers who have knowledge on drought preparation, likewise fewer students who know about drought preparedness. Furthermore, these results show that teaching students about drought preparedness is done a very minimum level. Most students are not taught in schools how to prepare for droughts yet a school is supposed to educate students holistically.

Table 5- Number of teachers who have knowledge of drought preparedness

Responses	No: of teachers	percentage
Yes	8	23.5
No	26	76.5

Source: Fieldwork

Figure10, below Shows teacher's experience of disasters in their schools, the leading disaster with most teachers having experienced before was flooding 44% followed by strong winds 41% which show that the city had been affected by floods and strong winds before. It is evident that droughts have not impacted schools before and that even though teachers cannot teacher drought preparedness it does not mean that they did not know anything about disasters and droughts. None the less preparation for disasters drought inclusive must be taught in schools to provide a safe environment.

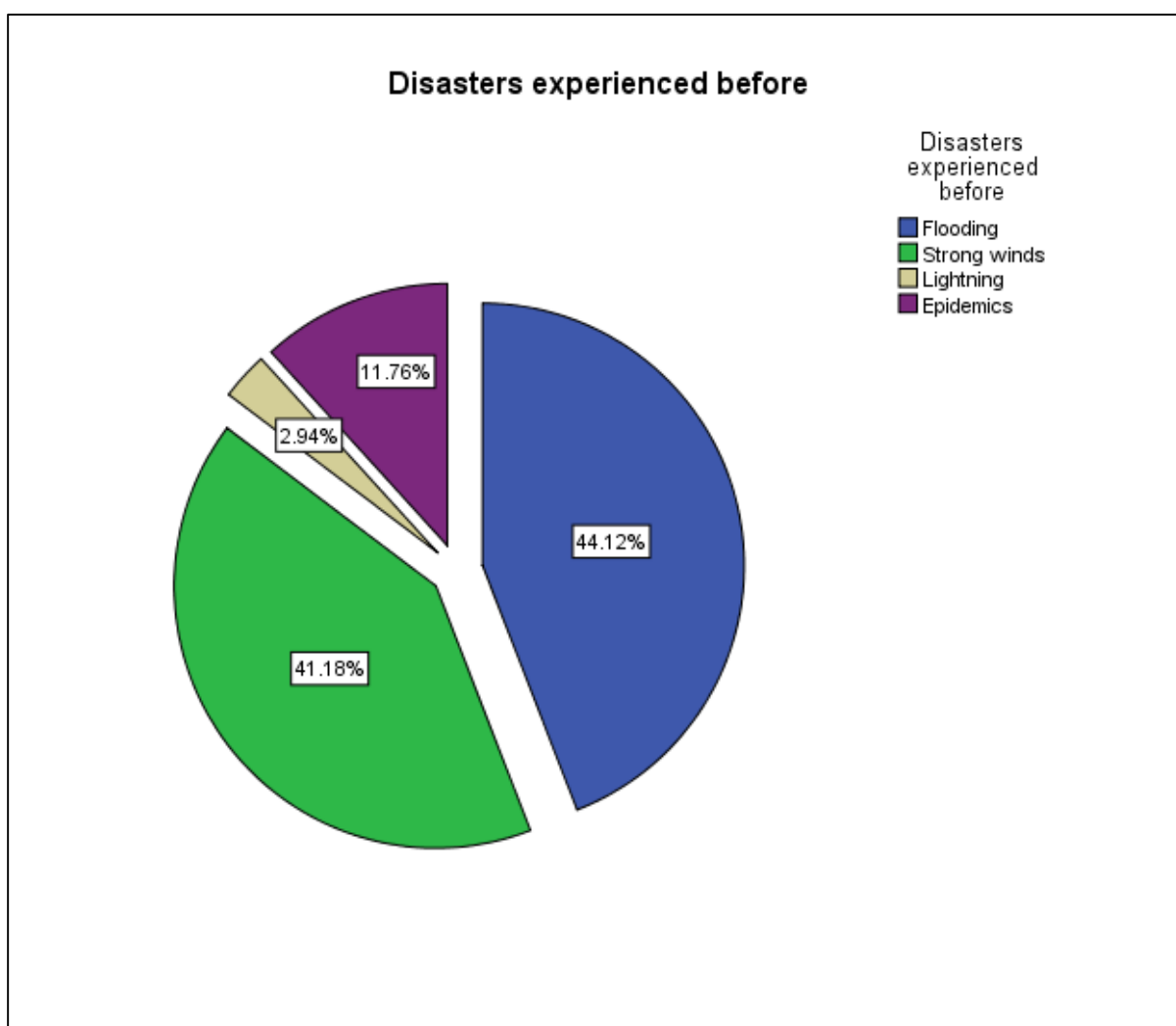


Figure 9-Disasters Experienced by Schools Before

The next section will discuss the readiness of schools for droughts. It shall show the number of schools that have alternative sources of water and the types of alternative sources schools have.

Table 4 below shows the number of schools that had alternative sources of water supply by January 2017. It shows that very few had boreholes and tanks, 23% most schools had not prepared alternative sources of supply water when schools open. Once more that shows signs of lack of preparedness for the drought in schools. These results are an effect of lack of drought awareness in the city and lack of warning from the Ministry of Education and Training (MoET) through the REO. Without a directive and financial assistance from the REO, schools could not prepare for the drought. When answering question 8, all schools said

they did not receive a warning for the REO about the drought and proving alternative supplies of water.

Table 6- Number of Schools with alternative sources of water supply

Response	Number of schools	Percentage %
Yes	8	23.5
No	26	76.5

Source: Fieldwork

Figure11, shows the types of alternatives sources of water supply that schools had, it also shows that most schools, 76.5% did not have alternative sources of water supply. At the time schools opened in January 2016, most schools had not provided water either through tanks or boreholes, as a measure of drought preparedness.

