



**INVESTIGATING THE INFLUENCE OF WATER SCARCITY ON THE WELL-  
BEING OF SOME PRIMARY SCHOOL LEARNERS IN THE LUBOMBO  
REGION OF SWAZILAND**

**By**

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**DECLARATION**

This work was carried out from April 2014 to January 2017 under the supervision of Dr Doras Sibanda

This study is the original work of the author and has not been submitted in any form for any degree or diploma to any tertiary institution. Where use has been made of the work of others, it is duly acknowledged in the text.

  
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## **ABSTRACT**

This research was aimed at understanding some learners' experiences of water scarcity and well-being in Thulwane primary school in the Lubombo region of Swaziland. A case study was carried out with the focus being on the learner's experiences of water scarcity at primary school, how the scarcity of water influences the learner's well-being and how these primary school learners are able to cope in times of water scarcity. The study employed a qualitative research design which used a grounded theory approach in order to understand learners' experiences of water scarcity and the well-being of learners in a school context where there is limited water supply. The study was guided by the following main research question; what is the influence of water scarcity on the well-being of learners in Thulwane primary school in the Lubombo region of Swaziland? The following sub-questions guided the researcher: a) what are primary school learners' experiences of water scarcity in Lubombo Region. b) How is water scarcity influencing primary school learners 'well-being? c) How are the primary school learners coping with water scarcity?

A questionnaire was administered to Grades 5 to 7, with biographic information that was used to sample 24 learners who participated in the interviews. A semi-structured interview was carried out with the 24 learners with different abilities. Data was collected from the 24 learners, was coded and analysed using content analysis, and then interpreted using the grounded theory. The findings of the study indicated that most learners' experienced great scarcity of water in their schooling days and that created a number of challenges. The study also found that learners experienced challenges in terms of their health and hygiene and this affected the levels of medication while at school and the washing of their hands. The study revealed that water scarcity influences the well-being of learners, like their academic performance. The learners in the current study developed coping strategies such as bringing water from home. The implication of this study was that water scarcity interfered with the overall curriculum and extra-curricular activities.

## DEDICATION

I am honoured and humbled to be one of those auspicious people whose wife-NaboNgwane has taken her job of being a wife so seriously,-who has cared enough in my education journey and my day to day life supporting me in all spheres of my life, and who has made immeasurable personal sacrifices, some of them astonishing, throughout my life in order to give me the fullest and most momentous existence possible. While those expressions convey to mind some unambiguous clandestine reflections; taking a leaf from this research manuscript, I am grateful to her for being loving, for being unswerving, for being admiring, and I am appreciative that she has had that intrinsic worth for many years of our marriage and counting. With that prelude, I bestow this document and all of the period and endeavour spent in the research that resulted in its conception to **Sindisiwe NaboNgwane Dlamini**.

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## **CHAPTER 1: INTRODUCTION TO THE STUDY**

This chapter serves as an introduction to the study. It also presents the general idea on the background of the study, a statement of the problem, objectives of the study, research questions, and significance of the study and purpose of the study. It also provides the scope of the study, challenges, ethical issues, synthesis, course of study and the conclusion.

### **1.0 BRIEF BACKGROUND OF THE STUDY**

Substantial research has been done in Swaziland schools focusing on water and sanitation, and water and diseases. However, limited studies have been carried out on water scarcity and well-being of rural primary school learners. In Swaziland, rural schools obtain water from rivers, boreholes and water wells. The standard of water access in rural areas in Swaziland is well below the prescribed standard by World Health Organization (WHO, 2006)

Among the three basic human needs, water is a leading basic human need and it is protected by several human rights instruments. Swaziland is a signatory to regional human rights treaties like in SADC and the international community like in United Nations. These treaties are tailor made to address water access in the global community. In the same vain the vast population in our school system is not left out from these treaties. As good as these treaties are, they seem to be yielding no fruits to benefit the rural folks.

A study commissioned by the Presidency in South Africa looked into the situation regarding access to water in the schools revealed that “11.5 % of South African schools have no water source and no water near the site”(The Presidency & UNICEF, 2009: 70). The study also revealed that schools affected the most are schools in the rural areas and provinces. The findings gave a list of schools most affected by water absence like the Eastern Cape (1 135 schools). It is followed by KwaZulu-Natal (648 schools) with schools in Jozini (Umkhanyakude district) bordering the Lubombo region of Swaziland. The third province is the Limpopo with 397 schools and lastly the Free State with 320 schools. It is obvious that the absence of water in schools give room to the poor sewerage disposal and

this may result to health hazard for children. The situation faced by a school gives an indication of the scope of intervention required.

Inadequate and poor access of water supply at school intersects with virtually every facet of the learner's schooling life. This may include sports, play, health, morale, dignity, attendance rates, sustainable environment programmes, hygiene, school functioning, educational performance and sanitation amongst many others. The research study seeks to explore the experiences primary school learners regarding water scarcity in the school, their coping mechanism and recommendations to solving the problem.

The motivation to undertake this study stems from my observations as an experienced geography lecturer with almost two decades in a teacher training college in the Manzini region of Swaziland. Over this period, the researcher has observed that some schools do not have constant water supplies and has found this to be cause for concern and reason to focus this study on water scarcity. Water is a finite resource which encompasses every aspect of our daily lives. It can be used up and polluted. The purpose of this study is to understand the nature of water scarcity and how it influences the well-being of primary school learners in the Lubombo region.

### **1.1 Statement of the problem**

The school being investigated is in a rural setting of the Lubombo region of Swaziland which is susceptible to rainfall variability and depends on water from seasonal stream flow and boreholes. During the period of severe drought a greater population in this region is susceptible to water scarcity and has inadequate livelihood options. In such regions, schools are characterized by poor examination pass rates, a high level of absenteeism and children's inability to proceed to the next level of their schooling in secondary and tertiary education. Most people in this rural area are not highly educated and their economic background is poor as shown by their homesteads. The dry season is from April to October, and the lack of water infrastructure is a major problem. In this season, school aged children are faced with numerous challenges such as getting water for their health and hygiene. These circumstances ultimately compromise the potential and long over-awaited

period of school learner's aspirations to come out from the poverty position. According to Devnarain (2010) access to significant fundamental education for learners is reliant on quite a few factors and it includes access to clean potable water at school. It is clear that poor access to water supply at school affects practically every facet of the learner's schooling life including health, play, sport, morale, dignity, nutrition, attendance rates, sustainable environment programmes, educational performance outcomes, hygiene, school functioning and sanitation.

The purpose of this research study was to investigate the impact of water scarcity on the well-being of primary school learners in the Lubombo region of Swaziland.

## **1.2 Objectives of and need for the study**

1. To explore learners' experiences of water scarcity at primary school in the Lubombo Region.
2. To find out how water scarcity influences primary school learners' well-being.
3. To explore how primary school learners cope with water scarcity at the school.

## **1.3 Questions to be answered in the research**

1. What are primary school learners' experiences of water scarcity in Lubombo Region?
2. How is water scarcity influencing primary school learner's well-being?
3. How are the primary school learners coping with water scarcity in school?

## **1.4 Significance of the study**

This research study might provide responses that are theoretical and practical in value. Reading through researches done by different scholars, it is evident that little literature describing learner's experiences of water scarcity and more so influencing their well-being has been done. This will influence the theoretical aspect of research in educational circles.

The research might provide positive responses to the calls of quality and accountability in the Ministry of Education and training and other stakeholders. By doing so increase installation of boreholes in the drought stricken schools and water provision. This will have a bearing on the practical value influencing the policy developers for the transformation of education at the primary school level. This does not mean ignoring school at higher and tertiary level especially areas that are prone to drought. Communities and societies surrounding such schools are bound to benefit from such an arrangements.

This will also evoke parliamentarians to pronounce bills advocating for an increase in school budget and thus putting value on schools. The researcher as a postgraduate student might learn from his experiences and his reflections in order to move towards better understanding of research practices.

### **1.5 Purpose of the Study**

The aim of this study is to investigate experiences of some primary school learners on water scarcity and how it influences their well-being in the Lubombo region of Swaziland.

### **1.6 Scope of the Study**

This research study dealt with grade 5, 6 and 7 primary school learners. This school is located in a drought stricken area in the Lubombo region of Swaziland. It was limited to 24 learners partaking in the study. These were chosen because they are thought to have spent at least 5 years in the school to have a good recollection of experiences.

Findings that will emanate from this research study about the experiences of learners on water scarcity influencing their well-being in the Lubombo region of Swaziland are nor to be assumed because the case study is not representative of the schools in the Lubombo region and Swaziland as a whole, not mentioning the world. However, the study is relevant for encouraging the fight against water scarcity in schools of Swaziland. There were a few answers or phrases that were answered in Siswati, especially for grade 5s.

## 1.7 Definition of Terms

*Pupils' Participation:* refers to the access to education, retention, performance and graduation of learners in primary schools.

*Water scarcity:* is defined as a difference between available water supply and expressed demand of freshwater

*Water source* refers to a source of water by character of its assembly, or through active intervention, which is likely to be sheltered from external defect.

*Well-being:* is a vibrant process, emerging from the manner in which people interrelate with the world, and as such, promotes good mental and emotional health

*Experience:* can be defined as the skill or knowledge gained by actually doing a thing. Can be to do or see (something) or have (something) happen to you: to feel or be affected by (something). It could also be something that someone has actually lived through.

## 1.8 POSSIBLE CHALLENGES

The only time available for conducting interview was after school and this time was available at the mercy of the teachers who were conducting their mid-year examinations for the learners. This was a challenge as the researcher was to patiently wait as learners struggle to finish their examinations. Furthermore, this was a mountain to climb for the researcher as the learner came from the examination rooms tired, so the researcher had to give them a few minutes to rest and also considering not delaying them to go home early. Some were hungry as the meals were not served. The researcher was able to circumvent this possibility by providing some snacks at the end of the interview and continually reassuring the participants of confidentiality of the responses and discussions, and how nothing that they say including their responses and discussions could, in any way, disadvantage them in their school work.

### **1.9 Ethical issues**

The researcher will obtain the obligatory steps to monitor the ethics code of the university under which the study will be conducted. The researcher will start collecting data from the learners only after having obtained clearance from the University of KwaZulu-Natal. Notwithstanding that all the learners of the study will be between 10 and 15 years of age, permission will also be obtained from the school teacher and in turn ask for parental consent for the study to be carried out in the school. Also, the learners will be required to sign a written consent form where all the consent conditions have been observed.

### **1.10 Synthesis**

This study looks into exploring the impact of water scarcity on the well-being of primary school learners in the Lubombo region of Swaziland. Furthermore, this study hopes to build up the understanding of learner's experience of water scarcity and the challenges faced by learners as a result of water scarcity. The following chapter will discuss literature on how water scarcity influence primary school learner's wellbeing.

Among the three basic human needs, water is a leading basic human need and it is protected by several human rights instruments. Swaziland is a signatory to regional human rights treaties like in SADC and the international community like in United Nations. These treaties are tailor made to address water access in the global community. In the same vain the vast population in our school system is not left out from these treaties. As good as these treaties are, they seem to be yielding no fruits to benefit the rural folks.

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The third province is the Limpopo with 397 schools and lastly the Free State with 320 schools. It is obvious that the absence of water in schools give room to the poor sewerage disposal and this may result to health hazard for children. The situation faced by a school gives an indication of the scope of intervention required.

Inadequate and poor access of water supply at school intersects with virtually every facet of the learner's schooling life. This may include sports, play, health, morale, dignity, attendance rates, sustainable environment programmes, hygiene, school functioning, educational performance and sanitation amongst many others. The research study seeks to explore the experiences primary school learners regarding water scarcity in the school, their coping mechanism and recommendations to solving the problem.

### **1.11 Course of the study**

Chapter one introduced the study by outlining the scope of water scarcity and well-being of primary school learners in the Lubombo region. The research study further presented the statement of the problem under investigation, the study aim, objectives and the questions the researcher attempted to answer.

Chapter two outlines literature review relating to the influences of water scarcity on a learner's well-being. Relationships between water scarcity, health & sanitation and learner academic performance are also delineated.

Chapter three addresses the design of the research and methodology. This chapter presents a full account of the research setting; tools for the research, learners as participants and a comprehensive description of the data gathering process. In the same chapter, data analysis is clearly specified.

Chapter four presents research findings which are interpreted and discussed thematically. These discussions are assisted with direct quotes from other research discussions. The findings are discussed in relation to the literature.

Chapter five as the last chapter presents the conclusions, implications of the findings, recommendations and suggestions for further research. The study limitations are listed at the end of this chapter.

## **1.12 CONCLUSION**

This chapter of the research study gave a course to be followed and the background to the study. The purpose and the main objectives and the significance of the study were preceded by research questions. This chapter also includes the significance of the study, purpose and scope of the study. Challenges, ethical issues were dealt with and synthesis.

## **CHAPTER TWO: LITERATURE REVIEW AND THEORETICAL FRAMEWORK**

### **2.0 Introduction**

This chapter presents the review of literature and theoretical framework of the study. Observations and arguments of different scholars shall be presented and expressed in order to illuminate the intentions of the present study. A wide exploration of the nuances of literature that is relevant to the questions and objectives of the study shall be forwarded in this study. This is a preparatory stage for a detailed treatment of the topic in the following chapters. This chapter seeks to give an account of learner's experiences on water scarcity as vantage point of the discipline in Developmental studies. The scarcity of water in this chapter will be looked at as developmental challenge and thus coping strategies as a possible remedy.

### **2.1 Concept of water supply, usage and water scarcity**

Asomaniwaa (2013) insists that by the year 2025 four billion people will subsist under severe water stress conditions. This means that the growing world population will struggle to increase water storage and fend for itself. A billion or more people worldwide will continue to lack access to direct water supplies. This is not because there is water shortage, but because governments have not succeeded in providing it. Just one percent of existing water withdrawals would provide a fundamental level of 40 liters per capita per day to all those presently lacking adequate supplies. This amount will supply water to 2 billion people anticipated to be added to the world's population by 2025.

Falkenmark (1989) states that 1700 m<sup>3</sup> of renewable water resources per capita per year has been projected by the Falkenmark indicator as the threshold. It is entrenched in estimates of water necessities in the agriculture, household, industrial and energy sectors, and the needs of the environment. The countries whose renewable water supplies cannot maintain this figure are supposed to experience water stress. It is believed that when the water supply of a particular country falls below 1000 m<sup>3</sup>, per capita per year, that country

experiences water scarcity. If a country experiences water supply less than 500 m<sup>3</sup>, this shows absolute scarcity. The United Nations Convention to Combat Desertification UNCCD (2009, p. 1) explains in its report from 2009 that “water scarcity is the long-term imbalance between available water resources and demands”. By water scarcity in this study, the researcher means how learners access, use and manage water supply and water quality in a school environment, facing inadequate water supply.

UNFPA (2001, p.11) acknowledges the fact that “water covers about 70 percent of the earth; of that more than 1, 4 million km<sup>3</sup> (2.5 percent) is freshwater. But only 0.5 percent is accessible groundwater or surface water that plants, land animals and freshwater birds and humans can use”. Solar energy and the earth’s gravity are accountable for powering the water cycle, thus renewing freshwater, as water supply mostly fall as rain far from human settlement and flow directly to the oceans in floods or become gripped as icebergs.

According to WHO and UNICEF (2012) a water source that is improved can be defined according to its character of creation or through vigorous intervention. It is likely to be protected from outside contamination, in particular from contamination by faecal matter. For purposes of allowing international comparability of estimates in order to monitor the Millennium Development Goals (MDGs); UNICEF Joint Monitoring Program (JMP) for Water Supply and Sanitation; World Health Organization improved drinking water source can be defined according to the following parameters:

- Public standpipes/taps
- Water that is piped into dwelling areas
- Water that is piped into plots/yards
- Wells that are dug and protected
- Tubewell/boreholes
- Rainwater harvesting
- Protected springs
- Water that is bottled , if and only if the second most important source used by the community or family/ household for cooking and personal hygiene is improved(WHO and UNICEF, 2012)

According to UNICEF (2012, p. 82) an improved water source is defined according to a certain percentage of the population having practical access to an adequate amount or quantity and quality of water from any of the improved or upgraded source mentioned above.

It is upon such premises that as humans we use water for different purposes like:

- households using 95% of water for cooking,
- households washing their hands using 91%
- For washing utensils in the kitchen, 89%
- Bathing and laundry taking up 84% and 66% respectively

For non-domestic use, the following improved water usage applies:

- households use 30% and 4% for pets or small animals and large animals respectively
- for irrigation purposes 0.3% is used and
- 5% for construction or building purposes.

“The vast majority of households use water from improved sources for domestic purposes”.

The problem of water scarcity in the primary school being investigated is compounded by the fact that it is located in the Lubombo region. The Lubombo region has an average altitude of about 150 metres above sea level and it lies at the foot of the Lubombo plateau with temperatures ranging between 2.5°C and 37.2°C, and with a mean annual rainfall between 540mm and 787mm. In the Lubombo region rainfall is irregular and unreliable and often torrential and destructive. This means that the Lubombo region lies under the effect of the rain shadow, whereby little or no rainfall is experienced. Consequently the population living in this region faces more water scarcity than the other three regions: Manzini, Hhohho and Shiselweni.

It is important that the physical scarcity is improved and water supply made available to the rural areas like Lubombo. According to Rasmussen (2009) so many places are running out of water and this makes one wonder how the extremely poor will cope. In

this study, water scarcity refers to how learners utilize water and the quality of water in a school that is faced with an inadequate water supply.

## **2.2 Different meanings and types of water scarcity**

Researchers use different ways to define water scarcity. For example, UN Water (2006, p. 4) defines water scarcity as “the point at which the aggregate impact of all users impinges on the supply or quality of water under prevailing institutional arrangements to the extent that the demand by all sectors, including the environment, cannot be satisfied fully”. The volumetric surplus or shortage of water supply is referred to as water scarcity. In a given area, water scarcity is typically calculated as a ratio of human water utilization to obtainable water supply. Rijsberman (2006, p. 6) defines the term, water scarcity, in the following manner “When an individual does not have access to safe and affordable water to satisfy her or his needs for drinking, washing or their livelihoods we call that person water insecure”. This means that when a large number of people in a given area are water insecure for a considerable period of time, we can name that area water scarce (Rijsberman, 2006).

Wolfe and Brook (2007) posit that economic scarcity and physical scarcity are two main types of water scarcity. Economic scarcity can be described as a state of affairs caused by shortage of investment in water, or lack of human ability to fulfill the demand for water. The signs of economic water scarcity may embrace small or large infrastructure development, which prevent getting enough water for agriculture or drinking purposes. This scarcity entails unbalanced allocation of water in spite of existing infrastructure.

Economic water scarcity is representative of a good number of sub-Saharan African where most countries are faced with poverty. On the other hand physical water scarcity is viewed as a situation where water is not enough to meet all demands, including environmental flow. Physical scarcity symptoms include severe decline of ground water, degradation of the environment and limited water allocation which may favour certain groups over others (CA, 2007).

In a report on water scarcity in the Middle East, the World Bank (2007) indicated that there are three types of water scarcity. These are: scarcity of the physical resource, organizational scarcity, and scarcity of accountability. For example, getting water to the right place at the right time is considered as organizational scarcity. When governments are accountable to their constituents and service providers; we call this form of scarcity accountability (World Bank, 2007). The important issues that can be generally considered as institutional are representative of the contemporary trends towards escalating concentration being given to management, as supply options reach their confines.

