FACTORS AFFECTING THE IMPLEMENTATION OF WATER AND SANITATION PROJECTS IN PRIMARY SCHOOLS IN ZOMBA RURAL

MSc. (Infrastructure Development and Management) Thesis

By

Lemelani Davidson Sebastian Thawani

BSc. Technical Education-University of Malawi

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The Polytechnic

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DECLARATION

I**,** Lemelani Davidson Sebastian THAWANI**,** declare that this thesis is my own original work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

Signature ---------- **Date----------**

CERTIFICATE OF APPROVAL

The undersigned certify that this thesis represents the student's own work and effort and has been submitted with our approval.

Signature: _____Date:_____

Steven Taulo, PhD

Main supervisor

Signature: _____Date:_____

Aaron Mapondera, M. Ed

Second Supervisor (Co-Supervisor)

Signature: _____Date:_____

Burnet Mkandawire, PhD

Head of Department

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Above all I thank God for His Mercies and Love upon me. To Him be the glory and honour forever and ever.

DEDICATION

To all children who suffer innocently due to lack of safe water, sanitation and hygiene facilities and services in their schools across the globe.

ABSTRACT

The aim of the study was to explore the factors affecting the implementation of WASH projects in primary schools in Zomba Rural. The specific objectives of the study were to: critically analyse factors that enhance the implementation of water, sanitation and hygiene projects in primary schools in Zomba Rural; examine the challenges facing the implementation of water, sanitation and hygiene projects in primary schools in Zomba Rural and; propose the possible solutions for dealing with the challenges affecting the implementation of WASH projects in primary schools in Zomba Rural.

The study adopted an inductive approach since it involved theory development using interpretivism philosophy. Data collection was done using mixed methods, for instance qualitative and quantitative techniques were adopted. Focus group discussions were conducted to learners and school management committees while in-depth interviews and questionnaires were conducted to sanitation teachers and officials from implementing agencies, respectively.

The variables were subjected to principal component analysis with varimax rotation. The results revealed that the involvement of school management committees, child-friendly designs, commitment and support by leaders at different levels, and availability of strong development policies and implementation plans, were major contributing factors for the successful implementation of WASH projects in primary schools in Zomba Rural. The same study revealed that financial resource constraints, poor learners' hygiene practices, lack of operation and maintenance mechanisms and poor supervision of the latrines were major challenges facing the implementation of WASH projects.

It is thus recommended that the District Education Management Unit should include, in their budget, funds for the operation and maintenance of WASH facilities. In addition, implementers of WASH projects should provide trainings to learners in behaviour change intervention to curb the learners' poor sanitation and hygiene practices so as to sustain proper hygiene behaviours. Further research aimed at examining causal relationships between the identified factors and the success or failure of the WASH project is also recommended.

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LIST OF ACRONYMS AND ABBREVIATIONS

CLTS	Community-Led Total Sanitation
DCT	District Coordinating Team
DDP	District Development Plan
DDPS	District Development Planning System
DHO	District Health Office
DSIP	District Strategic Investment Plan
DWO	District Water Office
EFA	Education for All
GoM	Government of Malawi
HIF	Hygiene Improvement Framework
MDGs	Millennium Development Goals
MGDS	Malawi Growth and Development Strategy
MoEST	Ministry of Education, Science and Technology
NESP	National Education Sector Plan
NGO	Non Governmental Organisations
PCA	Principal Component Analysis
PHAST	Participatory Hygiene and Sanitation Transformation
PIF	Policy and Investment Framework
POU	Point of Use

SIPs	School Improvement Plans
SLTS	School Led Total Sanitation
SMC	School Management Committee
SPSS	Statistical Package for the Social Sciences
SWAP	Sector Wide Approach
TIMMS	Tikonze Mijigo Maintenance System
UN	United Nations
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VIP	Ventilated Improved Pit
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization
WSSCC	Water Supply and Sanitation Collaborative Council
WSSD	World Summit on Sustainable Development
WUA	Water Users' Association

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

Safe water and sanitation are fundamental components of sustainable development and poverty alleviation (United Nations, 2002; Osumanu, Abdul-Rahim, Songsore, Braimah & Mulenga, 2010). Several Water, Sanitation and Hygiene (WASH) projects, therefore, have been carried out in many countries over the years. However, the implementation of WASH projects remains a challenge to both public and private sectors (Filho & Abreu, 2007; Foster & Shkaratan, 2011).