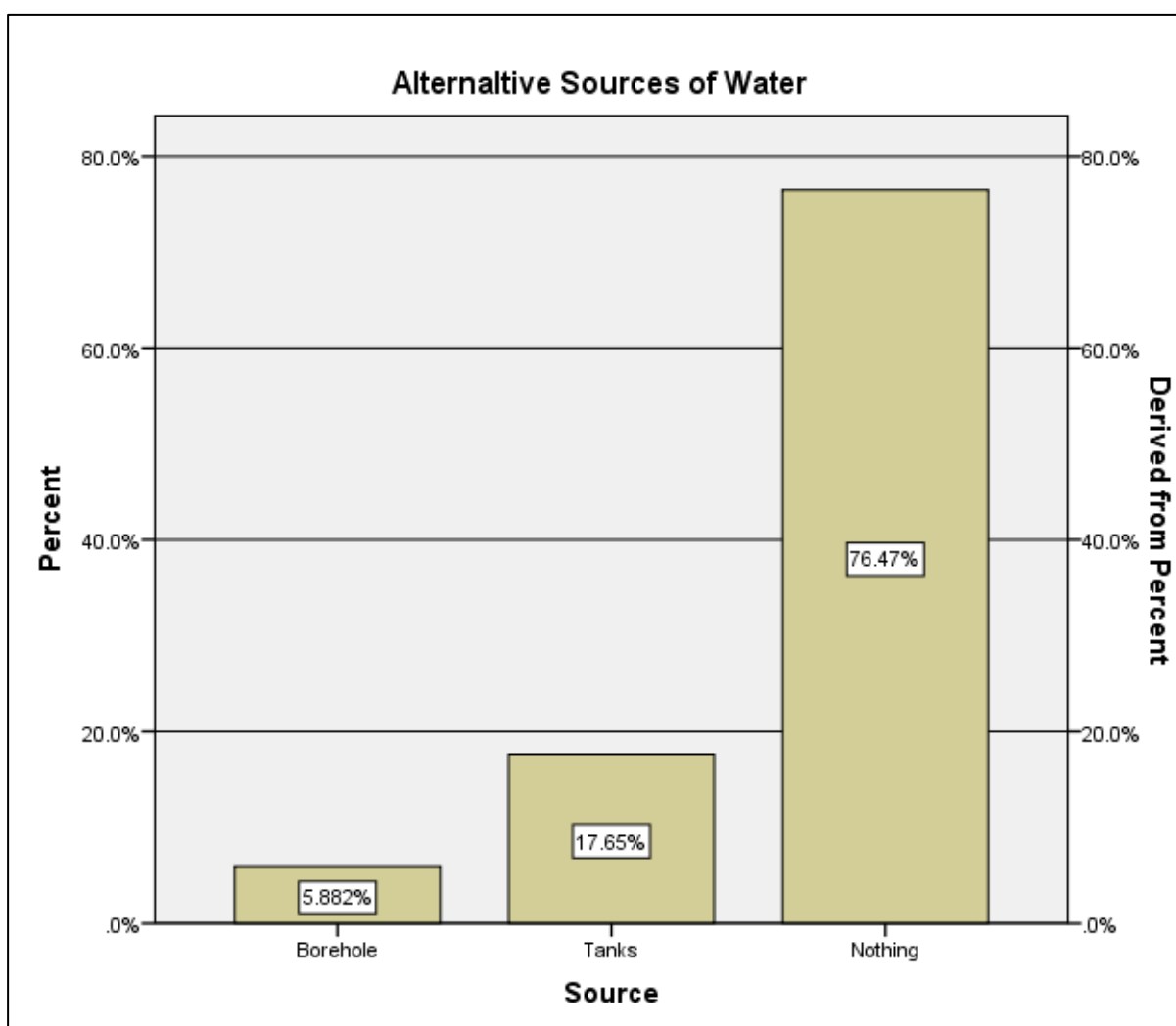


Figure 10-Alternative Sources of Water

This section presents information on the impact of droughts in schools and response measures taken by schools. It shall further on discuss the effectiveness of the response measures taken by schools.

students were asked to describe problems faced in their schools during droughts, their responses varied, figure 12 below shows the results. 76.5% of the students complained about water shortage, 20.6% complained about dirty toilets and 2.9% complained about students falling sick.

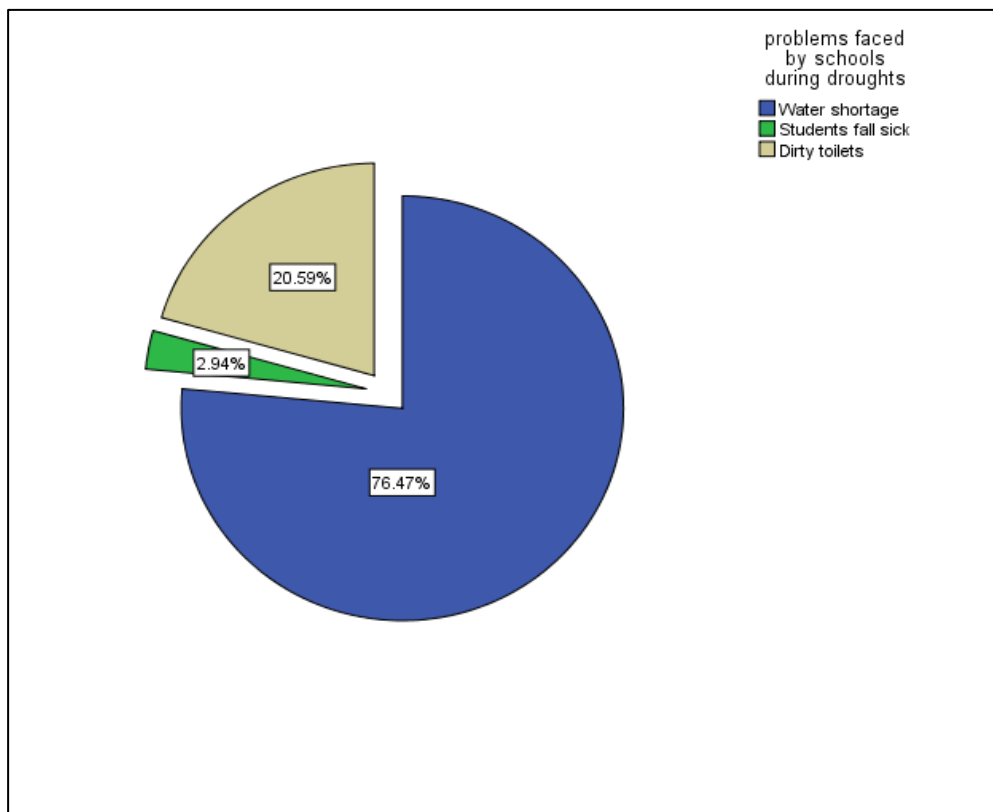


Figure 11- Impact of Droughts in Schools

In response to the drought situation, students were asked to identify efforts taken in their schools to provide water. The response was that the government supplied schools with water tanks and some private schools which are located in the outskirts were able to drill boreholes. Figure 13 shows some of the response measure taken by schools during the drought.