### **2.3 Causes of water scarcity and guidelines to water Access**

Acknowledging that scarcity is a consequence of numerous causes and building on these and other approaches will require a variety of responses. The researcher proposes considering three main dimensions of water scarcity that can be summarized as follows: disproportionate cultivation, deforestation and overgrazing. These are said to apply pressure on water resources, dropping vegetation cover and topsoil, and causing greater reliance on irrigated cropping. Escalating rates of water scarcity may be human-induced or natural. These may serve to intensify and activate effects of desertification on land. UN-WATER (2006, p. 4), indicate that “disproportion between availability and demand, the dreadful conditions of groundwater and surface water quality and interregional and international conflicts, all bring water issues to the front”.

In response to failure by governments to supply clean water to its citizens the World Health Organization (WHO, 2006) has tried to set some guidelines so that countries can determine the levels of water access in relation to human settlement. The World Health Organization guidelines stipulate that on average there should be about “20 litres of water accessible per person per day” and that the water source should be within one kilometre walking distance from each household (Mayengbam, 2010, p. 28). These guidelines are not met in most rural schools in Sub-Saharan Africa (SSA), in particular Swaziland, where most rural schools are located in drought stricken areas. The Swaziland government has tried to provide tanks to some of these schools, but in dry seasons, these schools experience water scarcity. This has prompted the researcher to carry out this study. The

literature indicates that in most developing countries women and children of school going age travel long distances in search of water (UNFPA, 2002).

An obvious activity in rural families and schools is mainly the collection of water and firewood. “Rural families use up an average of 40 minutes each day collecting water, where urban households spend only 9 minutes” (M`Nyiri, 2014, p. 16) . If learners are able to walk to a water source and come back during break time the water source is considered to be near as it is also perceived to be less than 100 metres from the school compound. Nonetheless, with a raise in distance away from 100 metres, learners may be held up and this may lead to less study time for the learners.

#### **2.4 Problems associated with water scarcity**

Literature indicates that water scarcity is a worldwide problem (Asomaniwaa, 2013; Bulcock & Schulze, 2011). One of the problems associated with water scarcity is that the world’s population is growing and there are about 7.2 billion people in the world. This sudden growth of population has caught most governments off guard, since very few governments plan ahead. This lack of proper planning by most countries has resulted in inadequate water supply for most families in dry regions (Asomaniwaa, 2013).

Water scarcity creates considerable cultural, social and economic disadvantages, as it remains an endemic problem and a continuous threat to survival causing major ethnic and environmental conflict in the region. Customarily, technology has been the main focus when exploring for solutions to the problem of water scarcity. But much less exploration has been done on economic instruments and even less on population dynamics, growth, and distribution when finding solutions to water scarcity (Antaramian, et al, 2010).

Aroka (2010) addresses the issue of water contamination, which affects water quality due to temperatures that are high. Low water quality and scarce water sources influences a great number of people living in the tropics. This predicament is said to go from individual’s intensity to the family level. From family level it goes to affect people at national scale, and touches human welfare and inhibits development. In developing countries, there is a relationship between poor water resources and poverty and it is of meticulous worry.

Rasmussen (2009) states that people all over the planet are affected by water scarcity. The most affected are the poor who live on a subsistence basis in Sub-Saharan Africa (SSA). It is particularly true that climate change has contributed enormously to increase in water scarcity and as such will continue to make it harder for the people in SSA to produce food. The problem of water scarcity puts the well-being of women and children in jeopardy as they risk injury, attack by animals or drowning when collecting water from water sources. Some of the children miss school, or arrive late, because of fetching water before going to school.

Women and especially young girls are customarily responsible for each family's water supply and they spent a lot of energy and time fetching water from different sources. Momsen (2004) claim that on average a Sub Saharan African woman spends about four hours fetching water and performing water related errands. It is evident that women and young girls could have spent this time undertaking education related activities. Even though this study is not mainly based on gender differences, it is imperative to note that women and girl learners are traditionally responsible for water collection and household chores.

According to IPCC (2006) nearly all institutions do not make water scarcity a priority in their annual budget or rather in their overall development goal as stated in Section 7.c of the Millennium Development Goals, where the mention of water and sanitation occurs. 1.1 million People have no access to clean water and 2.6 million people have no access to basic sanitation (Rasmussen, 2009). "By 2025, 1 800 million people will be living in countries or regions with absolute water scarcity, and two-thirds of the world population could be under stress conditions" (UN Water, 2006, p. 2). In view of such statistics, the researcher is compelled to investigate how primary school learners cope with water scarcity and how their well-being is affected.

Studies have indicated that water scarcity and water degradation have serious effects on household economies and personal health. It said to do damage to the health and economic well-being of the worlds poor. Sullivan (2001) argues that the effects of water scarcity on learners, families, communities, and cultural institutions have not been studied extensively. It is important that schools in rural areas should have access to water.

The physical scarcity in the rural areas is not presumed to be made worse otherwise even the high-income countries will feel the pressure from people fleeing to cities. When large numbers of people flock to cities, cities cannot absorb them or to countries where they are unwelcome and will increase resentment and conflict.

Boreholes, which act as improved sources, may still hold detrimental substances as water can be contaminated during transportation and storage. It is quite likely that community-based water facilities (e.g., confined springs) often have pitiable water quality due to poor maintenance. Post-collection contamination can compromise policies that aim to improve water quality through source improvements. In order to reduce the risk of recontamination, institutions should use narrow mouthed enclosed containers. Institutions can also use devices such as spigots and taps to reduce the risk of recontamination. Scientifically it has been proven that disinfecting surface water and groundwater acts as an effective barricade to many pathogens. These pathogens (especially bacteria) are observed during drinking-water and should be treated for faecal contamination (WHO, 2008).

## **2.5 Coping strategies towards water scarcity**

There is a need to encourage communities and schools to have total ownership of water and sanitation initiatives. The main idea behind ownership is affordability and commitment to pay a small amount of money, showing a desire to manage and look after this facility in the long term. For proper management of this facility, incentives in terms of money are important for service providers to ensure the smooth running, repair and maintenance of the system (Skinner, 2009).

Gleick ( 2000: 132) states that retrofitting used in Mexico is considered to be a mitigating measure towards water crisis as it releases more extra water “350 000 toilets replacement has saved enough water to meet 250 000 additional residents”. Another coping strategy used in Singapore is the addition of ultra-low toilets which turn to mitigate water shortage. In South East Queensland frequent water restrictions, shorter showers, turning off taps while brushing your teeth and the construction of efficient appliances and rain water tanks to prolong the need to build additional water infrastructure Spinks et al (2011).

Groundwater is likely to be most severely affected, with the groundwater table dropping due to reduced recharge in particularly the western parts of the country. Strict groundwater management systems should be put in place with early warning mechanisms to report depleted groundwater reserves (Department of Water Affairs and Forestry (DWAF), 2004b). Mayengbam (2010, p. 62) argues that in Ghana they sell water as “91 per cent of the household in the research area in Ayigya have access to water from water vendors/neighbour sellers”. These water vendor or neighbour sellers in Ayigya normally obtain their water supply from Ghana Water Company Limited (GWCL) and also have individual boreholes as a supplementary measure for their business.

## **2.6 Meaning of Well-being for children**

There are different ways in which researchers have describe well-being, for example Ashton and Jones (2013) argue that well-being is an individual’s feelings and thoughts which are not bound by income, but rather by how well people succeed in life. It is also measured by satisfaction of having material wealth. Well-being is also measured by the different associations that help people to realize their goals. Ashton and Jones (2013) further argue that an individual’s ability to live well is influenced by many factors such as conflict, social fragmentation; malnourishment, war, poverty, inequality and access to resources, especially water.

According to Pollard and Davidson (2001, p. 8) well-being is a “dynamic process, emerging from the way in which people interact with the world and as such promotes good mental and emotional health. As a subjective dimension, it satisfies one’s potential thus allowing a person to live a meaning filled experience of wholeness.” The facets of well-being are made out of numerous things that put us together as human beings. It consists of our spirituality, thoughts, feelings, intelligence and creativity, to name just a few.

In general, human well-being when viewed by Ashton and Jones (2013, p. 2) is the “recognition that everyone around the world, regardless of geography, age, culture, religion or political environment, aspires to live well”.

Well-being is a term that is not well defined in education and policy circles and it is difficult to plan for and monitor efficiently (Ereaut & Whiting, 2008; Fraillon, 2004; Konu & Rimpela, 2002). Well-being in this study is considered an active process, which results from the dealings of learners with their immediate environment (water scarcity), and thus emotional and mental health is developed and learners' potential is realized. Ashton and Jones (2013, p. 2) reiterate that "human well-being is the recognition that everyone around the world, regardless of geography, age, culture, religion or political environment, aspires to live well. Well-being is not necessarily bound by income; rather, it is an individual's thoughts and feelings about how well they are doing in life, contentment with material possessions and having relationships that enable them to achieve their goals".

Learner's ability to learn at school is affected by learner's state of wellness. According to Antaramian, Scott, Hills, and Valois (2010) well-being encompasses all aspects of life such as; biological, social, physiological, intellectual, emotional, and spiritual. There is evidence that learners with sufficient wellness reserves are able to react to challenges or opportunities. This usually results in habits that are more probable to end in optimistic outcomes. Well-being in this study would be viewed as the potential of learners' academic achievement from grade 5 to 7 learners. Literature has revealed a significant relationship linking academic performance and water scarcity. For example, Tohnain (2014, p. 43) insists, "access to potable (or 'improved') water is important for ensuring hygienic practices within schools and reducing the spread of certain diseases which may affect pupils' well-being or educational performance". FNS and CDC (2011) indicate that children, who are chronically undernourished and have limited access to a water supply, accomplish worse scores when conducting test like the standardized achievement assessment. This simply means that learners have complications in concentrating, have lesser power levels and are more easily irritated.

### **Studies on the water crisis in Swaziland**

A number of studies have been done in Swaziland to try to understand factors associated with water crisis, for example, Sanitation and Hygiene at Rural Schools in Swaziland (Manyatsi, & Thwala, 2014); The Contribution of Informal Water Development in Improving Livelihood (Manyatsi, & Mwendera, 2007); Escherichia coli as an indicator of

bacteriological quality of water (Stephen & Ampofo, 2013); Water and Sanitation (UNICEF, 2004); Global Water Supply and Sanitation Assessment (UNICEF, 2008); Secondary Drinking Water Standards, pH in Drinking Water (WHO, 2011); Progress for children: A Report Card on Water and Sanitation (UNICEF, 2010). However, from all the studies that have been done, few studies focus on water and well-being of primary school learners in Swaziland.

## **2.7 The impact of improved water access and water provision**

A case study on the impact of improved water access on women in one community in Ghana “identified positive outcomes such as recognition of gender equality by the community, increase in women’s productive hours and increases in girls’ school enrolment” (Gender and Water Alliance, 2006a, p.164). In some schools, officials have expressed concerns about improving the quality of drinking water in schools. This includes costs for labour and equipment to update and maintain existing fountains. It also comprises of cost for introducing new water access points (e.g., serving water in pitchers at lunch, installing filters on fountains). Another concern for officials is the possible decrease in competitive beverage sales that often fund school extracurricular activities. This means that schools need proper planning which will include an adequate number of fountains that are properly located. Proper planning will also entail water safety in terms of odour, taste and colour. Such water is termed potable water.

It is apparent that 95% or more of adolescents and learners spend more than 6 hours in school every day (Makin, 2005). As children and adolescents spend this much time in school, it is imperative for them to have access to potable water which contributes to, and promotes, good health. Drinking water affords learners a healthy alternative to sugar-sweetened beverages. Moreover, learners’ and adolescents’ cognitive function, which is significant for learning is greatly enhanced if adequate hydration is applied as it influences learners’ exercise regimens. Benton and Burgess (2009, p. 143) imply that “drinking water, if fluoridated, also plays a role in preventing dental caries (cavities)”. This means that schools should make available simple (i.e., no additives, flavouring or carbonation) drinking water at no cost before, during and after school hours. Drinking of water should be found, more especially during break and lunch periods, at a convenient location.

Schools should also provide drinking water at no cost. Naturally water is not considered as part of the reimbursement meal and there is no separate fund for providing water. Water availability promotes female empowerment and gender equity by relieving girls of the chore of fetching water from afar. Therefore, it is important for the researcher to verify if it is true that a girl child (learner) has been relieved of water collecting chores.

Esrey, Potash, Roberts, and Shiff (1991) put forward that sufficient provision of water encourages proper hygiene such as the washing of hands. It is true that improved health, socio-economic development and poverty reduction can be achieved with improved safe water, passable sanitation, and proper hygiene education. This means that diarrhoea can be reduced by more than 63 per cent, through the use of piped water and access to covered private pit latrines. Well managed, clean, uncontaminated water will substantially avert water-borne diseases and insect-borne diseases such as malaria and typhoid fever. These are significant killers in Sub-Saharan Africa (SSA). “Their incidence is interrelated and so drops in one will necessarily lead to a drop in the others” (Bartram & Cairncross, 2010, p. 7).

When and if schools consider water as a beverage of first choice, adolescents and learners should be educated to drink water habitually so as to maintain and meet daily dietary requirements. Schools are obligated to ensure that safe drinking water is readily available (Sugar-sweetened beverage guide, 2010). Different schools get water from various sources like wells, borehole or public water supplier. Primary schools in towns and cities use the municipality health and safety department. This department is responsible for testing water as per FAO drinking water guidelines. This water is tested for contaminants, including certain chemical and bacterial elements. The assessing agents have the responsibility of constantly checking water pipes and plumbing features which may affect the quality of water, and thus the well-being of learners. Important points to note on the access points are related to time, amount of water available, and rate of flow, number of access points, distance and purpose for access. Different schools apply different water access points like water coolers, fountains, hydration stations and other water filling stations (UN Water, 2007).

### **The effect of lack of convenient water access on school learners**

Absenteeism, poor academic performance and lateness influence education due to lack of convenient access to harmless water supply. There is evidence indicating that drinking unsafe water infested with worm reduces learner's ability to concentrate during lesson and results in poor academic performance (VOA News 2009; Ivens 2008). In the developing countries, a usual morning task for rural girls is to fetch water from a-distant source. This often leads to lateness and sometimes absenteeism in school (Ngorima, Nkuna, & Manase, 2008; Harvey, 2008; Ivens, 2008). Studies done in India, Morocco discovered that school turnout, and enrolment rates for girls improved when their households attained access to improved, dependable, and close by water supplies. Attendance in 6 Moroccan provinces was said to have gone up by "20 percent over 4 years". This is said to be attributed in part to the shorter time spent "fetching water", while the amount of time spent on this task was reduced by 50 to 90 percent (Gender and Water Alliance, 2006b, p. 15). It has been seen that women and children lose a lot of time as a result of lengthened hours of collecting water. Certain indications have shown that this phenomenon might be performing a fundamental role in encouraging the low socioeconomic status of women and children.

### **2.8 Different coping strategies used by learners**

First order scarcity is when different societies demonstrate different abilities to cope with water discrepancy and it is called adaptive capacity of a social order. However, the shortage of adaptive capacity is considered as a second order scarcity which when developed as a framework determines water development trajectory (Turton & Ohlsson, 1999a).

Travelling far to fetch water and collecting water of worse quality from dry riverbeds is considered as coping strategy. Consuming less water is also considered as a coping strategy before implementing rainwater harvesting. In developing countries in the Sub Sahara region, a larger percentage of the people living without improved water sources, are found in rural areas. In rural areas in Africa, women generally shoulder the weight of water collection and in cases where water pipes are broken, unsafe water is used. Therefore, people are forced to walk long distances in order to collect water for domestic use.

Therefore, if a village water source fails, women and children may be forced to go back to walking several hours a day to gather water. Access to potable water for survival and basic needs is particularly a rural problem, as infrastructure coverage is much lower in rural than urban areas (WHO, 2003). Arguably, water for livelihoods is most critical in rural areas where formal employment opportunities are limited. People are forced to draw on available assets, which include the natural resource base, and engage in a wide range of activities to make ends meet. It is important to consider livelihood uses when planning rural water service provision.

Harvesting and treating water, and storing it nearer home, has its benefits as it assists in solving the water related health needs of the most unfortunate communities of the world. It prevents women and children from walking long distances to rivers or polluted streams to fetch water Mayengbam, B. (2010).. Water from rivers and streams usually harbour disease carrying organisms especially guinea worms. Another benefit is convenience related to the security of women and children. Convenience is a benefit as everybody wants water closer to their homes so as to minimise the chances of assault, abduction and or rape. Having harvested treated rainwater nearer home or school is an added advantage for women and children as it will save lots of time. Women and children will be able to avoid waiting in the queue and walking to and from the source (UNICEF, 2011). It also prevents many girls from failing to attend school. It is so unfortunate that households continue to buy water from vendors, often at exorbitant rates, but with the availability of harvested water, the cost of water will be reduced. In the SSA, women and girls have faced the challenge of fetching water over long distances, which puts their spinal column and pelvic girdle at risk (Tohnain, 2014).

Harvested water could mitigate these risks and the suffering of girls. In order to address the great need for irrigation water, water for rearing animals and general water supply, harvested water has the potential to supplement existing sources of water.

## **2.9 Inadequate sanitation in schools due to water scarcity**

Inadequate sanitation in schools is as a result of water scarcity, which affects learners' development and growth. It also confines school retention and attendance of learners and negatively affects learner's capacity to learn and concentrate (UN, 2009). About 40 percent of the worlds' 400 million school-age learners are infected with intestinal worms. It is also said that a small percent of school going girls miss school throughout menstruation. They also drop out at puberty due to lack of private and appropriate sanitation amenities.

Research has it that developing countries consists of 87 percent learners ranging from the age of 5 and 14. The hazard of bereavement in developing countries is 14 times higher than for learners of the same age group in the developed countries. This risk can drop tremendously when and if children can practice proper hygiene and be in a healthy environment in and out of school. In order to have healthy surroundings ideal for school-going learners, water is life and needs our urgent attention. For education to flourish water is an essential ingredient.

Schools and institutions in the dry rural areas stand a chance to benefit from the services of an emergency water trucking company, which would assist in supplying clean and safe water in times of water shortage. However, water-trucking services, even if they are organized, find it difficult to act as a stop gap in case of a borehole drying up. Enfors and Gordon (2008) posit that boreholes sunk within the school complex have a considerable impact on learners' participation in primary schooling. This provides learners with water, to quench their thirst throughout academic hours, to clean the toilets, classrooms and other social amenities and to take home.

## **2.10 Correlation of academic performance and water scarcity**

Tohnain (2014, p. 43) claim that there is a link between nutrition and school performance and "access to potable (or 'improved') water is important for ensuring hygienic practices within schools and reducing the spread of certain diseases which may affect pupils' well-being or educational performance". There is a direct relationship between educational achievement and having a nutritious breakfast with water available to drink at school, and a reduction in tardiness and improvement in daily attendance. Additional research shows that learners who partake in daily physical education coupled with nutrition and adequate

water intake, show signs of better attendance and academic performance, and a more affirmative approach toward school.

The first step towards a learner's readiness to learn is nutrition and water availability, ensuring the likelihood of attending class and school. Learners' cognitive development, more especially during childhood, is influenced by adequate nutrition and water. Learners who are persistently undernourished and lack water supply accomplish lower ratings when conducting standardized achievement tests. They are said to have problems in paying attention. They also experience lesser energy levels and are more easily irritable. Moreover, such children are more likely to become sick, have less ability to resist infection, miss class and school resulting in the school losing revenue (FNS & CDC, 2011).