WASH projects may be months or years behind schedule, over or under budgeted, of poor quality and inadequate quantity, or simply fail to satisfy users' requirements adequately (Kleemeier, 2000; African Minister's Council on Water, 2006). In the education sector, it is reported that in schools where WASH projects are implemented, some of the facilities are of poor quality (DeGabriele, 2009) resulting in high levels of water and sanitation- related diseases (Montgomery & Elimelech, 2007; DeGabriele, 2009; Ejemot-Nwadiaro, Ehiri, Meremikwu & Critchley, 2012).

The prevalence of illnesses related to water and sanitation is a serious public heath problem (El-Fadel, Maroun, Semerjian & Harajli, 2003; Mara et al., 2007; Ejemot-Nwadiaro et al., 2012). Children are the most vulnerable to diseases and other health hazards due to poor water and sanitation (Fewtrell et al., 2005; Steinmann, Keiser, Bos, Tanner & Utzinger, 2006; United Nations Children's Fund (UNICEF), 2009).

1.2 The Research Problem

Despite implementing WASH facilities in 85% of primary schools in Zomba Rural, most of these facilities are in unhygienic state (the existing condition of most of the WASH facilities is poor) and some of the water points are non-functional. Providing WASH facilities in 85% of the schools is quite a huge investment and having some of the facilities not usable and in unsanitary condition is a waste of resources.

A study conducted by Ministry of Education, Science and Technology (MoEST) in 2009 revealed that 75% of the schools lack proper hygiene practices, 23% of the available water is of poor quality, and the latrines for both boys and girls are inadequate resulting in congestion among users. DeGabriele (2009) conducted a study on sanitation sector status and gap analysis in Malawi and found similar results to MoEST (2009). There are no hand-washing facilities with soap in 99% of the schools. Studies have shown that only hand-washing facilities with soap offer proper hygiene (Fewtrell & Colford, 2004; Waterkeyn & Cairncross, 2005; Ejemot-Nwadiaro, et al., 2012). Pillitteri (2012) established comparable results although the study was on menstrual hygiene management in secondary schools which revealed that many schools in Malawi experienced unsanitary conditions that vary from inappropriate to inadequate menstrual hygiene facilities coupled with lack of privacy.

In schools where water and sanitation facilities are few or unclean or do not provide proper privacy and safety, some pupils decide to drop out of school especially adolescent girls who are menstruating (Water Supply and Sanitation Collaborative Council (WSSCC) & World Health Organisation (WHO), 2005; Rukunga & Mutethia, 2006; Nahar & Ahmed, 2006; MoEST, 2009; WHO, 2012) because such girls feel unsafe and insecure (Mannathoko, 2008). Despite the availability of the above data little information is available about the factors affecting the implementation of water and sanitation projects in primary schools in Zomba Rural.

1.3 Research Objectives

This section outlines the main and specific objectives of the study in order to address the research problem.

1.3.1 Main Objective

The aim of the study was to explore the factors contributing towards the implementation of WASH projects in primary schools in Zomba Rural.

1.3.2 Specific Objectives

In order to achieve the aim, the following specific objectives were pursued:

1. To critically analyse factors that enhance the implementation of water, sanitation and hygiene projects in primary schools in Zomba Rural.

2. To examine the challenges facing the implementation of water, sanitation and hygiene projects in primary schools in Zomba Rural.

3. To propose the possible solutions for dealing with the challenges affecting the implementation of water, sanitation and hygiene projects in primary schools in Zomba Rural.

1.4 Research Questions

The overall research question for this study was: what are the factors that have worked for or against the implementation of water, sanitation and hygiene projects in primary schools in Zomba Rural?

This research project sought to answer the following sub-questions:

1. What are the factors for successful implementation of water, sanitation and hygiene projects in primary schools in Zomba Rural?

2. What are the challenges facing the implementation of water, sanitation and hygiene projects in primary schools in Zomba Rural?

3. What could be the possible solutions for dealing with the challenges affecting the implementation of water, sanitation and hygiene projects in primary schools in Zomba Rural?

1.5 Rationale for the Study

Successful implementation of WASH projects in schools enhances effective learning by reducing absenteeism and dropout rates due to ill health and unhygienic conditions (Gutierrez, 2006; Manda, 2009). Studies have shown that properly implemented school WASH projects reduce infections related to water and sanitation (WSSCC & WHO, 2005; Rukunga & Mutethia, 2006; Mara et al., 2007) among pupils and staff. Pupils become agents of change for improving water, sanitation and hygiene practices in their families and communities at large.