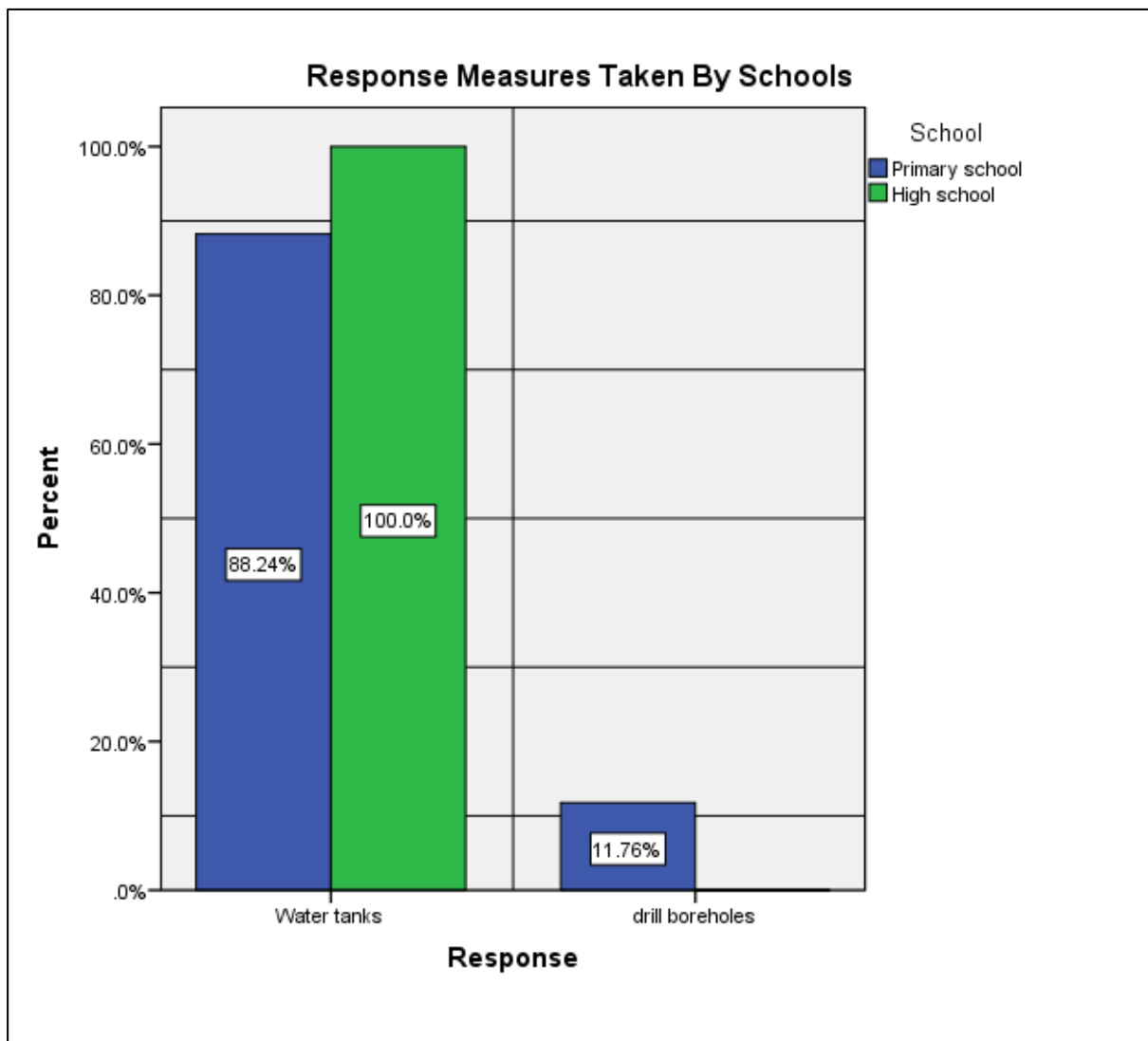


Figure 12- Response Measures Taken by Schools

Figure 14 below show data of schools that had experienced water shortage before the 2016 droughts. It is evident that most schools (70.5%) had never experienced water shortage in the city which could be the reason why most schools had not prepared alternative sources of water.

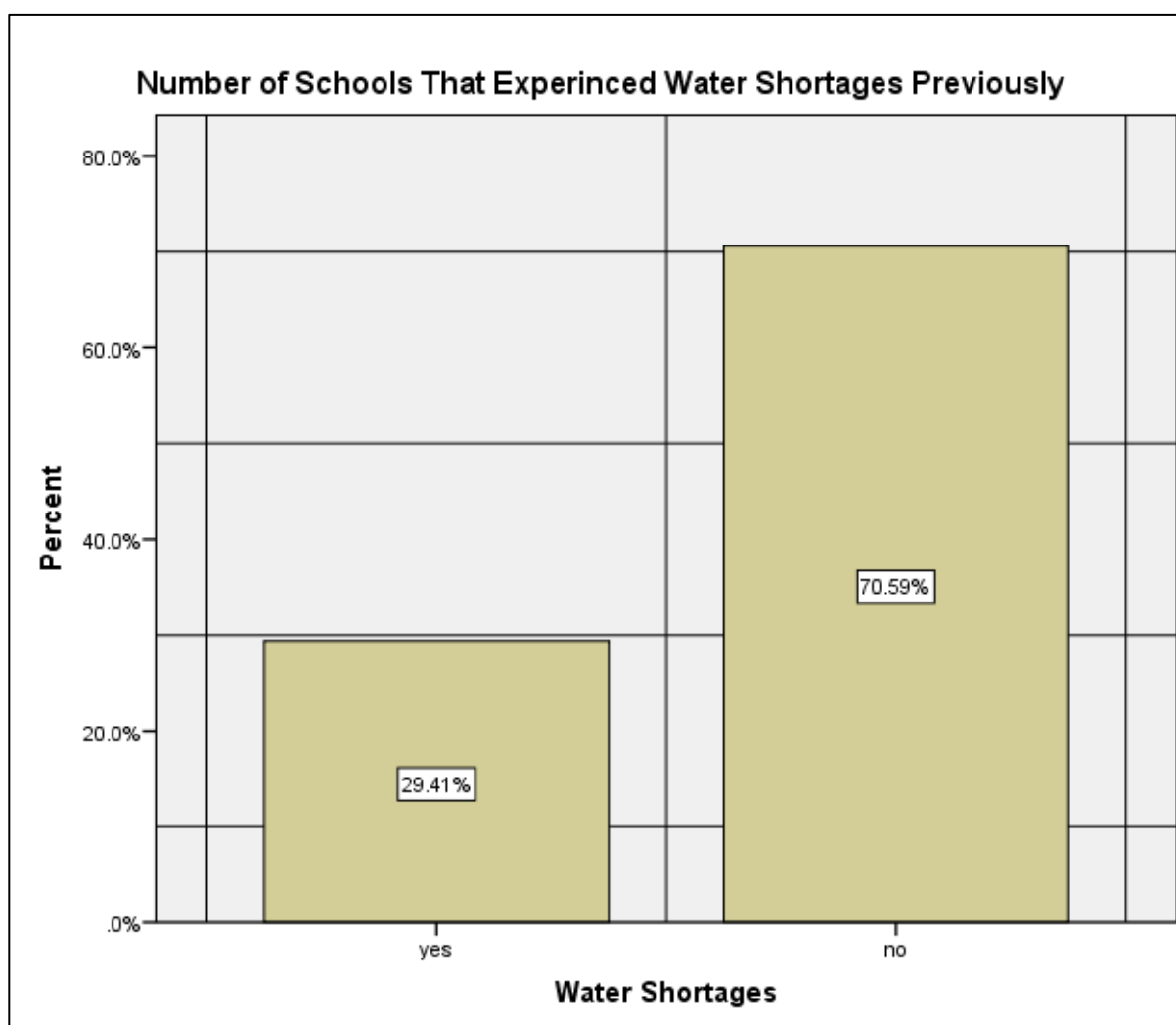


Figure 13-Schools that Experienced Water Shortages

Figure 15 below shows how effective the alternative sources of water in schools, the results indicate that even though some schools had other sources of water but they were not evenly distributed around the school and not sufficient. Students had to walk to water points carrying buckets to fetch water for flushing toilets. 76.4% of those who were using water tanks constantly faced water shortages and sometimes toilets were dirty without water, this is the reason why when asked some respondents said the alternative sources of water were not effective. Only 11.8% of the respondents said their water sources efficient and 11.8% found their water efficient to some extent. Stating that when water was available school operation ran smoothly but when water was finished from the tanks school's toilet became dirty exposing students to a risk of contracting germs.