### **2.11 Relationship between water scarcity, academic performance and sanitation**

Previous studies have shown that there is a clear connection between the learner's health and their academic performance. The learner concentration in class is often affected by worm infestation. Learner's education is said to be negatively affected by water supply and sanitation. "Statistics evidence indicates that every year, about 443 million school days are lost" as a result of water and sanitation related diseases. In many cases, the effects of lack of access to clean water trap generations of children in a cycle of poverty, as it causes ill health (UNESCO, 2009, p.1). The daily role for African women and child is carrying 40 pound jerrycans for an average of six kilometres to fetch water. Transporting loads of this size has physical health problems, such as permanent skeletal damage. This subject the body to a physical strain that contributes to increased stress. There is decreased ability to attend educational facilities. There is also increased time spent in health recovery due to the effect of stress on decision-making and memory skills.

Therefore, access to fresh, safe and clean water leads to greater protection from water-borne diseases and increases children's capability to attend school. If water scarcity goes unchecked, women's and children's educational attainment will affect their social and

economic capital in terms of earnings, leadership and working opportunities thus impacting on their ability to hold professional employment. It can also be said that the loss of education and potential school days has a bearing on the next generation of African women who will also fail to break out of the unequal opportunities cycle, and thus perpetuate unequal opportunity prevalence. Improved access to water will one way or another influence women's and learner's level of educational attainment. Proper allocation of time may lead to gaining higher achievements and it is associated with gainful and recognized employment (Prüss et al, 2002).

In the African context, often girls or children generally) are prevented from attending school and getting sound education. The unavailability of water means the absence of latrines and sanitary facilities in schools which when puberty hits bear tremendous challenge on the female learner. Vulnerability to shock is reduced by an increase in reliable water access which in turn allows for an increased livelihood security and allowing families to allocate more than enough portion of their quality time for their children.

Nelson (2007) reveals that human capital asset is education, which is capable of increasing adaptive capacity. One way of acquiring knowledge, competencies and skills that may indirectly or directly persuade coping capacities in times of predicament is education. The further knowledgeable persons become access to information and a greater capacity to interpret and appraise information is improved. Briefly, education equips learners with helpful genuine skills for life and work. These skills include problem solving that can be useful in hard times and decision-making abilities. Therefore, water scarcity has the potential to disturb the education process instead of enabling each individual to develop her or his own creativity, potential, and critical mind.

Improved water supply sources are significantly influenced by distance. This is whereby an augment of 1 kilometre from the improved water source decreases the chances that a homestead uses it by 18.3% (UNICEF, 2012). In order to improve the livelihood of learners and community there has to be ultimate support provided. This support includes sanitation, water supply and hygiene. It may be noted that these go beyond improving the health and reducing the water collection. It includes maintenance and performance of learners, and raising school enrolment. A key strategy for strengthening human capital is improving water and sanitation through education.

Water scarcity has led to a waste of time, in search of water, queuing at the toilets at break and lunch hours in school, resulting into lateness for lessons, spread of diseases (like typhoid), truancy and absenteeism, dirtiness, overloading of pupils as they come to school in the morning carrying a five litre jerry can of water and a school bag (Mayengbam, 2010). A girl child lacks concentration due to abuse, mockery and insults from the boy child, especially during menstrual flows. There are poor relationships between teachers, parents and pupils due to loss of jerrycans and sending pupils for water often, transfers and dropouts due to a water policy in the school that every pupil must carry water to school, messy pit latrines for teachers and pupils. There is difficulty in implementing health policies, like hand washing after visiting the toilet, which is often not possible due to lack of hand washing points. These and many more issues to do with water, affect pupils' participation in school in Arid and Semi-Arid Lands (ASAL) areas.

Accessibility of adequate hygienic and safe water is essential for the day-to-day running of schools. Enough water in the school system develops good drinking habits, helps in maintaining school hygiene in the classrooms and toilets as well as cooking food for learners. It is a requirement by the Ministry of Education to have a source of clean water before a school could be registered to operate. In Tharaka South Sub County the climatic conditions impact negatively on children's learning as too much heat leads to loss of water, and thus pupils become dehydrated.

The location of a water source in relation to school compound or home is an important characteristic that affects learner's access to education (Midgley, Stephanie, Dejene, Alemneh, Andrew, & Mattick, 2012). This is seen in most schools in rural arid areas in Ghana. These schools have main drinking water sources outside the school compound. In such cases, enmity between the communities and the school is rife as the community is usually not comfortable sharing the borehole with the pupils. Certainly, various administrators of different schools frequently report cases of violence and pupils denied access to such water.

Water scarcity brings the best in learners more particularly girls. This is so because girls are faced with the challenge to travel through treacherous terrain make walks to and from

the stream. These trips are made throughout the wet season and learners encounter accidents while scaling steep and muddy hillsides (Njeru & Orodho, 2003). It is of interest to the researcher to establish if such practices still continue, and discover how water is collected and stored in this primary school. In most cases water sources lack the presence and supervision of an adult person as learners harvest water.

At the source, learners remain in queue for water for lengthy periods of time, tensions increase and verbal and bodily abuse cannot be avoided. As learners scramble to fetch water and also provide an opportunity for all the stakeholders to make usage of the water, tempers flare. This also creates competition amongst water users like the home economics department, kitchen where they cook food for learners and agricultural department. The researcher will look into attitudes and behaviours created when fetching water from the source.

According to recent surveys by IRC/NUICEF (2010), the shortage of enough water supply and sanitation services and/or practices in primary schools affects learners educational achievement. The scarcity of water in school opens a window whereby learners are faced with water collection practices, thus time, which is of essence, is lost and learners are prevented from attending classes. The World Health Organisation (1999) argues that available data on water-related diseases such as cholera and dysentery, typhoid, intestinal worm infestation and diarrhoea shows an estimated 3.4 million children to be in and out of school in the Sub Saharan Africa.

It was discovered that poor sanitation in primary schools retards children's development and growth. The UN (2009) confirms the argument and posits that water related diseases have a tendency to limit school turnout and learner's retention. Learner's capability to learn and concentrate in class is negatively affected.

Owing to lack of water supply for sanitary usages, items like hygiene are likely to be affected, consequently leading to the spread of diseases like cholera or malaria and food borne illnesses (Prüss, Kay, Fewtrell, & Bartram, 2002). Climatic conditions experienced in the Lowveld regions, especially in the Southern part of Africa are hot which generally

leads to loss of water, thus learners become dehydrated. Dehydration on human health has a damaging impact on learner's academic performance since learners need to be healthy and physically active to perform well in schools. M' Nyiri (2014) did a study of primary schools in Tharaka South Sub County in Kenya and drew the conclusion that climatic conditions impact negatively on learners. It was discovered that excessive heat result in body loss of water, and as a consequence learners become dehydrated.

The research ended by revealing the fact that learning is affected greatly as learner's concentration is compromised by dehydration and they then need to go and seek drinking water to hydrate themselves. Age, gender and status have positioned women and most probably the girl child to be managers in the water sector and as such assigned them the workload of collecting water. History has it that women and children have been primarily considered to be water collectors and men as productive water users. Crow and Sultana (2002); Wallace and Coles (2005) reveal that there is a paucity of research in terms of comprehending the association between water and social change. The needs of women and children have been overlooked; they have been marginalized in management role and decision-making structures, creating effectiveness and equity problems.

It is clear that certain people have been disadvantaged as gendered nature of fetching water is not understood and as such programmes and water policies continue to disfavour them. It is significant to be aware that the reduction of gender issues and other inequalities is possible. This can be achieved when and if men, women and children have equal water access. The researcher shall investigate water collection in connection with age, gender and status of recipients. It is imperative to note that water access and use are addressed differently in various levels of school. It is also imperative to institute facts on the norms and rules governing who has access and collects the water (Bulcock, & Schulze, 2011).

The health of communities is greatly affected by water scarcity and can be a potential pandemic if not fully addressed by institutions, municipalities, health officials and government. It is said that ingestion of parasites or microorganisms that can lead to the growth of infectious worms inside the body comes from contaminated water. .

Consequently, children may be absent from school, perform poorly and/or die from diarrheal infection.

The health of learners is at risk as they are likely to suffer severe long-term physical damage to their body due to carrying heavy weights of water while travelling a long distance to and from school or home. Water and Sanitation has been enshrined in the United Nation's Millennium Development Goals (MDGS) as the top priority of the world. This goal is one of the most important goals as it is aimed at 2015 to have reduced by half the number of people without sustainable access to fundamental sanitation and secure and sound drinking water.

Due to prevailing drought and water scarcity this seems far-fetched for now. Accessibility of safe and adequate clean water is essential for the day-to-day running of schools as it is used for maintaining school hygiene in classrooms, running toilets as well as cooking food and drinking water for learners. It is a prerequisite by all the Ministries of Education in the world to have a source of clean water before any school could be registered to function (Save the Children, Oxfam, 2010). School children are more likely to be healthy and do well in school or class if they have access to sanitation and safe water. Literature further argues that separate and safe sanitation facilities allow menstruating girls to practice proper hygiene and in turn improve their school attendance. As water is life, its scarcity has an impact on people's lives especially the education of children (M'Nyiri, 2014).

Recent surveys have shown that little access to latrines may negatively affect school attendance when needs for privacy are compromised significantly. It is also said that about "400 million" school learners are not able to learn effectively. Ineffective learning is because of "physical and mental impairments caused by diseases like cholera and typhoid". These diseases are transmitted through food, and water that is contaminated (M'Nyiri, 2014, p. 22.) In places like schools where diseases are transmitted easily, children's ability to learn is affected, and their prospects in life are compromised and schools become unsafe places for the child's development. Countries that address MGDs are those that seek to prosper. They do that by addressing sanitation and hygiene urgently and consider these as worthwhile investments.

It is significant that factors reviewed in this study present variables of water scarcity and how they relate to the education and school attendance of learners. It is true that numerous researches have been done in various parts of the world. But little is known regarding water scarcity interventions on learner's well-being and performance in the Lowveld of Swaziland and Swaziland as a whole. This includes the girl child mocked or insulted by boys especially during her menstrual flow. Over and above this, is the poor relationship between parents, teachers and learners, over loss or breakage of water containers. Sending learners for water often leads to the development of inferiority complex and lower concentration levels.

Physical environment is important, as it models a vital role in any activity under the sun. Oni (1992); Hallak (1990) hold that physical amenities under physical environment create a planned factor in the functioning and operation of an institution. They are said to decide the presentation of any social institution or system, together with the education sector. They are also considered as inspiring factors that engage elementary roles as they improve academic achievement in the school system.

Literature reveals that inadequate and poor facilities affect the overall performance of the school. According to Hussain, Ahmad, Ahmad, Suleman, Din, & Khalid, (2012) overall performance is affected by the following factors:

- old and unattractive school buildings,
- lack of toilets;
- lack of drinking water; lack of transport facilities,
- lack of benches and desks;
- lack of playgrounds;
- lack of educational technology;
- lack of a proper security system;
- lack of power supply;
- lack of teaching staff;
- lack of a first aid kit;
- cracked classroom floors, walls and doors.

Therefore, it can be said that there is a close link between academic achievement and the accessibility of good educational amenities (Hussain et al, 2012). The development of socio-economy and maintenance of a healthy ecosystem is facilitated by water. The world population is increasing at an alarming rate and development calls for increased allocations of groundwater and surface water. Water is essential for domestic, agriculture and industrial sectors. Pressure on water resources is intensifying leading to tensions, conflicts among users, and excessive pressure on the environment. Accessibility to safe drinking water is a basic human right and it is a component of an effective policy for health protection for both the community and school.

As a follow-up to the importance of water for development and health, several international policy forums like the World Water Conference in Mardelplata, Argentina (WHO, 1977) and the Alma-Ata primary Health Care Declaration (WHO, 1978), dictate that provision of safe drinking water to learners as a way of reducing sanitation related diseases is essential for improved health performance, retention and transition of all learners.

Obure (2009) has confirmed in his assessment of Kenya Education Sector Support Program (KESPP) involving five schools in the Bondo District, that provision of safe drinking water to schools and its treatment is still not satisfactory. Supply of hygienic and safe water supply and sanitation facilities in schools needs to be supported by behavioural change. Behavioural change facilitates proper usage and maintenance of the amenities and better hygienic behaviour.

Tohnain (2014, p.43) have revealed that “basic physiological needs and access to potable (or ‘improved’) water is important for ensuring hygienic practices within schools and reducing the spread of certain diseases which may affect pupils’ well-being or educational performance”. Provision of a healthy learning environment and promotion of health in schools will only happen when there is access to water at all times, and there is the promotion of water intake.

Literature has established that individual’s health and that of communities is influenced by human environment. Numerous debates have occurred, associating political, socio-economic and cultural development of society with the health of the members. Unbalanced

diets and poor environmental conditions have been seen to have unpleasant effects on learners' health. The ill health of learners has contributed heavily to the rate of absenteeism, which stands to affect learner's performance in schools. In addition, poor health and nutritional levels and water insecurity are said to have psychological effects on learners. They hinder the regular operation of the bodies' metabolic processes resulting in poor long-term effects on the overall performance of learners (Tohnain, 2014). Institutions and communities that guarantee good water supply, nutrition and health for their learners or citizens usually boast of higher output, which includes high performance in schools.

Dehydration on human health has a damaging impact on the learner's academic performance since learners need to be healthy and physically active to perform well in schools. Wolford, Miller, and Gazzaniga (2004) conclude that no set of courses can reimburse for shortages in learners health condition and that children learn better when healthy.

Taking a leaf from Wolford (1997), water is considered for its nutritional elements, which influence a learner's performance in schools. Scheumann & Neubert (2006) attest that water is indeed essential and it acts as a strategic normal resource that is very important for all economies. They say, further, that every country's food production, drinking water capacity, supply of energy, and consequently agricultural and industrial development hinges on water availability. A great majority of schools in the Savannah and coastal regions of Cameroon have no source of drinking water supply. This has led to poor school attendance and academic performance.

In summary, this resource is referred to as a very important resource for healthy human living conditions and sound ecosystems (Scheumann & Neubert, 2006, cited in Tohnain, 2014). Many research studies dealing with fresh and safe drinking water focus on water quality, environmental integrity, availability and quantity. Others deal with the value of water in relation to sanitation and hygiene, health care and air quality. Numerous readings have revealed that people have knowledge about the essential needs for water, but little knowledge on the relationship between safe drinking water and academic achievements. It is therefore important that this study bring to light knowledge on safe drinking water and academic achievements in schools.

## 2.12 Theoretical Framework

In qualitative research methodology, grounded theory is a substantive theory. It is obtained through an ongoing process whereby data is constantly reviewed. It is also constantly deals with refining questions, and re- evaluates changes that have come up during the process (Ayres & Katharine, 2005). In the grounded theory, the researcher “does not begin a project with a preconceived theory in mind (unless his or her purpose is to elaborate and extend existing theory)” (Strauss & Corbin, 1998, p. 12). The grounded theory is viewed as a theory that is applicable to a specific situation. It involves a process whereby “data collection, analysis, and theory stand in close relationship to each other. The researcher began with an area of study and allowed what is relevant to that area to emerge” (Strauss & Corbin, 1998, p. 12).

Hutchinson, (1993) insists that the development of theories emanate from the grounded theory. It stands to describe or explain certain situations which may precisely distinguish and present another world. The researcher began with an area of study whereby themes emerged as the research progressed. As time went on a distinguished focal point occurred and learner’s pinpointed their experiences to the researcher. The use of a semi-structured questionnaire is in line with the grounded theory as it allowed learners to respond to similar questions. Mathieu (2008, p. 459) concedes that “grounded theory is appropriate when the study of social interactions or experiences aims to explain a process, not to test or verify an existing theory”. The grounded theory compares issues and is said to possess a central principle of data analysis. The process of constant comparison on available formal approaches results in refinement of emerging theoretical constructs. Comparisons is done with fresh examples from ongoing data collection, which produces the wealth that is emblematic of grounded theory analysis (Levinson, 2008)

The contemporary research study has applied grounded theory methodology in order to put together a grounded theory of water scarcity influence on primary school learner’s wellbeing (Glaser, 1992). The purpose of this research study is to produce an innovative theory. The foundations of this waited for theory is not predestined by any contemporary

social science theory or theories. The study's questionnaire have been based on a theoretical framework produced by (Moore, Jekielek, Bronte-Tinkew, Guzman, Ryan, & Redd, 2004). It provides categories of initial investigation, such as experience, and characteristics.

Charmaz (2004) posit that analysis of data and the construction of theory through grounded theory is an evolving process. Thus, Strauss and Corbin (1998) describe a procedure starting with the use of analytical tools such as the following:

- finding key phrases or words in documents and experimenting with meanings,
- open coding a process through which concepts are identified and their properties and dimensions are discovered in data' (p.101),
- axial coding – creating subcategories and associating these with 'properties and dimensions' (p.123) and
- Selective coding – 'integrating and refining the theory' (p.143) by using categories and their associations with subcategories to create a type of case study of a particular sub-phenomenon.

### **2.13 Summary**

Chapter 1 dealt with the importance of conducting a research study that inquire about the influence of water scarcity on the well-being of primary school learners. Chapter 2 began by presenting how the study seeks to explore how water scarcity influences learners at large, by using qualitative research. This study is expected to represent a new venture, with the results establishing foundations for future additional research studies.

Other researchers who may wish to use Grounded Theory Method (GTM) are expected to be watchful as asserted by grounded theorists. This will be possible by not allowing their preceding understanding of related research to shed an extreme pressure upon the analysis of the data. Instead researchers need to utilize alternative research findings to craft points of departure from which to configure the study. As the analysis stages continue, these researchers need to search for literature that may further assert the themes they gather from

the data. The points of exit revealed for the current research study evolved from a number of studies of well-known concepts in literature.

## **CHAPTER THREE: RESEARCH METHODOLOGY AND METHOD**

### **3.0 INTRODUCTION**

In chapter two of this research study the researcher discussed the concept of water supply, usage and water scarcity. Further went on to discuss causes of water scarcity, challenges of

water scarcity and effects of water scarcity. Chapter two also touched on the well-being of learners and how well-being is affected by water scarcity. Lastly, the coping strategies were discussed.

For usable and reliable results to be achieved, any study must deploy tested and tried research study design and methodologies. This study shall posit to flesh out the research methodologies and design of the present study and help to explain how these were applied scientifically. In this chapter variables that are central to the study shall be described. This chapter shall detail the sample design and sampling methods, data collection techniques and their design. Data capturing and editing as well as data analysis procedures are thoroughly explained.

In this chapter, the researcher described the research setting, the participants and their role, the role of the researcher, and offered a detailed method and the rationale for the choices made. The sampling technique, selecting criteria, sample size and the contexts of the selected learners are presented in the study. According to Creswell (2009) ethical issues run throughout the research process. The process of observing ethical consideration is put down which helps to formulate the research problem, research questions and data generation and analysis, and also writing and disseminating the research.