On the other hand, successfully implemented WASH projects reduce gender inequality in education (Gutierrez, 2006; UNICEF, 2009; World Bank, 2010) as more girls are attracted and retained in schools that are girl-friendly (Mannathoko, 2008; UNICEF, 2009). Girl-friendly WASH facilities provide security, privacy and dignity of the girls.

These benefits would help raise education standards (Zomba District Council, 2010; Göttelmann-Duret & Bahr, 2012) and consequently enhance equitable access to education (Yates, 2008; UNICEF, 2009; World Bank, 2010; Göttelmann-Duret & Bahr, 2012) which is one of the three strategic priorities of education goals in Malawi (Government of Malawi (GoM), 2008b). This in turn promotes the fulfilment of the Malawi Growth and Development Strategy (MGDS) which seeks to increase enrolment to 95% (GoM, 2006), and international protocols arising from Education for All (EFA) and United Nations (UN) Millennium Development Goals (MDGs) that seek to achieve universal primary education (GoM, 2005; Göttelmann-Duret & Bahr, 2012) and, the MDGs and World Summit on Sustainable Development (WSSD) targets that seek to halve the proportion of people without sustainable access to safe drinking water and basic sanitation by 2015 (United Nations, 2002; WSSCC & WHO, 2005; WHO/UNICEF, 2010; WHO, 2012).

Investing in school WASH projects is one of the means of achieving education goals both at national and international level. However, for the case of Zomba Rural primary schools providing WASH facilities in 85% of the schools is quite a huge investment and having some of the facilities not usable and in unsanitary condition is a waste of resources. It was plausible to find out the reasons and inform similar projects in future. The findings of the study will not only inform implementers of WASH in primary schools but also equip the Ministry of Education, Science and Technology, policymakers and project participants with indispensable tools and provide invaluable guidance. These tools will give implementers chances to replicate success stories on future projects and take appropriate measures and interventions to address the challenges so as to enhance effective WASH implementation.

1.6 Thesis Outline

The thesis has seven chapters. Chapter one is introduction. It presents the background of the study, the research problem, objectives and rationale of the study. Chapter two reviews the existing literature on the concepts of water, sanitation and hygiene; successful implementation of water, sanitation and hygiene projects; and the theoretical framework that has informed the study. Chapter three presents the methodology. It discusses the study area, research approaches, research strategies, data collection methods, data analysis techniques and limitations. In chapter four are the results of the findings of the study. The chapter contains an analysis of the data collected. Chapter five is the discussion and interpretations of the findings. Chapter six presents the conclusions drawn from the results of the study. Chapter seven provides recommendations for practice and areas further research on the topic.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature on the implementation of water, sanitation and hygiene projects in communities with an emphasis on institutions such as kindergarten (nursery), primary and secondary schools. The concepts that have been explored in this literature review are presented in the conceptual framework. Key concepts have been described. The factors that worked for or against certain water and sanitation projects have been critically reviewed to learn how they affected those projects. The strengths and weaknesses in methodologies in different studies have been discussed. The chapter ends with the general conclusion.

2.2 Attributes of Successfully Implemented WASH Projects

It is argued that the provision of all the necessary WASH facilities, products and services would lead to a successful project on the supply side. Literature indicates that necessary products and services in water, sanitation and hygiene include access to: improved latrines (Montgomery & Elimelech, 2007; Mara et al., 2007), improved water supply sources such as boreholes, protected shallow wells, taps and rainwater collection (WHO & UNICEF, 2010), effective water treatment (WSSCC & WHO, 2005; Clasen, Schmidt, Rabie, Roberts & Cairncross, 2007; WHO; 2012), safe storage containers (Graham & VanDerslice, 2007), soap or a substitute for hand-washing (Au et al., 2010; Ejemot-Nwadiaro et al., 2012), appropriate materials for anal cleansing (World Bank, 2005), and locally available resources such as local materials and artisans who make concrete slabs of sanitation platforms (Edmonds & Johannessen, 2003; Mara et al., 2007).

The accessibility and affordability of water, sanitation and hygiene facilities require that users decide the technologies that are simple, durable, low-cost (Edmonds & Johannessen, 2003; Waterkeyn & Cairncross, 2005), environmental- and child (user) - friendly (Montgomery & Elimelech, 2007; UNICEF, 2009; Pillitteri, 2012). In addition, knowledge of children's existing habits for anal cleansing is essential in deciding the type of facilities to be constructed in schools (World Bank, 2005).