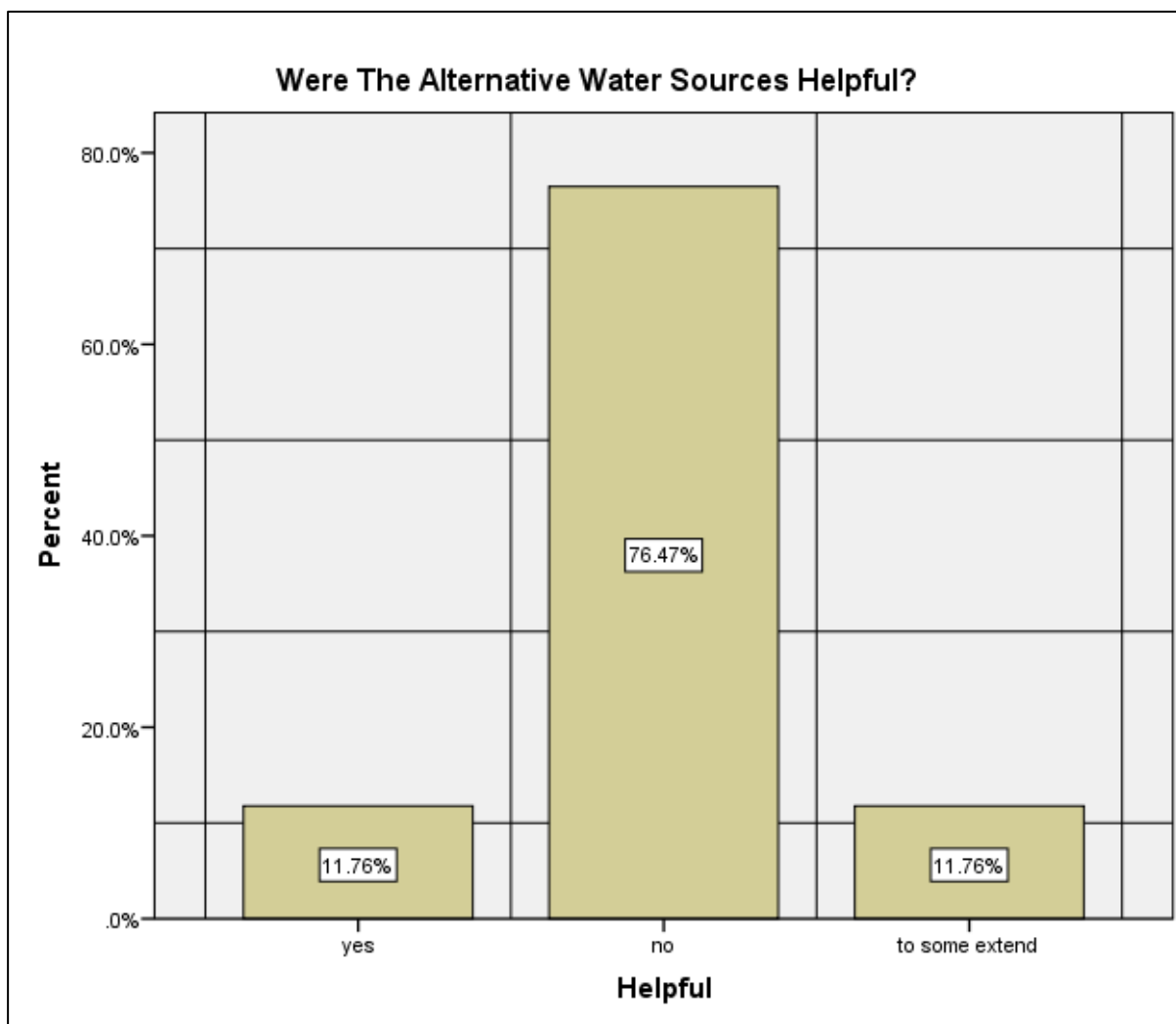


Figure 14- Efficiency of Alternative Water Sources

This section presents information on the impact of teaching on the drought preparedness of schools. Teaching about drought preparedness to students is one of the measures of drought preparedness, it empowers students with knowledge on how to reduce the effects of droughts at school so that their learning may not be affected, especially how to save water. There were some schools which taught about drought aspects formally and informal.

When teachers were asked how they taught or teach drought preparedness, figure 16 below shows the results from the respondents. 75% of those schools that said they tried to teach drought preparedness said it was part of their teaching syllabus in their subjects. Which is the reason why very few students understood what drought preparedness meant, not all subjects covered drought aspects and some subjects are elective. 25% said they talked about droughts

effects, response methods and preparation to students at the morning assembly as part of the announcements