### **3.1 Research Paradigm**

According to Nieuwenhuis (2007) a paradigm is a set of beliefs or assumptions about fundamental aspects of reality. On the other hand Mertens (2012) considers paradigms as “philosophical frameworks that delineate assumptions about ethics, reality, knowledge, and systematic” enquiry (p. 256). Nieuwenhuis (2007, p. 48) posits that a paradigm serve as “the organising principles or lens” through which reality can be constructed. Therefore, a paradigm is a model for understanding and observing, for shaping what we see and how we understand it (Babbie & Mouton, 2004)

The important aspect of research is that the researcher understands and goes beyond the nature of the research paradigm. This is important to keep communication with the reader unambiguous, and clear and thus assist in establishing the coherence of the study (De Vos,

2005). The understanding of the researcher of the paradigms is that they differ in the way they answer epistemological, ontological, and methodological questions (Nieuwenhuis, 2007).

The researcher has come to realize from the above that paradigms are crucial to research since they hold together and inform the direction and practice of inquiry. Therefore, the paradigms influence the selection of research methods and methodology. For purposes of this research the researcher will briefly look at three key paradigms or ways of seeing the world, which are namely positivist, interpretive and critical to show how they differ from each other. Then the researcher will discuss the interpretive paradigm in detail since this work is located in it.

For researchers working within a positivist approach there are patterns and reality is stable which give rise to discovering an order in what they are researching. These researchers in this approach subscribe to the notion that reality exists out there and relationships between things can be easily measured. Maree & van der Westhuizen (2007, p. 31) posits that positivist's epistemological assumption is based on knowledge that can be viewed "as hard, real and objective". This knowledge can be accessed by using quantitative data collection methods and quantitative methodologies. This paradigm is mostly associated with researchers in the natural sciences.

An interpretive paradigm views knowledge as subjective or personal, "which might lead to a more participatory role [and] often rejecting standard methods of natural science" (Maree & Van der Westhuizen, 2007, p. 32). This paradigm is mostly used by researchers in the social sciences field covering people's behaviour, beliefs, attitudes, and perceptions, which are often not easily measurable. Interpretivist's researchers believe that the world is changeable. They believe that it is people who construct and define the meaning of a particular phenomenon or situation. These constructions and meanings can be explored by using qualitative data generation methods and qualitative methodologies. In this approach, researchers believe that it is not possible to discover all the laws and rules of the social world. But researcher are of the view that it is possible to understand how people make sense of the context in which they live.

The critical paradigm is said to identify the interests or forces place a social group in

relative powerlessness and thereafter question the legitimacy of this act. This paradigm seeks to subvert excesses of power and emancipate the disempowered (Cohen, Manion, & Morrison, 2007 & Nieuwenhuis, 2007). The researcher has seen that this paradigm discusses the marginalisation of the powerless. In doing so researchers are aware of the unequal and discriminatory ways in which our society is organised. This research is capable of moving beyond what the interpretivists do as they try to describe and understand how the world works. Therefore, researchers in this paradigm have a clear agenda which is to establish a equal society whereby discrimination based on race, gender, and age does not exists.

The study is located within an interpretive paradigm. The term paradigm refers to “the philosophical intent or motivation for undertaking a study” (Cohen, et al, 2007, p. 38). A paradigm serves as “the lens or organizing principles” by which reality is constructed (Nieuwenhuis, 2007, p. 48). It is a classic that profiles what we see and understand and how we see and understand it (Babbie & Mouton, 2004). From the aforesaid descriptions of a paradigm, it is evident that different researchers assign different meaning of a paradigm.

### **3.2 Research design**

Nieuwenhuis (2007) avers that research design is a plan or blueprint for collecting data, specifying the choice of participants, selecting the techniques for gathering the data and the steps to be followed in analyzing it. It is the plan of how the researcher will systematically collect and analyze data to answer the research questions (Christiansen, 2003). In this research study the researcher adopted a qualitative, interpretive research design (Merriam, 2009) which is described in the sections that follow.

On the other hand Bhattacharjee (2012:35) gives a succinct explanation of a research design when he refers to it as a “...comprehensive plan for data collection in an empirical research project”. From this definition, research design is a comprehensive plan of action for assembling data for a scientific research. Therefore, research design constitutes “data collection process, the instrument development process and the sampling process”. It must further state how participants are chosen, how research tools are developed and used as well as how data is gathered.

In conclusion, research design is taken from literature review as it shows the research blueprint informing the choice of research paradigm. It also refers to all procedures for data collection instruments, data gathering, editing, analysis and reporting. An empirical research requires a good research design.

### **3.3 Qualitative research**

A qualitative research attempts to generate rich descriptive and textual data in respect of a particular context or phenomenon. It is said to develop an understanding of what is being studied. Cohen et al (2007, p. 20) argues that qualitative approach allow for thorough creativity and deliberation with participants as they “make meaning in and through their activities”. Qualitative research strives to record multiple perspectives of concepts, events and situations. It gives allowance for participants to interact among themselves. The researcher acts like the “main instrument” as the researcher takes an “inside view” (Babbie & Mouton, 2004, p. 270). Babbie and Mouton (2004) regard qualitative research as flexible, fluid, data driven and context sensitive.

### **3.4 Case Study**

A “case” is generally an entity which can either be a person, organization, behavioural condition, event, or other social phenomenon. The boundary between the case and its contextual settings—in both spatial and temporal dimensions—may be unclear. The case can serve as the main unit of analysis in a case study (Yin, 2009). Literature suggests multiple definitions of case study research but for purposes of this study, a case study is a

comprehensive analysis of a real life phenomenon within its context (Creswell, 2013; Yin, 2009). According to Nieuwenhuis (2007), over the years, the “how” and “why” questions have been answered using case studies. In this instance, the researcher is inclined to choose a case study to answer the “how” question on the impact of water scarcity on the well-being of primary school learners.

As the researcher is using a case study, the first step is defining the case, which in this instance is the primary school with limited water sources. This definition will help enormously in organizing the case from which research questions will be developed and literature reviewed. The case will serve as the main unit of analysis as the researcher considers its definitional task and sets a high bar (Yin, 2009). The researcher considers this case to be special as it covers an extremely distinctive event or subject: “the influence of water scarcity well-being on learners”.

As a second step, the researcher has selected the single-case study (one primary school). The reason to select this school is because it is located in a drier region than other schools. The conditions at the primary school will allow the researcher to comprehend the nature of water scarcity and the well-being of the learners and how they cope with water scarcity (Yin, 2009). The third step involves deciding to use grounded theory. In this regard the theory will emerge from the data.

### **Piloting and data generation**

According to Shuttleworth (2010) pilot study is a tool that allows a researcher to conduct a preliminary investigation before engaging in the actual research or a feasibility study. Considering that the researcher is conducting a qualitative research which is often described as a research that attempts to gather wealthy descriptive data in respect of a particular phenomenon or context with the intention of developing an understanding of what is being studied or studied-the researcher, will therefore, do a pilot study to sharpen and refine the data generation tools to ensure sound data generation (Nieuwenhuis, 2007, p. 50)

Porta (2008) admits that a pilot study is a small-scale test of the procedures and methods to be used on a large scale as it enhance the probability of success. Furthermore, several authors have applauded pilot studies because they see them fit to test the research methods and to ascertain potential problems which may have an effect on the trustworthiness of the investigation's conclusion. In this case, piloting has been done to find out if the questions in the semi-structured questionnaire were what the researcher had actually intended to ask (Blessing and Chakrabarti, 2009). The piloting exercise was meant to help the researcher eliminate or rephrase questions that were ambiguous or irrelevant in the manner in which they were formulated. It was also meant to gain feedback on how valid the interview items were: to identify redundancies, oversights irrelevancies in the interview items and to get an opportunity to test the coding system to be used in analyzing the data Cohen, Manion and Morrison, 2007).

A short questionnaire was administered to a group of grade 5.6 and 7 in a neighbouring primary school. This was done in this order to pilot the study. A second questionnaire was administered to the entire grade 5 made of 45 learners, 62 grade 6 learners and 56 grade 7 learners in the school of interest. Purpose for the second question was to select learners who seemed to have relevant experience on water scarcity. Open and ended questions were used in the questionnaire because as they will allow the researcher to collect source data in greater detail by remaining conversational and situational (Ulin, Robinson, Tolley, & McNeill, 2002). Lastly, a semi-structured questionnaire was used to gather information from the 24 selected learners in grade 5, 6 and 7.

### **3.5 Sampling of learners**

For purposes of this study, purposive sampling was used. Purposive sampling is when participants that the researcher believes will be able to yield the most rich data are the ones that a selected for a study (Denscombe, 2005). This school was chosen because it is experiencing water scarcity and it possesses the potential to provide relevant data for the study. To participate in this study 24 learners were purposively selected from Grades 5, 6, and 7. The 24 learners were carefully selected by the researcher because they were believed by the researcher to be able to yield the richest data. The justification for engaging grade 5, 6 and 7 is because of their experience in issues related to water scarcity in the school.

Purposive sampling is described as selecting “particular subjects to include because they are believed to facilitate the expansion of the developing theory” (Bogdan & Biklen, 2003, p. 65). A purposeful sample was selected since the purpose of the study was to develop a theory insinuating on the participants’ experience of learning in a drought stricken area, and their performance regardless of the conditions existing in the school. This was a group of both male and female learners between grade 5 and grade 7; aged between 9 and 13 years. The specific criterion for involvement in this study was having attended this school for a minimum of five years. Different scholars have argued that the role of experience in the acquisition of knowledge is pivotal because it is through experience that experts acquire adequate knowledge.

### **3.6 Method of Data Generation**

#### **3.6.1 Semi structured Questionnaires**

The primary tool selected for data generation was a semi-structured questionnaire. The semi structured questionnaire that was filled in by the participants comprised four sections. The first section, Section A, recorded the biographical details of the participants. Section B was an interrogation of the participants’ experiences on water scarcity. Section C investigated the influence of water scarcity on the well –being of the leaners in the school. The final section, Section D, sought information about how the learners coped with water scarcity in the school.

The semi structured questionnaire was issued to the participants in groups. A series of questionnaire answering sessions were conducted. Small groups for the questionnaire answering sessions were chosen by the researcher in order to allow the researcher the opportunity to render assistance with the questions, where it was required. According to Maree and Pietersen (2007), this is a method that is not only cost effective but also saves time.

Before data collection, a few issues were sorted with the school and the learners. These are issues like requesting the Head teacher's consent for learner's participation indicated by Appendix 1 which was given, and shown by the Head teacher's declaration Appendix 2 for the research to carry on. Another issue was the involvement of parents and/or guardians as the participants were minors and needed permission. Learners were given a form to take home for their parents and/or guardians as shown by Appendix 3. After the learners had brought back the signed form from home, they were given another form to sign-Appendix 4 if they voluntarily agree to participant in the research study.

For purposes of running smooth sessions the researcher had to seek permission from the different teachers especially grade 5, 6 and 7 teachers to allow the learners to take time off to answer the questionnaire. A classroom was allocated for the sessions for each of the groups of learners. May the researcher hasten to say time was a rare commodity and the researcher had to compromise, by taking the learners after they had finish their routine class periods, that is after 12.00 noon. This was a challenge as some were already playing outside and some were on their way home.

This called for a way of saying thank you to them, by giving some snacks at the end of the exercise and thus they gladly participated. A semi-structured questionnaire was administered for close to 1 hour as shown Appendix 5. After the exercise, the responses were collected with the help of my colleague.

### **3.6.2 Data analysis**

The data analysis process used in this research was based on grounded theory and it involved concept labeling, categorizing, identifying core categories, finding relations between categories, and generating a theory from such relationships (Ji & Eun-Hee, 2014). Creswell (2004) argued that data emerging from the semi-structured questionnaire was descriptive. To eliminate researcher bias, probing was done and data transcribed verbatim. The data analysis process involved an iterative process of concurrent information collection and analysis whereby the researcher did not wait until data was completely collected so that data analysis could begin, instead, collection and analysis of data was done simultaneously. Qualitative data analysis is generally an inductive process of organising data into categories and identifying patterns among the categories (De Vos,

2005). According to Babbie and Mouton (2004), the method of analysing the patterns and themes is carried out for the rationale of drawing conclusions, which are in line with the critical questions, interest of the study, and reflect theories of the study.

Analysis of data in grounded theory is said to originate from Glaser and Strauss (1967) as a technique of constant comparative analysis which consists of “explicit coding and analytic procedures” (p 102).

It is based on the following four procedures of analysis of data:

- Comparing incidents applicable to each category,
- Integrating categories and their properties,
- Delimiting the theory, and
- Writing the theory

***Step 1- Creating a master sheet.***

The responses from the semi-structured questionnaire were read and re-read to get a feel for the data. A master sheet was created comprising all the responses as seen in Appendix 5 to the questions. The researcher therefore, assembled the responses to each question in the semi-structured questionnaire as seen on fig. 2.

***Step 2- Making tables from questionnaire data***

From the master sheet, the researcher made tables representing the responses from each of the participants. The principle of this exercise was not to twist this research study into a quantitative one, but to help the researcher compute the participants’ responses to each of the questions.

***Step 3 – Coding the semi-structured questionnaire data inductively***

Following Nieuwenhuis (2007), the researcher read through the data and came up with words or phrases which were similar in the participants’ responses’ these were highlighted

in the same colour – coding. In qualitative inquiry a code is most often a short phrase, or word that symbolically assigns a salient, collective, essence-capturing, and/or evocative attribute for a portion of visual data or language based (Saldana, 2008). Nieuwenhuis (2007, p. 105) emphasizes coding as the process of reading carefully through your transcribed data, line by line, and dividing it into meaningful analytical units”.

#### ***Step 4 – Grouping of data into themes and categories***

From the codes created from the data the researcher created themes responding to the questions of the study - which is termed inductive data analysis. From this point of view, themes and categories were formed as they emerged from the data. In the last but one step the researcher noted references of corresponding literature and revisited the objectives of the study, using the themes and identifying categories that answered critical questions of the study.

### **3.7 Reliability, Credibility and Rigour**

#### ***Reliability***

In order to ensure reliability the researcher used a questionnaire, and a semi-structured interview to collect data sources. Audio recording was also used to capture appropriate information as the researcher probed for clarity and then accurately transferred all of the learner’s voices into written text. To ensure reliability in qualitative research, examination of trustworthiness is crucial. Seale (1999, p. 266), argues that while establishing good quality studies through reliability and validity in qualitative research, “trustworthiness of a research report lies at the heart of issues conventionally discussed as validity and reliability”. The reliability of the instruments used are trusted because they are constantly expected to produce the expected results when used more than once for data collection from the same samples of the same learners. This means that learners who were sampled were asked to be a part of the semi-structured interview.

### ***Credibility***

Credibility is a way of convincing the audience that the findings represented interpretations of the views of the participants such that people who shared the same experience can recognize the interpretations. In addition using semi-structured interviews allowed the researcher to penetrate the human understandings and constructions of the phenomena under study. To ensure credibility of the instruments the researcher allowed his peers to scrutinize data and authenticate that the instruments measured that which they were purported to measure (Shenton, 2004; Straits & Singleton, 2011). The instruments would be deemed credible and trustworthy only after piloting. Blessing and Chakrabarti (2009, p. 114) state that the aim of a pilot study is “to try out the research approach to identify potential problems” which may impact on the trustworthiness of the research findings. In an attempt to institute, credibility the researcher applied progressive subjectivity, substantial and prolonged meetings, member checks and triangulation (Mertens, 2005). For the duration of the case study the researcher endeavored to obtain learners perspective during the 60 to 90 minute questionnaires filling in sessions.

### ***Rigour***

Rigour is the demonstration of truthfulness and competency as a way of verifying the correctness of a research process (Aroni et al. 1999). Without rigor, there is a danger that research may fail to make a worthwhile contribution to scholarly knowledge (Barrett et al, 2002). The usage of different data sources contributed to the rigour of this study. For this study a combination of semi-structured questionnaires and analysis of written material on the topic were used to collect data. Moreover, trustworthiness will be enhanced by allowing research participants (i.e. learners), the head teacher and other people having interest in the research to give their comments or assess the research findings, interpretations and conclusion. Biasness which might have been caused by development of relationships with learners was eliminated. It was important to remove the biasness as it could tempt the researcher to see what he wanted to see and thus miss things that do not conform to his expectations. The researcher also needed to avoid generalizing the findings, but instead provide understanding from the learners or principal’s perspective (i.e. to seek insight into participant’s perspective, attitudes, experiences and behaviours).

To maintain rigour in this study, the process of translation through the development of descriptive and analytical themes was carried out, and it facilitated transparency of reporting. The researcher further translated the themes and concepts from one situation to another, always checking that each transfer was valid so did not translate concepts into situations where they did not belong.

The researcher also followed principles that others have followed when using synthesis methods. . Lastly, the researcher assessed the quality of this study with regards to the degree to which it represented the views of the learners. This made sure that the concept of quality was located within the context of the purpose of the research review-learner's views- and not necessarily the context of the primary study.

### ***Coding-Categories-Themes-Hypotheses***

This research study applied saturation of categories as well as on the data gathered. This means by using literature review and interviews codes, categories and then subcategories were created; namely 11 codes or themes (i.e. open coding) and 21categories. The researcher then looked through the transcripts to see which codes were appearing in the learner's questionnaires. This is done to search for concepts relating to events or happenings and incidents. This is the main purpose behind theoretical sampling which appears frequently and helps to influence outcomes (Strauss & Corbin, 1998). The most popular codes were detected amongst the set of 24 learners that were interviewed and also the codes which were rarely used and why this was so. From an initial understanding of learner's responses, it was discovered that they zeroed around water as a scarce resource. The researcher observed that this was a recurring theme amongst learners. It connected to challenges, problems, well-being and coping strategies. It further led to explanations as to why "water is a scarce resource." Selective coding in the grounded theory is as a result of locating themes that connected cause and effect. . Issues coming up from the transcripts were explored across subtopics to create linkages. For example how water scarcity is connected to hygiene and the influence of the learning environment.

Pope-Davis, Toporek, Ortega-Villalobos, Ligiero, Brittan-Powell, Liu, Bashshur, Codrington, and Liang (2002) reveals that qualitative methodology based on grounded theory has established attention in the psychology research. This methodology was used in the contemporary study to appreciate the experiences of learners on water scarcity in primary school settings. The grounded theory has received increased attention as it emphasizes the understanding of the learner's voice to assemble a theory about this phenomenon.

Strauss and Corbin (1990, p. 23), two of the researchers who have been instrumental in defining grounded theory methodology, state that theory is “discovered, developed, and provisionally verified through systematic data collection and analysis of data pertaining to that phenomenon” . In the current study, interviews with grade 5, 6 and 7 learners were analyzed to develop a theory that explains the experiences of primary school learners on water scarcity in the Lubombo region of Swaziland. This theory addresses the experiences, challenges and problems faced by learners, influences of water scarcity on well-being and strategies used by these learners to cope in times of scarcity.

### *Open Coding of the results*

The first step in theory building is conceptualizing, as stated by Strauss and Corbin (1998). Conceptualizing involves breaking down of data into concepts or representations of matter and measures. This first step is called open coding. After transcription, questionnaires were re-evaluated and dismantled into sentences and phrases, which stood for learner's main ideas. Lists and transcripts of major thoughts were given to the transcriber to ensure that the researcher had accurately noted the concepts of the learners. Strauss and Corbin (1998) state that the “first step in theory building is conceptualizing” (p. 103).

### **3.8 Ethical Issues**

The researcher followed the obligatory steps to adhere to the ethics code of the university under which the study was conducted. The researcher started collecting data from the learners only after having obtained clearance from the University of KwaZulu-Natal. Before interviews were conducted the researcher explained the purpose of the study to the

participating learners and issued them with ‘informed consent agreement’ forms that were signed by both the participants and their parents – since the participants were minors. Only learners whose parents gave consent were allowed to participate in the study. Pseudonyms were used to conceal the identity of the school and the learners, in writing the thesis.

According to Holloway (1997); Kvale (1996) it is imperative that participants sign and informed consent form prior to the commencement of a research study. Ethical consideration is a crucial aspect of social research. As explained by Spencer et al (2003), as cited in Bryman 2008) evidence of the consideration of ethical issues is part of the criteria for measuring the quality of qualitative studies. Ethical principles include ensuring and assuring the participants that they will suffer no harm from their participating in the study and that there will be no degree of deception involved in their participation.

As part of the ethics observation consent to collect data from the school was obtained from the head teacher of the school. Subsequent to that individuals were approached and informed of the subject matter of the research and the use of the data that would be collected. Their due approval was obtained before questions were asked (Cranddall & Diener, 1978 cited in Bryman 2008). The researcher made sure that the learners were comfortable with the questions asked. The learners were informed about recording their ideas. The contents of the ‘informed consent agreement’ form were explained to the participants at the beginning of each interview. Potential participants signed the agreement and those who did not sign were not pressured to participate in the study. Parental consent was sought for all those who ended up being participants after completing the closed-ended questionnaire, as learners used in this research were between 10 and 15 years of age.

The researcher explained the purpose of the study to the learners and parents, and thereafter the parents signed if they were in agreement with the content. Teachers, Head Teacher and the other stakeholders of the school system were not part of the group as the learners needed to be free in their discussion and not be afraid of victimization by the teachers, head teacher or any adult who might think he/she was the subject of discussion.

### **3.9 Limitation of the study**

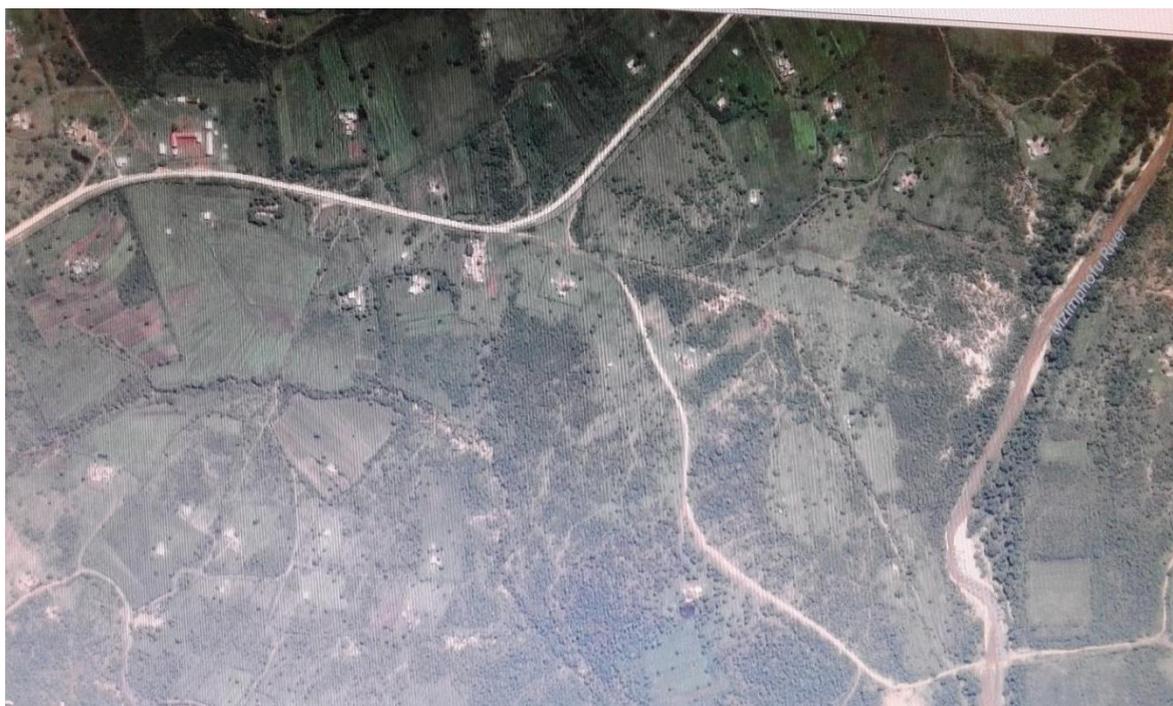
The researcher further acknowledges the inadequacy of the study that due to the fact that it was limited to only one school in one region in the country whereas there are numerous primary schools in the country. Another limitation was the time available for the research, which was after a long day's work, so the learners were exhausted after 12.00 noon. There is also the element of the high temperatures at this time of the day and the fact that learners could be hungry creates a situation of uncertainty if learners will collaborate fully with the researcher.

Furthermore, in this primary school, learners come from as much as e 3 kilometres away, and there is no transport, so the researcher may be pressed for time not to delay the learners, as the area is full of thorny bushes which could be dangerous when the learners leave for home late. Some learners may fear to divulge information on such practices in the school as most of the teachers obtain water for their personal needs from the learners. The researcher should be able to convince the administration and the teachers that this research would improve the well-being and performance of the children in the school.

### **3.10 Location of the study area**

The study was carried out in one rural primary school which is 21 kilometres from Manzini city and amongst 127 primary schools in the Lubombo region of Swaziland. This area lies in the arid part of the country, suffers from frequent drought and experiences water scarcity which is perhaps the most important resource for mankind and it is facing an ever-increasing supply/demand imbalance (Habibi et al, 2014). The study area is seen on fig 1; Red roof near bend road, North West direction.

**Fig 1: Map of the Study Area**



### **3.12 Summary**

This research study utilized an interpretive paradigm and was located within the qualitative research design. It also engaged purposive sampling in order to yield richest information, and was accompanied by a case study which provided the best possible approach to achieve the purpose of the study. This research used the grounded theory approach as an analysis process which finally came up with categories and relationship within these categories. Furthermore, the sample comprised 24 learners from grade 5, 6 and 7 and since one school was used for the data, generalization of the findings is limited. To ensure ethical practices, ethical issues for this research study were carefully considered. Chapter four, deals with data presentation, analysis and discussion of the findings.

## **CHAPTER FOUR: DATA PRESENTATION AND DISCUSSION**

### **4.0 Introduction**

The preceding chapter presented the research design and methodology that the study employed to generate and analyse data. In this chapter the research findings are presented and discussed in line with the research questions:

1. What are primary school learners' experiences of water scarcity in Lubombo Region?
2. How is water scarcity influencing primary school learners 'well-being'?
3. How are the primary school learners coping with water scarcity?

The answers to these questions were obtained from the questionnaire with primary school learners in one school. This chapter was organised into Part A, Part B and Part C. For example, Part A focuses on research question one, that is, in line with the research questions.

### **4.1 PART A: RESEARCH QUESTION ONE**

What are primary school learners' experiences of water scarcity in Lubombo Region? The answer to this question was obtained from the questionnaire with primary school learners. This question focused on three aspects,

1. Learner's Experience of water scarcity
2. The challenges faced by learners as a result of water scarcity
3. Impact on learner's overall learning experience

Open-ended questions were used to elicit learner's answers to these three aspects of question. The views expressed by learners are discussed in sections 4.1.1, 4.1.2, and 4.1.3

#### 4.1.1 Can you tell me your experience of water scarcity in your school?

The results indicate that learners have two experiences:

1. Water supply is a scarce resource
2. A few of them were ambivalent in their responses.

The above-mentioned experiences will be explained further in following paragraphs.

##### *Water as a scarce resource*

**Table 4.1: learner's response about water as a scarce resource**

Responses	Number of learners
There was no water in the school for a long period of time	10
My experience is that water supply is sometimes there and other times not there (intermittent)	6
The water pressure in the taps is very low which results in long queues	3
My experience of water scarcity is the dry school tap	2
Not sure	3

From Table 4.1, it can be seen that 10 learners provided a more detailed account about water supply as a scarce resource. The following quotes illustrate what learners said about water supply as a scarce resource;

*Water is scarce and there is none sometimes*

*Sometimes there is no water for days*

*The school is getting lesser amount of water of and it is dry for a long period of time*

*Learners observed changes in the seasons, lesser rain, getting dryer*

It can be seen in Table 4.1 that six learners responded by saying that they have experienced unreliable water supply. The following quotes illustrate what the learners said:

*My experience is that sometimes water supply is there and other times not there  
You cannot be sure if you are going to get water from the tap as you come with high hopes of drinking*

The other group of learners indicated water supply as a scarce resource and they observed that at break time learners rush to the tap to drink water. At the tap they usually find that pressure in the tap is low. The following quotes illustrate what the learners said;

*The water pressure in the tap is very low which results in long queues  
We waist a lot of time at the because water is coming out slowly  
There is small amount of water from the tap*

Two learners indicated their experiences on water as a scarce resource and this what they said;

*When you go for drinking at break time the school tap is dry  
It is dangerous to ply games because when you want to drink the tap is dry, we have to suck the tap.*

#### ***A few learners were ambivalent in their responses***

Lastly, on experiences on water scarcity, a few of the learners were ambivalent in their responses. A small group of three learners were not sure about their experiences on water scarcity and had this to say

*Water is life and we need it, when you sing, you talk you need water and drinking tablets  
I can feel bad as I cannot eat and drink  
I can feel bad because I cannot do well and eat well*

The research has revealed water supply to be a scarce resource in the school, producing negative experience as learners are left stranded, not knowing where they will get their next cup or drop of water.

#### 4.1.2 Can you tell me challenges that you face as a result of water scarcity?

The analysis of the results indicates that learners have experienced two main challenges;

Health and hygiene

Curricula issues

The above-mentioned problems will be explained further in the following paragraphs.

##### *Health and hygiene*

**Table 4.2 Effect of water scarcity on learner's health and hygiene**

Responses	Number of learners
No water for taking medication,	6
No water for hand washing	5
No water for drinking leading to dehydration,	4
No feeding scheme,	3
No water for cleaning	3

From Table 4.2, it can be seen that six participants provided a more detailed account on challenges brought under health and hygiene due to water scarcity. The following quotes indicate what learners said;

*Our sickness does not stop because we cannot take medication*

*We cannot learn, learners get sick*

*Waiting for your turn to get water, you can faint*

*We do not have enough water for taking medication*

*We find that we have skipped our medication*

*While waiting for your turn to get water for your medication, learners play and steal your medication*

The other group of learners indicated that there was no water for hand washing which is another category under health and hygiene.

The responses of these five learners are illustrated below;

*When we come from playing games, there is no water for washing hands*

*After using pit latrine toilets, there is no water for washing hands*

*We face a challenge of washing our hand before and after eating our meals*

*We use our hand when we cough and they need to be washed, but there is no water*

*When we help sick learners, we need to wash our hands as there are no gloves and water*

A group of four learners, during the interviews, raised an issue of lack of water for drinking purposes, which affects their thirst and finally leads to dehydration. The following quotes illustrate what learners said;

*No water for drinking leading to dehydration*

*After playing games we are thirsty, but no water to drink*

*When we have brought food like sweet potato from home it chocks us, no water to loosen the catch*

*We walk long distances from home, we find ourselves longing for a cup of water*

Three learners suggested that the challenge of water scarcity affects their feeding scheme, which exacerbates hunger directly, affecting their health and hygiene. This is illustrated by the following quotes;

*When there is no water, we are hungry*

*In the absence of the water, the lady in the kitchen does not prepare any food*

*Scarcity of water challenges our feeding scheme and we are not able to take our medication on an empty stomach*

A group of three learners showed water scarcity as a challenge affecting their cleanliness in school, which creates a breeding ground for diseases directly affecting their health and hygiene. The following quotes indicate what they said;

*No water for cleaning classrooms and toilets*

*We learn in dirty classrooms, full of dirt and dust which chocks us*

*Learning conditions in our school are bad they are affecting our cleanliness*

### ***Curricula issues raised by learner***

**Table 4.3 Effect of water scarcity on the learner's Curricula issues**

Responses	Number of learners
No water for garden,	3
Interference with consumer science,	2
School breaks off early	2

From Table 4.3 three learners suggested that water scarcity has a direct effect on growing of vegetables and learning agriculture in the school as part of curricula. The following quotes illustrate what learners said;

*They are not able to do gardens as a subject in agriculture*

*We cannot plough vegetables and this is a disadvantage in fulfilling our prerequisite for external examination as a practical subject*

*Absence of water inconvenience us in furthering our studies in agriculture at a higher grade*

Only two learners, when interviewed, raised an issue of water scarcity affecting their curricula issues like consumer science which when not done, for some girl learners, prevents them from pursuing home economics at high school. The following illustrates what they said;

*We are not able to do home economics as a subject*

*We cannot do cooking, sawing, knitting and crocheting practicals and not doing these is a disadvantage as it reduces the number of subjects taken for examination*

The other two learners when interviewed raised an issue of water scarcity influencing the amount of time spent at school which thus affects learner's performance.

The following quotes indicate what learners said;

*In times of water scarcity school breaks off early and affect curricula coverage and achievement*

*Water scarcity gives teachers no choice but to reduce the size of periods which makes it impossible for learners to finish their syllabus*

In summary of the question that addresses challenges faced by learners as a result of water scarcity, the researcher found that learners experience numerous challenges. They were not able to wash their hands before and after eating and visiting the toilet; not able to take medication; no water for drinking; no water for cleaning classrooms and toilets and the school not able to cook meals for learners. It also affected practical subject like science, consumer science and agriculture as these practicals need large amounts of water for their success.

#### **4.1.3 How does the scarcity of water in your school impact on your overall learning?**

The analysis of the results indicates that learners have one main overall anxiety emanating from water scarcity;

Poor concentration and performance

The above-mentioned problem will be explained further in the following paragraphs.

## Effect of water scarcity on learner's overall learning

**Table 4.4 Effect of water scarcity on learner's overall learning**

<i>Responses</i>	<i>Number of learners</i>
<i>Scarcity of water results in reduced participation in class</i>	<i>13</i>
<i>Water scarcity results in poor concentration</i>	<i>7</i>
<i>Water scarcity results in poor performance</i>	<i>4</i>

It is evident from table 4.4 that 13 learners suggested that the issue of water scarcity reduced participation in class. The following quotes illustrate what learners said;

*Sometimes some of us fall asleep; they take tablets in the morning. There are about three that take tablets in the morning*

*We always come to school late and very dirty and we miss a lot*

*At some point we come to school smelling badly and other learners move away from us.*

Seven learners when interviewed raised an issue of water scarcity causing learners not to participate in class. In the interview they unanimously agreed with each other saying that;

*They cannot listen and concentrate because we are hungry and thirsty*

*One female learner personally described what happens to her; she said*

*My mind is blocked*

*When I have not drunk water my mouth is dry and I cannot participate*

*Instead of participating I think about where to get my next cup of water*

The other group of four learners indicated that water scarcity contributes to the learners' poor performance. The following are examples of what they said;

*We make a lot of noise, we cannot perform*

*Some learners steal from others and they quarrel with the other and our performance is poor*

*As learners, we become thin, not active; not playing, jumping*

In addressing the impact of water scarcity in the school on the overall learning of learners, the research revealed that water scarcity reduces participation in class, results in poor concentration and poor performance.

#### **4.1.4 DISCUSSION OF RESEARCH QUESTION ONE**

What are primary school learner's experiences of water scarcity in the Lubombo Region?

- 1. The findings of this study indicate that learners experience water to be a scarce resource in the Lubombo region of Swaziland.*
- 2. The current study also found that learners experience health and hygiene related problems because of water scarcity.*
- 3. The study also found that learners have to finish school early each time there is water shortage and this affected their performance at school.*

Firstly, when learners were asked to describe their experiences of water scarcity in the school, 10 learners indicated that water supply was a scarce resource at their school. The findings of the current study are similar to a study carried out in townships school by Mukuhlani and Nyamupingidza (2013) in three townships (namely Nketa 7, Entumbane and Newton West). In Mukuhlani and Nyamupingidza 's study mitigation measures employed by residents, local authorities, Non-Governmental Organisation (NGO) were evaluated in line with existing geographical and climatic conditions of low and unreliable rainfall.

Secondly, when learners were asked to explain their challenges due to water scarcity in the school, and 21 learners revealed the main challenges as health and hygiene. They claimed that the scarcity of water challenged their ability to take medication, wash their hands, and drink water to quench their thirst, have an efficient feeding scheme and to clean their classrooms and toilets. Another challenge revealed by 3 out of 24 learners was the learner's curricula issues, which resulted from water scarcity and was said to affect their ability to do gardening as a practical subject and interfere with consumer science. This finding is in line with that carried out at a Primary School in Entumbane-Bulawayo, Zimbabwe. In this study the school was forced to cut lessons short on days that water

shortages were most acute and educator's plans were disrupted with regards to subjects like building and agriculture (Mukuhlani & Nyamupingidza, 2013)

Thirdly, when learners were asked about how water scarcity influences their overall learning at school, 13 learners indicated that water scarcity resulted in reduced participation in class, 7 learners emphasized poor concentration and 4 learners felt water scarcity has a bearing on their poor performance. The findings of the current study are similar to those of the study carried by (Devnarain, 2010) which indicate that dehydration has adversely affected learner's mental performance. In these studies, it was observed that provision of water reduces tiredness, irritability and distraction from thirst and to a greater extent improves concentration levels, academic performance and learner's behaviour in schools.

#### **4.2 PART B: RESEARCH QUESTION TWO**

How is water scarcity influencing primary school learners 'well-being? The answer to this question was obtained from the interview with primary school learners. This question focused on four aspects,

Feelings

Health and hygiene

Academic performance

Extra curricula activities

The above mentioned experiences will be explained further in the following paragraphs.

Open ended questions were utilized to elicit learners' experience of water scarcity, and learners had different views.

The views expressed by learners on the influence of water scarcity on their feeling that emerged from the data are discussed in section 4.2.1. The learners views on their health and hygiene experienced due to water scarcity are discussed in 4.2 2.

The impact on learner's academic performance experience is discussed in section 4.2.3. The views on the influence of water scarcity on the extra curricula activities of learners is discussed in 4.2.4

#### **4.2.1 How do you feel when there is no water in your school?**

The results indicate that learners experienced three feelings due to water shortage:

Learners felt bad when there was no water in the school

Some participants revealed physical feeling

A few of them were happy in their responses.

The above mentioned feelings will be explained further in following paragraphs.

#### ***Influence of water scarcity on learner's feeling bad.***

**Table 4.5 Effect of water scarcity on learner's feeling bad.**

Responses	Number of learners
<i>Learners are unhappy &amp; not feeling good</i>	6
<i>Learners feel lonely</i>	2
<i>Learners feel disappointed.</i>	2

From Table 4.5, it can be seen that six learners had a feeling of unhappiness and not feeling good. What they had to say is illustrated in the following;

*We are not happy because we are requested to bring water for cooking*

*We are unhappy when it is time to drink water*

*When you want to take, some pills you must bring some water with you otherwise you will not drink your pills*

*We feel unhappy when it is time for drinking; washing hands before we eat,*

*We are not happy when we are thirsty after playing*

*We are not happy to carry 2 litre water containers, which we do not have*

The other two learners felt water scarcity influences learner's well-being thus creating a feeling of loneliness.

The following quotes illustrate what learners said;

*If you do not have water other learners avoid you*

*For us who are physically challenged are lonely, not able to carry water container*

Two learners when responding to the influence of water scarcity on their wellbeing reported feeling of disappointment.