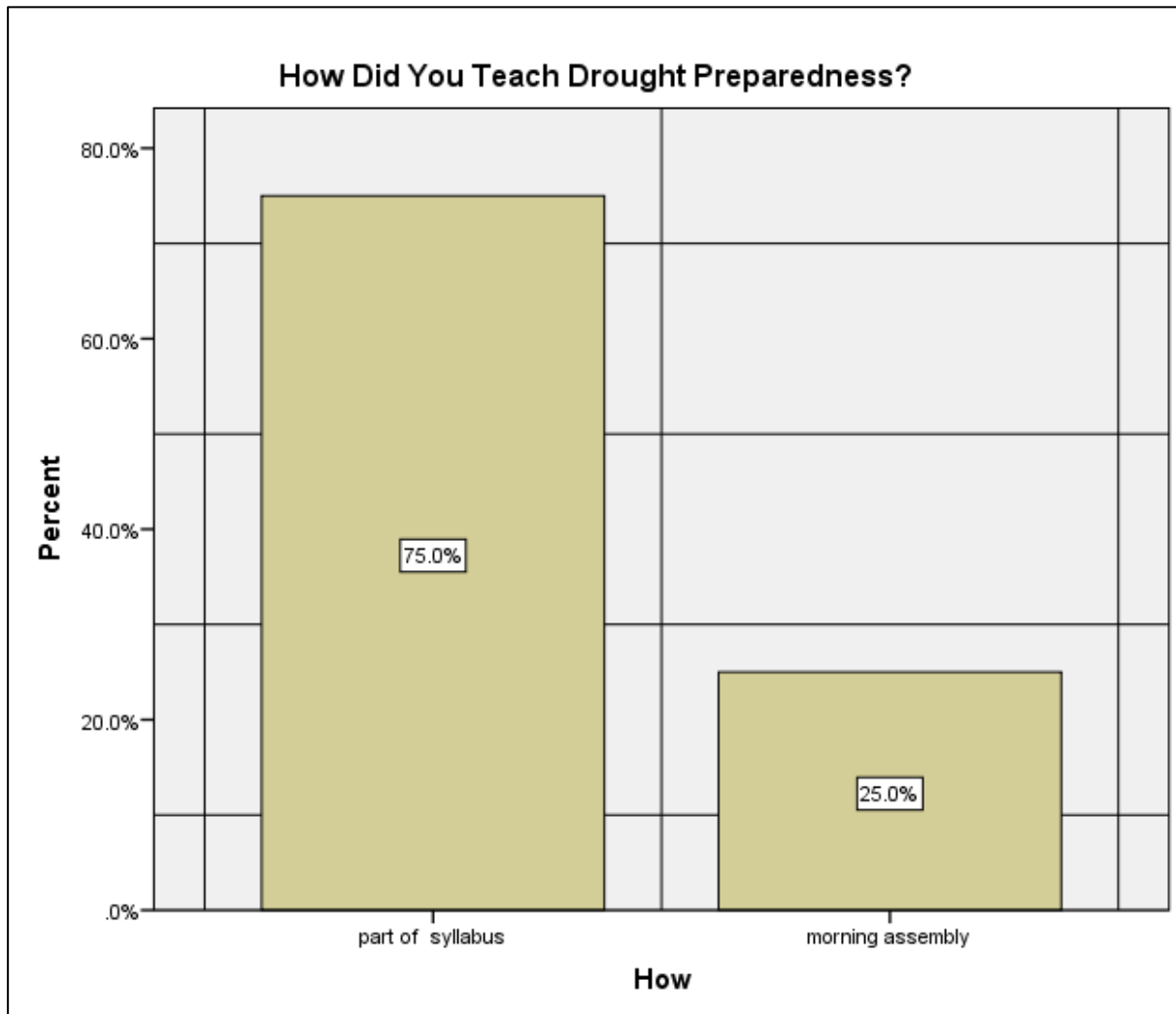


Figure 15-How did you Teach Drought Preparedness

There were also schools which did not teach about drought preparedness and when asked to give reasons why they did not teach students they gave varied response which is shown in figure 10 below. 53% of the respondents said they did not see the importance of teaching students since their subjects do not cover the topic. 23% said droughts rarely occur so they see no need to teach students about drought preparation. 19.2 %said they do not know what to teach, they do not have the content of the subject. Only 3% of the teachers thought that

students come from well-off families, they come to school well informed they think the situation will not affect them.

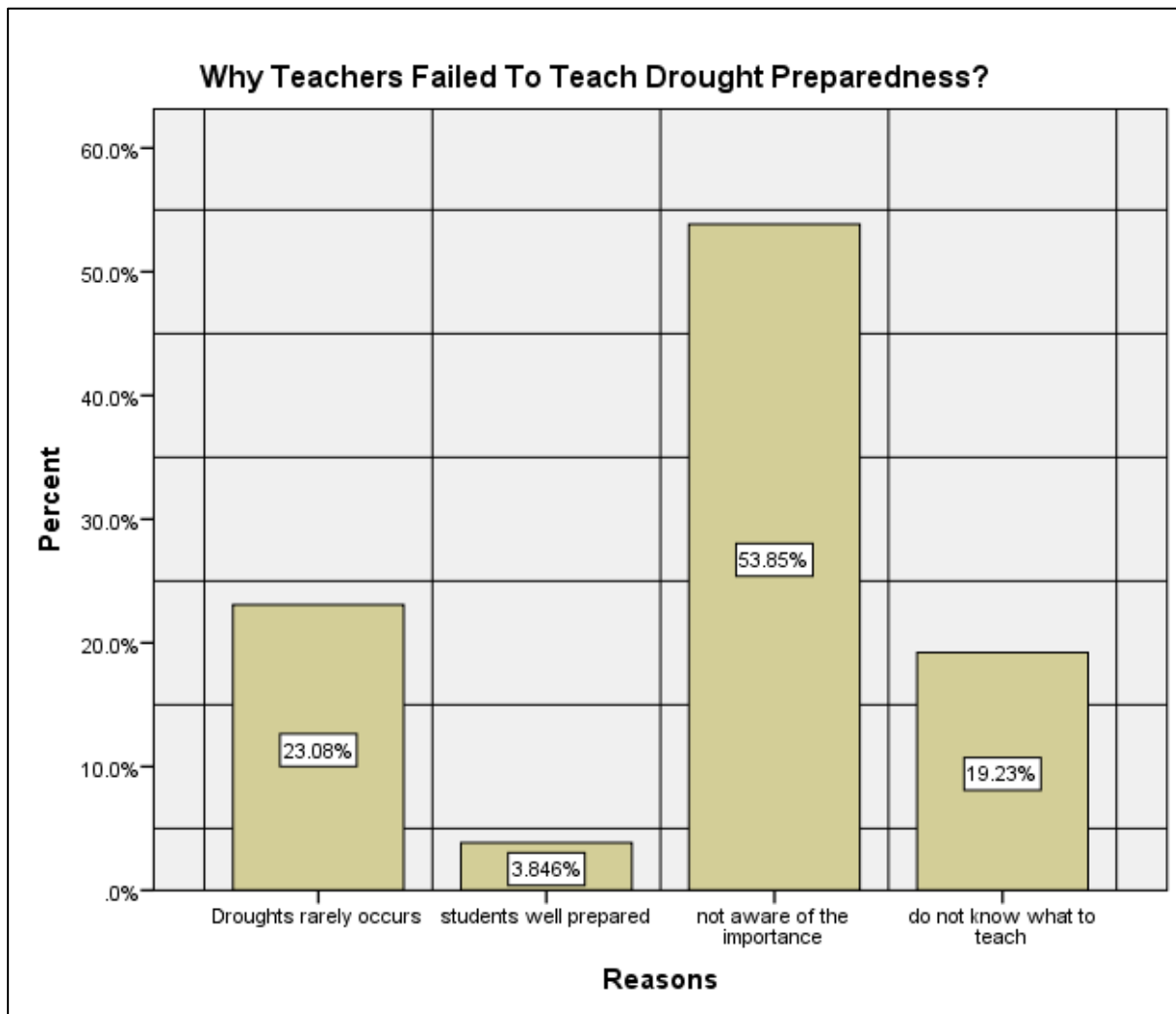


Figure 16-Why Teachers Failed to teach Drought Preparedness

During the droughts one of the challenges that will be faced by ill-prepared schools is lack of safe water supply, for schools that had alternative sources of water situation was under control though to some extent. Teachers were asked to describe the challenges faced in schools concerning water supply and sanitation. Below figure 18 show results gathered from teachers. Only 11% responded that water supply in High schools was good yet 25% responded in primary schools that water supply was good. A majority of the respondents in High

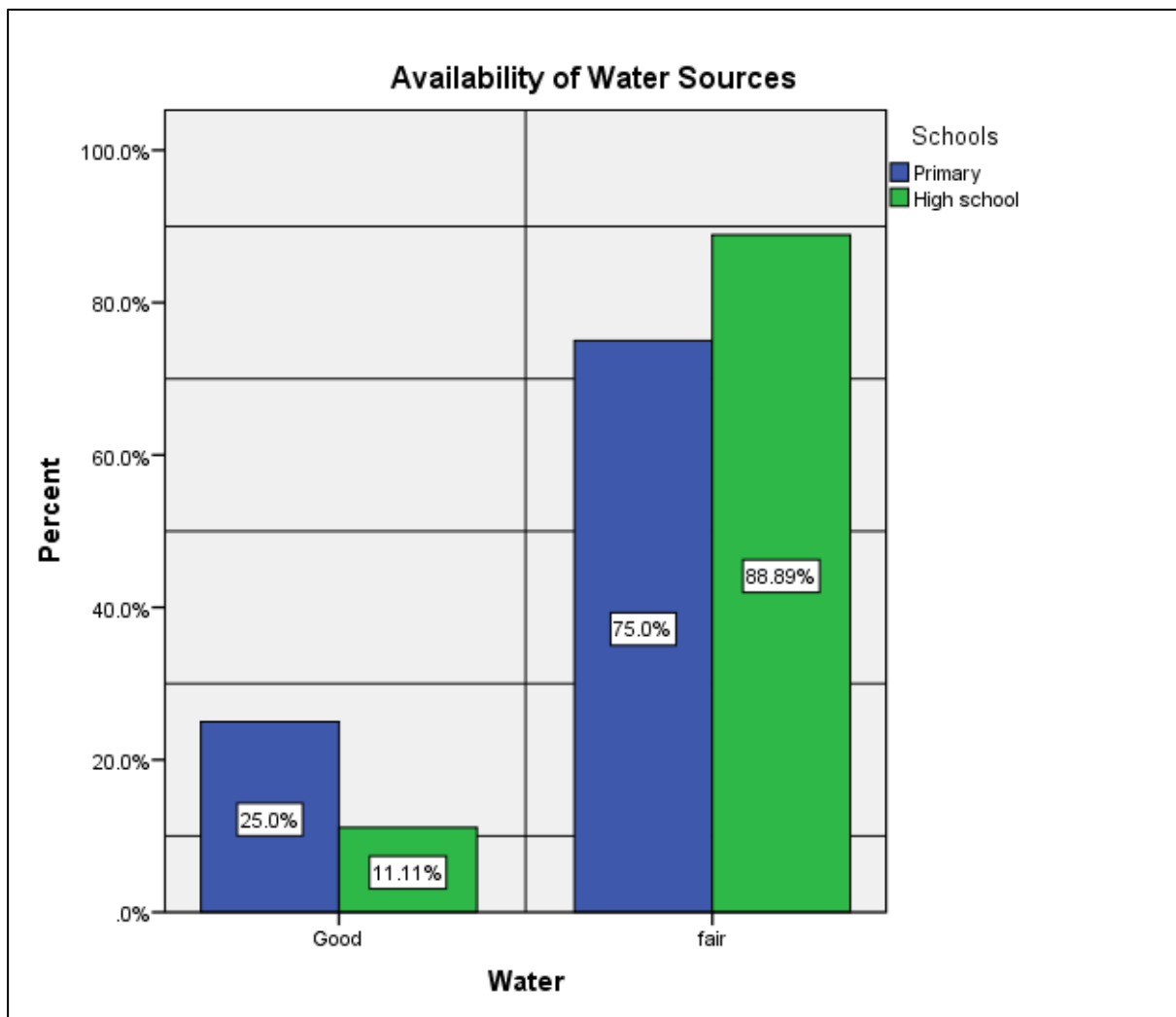


Figure 17- Availability of Water Sources

Schools thought water supply was fair which means there were days when there they had no water.

Sanitation in primary schools was Better than high schools, 75% of respondents thought sanitation was Good in primary schools yet 44% thought sanitation was Good in high schools. First, High schools have older students ranging from 13-19 and above whose water demand is higher than primary schools. Secondly, High schools knock off later than primary schools their water consumption may not be the same. Lastly the enrolment and staff in both school categories is not the same. Hence the need to increase alternative water sources in High

schools. Poor sanitation of schools results from lack of water supply. Results from discussion with teachers reveal that without water it became difficult keep toilets clean some schools locked up some of their toilets. Figure 19 below shows the results from data collected from teachers.