The following quotes illustrate what learners said;

*We are disappointed to be in this school as it fails to provide water*

*I feel as if I have been let down and I cannot do home economics*

### ***Effect of water scarcity on learner's physical feelings***

**Table 4.6 Influence of water scarcity on learner's physical feelings**

Responses	Number of learners
<i>Water scarcity makes learners weak,</i>	6
<i>Without water learners become scared of uncertainty</i>	4

From Table 4.6, it can be seen that six participants had physical feelings of weakness. The following quotes illustrate what learners said;

*In times of water scarcity, we are usually sick*

*Absence of water makes us weak and we cannot learn well*

*Water scarcity in our school prevent the cooking of meal and drinking of water and this makes our bodies deteriorate fast*

*Without water, our bodies are tired and restless*

Four learners indicated that water scarcity influences physical feelings creating uncertainty.

The following illustrate what learners said;

*As learners we are so hesitant on the future of our learning*

*As a learner in this school you are not sure of your next meal and glass of water*

*Water scarcity in this school has created uncertainty with our achievements*

*It is not easy to relax when you are not sure about the presence of your teachers who often say they will move away from this god forsaken school*

### ***Influence of water scarcity on learner's happy feeling***

Learners' response on the influence of water scarcity on their feeling happy and said:

*Absence of water gives us an early break/go home early.....there were 4 learners*

The four learners who participated in this study confirmed that absence of water makes them happy and stated that they did not see anything wrong with that. The following quotes indicate what learners said;

*Absence of water supply gives us the opportunity to go home early*

*Our teachers make us leave early and we get a lot of time to play*

*Water scarcity extend our holiday period, we visit our grandparents*

*In times of water scarcity, we avoid boring teachers, who send us up and down on errands*

In summary, addressing how learners felt when there is no water in the school, the study revealed that learners felt bad, lonely and disappointed; it also made learners felt uncertain and weak and lastly a few learners felt happy as they had spare time to do their own thing..

#### 4.2.2 How are you affected when there is no water in your school?

The results indicate that learners were affected by water shortage in two main ways;

Health and hygiene

Hunger and thirsty

The above mentioned ways will be explained further in the following paragraphs.

#### *Influence of water scarcity on learner's health and hygiene*

**Table 4.7 Influence of water scarcity on learner's health and hygiene**

Responses	Number of learners
The absence of water affects learner's health as they fall sick	4
No water for hand washing, affects hygiene practices	3
No water for cleaning rooms affects hygienic practices	2

From Table 4.7, it can be seen that four learners who participated in this study said water scarcity directly affects their health and hygiene. The following quotes signify what learners said;

*The absence of water affects our learner's health and we fall sick*

*With the continuing drought our health is deteriorating*

*Absence of water forces us to drink water polluted by animals which affects our health*

*Water scarcity is a big problem for me because I need water and a meal to take my HIV/AIDS tables; if not taken my CD4 count drops*

Three learners who participated in this study said their hygienic practices were affected. The following quotes indicate what learners said;

*Our school is in the rural areas without water it does not practice hygiene*

*We are not able to wash our hands with soap and water*

*As learners we face problem of going to class and eating meal if provided with dirty hands*

Two learners when interviewed felt water scarcity deprived them of water to clean their classrooms and toilets. The following quotes illustrate what learners said;

*Our toilets have no running water and at times smell strongly; they are filled with flies and dirty*

*We use dirty toilets and this makes us avoid going to relieve ourselves*

#### ***Influence of water scarcity on hunger and thirst***

**Table 4.8 Influence of water scarcity on learner's hunger and thirst**

Responses	Number of learners
No feeding scheme leading to hunger	3
Lack of concentration in class due to thirst	3

From Table 4.8, it can be seen that three learners felt water scarcity deprived them of water to cook their meals and they are left to starve. The following quotes illustrate what learners said;

*Learners are left with no meal for the day, as there is no water*

*The lady who cooks our meals is bitter if there is no water to use in cooking our meals and shouts at us*

*The lady cook is not able to cook food that has been issued by the government and we are left to starve*

Three learners felt water scarcity influenced their thirst for water leading to loss in concentration. The following quotes illustrate what learners said;

*Absence of water leave learners dehydrated*

*Some learners steal our water bottles and leave us with nothing*

*If there is no water in the school we lose concentration as we think where to get our next cup of water*

In summary, addressing the question how learners are affected when there is no water in the school; the research revealed that water scarcity influenced learner's health and hygiene. It was also revealed that water scarcity resulted in learners falling prone to hunger and thirst as the school failed to offer meals and water for them.

#### 4.2.3 How is your academic work affected when there is no water in your school?

The results show that learners are affected in their academic performance in three main ways;

- School work
- Practical arts
- School time

The above-mentioned ways will be explained further in following paragraphs.

#### *The influence of water scarcity on learner's school work*

**Table 4.9 Influence of water scarcity on learner's school-work**

Responses	Number of learners
<i>The absence of water affects learner's core curricula</i>	4
<i>Learners are taught by under qualified teachers</i>	5

From Table 4.8, it can be observed that four learners felt that water scarcity makes learners underperform in their core curricula work. The following quotes illustrate what learners said:

*Water scarcity disturbs our plans to do well in our subjects*

*As learners of this school we are always behind in our subjects*

*In our winter season, we are forced to stop learning early in order to avoid dehydration*

Five learners felt that water scarcity opens an allowance for learners to be taught by under qualified teachers. The following quote illustrates what learners said:

*Good teachers always run away from our school and we get teachers without Certificates*

*Some of our teachers are 'O' Level or grade 12 school levers without any experience, they don't mind such condition*

### ***The effect of water scarcity on Practical Arts in the school***

Learners' response on how their practical art is affected by water scarcity said:

*The absence of water affects learner's sporting skills.....*

It was observed that nine learners felt that water scarcity makes learners miss their sporting activities or extra-curricular work.

The following quotes illustrate what learners said:

*Most of us are not gifted to do well in our core subject and if we were to get a chance to excel in sport, we might make a living on that*

*If we had water, we will be best sportsperson*

*Learners are not able to play soccer*

*Learners not able to play netball*

*Not able to engage in other games*

### ***The influence of water scarcity on school time***

Learners' response on how their school time is affected by water scarcity was

*The absence of water affects amount of time for learning.....* It was observed that nine learners felt that water scarcity makes them lose a lot of school time which otherwise would have been used wisely.

The quotes below indicate what learners said;

*Water scarcity makes us loses a lot of instruction time*

*Water scarcity places greater burden on the little time available for learning*

*There is little time for interaction between teacher and us*

*There is little time to horn our skills*

*The amount of time spent in school is short*

In summarizing responses obtained from the question of how learner's academic work is affected when there is no water in the school; the researcher discovered that learner's school work in terms of their core curriculum, s extra-curricular activities and school time is affected.

#### **4.2.4 Discussion of research question two**

##### **How is water scarcity influencing primary school learners 'well-being'?**

1. *The findings have revealed that learner's wellbeing is affected by water scarcity more specifically touching on learner's academic performance*
2. *The findings also reveal that water scarcity negatively affects extra-curricular activities, which reduces the development of sporting skills..*
3. *The findings show that water scarcity makes learners lose a lot of time through absenteeism, missing school, and breaking up early from school and spending time trying to source t water from the dry tap.*

Research findings have revealed that learner's well-being, especially the academic performance, was affected by water scarcity. Nine learners were clear about how water scarcity affected their core curricular activities. This means the inability of teachers to conduct science experiments or practical agriculture so as to engage in a skills transfer, for an example-on how to plant vegetables, which is considered a missed opportunity to the learners. As the researcher probed further it was revealed that some of the teachers are grade 12 school leavers as they do not mind going to the rural area because they are in need of job opportunities and then depend on learners for their water needs. The researcher has also observed that the introduction of Free Primary Education (FPE) in a setting such

as this has created a dire need for teachers in the schools resulting in their core curricula being taught by under qualified teachers as qualified teachers are mostly found in the urban schools where water is supplied by the municipality. The experiences of the learners in the current school are similar to those of a study carried by Devnarain, (2010) in a rural primary school in Jozini, KwaZulu-Natal, South Africa. Devnarain's study indicated that water scarcity influences the regularity of attendance and partial presence of learners which in turn impacts on the teachers who have to constantly review work and cannot advance with the curriculum at the pace they would like thus affecting education outcomes.

A group of 9 learners felt that water scarcity was depriving them of opportunities in playing sport .and doing well at what they do best. They felt that if allowed to play they could hone their skills and make a living from that. This finding is different from the study carried out by Chambers and Schreiber (2004) who found that engagement of learners in extra-curricular activities like sports or clubs has not been seen as having an effect on academic performance but on a theoretical point of view such activities are seen to boost academic performance.

Devnarain (2010) in a study done in a rural primary school in-Jozini, KwaZulu-Natal, South Africa, alludes to the fact that learners reveal their frustration when there is no water. These learners said in the absence of water there is no playing, no jumping and no exercise done. From studies done by Arnold (2001); Schneider and Butcher (1999) it is seen that water availability enhances school based sports as well as extra-curricular sport. This in turn helps young people form values, abilities and behaviour that lead to healthy, fulfilling and productive lives

Lastly, the findings show that water scarcity makes learners lose a lot of time accessing the little water available. The time could have been used for other things. The findings revealed that water scarcity places greater burden on the little time available for learning and learners find themselves under performing. The issue of water scarcity affects learner's homesteads as well as the school system. Sometimes it is not easy to separate the two places, home and school, as learners come from homes experiencing equally bad water problems. This finding is relevant and important to both learners and the teachers as inadequate access to water at school and home is causing a ripple effect on learning and

teaching. Devnarain, (2010) in his study of rural primary school in Jozini, KwaZulu-Natal, South Africa found that teachers felt that schools were affected by water shortages because learners were late for class most of the time. This problem caused learners to consistently sleep in class or sent home early during school days. The above mentioned statement is motivated by partial loss of instruction time and absenteeism leaving educators vociferous on achieving their educational outcome and learners disadvantaged in terms of that which is set down in the curriculum.

How do primary school learners cope with water scarcity in the school?

### **4.3 PART C: RESEARCH QUESTION THREE**

The answer to this question was obtained from the interview with primary school learners in this primary school. This question focused on two aspects,

Learner's coping strategies in the school

The strategies applied by the school

The above-mentioned experiences will be explained further in following paragraphs. Open-ended questions were used to elicit learners' coping skills in times of water scarcity and learners had different views. The views expressed by learners on their provision of their own water and alternative ways of quenching thirst emerged from the data are discussed in section 4.3.1. The learner's views on water collection due to water scarcity as a coping mechanism by the school are discussed in 4.3.2

#### **4.3.1 What do you do at your school when there is no water?**

The results indicate that learners have two ways to cope with water scarcity:

Water collection by learners

Alternative ways of quenching thirst

*Learners' coping strategies in the school*

**Table 4.10 Provision of water by learners in the school**

Responses	Number of learners
Learner's ways of collecting water from streams/rivers/dams	6
Bring water from home/ neighbours/community borehole or lidladla	4

From Table 4.10, it can be seen that 6 learners revealed ways they use to collect water as a coping strategy. The following quotes illustrate what learners said;

*Learner's fetch water from streams/rivers/dams*

*We fetch water from nearby dam (tikelembe)*

*Other learners steal water from other learners*

A group of 4 learners revealed that learners bring water from home/ neighbours/community borehole or lidladla to overcome water scarcity as their coping strategy. The following quotes illustrate what learners said on their ways of coping;

*We bring water to school using our own containers*

*Neighbours allow us to get water from the borehole*

*We come with water from home*

*We get water from a lidladla (kitchen for offering soup for local orphaned and vulnerable children*

***Alternative ways used by learners to quench thirst***

The results indicate that learners revealed alternative ways of quenching their thirst; drinking different liquids to quench their thirst.

**Table 4.11 learners' views on alternative ways of quenching thirst**

Responses	Number of learners
learners drinking different liquids to quench their thirst	5
Water scarcity influencing their drinking habits.	5

From Table 4.11, it can be seen that 5 learners revealed different ways they use to quench their thirst. The following quotes indicate what learners said:

*We buy and drink ice from market vendors at the school*

*We are forced to drink dirty water with animals*

*Some teachers sell liquid foods*

A group of 5 learners when interviewed raised an issue of water scarcity influencing their drinking habits. The following quotes indicate what learners said:

*We push ourselves not to have a drink for the whole day*

*We don't drink anything because we do not have money to buy any liquid*

*We sit under trees or in class to save the water in us*

*Learners do not play any games because they will be dry*

In summary, addressing the question of what learners do at school when there is no water, the research found that learners have their own coping strategies such as water collection from river and community borehole. It was also discovered that learners applied alternative

What is done by your school to alleviate the problem of water shortage in your school?

The results indicate what is done by the school to cope with water scarcity:

Strategies of securing water in the school

### ***School's coping strategies in the school***

**Table 4.12 Strategies applied by the school to provide water**

Responses	Number of learners
<i>The school uses rainwater harvesting methods</i>	6
<i>Procurement of water from different vendors</i>	4

From Table 4.12, it can be seen that 6 learners revealed ways the school uses to collect water as a coping strategy. The following quotes indicate what learners said;

*As learners we were sometimes sent by the school with a bottle to the neighbours to ask for water*

*Another way of coping, the school asked parents for water for cooking*

*The school administration was compelled to slice lessons short on days that water shortages were most severe*

*The schools has now installed a borehole to make certain that lessons are not disturbed due to the unavailability of water*

*Our parents were asked to pay a water levy*

A group of 4 learners revealed the way the school procures water. The following quotes indicate what learners said;

*The school purchased water to use at the school*

*Buy water from Swaziland Water Services Corporation (SWSC)*

*Buy water from tankers or water vending trucks*

#### **4.3.2 DISCUSSION OF RESEARCH QUESTION THREE**

How primary school learners cope with water scarcity in the school?

The findings indicate that learners collect water from different sources and they bring their own water to school.

Learners use alternative ways to quench their thirst

Coping strategies applied by the school as a way to address water scarcity issues.

Firstly, results reveal that learners are compelled by circumstances to provide their own water. Learner's revealed different ways of collecting water from sources like the streams/rivers/dams and they are told to bring water from home/ neighbours/community borehole or lidladla. Studies done in Ayigya, Ghana by Mayengbam (2010) revealed that learners were sometimes sent by the school to ask for water from villagers.

Secondly, the research has also revealed that learners' drink different liquids to quench their thirst and water scarcity influences their drinking habits like opting not to play or do any activity that will require water intake. Reading this finding, we can associate it with a study done in Ayigya, Ghana by Mayengbam (2010, p. 99), whereby teachers were asked how learners coped with not having access to water at school. They said "... they don't cope. They don't come to school when there is no water; we give them water from our two litres. They also share amongst themselves..." Learners in their desperate attempts to get access to water sometimes resort to unsavoury habits such as stealing from others and quarrelling with the learners that have taken their water, trying to break the tank looking for water to drink and if you send them to do anything they respond by shaking their heads refusing to follow instructions and making noise. A study done in Lethbridge, Alberta by Ottewell (2002) focusing on a slogan "*think to drink*": the effects of adequate hydration on learner's performance, revealed that learners who are encouraged to drink cool, fresh water are found to behave well, increasing their mood and performance. The study revealed that the brain dehydrates rapidly as learners are not even aware of an insistent thirst, thus boredom sets in, concentration wanes, and confusion and drowsiness reign (Bourne et al, 2000; Fahey, 2000).

Thirdly, in this study a group of learners revealed that in times of water scarcity, the school had applied strategies to provide water, like the usage of school rainwater harvesting methods, collected in a 5 000 litre tank. A study done in Cameroon by Tohnain (2014) is in line with this finding and it reaffirms what strategies most rural schools do to achieve better school performance. Schools should have good drinking water sources necessary for the hydration of the children, with canteens serving the required liquid foods. Finding of a study done by Tapela (2012) reveal the absence of boreholes or other water sources to fill up the tanks in the Mbuzini area, which is in the Mpumalanga Province of South Africa. Informal water vendors, with their own trucks or bakkies fill up the tanks with raw water from local dams. Water sources used to extract water include the local Masibekela Dam and Mbuzini Dam which are located closer to Nkomazi River in Mpumalanga province of South Africa.

#### 4.4 SUMMARY

This chapter outlined the results of learner's experiences of water scarcity. The study has revealed experiences of learners at this primary school to be greatly influenced by scarcity of water and thus water is considered as a scarce resource. A large majority of learners experienced complications with accessing water at the school which exacerbated conditions that impacted on the development of their well-being. In this research, learners in the school have claimed that the scarcity of water has revealed challenges which impact on their health and hygiene such as their ability to take medication, wash their hands, and drink water to quench their thirst, have an efficient feeding scheme and to clean their classrooms and toilets. The absence of water in the school has placed a greater burden on the little time available for learning and learners find themselves under performing. Water scarcity at this school has brought about means to secure water and have it brought from several sources including SWSC, rivers and dams, tankers or water vending trucks and this result in varying degrees of risk to learners and teachers. Water scarcity has also affected learner's capabilities and abilities to perform in their various subjects and extra-curricular activities and has highlighted the different coping strategies implemented this far in the school.

In relation to the first research question: what are primary school learners' experiences of water scarcity in Lubombo Region of Swaziland, the researcher has unearthed learner's experiences indicating water as a scarce resource in this school. The research further associated numerous challenges to the scarcity of water, challenges like health and hygiene and their curricular. Learners also revealed that from their experiences of water as a scarce resource, their curricular was affected such that the absence of water resulted in gardening not done, interference with consumer science, and the school breaking off early and this have a bearing on the second question of the study; affecting learner's well-being.

The second question of the study; how water scarcity influencing primary school learner's well-being has been addressed by responses such as learner's feelings, health and hygiene, academic performance and extra-curricular activities.

The research has established that water scarcity influences learner's well-being by touching on their feelings. It was established that well-being is hampered by feeling unhappy and feeling lonely or disappointed. . The research further established that learner's well-being is affected by water scarcity and learners are subjected to sickness and their health is also affected. The well-being of learners was seen to be affected by severe hunger and thirst as the school experienced little or no water and this led to loss of concentration in class. The researcher further established that water scarcity affected learner's school work, more especially their core subjects, doing practical, and their school time is also affected as learners are sent home early or sent on errands to collect water and this has a way of affecting learner's wellbeing.

In addressing the third question; how are the primary school learners are coping with water scarcity, the research established that learners usually find means of collecting water from the nearby Mzimofu river and man-made dams. More often than not, learners are requested to bring water from home, their neighbours and community borehole or lidladla. The research further revealed that when learners are faced with water scarcity at school, those that are financially able opt for using different liquids to quench their thirst and water scarcity influences their drinking habits. The research also established that the school also engages itself in an endeavor to make water available for the school community, especially the learners as their sole priority. It was also found out that the school procures water from different vendors. The following chapter five is a summary of the main findings and recommendations.

## **CHAPTER 5: CONCLUSION AND RECOMMENDATIONS**

### **5.0 Introduction**

This chapter will present a summary of the main findings of the study, together with a conclusion. The findings of this study present satisfactory evidence that water scarcity at the school raises a number of challenges that impact broadly on the well-being of the learners. The main findings of this research study are assembled together deriving a conclusion from which recommendations are thereby generated as well as suggestions regarding areas for upcoming research.

### **5.1 Summary of the study**

The purpose of this study was to explore the impact of water scarcity on the well-being of primary school learners in the Lubombo region of Swaziland. The aims and objectives of the research are therefore, to explore learners' experiences of water scarcity at primary school; to understand how water scarcity influences primary school learners' well-being and to examine how primary school learners cope with water scarcity at the school. The aims, objectives and key questions were commented on in chapter one.

The current study design prescribed a gathering of data through semi-structured questionnaire with the individual learners in order to understand how water scarcity influences learner's well-being in primary school. The learners firstly completed a questionnaire survey to facilitate sampling of 24 learners and secondly learners completed a semi-structured questionnaire for gathering data for the study. All these were monitored through a set of questions meant to recognize the experiences of individual primary school learners. It was also set to probe further into the water scarcity and learner's performance relationship.

The character of the research study was qualitative and the researcher used a case study with a single method of data collection. The theoretical framework for the research was approached from grounded theory perspective and the researcher personally used a semi-structured questionnaire which was analyzed.

## **5.2 SUMMARY OF THE MAIN FINDINGS**

This research study sought to examine the influence of water scarcity on the well-being of primary school learners in the Lubombo region of Swaziland. The study found that water scarcity resulted in learners experiencing water as a scarce resource in a primary school. The research revealed that learners experienced challenges such as poor health and hygiene, learners were not able to take medication when they are sick due to water scarcity. The learners made it clear that water scarcity affected the levels at which they wash hands before and after eating food and in some cases they sometimes feel dehydrated due to water scarcity.

The second research question sought to understand how water scarcity influenced the learners' well-being. The finding revealed that the learner's well-being was affected by water scarcity in terms of academic performance since the core curriculum was not fully covered due to absenteeism and failure by teachers to conduct practical work. The critical shortage of water at the primary school meant that teachers were not able to conduct science experiments or agriculture practical so as to engage in a skills transfer.

This study indicated that water scarcity influenced the regularity of attendance of learners, which in turn impacted on the teachers who had to constantly review and repeat work, and could not advance with the curriculum at the pace they would like, thus affecting education outcome. The study also revealed that water scarcity negatively affected learners' participation in extra-curricular activities which reduced the development of sporting skills. The findings showed that water scarcity made learners lose a lot of time fetching water in times of scarcity, which could have been better used in covering the syllabus.

The study findings also revealed that water scarcity places greater weight on the little time available for learning and learners find themselves under performing in both academic and

practical subjects. The issue of water scarcity affects homesteads as well as schools, which has a negative ripple effect on learning and teaching in rural schools in Swaziland.

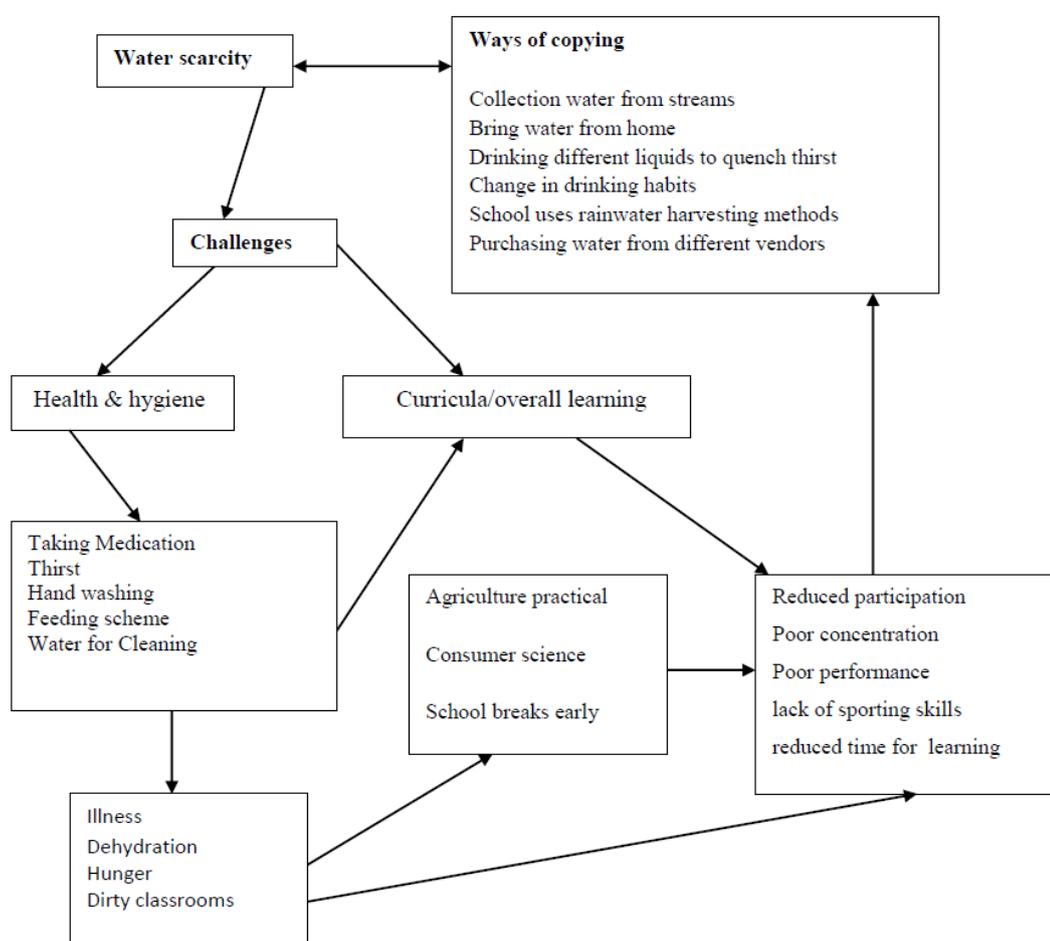
The third research question sought to understand how the learners were coping with water scarcity in the Lubombo region of Swaziland. The findings revealed that learners were obligated by circumstances to provide their own water. The learners indicated that they used different ways of collecting water from sources like the streams/rivers/dams were also told to bring water from home/ neighbours/community borehole or lidladla. This was a huge task for learners in the lower grades due to their size and stature and the likelihood was high that their water could be stolen or taken by force from them. The study also revealed that learners' drink different liquids to quench their thirst and water scarcity influences their drinking habits. They opt not to play or do any activity that will require energy, because of their lack of water intake. A few learners can afford to purchase alternative liquids. In this study a group of learners revealed that in times of water scarcity the school had applied strategies to provide water such as water harvested from rains.

### **5.3 RESULTING THEORETICAL FRAMEWORK**

This section provides as overview of the model (as shown in Fig. 4.1), that was constructed from the themes and categories that emerged from the data collected from the interviews with the primary school learners that were participating in this study. The emerging categories addressed the effects of water scarcity on primary schools learners in the schools. Consequent to the scarcity of water in the schools two themes emerged from the results. The first theme that emerged revealed that learners will face challenges as a result of the scarcity of water. This theme comprised two categories which were the learners facing challenges with their health and with their learning. This could lead one to say that the scarcity of water in a school will cause learners to be challenged health wise when they are short of clean water for taking medication, have no water for hand washing; suffer from hunger because there is no water for cooking and have to stay in dirty surroundings because there is no water for cleaning. The next category revealed that in a school with a scarcity of water learners will encounter curricula problems since subjects such as consumer science and agriculture required water for smooth progression.

Secondly, it emerged that learners developed strategies for coping with the scarcity of water in the schools. From the emerging categories it could be said that when faced with the problems of water scarcity learners will cope with the situation through collecting water from nearby streams; bringing drinking water from their homes; altering their drinking habits; having their school employ water harvesting methods and purchasing water from different vendors at the school.

Figure 4.1 Effects of water scarcity on learners' well-being in a Lubombo Primary School.



From Figure 4.1, the current study has established that water scarcity was severe in Thulwane primary school and it has created challenges such as poor health and hygiene and teaching of a reduced curriculum. Under health and hygiene the researcher established issues like lack of water for taking medication, hand washing, feeding scheme cleaning of rooms and quenching their thirst. Such issues were seen to influence learner's curriculum.

Figure 4.2 on page 107 is as a result of coding done on the responses of learners and this gave rise to figure 4.1.

#### **5.4 The implications of this study**

This study was vital for purposes of identifying learner's experiences of water scarcity, and how it affected their well-being. This has created a point of reference for the researcher against which human life would be evaluated and in turn water acquisition strategies, storage and usage, can be developed in the context of each learner's well-being. Considering the challenges faced by learners, it would be appropriate for the school to address such issues at school policy level and make possible the availability of reserve tanks that can provide water for taking medication, cooking meals and cleaning their rooms. The school should also provide swipes for cleaning learner's hands. Considering learner's experiences, the study would assist to inform the school and the school committee on engaging learners on issues about collecting water. The revealed challenges stand as a good reference point for the school community to put policies in place.

Concerning the effect of water scarcity on the well-being of primary school learners, the study will provide the Ministry of Education and Training, United Nation agencies, NGO's and schools in areas facing such a problem, with strategies to cope, and the ability to restructure their curriculum to best suit situations such as these. It will also equip the stakeholders with knowledge to preserve water for drinking purposes, cooking meals and cleaning the school. As the research has revealed each learner's poor performance, low achievement and low concentration, the school can seek help from NGO's, UN agencies and the government in drilling a more efficient borehole. This will open opportunities for the school to encourage and open water management clubs consisting of learners, teachers, administrators and parents, as stakeholders.

The club would work hand in hand with other environmental clubs to have open debates and competitions amongst learners and create a forum where deliberations on water issues will be brought to the forefront. This will extend to other schools in and out of this region as learners feel the need to be responsible and thus carry such a wealth of knowledge to

their various homesteads and pass-on the knowledge of collecting, storing and using water properly, to their family members.

When the school community has learned and provided proper water conservation they would then develop backyard gardens, live in a clean environment and teach members hygienic practices like drinking adequate water, hand washing, cooking of meals and would encourage playing of sports. The policies and guidelines created at the school level would have a high propensity to influence policies and regulation at national level and government level. To emphasize the importance of water supply, curriculum review panels, various committees and the examination council could work towards examining water related issues, after water issues have been included in the curriculum.

## **5.5 CONCLUSION OF THE STUDY**

The findings of the research study have illuminated the extent to which water scarcity influences the participation of learners in the classroom and in practical work. Learners experience reduced participation, poor concentration, poor performance, lack of sporting skills, reduced time for learning both theoretically and practically and lack of water has a great effect on their feelings.. This seems to be irrelevant in the conclusion.

## **5.6 Recommendations**

Taking into account the theoretical framework and the review of literature upon which this research study was based. The researcher has forwarded the following recommendations:

1. The Ministry of Education and Training should constitute a policy or regulation enacted as an Act of Parliament dealing with water issues in the schools.
2. The MoET should increase the budgetary allocation for school water, and for health and hygiene programs based on the specific needs of the schools.

3. The MoET should review education policies relating to the establishment of new schools or institutions, to ensure compliance to a minimum standard of water issues before the school or institution is registered.
4. Schools in Swaziland should promote the formation of school's Water, Sanitation and Hygiene (WASH) clubs in all public primary schools. This will help to develop knowledge of hygiene and to share experiences, which would, hopefully, attract more participation by learners.

### **5.7 Suggestion for further research**

Based on the findings of this research study, further research suggestions are set forward in the following areas;

1. A similar research study for the whole of Swaziland, to establish how other schools in the different regions, deal with water scarcity.
2. A study to analyze girls participation in times of water scarcity, so as to find out if girls are the most affected by the absence of water.
3. A research study on other factors affecting the participating of learners in schools in Swaziland.

To sum up, this study has been an eye opener to the researcher, who has learnt from the experiences of learners that there are schools that face such extreme water scarce conditions, in the rural areas. This problem is not an urban problem. Hopefully, through this research, avenues will be opened up, so that water would be readily available, and the rural learners would not have their future aspirations and careers jeopardized, which you would not know staying in the urban areas. Looking at the learners moving up and down the school yard, one would wish water was not an obstacle to the future of these learners and it would not jeopardize their careers and future aspirations. The researcher has acquired vast knowledge of how to engage fully in writing a research dissertation.

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## Appendix 1 – Headteacher’s Letter



Dear HeadTeacher

I am a Masters Research student under the supervision of Dr. D. Sibanda in the School of Education and Development, Edgewood Campus University of KwaZulu Natal. I am conducting research on water scarcity and primary school learners. The title of my study is “Investigation of water scarcity on the well- being of primary school learners in the Lubombo region of Swaziland: A case study of one school.

I am seeking your consent for your learners to participate in the study. Participation will entail responding to a brief questionnaire and taking part in semi-structured interviews that will be voice recorded and video recorded. The whole exercise may extend over a period of two weeks. Your learners’ participation in this research is voluntary, and continued participation is also by choice. Your learners will be free to withdraw from participation at any time, if they so wish without having to give a reason or explanation. You also have the right to choose not to have your learners participate and to withdraw your learners from participating at any time. There is no penalty if a learner chooses not to participate in this research or chooses to withdraw from participation at any time. The outcome of this research may be published. In the event of this being the case, learners’ names and identities will not be used.

All information you and your learners give concerning this research will be confidential. A code or number will identify the information your learners provide. Only authorized persons from the University of KwaZulu-Natal will have access to review the research records that contain learners’ information.

May I also draw your attention to the fact that no information given by the learners will be used against them. This exercise is purely for research purposes. After collection, data

will be stored in secure storage and destroyed after a mandatory five year period; the research is purely for finding out how water scarcity affects the well-being of primary school learners.

If you are willing for your learners to participate in the study please indicate by signing the attached declaration.

If there are any questions you wish to ask concerning the research or the participation of your learners in this research, you can contact me or my supervisor, Dr. D. Sibanda. You may also contact the research office through Mr. Prem Mohun. Below are our contact details respectively:

**Mr Nollen Mefika Dlamini**

Email: nollenmd@gmail.com

Cell: +268 76053053

**Dr. Doras Sibanda**

Email: Sibandad@ukzn.ac.za

Tel: +27 332606040

**Mr. Prem Mohun**

Email: mohunp@ukzn.ac.za

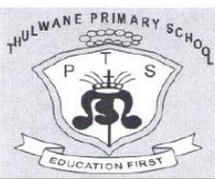
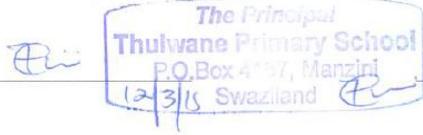
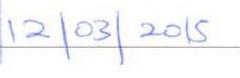
Tel:  031 260 4557

Thank you for your contribution to this research.

Sincerely,

Nollen Mefika Dlamini

## Appendix 2- Headteacher's declaration of consent

 <div style="display: inline-block; text-align: center;"> <p><b>THULWANE PRIMARY SCHOOL</b></p> <p>P.O. Box 4167 Manzini, Swaziland</p> <p>CELL: 7604 2488</p> </div>	
<p><u>University of Kwa-Zulu Natal</u></p> <p><u>School of Education and Development,</u></p> <p><u>Pieter Maritzberg Campus</u></p>	
<p>Dear Sir/ madam,</p>	
<p><u>Re: DECLARATION BY THE HEAD TEACHER OF THE SCHOOL</u></p>	
<p>I <u>Futwile C. Dlamini</u></p>	
<p>(Full name of Head Teacher), Head Teacher of</p> <p><u>Thulwane R-C</u></p> <p><u>Primary</u> (full name of School) hereby confirm that I understand the contents of this document and the nature of the research project, and I hereby give my full consent for my students to participate in the research project.</p>	
<p>I understand that I am at liberty to withdraw my students from the research project at any time, should I so desire, and any participant is also at liberty to withdraw from the research project at any time, should the participant so desire.</p>	
<p style="text-align: center;">  </p>	<p style="text-align: center;">  </p>
<p>SIGNATURE OF HEAD TEACHER</p>	<p>DATE</p>

**Appendix 3- Parents' consent letter**25<sup>th</sup> May 2016

Dear Parent

**RE: INFORMED CONSENT LETTER FOR LEARNER PARTICIPATION**

My name is Nollen Mefika Dlamini. I am a Masters student supervised by Doctor D. Sibanda in the School of Education, Edgewood Campus, at the University of KwaZulu-Natal. My Masters Research topic is entitled **“an investigation of water scarcity on the well-being of primary school learners in the Lubombo region of Swaziland, a case study of one school”**. The findings of the study will contribute to understanding how learners cope in situations where there is water scarcity.

I am kindly requesting that your child be part of the group if he/she is chosen as part of the sample that will partake in the research. In order to gather information for the research, your child will be asked some questions during the school break and he/she will be observed while at school to establish how he/she copes in such conditions.

Participation by respondents will be voluntary. Anonymity and confidentiality will be assured to all participants. Pseudonyms will be used to protect the participants.

Thank you for your assistance in this research.

Sincerely

Nollen Mefika Dlamini (00268 76053053)

Doras Sibanda (+27332606040)

.....

DECLARATION

I..... (Full names of parent) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to my child participating in the research project.

I understand that I am at liberty to withdraw her/him from the project at any time, should I so desire.

.....

.....

SIGNATURE OF PARENT

DATE

**Appendix 4- Participants' consent letter**11<sup>th</sup> April 2016

Dear Participant

**RE: INFORMED CONSENT LETTER FOR LEARNER PARTICIPATION FOR SEMI-STRUCTURED INTERVIEW**

My name is Nollen Mefika Dlamini. I am a Masters student supervised by Doctor D. Sibanda in the School of Education Edgewood Campus, at the University of KwaZulu-Natal. My Masters Research topic is entitled “**an investigating of water scarcity on the well-being of primary school learners in the Lubombo region of Swaziland, a case study of one school**”. The findings of the study will contribute to understanding how learners cope in situations where there is water scarcity.

I am kindly requesting that you take part in the research since you form part of the group that has been chosen as a sample. In order to gather information for the research, you will be asked some questions during the school break and you will be observed while at school to establish how you cope in such conditions.

Your participation is voluntary and you will be assured of anonymity and confidentiality. A pseudonym will be used to protect your identity as a participant.

Thank you for your assistance in this research.

Sincerely

Nollen Mefika Dlamini (00268 76053053)

Doras Sibanda (+27332606040)

## DECLARATION

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

.....

.....

SIGNATURE OF PARTICIPANT

Date

## MEASURING THE INFLUENCE OF WATER SCARCITY ON LEARNERS

### HOW TO ANSWER THIS QUESTION

#### These questions are for the current situation (2015)

There is no right or wrong answer. The researcher is only interested in your own views. Try to answer every question as a blank answer cannot be used. Please only provide one answer, unless the question asks for clarification or reasons or factors etc. If you wish to change your answer, put a large cross through it and clearly write your preferred answer.

Please note that this interview is anonymous. You do not have to put your name on it and the people who see your answers won't know who you are. If you have any question(s) about this interview or this study please do not hesitate to contact me or my supervisor at the given address... Tel: +27332606040 email address: Sibandad@ukzn.ac.za

**Pseudonym:** \_\_\_\_\_

## NOTES TO SEMI-STRUCTURED INTERVIEW

The purpose of a learner's or participant's interview is to gain a deeper understanding of the learner's daily life and the learning situation.. The researcher will take his research journal with him and write down things which seem to be important.

There is potentially a lot of information to record; here are some notes to guide the researcher: For this section below.

### Semi -Structured Questionnaire

#### SECTION A - Biographical information

**Pseudonym:** \_\_\_\_\_

1.0 Are you

Male

Female

2.0 A) How old are you?

- i) Less than 6 years.....
- ii) 6 – 7 years old.....
- iii) 8 – 9 years old.....
- iv) 10 – 11 years old.....
- v) 12 – 13 years old.....
- vi) Above 13 years old.....