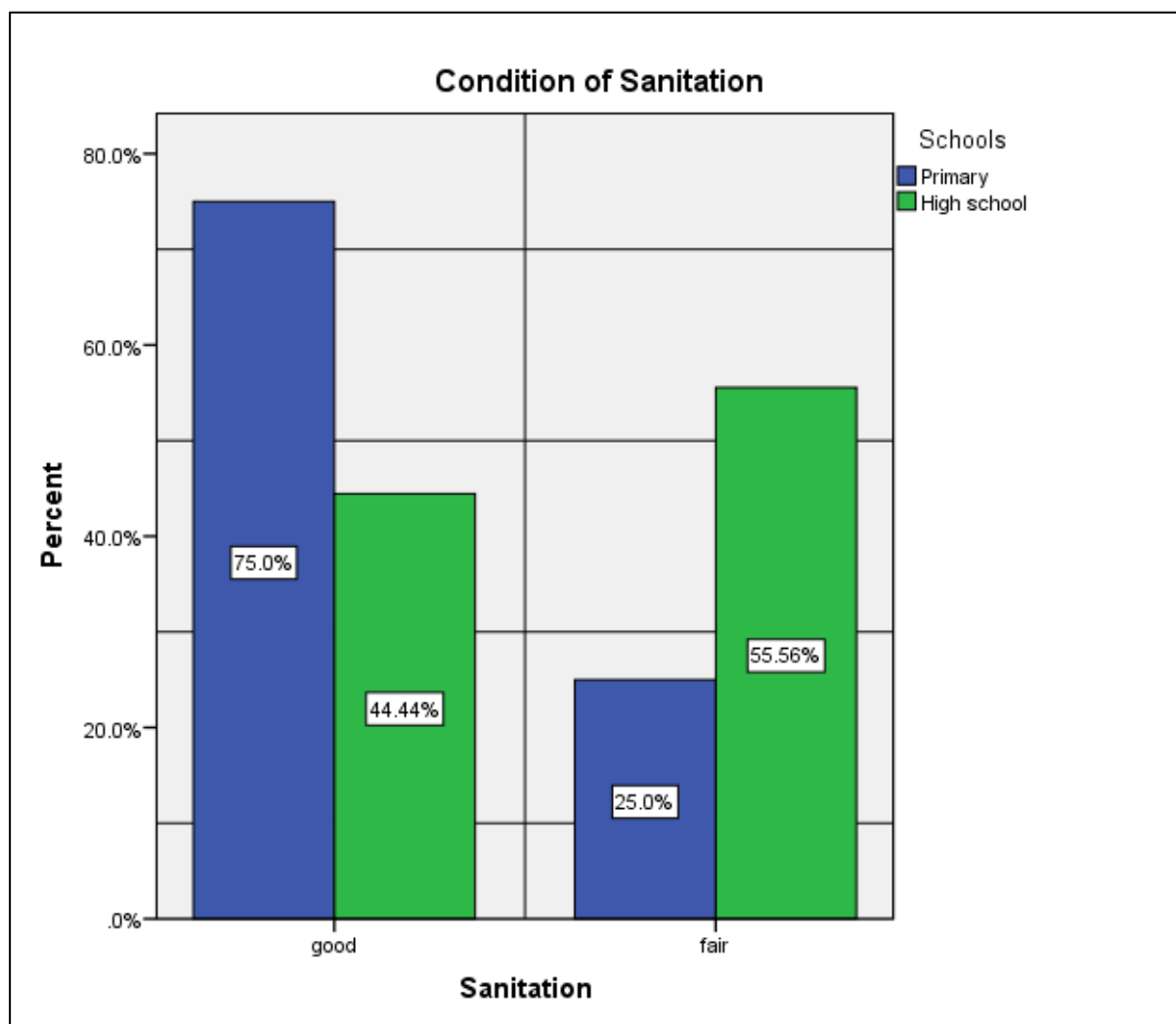


Figure 18- Conditions of sanitation

4.3 Discussion results of open-ended questions from both teachers and students

This section discusses data collected on the importance of teaching teachers and students about drought preparation were highlighted in discussions interviewers had with teachers and students whilst they were filling the questionnaires. Both teachers and students indicated that lack of knowledge on how to prepare for droughts negatively affected teaching and learning in schools see box 1.

Box 1. Do you think drought preparedness should be taught in schools?

Teacher's response was:

- ❖ They were never trained on this area; they do not know if their general knowledge is sufficient.
- ❖ Lack of knowledge has resulted in failure to provide a safe learning environment in schools.
- ❖ Schools must be guided by a policy regarding teaching and learning about drought preparedness in schools.

Boxtext1 1-Do you think drought preparedness should be taught in school?

Box 2. What suggestions would you make regarding the teaching and learning about preparation droughts in schools?

- ❖ Incorporate drought preparedness lessons in the teaching syllabus.
- ❖ The Disaster Management Agency should visit schools periodically to teach both teachers and students.
- ❖ Train teachers on disasters

Boxtext1 2- What suggestions would you make regarding the teaching and learning about preparation droughts in schools?

The students also responded to their question, see box 3.

Box 3. Do you think it is important to learn about drought preparedness and why?

- ❖ Yes, it is important to learn about drought preparedness at school to prevent students from getting sick.
- ❖ They would learn various ways of getting prepared for the situation.
- ❖ Rising awareness will help them to be better prepared psychologically.

Boxtext1 3- Do you think it is important to learn about drought preparedness and why ?

4.4 Summary

The chapter presented and analysed data collected from teachers, administrators and students, assessing the levels drought preparedness measures taken by urban schools in Mbabane city. Since schools are learning centres the purpose of the study was to find out if schools had drought plans, alternative water sources and if they taught students how to prepared for droughts and how to respond to drought situation. A drought plan that engaged parents, teachers, students and the outside community, the drought Task Force (DTF) to provide a safe learning environment is one of the measures investigated by the study. It also investigated the availability of alternative water sources in schools that could be used during droughts such as boreholes and water tanks. Since schools are learning institutions educating students on drought preparedness would psychologically prepare students for drought situations, this is another measure of drought preparedness in schools that was investigated by the study.

4.5 Highlights on findings

- Students are aware of disasters.
- Schools do not have safety plans for droughts.
- Most schools do not have boreholes but depend on Swaziland Water Services Corporation (WSC) for water supply.
- Urban schools do not practise water harvesting and before the drought they did not have water tanks.

5 Chapter 5

Summary, conclusion and recommendations

5.1 Introduction

The chapter is divided into the following sub divisions,

- Summary of findings,
- Conclusion
- Recommendations.

5.2 Summary of findings

The aim of the study was to find out from schools in Mbabane whether or not they had contingency plans of providing alternative water supply during droughts in order to provide safety for learners. To find out if their plans were effective, efficient and in line with their needs during the droughts and what could be adopted as responsive behaviour to reduce negative impact in future. It also sort to find out whether or not schools taught drought preparedness to develop resilience and the mental strength of students.

The objectives were, to assess the level of drought preparedness in schools in terms of educating students about drought preparation and response, provision of alternative water sources, water tanks and boreholes where possible and the practice of water harvesting. Assessing the degree of effectiveness of these measures and making recommendations.

Data collected from both teachers and students through the use of questionnaires has revealed that:

- Students are aware of types of disasters.
- They are most familiar with floods and strong winds.
- They do not learn about drought preparedness at school.
- They are aware of challenges faced during drought, which are mostly lack of drinking water, dirty toilets and students falling sick.

Teachers were also investigated using questionnaires and results revealed that:

- They do not teach drought preparation because there is no policy regarding the teaching drought preparedness.

- Teachers are not trained on drought preparedness.

Problems schools have regarding drought include:

- Schools do not have drought plans and drought task forces.
- Very few schools had alternative water supply by January 2016.
- Schools response to droughts was through provision of water tanks, some schools were able to drill bore holes.
- Schools lack alternative solutions to poor sanitation.

5.3 Conclusion

The results of this study concerning drought preparedness in urban schools suggest the following:

- A. Both teachers and students have basic knowledge about disasters but not drought preparedness.
- B. Teachers, administrators and students lack training on drought preparedness.
- C. The MoET does not have a policy regarding drought preparedness in schools and it incorporation in the syllabus.
- D. Schools do not have Drought Task Force.
- E. And most importantly teachers, administrators and students are not prepared for droughts.

5.4 Recommendations

- A. School administrators must be trained on drought preparedness.
- B. Teachers must be trained on teaching drought preparedness in schools.
- C. Schools will be better prepared if they develop a Drought Task Force.
- D. Occasional visits by disaster management agency in schools will enforce drought preparedness and safety in schools.
- E. The MoET through the REO should provide all necessary measures in schools for droughts.
- F. The MoET should develop a drought preparedness policy for schools to follow and offer proper guidance.
- G. The MoET should incorporate drought preparedness in teaching syllabus of various subjects.