B) If the answer to question 2 above is vi), how old were you when you entered School?

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C) What are the reasons for your entry at this age?

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**SECTION B – LEARNERS’ EXPERIENCES ON WATER SCARCITY IN SCHOOL.**

1. Please can you tell me about your experience of water scarcity in your school?

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2. What are some of the challenges that face as a result of water scarcity in your school?

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3. How does the scarcity of water in your school impact on your overall learning experience?

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4. How does the scarcity of water in your school impact on your health?

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5. Do you feel water scarcity is a problem in your school?

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6. If so, how?

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---

7. If not, how?

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**SECTION C – INFLUENCE OF WATER SCARCITY ON LEARNERS’ WELLBEING.**

8. How do you feel when there is no water in your school?

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9. How are you affected when there is no water in your school?

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**SECTION D- HOW PRIMARY SCHOOL LEARNERS COPE WITH WATER SCARCITY.**

10. What do you do at school when there is no water?

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11. What is done by your school to alleviate the problem of water shortage in your school?

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12. What activities do you do at school when there is no water at school?

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## FIGURE 4. 2: PARTICIPANTS RESPONSES

**OBJECTIVE ONE: To explore learners' experiences of water scarcity in the school.**

### Question 1

#### 1. Can you tell me about your experiences of water scarcity in your school?

- Water is scarce and there is none sometimes
- Sometimes pressure in the tank is low and we have no drinking water – has to suck the tap
- Sometimes no water for days
- No school garden because of lack of water ,
- sometimes no food from school
- feeding scheme because of lack of water
- Very scarce
- Very scarce
- No vegetable garden in school because of lack of water
- Scarce
- No feeding scheme when there is no water
- Sometimes scarce
- Sometimes no water
- Intermittent resulting in no school garden
- No water
- Sometimes no water
- Intermittent
- Intermittent
- Long queues at drinking point
- Lack of concentration in class due to thirst
- No feeding scheme resulting in hunger
- Feels sick
- no eating
- Health affected
- Health ot good,
- no feeding scheme

- poor performance

## 2. Challenges faced as a result of water scarcity

- No water for handwashing
- No water for feeding scheme
- No water for feeding scheme
- Hunger as there is no feeding scheme
- No water for cooking
- No food
- No water for cleaning
- No drinking water resulting in health problems
- Long queue at drinking point
- No water for school garden
- No water taking medication

## 3. How water scarcity impacts on learning overall experience

- No learning without water
- Cannot learn properly when thirsty \* not able to learn
- Not able to learn
- Not perform well
- Difficult to learn in class
- not able to understand
- not able to concentrate
- not able to study
- not able to learn;
- not able to participate
- not learning
- not able to concentrate
- cannot learn well
- not able to learn well
- , not learning well
- not able to learn
- not able to lean
- not able to learn
- cannot learn properly when hungry
- not able to listen carefully when thirsty
- not able to learn well because I want to go home and have water
- with dirty hands from the toilet
- with dirty hands from the toilet \* no water for handwashing
- dirty hands from toilet
- not able to learn with my hands dirty after playing
- with dirty hands from the toilet
- coming from the pit toilet, not able to wash hands then not performing well
- No effect
- not feeling good get dehydrated,

## 4. How does scarcity of water in your school impact on your health

- Body becomes dry (dehydrated) and thin
- Dehydrated
- I fall sick
- Body does not feel good
- I fall sick
- Develop headache
- Become sick
- Fall sick,
- Become sick
- Our bodies get diseases
- not able to drink tablets
- Not able to take medication
- Learning in dirty classroom
- Mental fatigue
- Mental fatigue
- Slow down metabolism (hungry)
- Blood circulation is not good
- My blood circulation is not good
- Thickened blood might lead to death
- Blood circulation is not good
- Blood circulation is poor in the body
- Weak body due to water shortage
- My heart will have problems
- My heart has problems
- My urine is dirty
- My health deteriorate

5. Do you feel water scarcity is a problem in your school?

• Yes

• No

• Yes

• No

• Yes

6. Do you feel water scarcity is a problem in your school, if yes, how?

- Not able to drink the required amount of water per day
- Shortage of drinking water
- Shortage of drinking and we have to drink 8 glasses of water a day
- Shortage of water for taking medication
- and others do not get chance to drink
- We need water to survive
- We need water to survive
- Shortage of water for handwashing, drinking and watering the garden
- Shortage of water for cleaning classrooms
- Learning cannot go on without water
- Nothing can be done without water
- Our learning is disturbed
- Nothing can be done without water
- We need water otherwise our health is affected
- Water is life
- We need water for health reasons
- There is no feeding scheme
- Drinking point gets overcrowded
- Taps have reduced water pressure
- Shortage of drinking water points

7. If not. How?

- There is no water shortage
- We get water from the borehole
- There is no water shortage
- There is no water shortage
- There is now water shortage

**Objective two: to find out how water scarcity influences primary school learner's well-being.**

8. How do you feel when there is no water in the school?

- Not good
- Not good
- Not good
- Happy because school breaks early
- Feel lonely because school breaks early
- Stressed because others faint due to stomach cramps
- Scared and sick
- Lazy
- Not good
- Unhappy and weak
- Bad
- Bad
- Unhappy
- Bad
- Cannot concentrate on school work
- Bad
- Bad
- Bad
- Feel bad because water is life
- Stressed and thirsty
- Feel bad
- Worried and stressed
- Bad because I cannot play during break
- Bad because my performance in class is affected
- Not well
- I get headaches
- Unhappy because we are kept in school till late

9. How are you affected when there is no water in your school?

- Feel sick
- I feel irritated
- I get angry and suffer from headache
- Our school work is affected as we break off early
- Sad and angry, not good
- We break before time
- Angry
- Inconvenienced by lack of water for handwashing
- Worry about eating with dirty hands
- Worried
- Lack of drinking water and no feeding scheme
- Scared
- Worried by lack of water for handwashing and drinking
- Feel sick from not drinking
- Scared
- Unhappy because we cannot play since we have no drinking water
- No drinking water
- No drinking water
- My performance is affected
- I feel bad because I need to drink at least 2L daily
- Lack of water for handwashing before eating
- I feel sad
- I become thirsty
- I feel weak

**Objective three: to explore how primary school learners cope with water scarcity in the school.**

10. What do you do at school when there is no water?

- Fetch water from the river
- School breaks early
- Get water from neighboring homesteads

- Get water from neighboring homesteads
- Get water from nearby lidladla
- Drink dirty water
- Bring water from home
- Not come to school
- Fetch water from the river
- Bring water from home
- Ask for water from neighbouring homesteads
- Ask to go home
- Fetch water from the river
- Want to go home
- Fetch water from the river
- Collect rainwater
- Not come to school
- Get water from dam
- Fetch water from the river
- Get water from neighbors
- Bring water from home
- Bring water from home
- Ask to go home
- Fetch water from the river
- Want to go home
- Fetch water from the river
- Collect rainwater
- Not come to school
- Get water from dam
- Fetch water from the river
- Get water from neighbors
- Bring water from home
- Ask to go home
- Fetch water from the river
- Want to go home

- Fetch water from the river
- Collect rainwater
- Not come to school
- Get water from dam
- Fetch water from the river
- Get water from neighbors
- Bring water from home
- Bring water from home
- Bring water from home
- Fetch water from the river
- Get water from community borehole
- Go home
- Drink ice from the market
- Get water from home

11. What is done by your school to alleviate the problem of water shortage in your school?

- Break of early
- Nothing
- Buy water form SWSC
- bring water from the river in a tanker
- Bring water from the river in a tanker
- Teachers hold meeting to decide what to do
- School breaks off early
- School buys water from SWSC
- Tell us to bring water from home
- Send us home
- School breaks off early
- Buy water from SWSC
- They try to do something
- Boys are sent to the river to fetch water
- Send us home
- Tell us to bring money from home to buy water

- Hire cars to get water from the river
- Hire cars to get water from the river
- Try to do something
- Do nothing
- Buy water from a tanker
- Buy water from tanker
- Buy water from a tanker
- Send us home

12. How are your daily activities at school affected when there is no water?

- My performance is affected,
- no feeding scheme,
- Cannot play
- We cannot do HE
- No feeding scheme
- Cannot wash our hands after eating
- Cannot wash our hands after playing
- We cannot wash our hands after going to the toilet
- Cannot wash our hands or drink
- Cannot concentrate on my lessons
- Cannot play football
- I do not play because after playing I need to drink water
- I do not play because I lose energy
- Cannot learn properly
- Cannot play because I have to drink water after playing
- Cannot play football
- Cannot play because I have to drink water after playing
- Cannot play
- Cannot work the garden
- Cannot do our sports
- We don't do sporting activities
- We do not do agriculture

- We do not do agriculture
- No cooking
- We do not play because we get thirsty
- We do not play because we get thirsty
- We do not play because we get thirsty

The researcher categorized learner's responses according to the three objectives and came up with the following tables.

**OBJECTIVE ONE: To explore learners' experiences of water scarcity in the school.**

**Question 1. Can you tell me about your experiences of water scarcity in your school?**

**Tables 1: Learner's experiences of water scarcity**

<b>Responses</b>	<b>Total responses</b>	<b>Frequency</b>
<b>Water is scarce (WS)</b>	<b>14</b>	<b>53</b>
<b>Poor performance (Pp)</b>	<b>2</b>	<b>7</b>
<b>No feeding scheme (Fs)</b>	<b>6</b>	<b>22</b>
<b>Health is poor (H)</b>	<b>3</b>	<b>11</b>
<b>No school garden (Sg)</b>	<b>2</b>	<b>7</b>

**Question 2**

**Table 2 -Challenges from water scarcity**

<b>Responses</b>	<b>Total Responses</b>	<b>Frequency</b>
<b>No water for feeding scheme (Fs)</b>	<b>5</b>	<b>21</b>
<b>No water for drinking (Dw)</b>	<b>6</b>	<b>25</b>
<b>No water for school garden (Sg)</b>	<b>1</b>	<b>4</b>

Poor concentration due to thirst (Pc)	3	13
Affects health (H)	4	16
Pps have to provide own water (Wp)	2	8
Long queue (Lq)	1	4
No water for cleaning classrooms	1	4

### Question 3

**Table 3: Impact of water scarcity on overall learning experience**

Responses	Total Responses	Frequency
Not able to learn	22	92
No water for hand washing	6	25
No effected	1	4
Dehydration	3	13

### Question 4

**Table 4: Impact of water scarcity on learner's health in the school**

Responses	Total responses	Frequency
Get dehydrated	2	8
Fall sick	17	71
Leads to fatigue	2	8
Learning in dirty classrooms	1	4
Unable to take medication	2	8

**Question 5****Table 5 – Learners feelings on the scarcity of water in the school?**

<b>Responses</b>	<b>Total Responses</b>	<b>Frequency</b>
<b>Yes</b>	<b>22</b>	<b>92</b>
<b>No</b>	<b>2</b>	<b>8</b>

**Question 6: Do you feel water scarcity is a problem in your school? If yes, how?****Table 6- Feelings of learners on water scarcity as a problem in the school**

<b>Responses</b>	<b>Total Responses</b>	<b>Frequency</b>
<b>Health</b>	<b>8</b>	<b>33</b>
<b>Overcrowding at drinking points</b>	<b>3</b>	<b>13</b>
<b>Shortage of drinking water</b>	<b>8</b>	<b>33</b>
<b>Performance disturbed</b>	<b>4</b>	<b>16</b>
<b>No water for feeding scheme</b>	<b>1</b>	<b>4</b>
<b>No water for cleaning classrooms</b>	<b>1</b>	<b>4</b>

**Question 7: do you feel water scarcity is not a problem. If no, explain how?****Table 7 Learners having no problem with water scarcity**

<b>Responses</b>	<b>Total Responses</b>	<b>Frequency</b>
<b>No water shortage</b>	<b>4</b>	<b>16</b>
<b>Get water from borehole</b>	<b>1</b>	<b>4</b>

**OBJECTIVE TWO: To find out how water scarcity influences primary school learner's well-being.**

**Question 8: How do you feel when there is no water in your school?**

Table 8 Feeling of having no water in the school

Responses	Total Responses	Frequency
Bad	15	63
Unhappy and stressed	7	29
sick	2	8
Cannot concentrate on schoolwork	2	8
Happy because school has a short day	1	4
Lonely because school has short day	1	4

**Question 9: How are you affected when there is no water in the school?**

Table 9- Learner's effect of having no water in the school

Responses	Total Responses	Frequency
Sick	4	16
Bad	8	32
Scared	2	8
Break early	2	8
No water for hand washing	3	13
No drinking water	5	21
Performance affected	1	4

**OBJECTIVE 3: To explore how primary school learners cope with water scarcity in the school**

**Question 10: What do you do at school when there is no water?**

**Table 10- Things done by learners in the school when there is no water**

<b>Responses</b>	<b>Total responses</b>	<b>Frequency</b>
Fetch water from the river	<b>14</b>	<b>31</b>
School breaks early	<b>12</b>	<b>27</b>
Get water from neighbouring homesteads	<b>8</b>	<b>18</b>
Drink dirty water	<b>2</b>	<b>4</b>
Bring water from home	<b>9</b>	<b>20</b>

**Question 11: What is done by your school to alleviate the problem of water shortage in your school?**

**Table 11 Coping strategies done by the school to alleviate water shortage**

<b>Responses</b>	<b>Total Responses</b>	<b>Frequency</b>
Break of early	<b>6</b>	<b>25</b>
Buy water from SWSC	<b>3</b>	<b>13</b>
Bring water from the river in a tanker	<b>7</b>	<b>29</b>
They try to do something	<b>5</b>	<b>21</b>
Nothing	<b>2</b>	<b>8</b>
Tell us to bring water from home	<b>1</b>	<b>4</b>

**Question 12: How are your daily activities at school affected when there is no water?**

**Table 12 Daily activities affected by the absence of water**

<b>Responses</b>	<b>Total Responses</b>	<b>Frequency</b>
<b>Cannot play</b>	<b>13</b>	<b>48</b>
<b>Cannot do practical subjects</b>	<b>4</b>	<b>15</b>
<b>No feeding scheme</b>	<b>3</b>	<b>11</b>
<b>Cannot learn</b>	<b>3</b>	<b>11</b>
<b>Cannot wash our hands</b>	<b>4</b>	<b>15</b>

**FIGURE 3: THEMES AND CATEGORIES**

**THEMES AND CATEGORIES RESPONING TO OBJECTIVE 1 – Experiences of water scarcity**

**THEMES**

**CATEGORIES**

**1. WATER IS SCARCE**

- **No water for days**

**2. CHALLENGES FACED BY LEARNERS**

- **Intermittent supply**
- **Problem – low pressure**
- **Curricula issues –**  
*No water for garden, interference with consumer science, school breaks off early*
- **Health and hygiene -no water for taking medication, no water for hand washing, no feeding scheme, no water for cleaning, no water for drinking leading to dehydration, long queues at drinking points, headaches**

<b>3. IMPACT ON OVERALL LEARNING EXPERIENCE</b>	<ul style="list-style-type: none"> <li>• Educational issues –<i>poor concentration, reduced participation, poor performance</i></li> </ul> <p style="text-align: center;"><i>Nothing can be done without water – use in summary</i></p>
<b>THEMES AND CATEGORIES RESPONDING TO OBJECTIVE 2- How water scarcity influences primary school learners’ wellbeing.</b>	
<b>4. FEELINGS</b>	<ul style="list-style-type: none"> <li>• Bad – <i>unhappy. Not good, not well, lonely, disappointed</i></li> <li>• Happy</li> <li>• Physical responses – <i>lazy, weak, sick, scared, stressed, worried</i></li> </ul>
<b>5. HEALTH AND HYGIENE</b>	<ul style="list-style-type: none"> <li>• No water for drinking,</li> <li>• no feeding scheme,</li> <li>• no water for handwashing</li> </ul>
<b>6. ACADEMIC PERFORMANCE</b>	<ul style="list-style-type: none"> <li>• school work affected,</li> <li>• applied sciences affected-no water for agriculture</li> <li style="text-align: right;">-no water</li> <li>consumer science</li> <li>• School hours limited-school breaks early</li> </ul>
<b>7. Extra Curricula activities affected</b>	<ul style="list-style-type: none"> <li>• Extra-Curricular activities-cannot play,</li> </ul>
<b>THEMES AND CATEGORIES RESPONDING TO OBJECTIVE 3 “To explore how primary school learners cope with water scarcity in the school”</b>	
<b>8. PUPILS PROVIDE OWN WATER</b>	<ul style="list-style-type: none"> <li>• Water collection-fetch water from stream/river/dam, -from home, neighbours, from Lidladla, community</li> </ul>

	<b>borehole</b>
<b>9. Rainwater Harvesting</b>	<ul style="list-style-type: none"> <li>• <b>collect rainwater</b></li> </ul>
<b>10. purchase water from outside source</b>	<ul style="list-style-type: none"> <li>• <b>buy water from SWSC,</b></li> <li>• <b>buy water from tanker</b></li> </ul>
<b>11. use</b>	<ul style="list-style-type: none"> <li>• <b>Alternative ways-drink ice from market</b> <b>-drink dirty water</b></li> </ul>

## Appendix 5 - Ethical clearance



05 May 2016

Mr Nollen M Dlamini 214583336  
School of Education  
Edgewood Campus

Dear Mr Dlamini

Protocol reference number: HSS/0028/006M

Project title: Exploring the impact of water scarcity on the well-being of primary school learners in the Lubombo region of Swaziland

**Expedited Approval**

In response to your application dated 04 April 2016, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol have been granted **FULL APPROVAL**.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

Please note: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

Dr Shamila Madoo (Deputy Chair)

/ps

cc Supervisor: Dr Doras Sibanda

cc Academic Leader Research: Dr SB Khoto

cc School Administrator: Bongekile Bhengu-Mnguni, Philiswa Ncayiyane, Mbakhenkhe Ngcobo

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## INVESTIGATING THE INFLUENCE OF WATER SCARCITY ON THE WELL-BEING OF PRIMARY SCHOOL LEARNERS IN THE LUBOMBO REGION OF SWAZILAND

### ORIGINALITY REPORT

<b>% 10</b>	<b>% 9</b>	<b>% 2</b>	<b>% 4</b>
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

### PRIMARY SOURCES

<b>1</b>	<b>www.drgregthompson.com</b> Internet Source	<b>% 1</b>
<b>2</b>	<b>www.uaf.edu</b> Internet Source	<b>% 1</b>
<b>3</b>	<b>webcache.googleusercontent.com</b> Internet Source	<b>&lt;% 1</b>
<b>4</b>	<b>docplayer.net</b> Internet Source	<b>&lt;% 1</b>
<b>5</b>	<b>www.lancs.ac.uk</b> Internet Source	<b>&lt;% 1</b>
<b>6</b>	<b>www.lib.umd.edu</b> Internet Source	<b>&lt;% 1</b>
<b>7</b>	<b>uir.unisa.ac.za</b> Internet Source	<b>&lt;% 1</b>
<b>8</b>	<b>stud.epsilon.slu.se</b> Internet Source	<b>&lt;% 1</b>
<b>9</b>	<b>James Thomas. "Methods for the thematic synthesis of qualitative research in</b>	<b>&lt;% 1</b>