- H. The MoET should collaborate with National Disaster Management Agency ,local government sectors ,various stakeholders and the city council to form a forum of drought risk reduction

5.5 Suggestion for future research

Based on the limitations of the study, the following suggestions may be taken by future researchers in this field:

- A. A comparative research of urban and rural schools to assess drought preparedness measures would necessary.
- B. Two more urban areas may be studied to increase the study areas and improve the results. Assess other urban areas would give a fair coverage of the country.
- C. An investigation of other disasters that the region is more familiar with to test their level of preparedness.

5.6 Research summary

Droughts are recurrent natural phenomenon, though it has a slow on set, but have an adverse impact on the environment. Their effects are clearly noticed in the rural areas where livelihood standards are constantly threatened by deteriorating water supply and soil qualities. Droughts may not be prevented but through preparation communities may lessen the adverse effects and develop resilience. Education on drought preparedness in schools will develop the students psychologically ensuring the attainment of a holistic education. The availability of drought preparedness measures in schools creates a safer environment for students, students and the support staff.

The study assessed the drought preparedness measures in urban schools, a case of Mbabane to ascertain whether or not schools are prepared for droughts in city. Data was gathered through the use of a questionnaire. The questionnaire had structured questions, both open-ended and close-ended question from students, teachers and schools managers from primary and high schools. Secondary data was collected from books and journals both online and hard copies.

The study revealed that though some school subjects cover topics on disasters, drought preparedness is not covered by some. Teachers are not trained in drought preparedness as a

result they do not teach their students about it. It also revealed that some schools do not have alternative sources of water supply.

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Appendix A

Consent letter for Questionnaire in schools

Dear sir/ madam

ACADEMIC REQUEST

I am a registered student of University of Free State under the faculty of Natural and Agricultural Sciences. I am doing an investigation on drought preparedness levels in urban schools and my topic is; **the assessment of drought preparedness measures in urban schools of Mbabane, the capital city of Swaziland.**

I hereby seek permission to administer a questionnaire to teachers, administrators and students from your institution; this is a part of my course work that I need to finish to attain my masters in disaster management.

Thanking you in advance

Yours faithfully

Qinisile Tsabedze

Cell; +268 76060629

Appendix B

Consent letter for questionnaires to the Regional Education Office

Dear sir/madam

RE; REQUEST TO ADMINISTER A RESEARCH QUESTIONNAIRE IN SCHOOLS

I am fully registered student of the University of Free State under the faculty of Natural and agricultural sciences. I am doing an investigation in schools assessing drought preparedness level and the topic for this investigation is; **the assessment of drought preparedness measures in urban schools of Mbabane, the capital city of Swaziland.**

I hereby seek permission to investigate schools in the city; this is part of the fulfilment of my degree of Masters in Disaster Management.

The following schools have been randomly selected for this investigation;

Primary schools

1. St Mark's primary school
2. Mangwaneni Primary school
3. KaBoyce primary school
4. The little school
5. St Frances primary school
6. Qedusizi primary school
7. Herman Gmeiner primary school
8. Mqolo primary school

High schools

1. KaShiele High School
2. St Frances High School
3. Mater Dolorosa High School
4. Sifundzani High School
5. SAIM Christian High School
6. Setsembiso Sebunye High
7. St John Wesley High
8. Fonteny High School
9. St Mark's High School

Thanking you in advance

Yours faithfully

Qinisile Tsabedze

Cell number: +26876060629

Appendix C

Questionnaire for teachers and administrators

Demography

Mark with X in the box that best represent your view.

1. Gender

Male	
Female	

2. Your work position

1.Temporal teacher	
2.Teacher	
3.Deputy	
4.Principal	
5.School's Manager	

3. Category of school

1.Primary school	
2.High school	

4. How long have you worked in this school?

Less than a year	
1-4yrs	
5-9yrs	
10-14yrs	
15 and above	

5. What is your age group?

20-25yrs	
26-30yrs	
31-35yrs	
36-40yrs	
41-45yrs	
46-50yrs	
55-60yrs	
60yrs and above	

Information on Droughts

6. What disasters did your school experience in the past?

Floods	
Droughts	

Fire	
Strong winds	
Lightning	
Epidemics(cholera)	
Earthquake	
Other	

7. Drought are the current disaster faced by the city-Mbabane, did your school receive warnings about it prior from the REO.

Yes	
No	

8. Did your school have safety and/or preparedness plans for droughts?

Yes	
No	

9. If yes, what?

Boreholes	
Tanks	
Educate students	

Nothing	
---------	--

10. Did the measures alleviate the impact of the drought?

Yes	
No	
To some extent	

11. Has your school ever faced water shortages or droughts before?

Yes	
No	

Do you have knowledge on how to prepare for droughts?

Yes	
No	

15. Did your school teach students how to prepare for droughts?

Yes	
No	

16. If yes, how?

As part of the syllabus in some of their subjects	
---	--

In their homerooms (career guidance)	
In the morning assembly as part of announcements	

17. If no, why?

Droughts occur rarely in the region	
Most students are from well-off families who are better prepared for the situation	
Not aware of the importance of teaching students about preparation of drought	
Do not know what to teach	

18. Conditions of sanitary conditions in the school

Describe the availability of Safe water at school	Good	fair	poor	Very poor
Describe the status of toilets in your school (Sanitation)				

19. Do you think education on drought preparedness should be incorporated in schools' curriculum?

Yes	
No	

20. Do you think there should be a policy regarding the teaching and learning of disaster preparedness in schools?

Yes	
No	

21. Does your school have a Drought Task Force, (DTF?)

Yes	
No	

22. What suggestions would you make regarding the teaching and learning about preparation for droughts in schools in the country?

.....

.....

.....

Thank you for your time!!!

Appendix D

Student's questionnaire

Demography

Mark with X the response that best suits your idea.

1. Gender

Male	
female	

2. What category of school are you attending?

Primary school	
High school	

3. How long have you been a learner in this school?

Less than a year	
1-2yrs	
3-4yrs	
5yrs and above	

4. What is your age group?

7-10yrs	
11-13yrs	
14-16yrs	
17-18yrs	
19yrs and above	

Information about drought

5. Did you learn about disasters?

Yes	
No	

6. What disaster has your school experienced before?

Floods	
Droughts	
Fire	
Strong winds	
Lightning	
Epidemics	
Earthquakes	
Other	

7. Did you learn about droughts preparedness?

Yes	
No	

8. If yes, who taught you?

Parent	
Teacher	
Friends	
Media	

9. What are problems faced by your schools during droughts?

Water shortage	
Students fall sick	
Dirty toilets	
Other Specify.....	

10. Since the occurrence of the drought, what has your school done to improve water supply?

	Provided water tanks	
	Drilled boreholes	
11.	Nothing	
12.		

11. Do you think it is important to learn about preparation for droughts in school?

yes	
No	

12 .If yes, why?

.....
.....

Thank-you for your time!!!