Mara (2003) asserts that such facilities should be '*socioculturally acceptable'* (p.454) but, should not compromise quality. Edmonds and Johannessen (2003) stresses that in terms of technology choice; experience has shown that effective implementation of rural infrastructure depends on locally available resources.

However, these locally available resources should not be harmful to the environment. Environmental-friendly facilities are an integral part of the design, implementation, operation and maintenance of water, sanitation and hygiene programmes (GoM, 2008a; Luiz, 2010).

Not only must school WASH facilities be environmental-friendly but also child-friendly. Gbadegesin and Olorunfemi (2011) in their study on sustainable water resources management emphasized that knowledge and understanding of environmental (ecological) aspects is essential for the implementation of sustainable, cost-effective and environmental-friendly options. This knowledge should be acquired by all stakeholders in order to improve understanding of key implementation strategies (Edmonds & Johannessen, 2003). World Bank (2005) stressed that this kind of knowledge should be translated into appropriate skills and attitudes towards successful implementation of WASH projects. The study by Gbadegesin and Olorunfemi (2011) has shown to be robust and useful in its methodology. Its inclusion of focus group discussions, in-depth interviews, structured and semi-structured questionnaires increased the depth of understanding and provided mutual verification of measures and justification of its findings. However, it does not consider the knowledge of stakeholders about environmental basics of sanitation and hygiene.

World Bank argues that the basic principles that underlie successful school WASH projects are similar to sustainable water and sanitation projects in communities but differ in that the main users of school projects are learners. Therefore, WASH projects in schools should call for child-friendly designed facilities and life-skills based hygiene education to promote good practices among learners. Accessibility of child-friendly facilities and services fosters inclusive education. Inclusive education brings together vulnerable children such as adolescent girls and children with disabilities who are often excluded in most school settings.

Literature states that the concept of child-friendly facilities involves the provision of privacy (in terms of using toilets and urinals), security, gender related and special needs to children, appropriate location, appropriate dimensions and adjustments of the facilities, (WSSCC & WHO, 2005; MoEST, 2009; UNICEF, 2009) and appropriate materials for anal cleansing (World Bank, 2005).

The status of child-friendly facilities is not clear in the Malawi School WASH Report by MoEST (2009) although it presents a comprehensive analysis of the situation of WASH in primary schools. The report has provided data on access to hand-washing facilities, drinking water quality, and improved sanitation facilities but it has disregarded data on child-friendly facilities. Furthermore, the report has failed to establish the quality of drinking water based on biological, chemical and physical aspects. However, the study had only focused on the biological characteristics neglecting the physical and chemical aspects. Water that is biologically safe may not be good to drink if it has physical and chemical contaminants (Mara, 2004). On the other hand, even in the biological test conducted, it was only the presence of bacteria that were detected overlooking other pathogens that can contaminate water such as viruses and protozoa (Mara, 2004; Yabanci & Sanlier, 2007; Montgomery & Elimelech, 2007). Therefore a complete assessment of all the three characteristics would have been necessary in this study to establish a whole picture of the quality of drinking water.

In addition, the study used self-reporting data which in some instances may not be a valid measure (Yabanci & Sanlier, 2007; Gould, Moralejo, Drey & Chudleigh, 2011) due to respondents' bias. Conducting a research that combines data collection techniques would have been necessary to yield more complete evidence-based findings. The combination of these techniques strengthens the findings.

WSSCC & WHO, 2005 stresses the need to combine access to hardware for WASH and enabling environment to complement each other for successes in WASH projects. Enabling environment refers to any conditions that need to be put in place to facilitate the successful occurrence of something. The elements of enabling environment are policy consensus, legislation (laws), institutional strengthening, inter-sectoral cooperation, political commitment, capacity building,

financing, and public-private partnerships (Mukheli et al., 2002; Montgomery & Elimelech, 2007; Terefe & Welle, 2008; GoM, 2008a; Shafqat, 2011; WHO, 2012).

Manda (2009) and Kotwicki and Al-Otaibi (2011) stated that policy guidelines and legal instruments influence the delivery of water and sanitation services. WHO (2012) stresses that specific water and sanitation policies and legal frameworks initiate effective and efficient implementation of water, sanitation and hygiene programmes. World Bank (2005), and WSSCC and WHO (2005) state that these enabling environments are the cornerstone for successful water, sanitation and hygiene projects. Actors in WASH projects have a mandate to adopt national and regional policies in order to plan and deliver services effectively and efficiently (WHO, 2012). Policies do guide actors since they contain established objectives, defined roles, responsibilities and expectations.

Institutional capacity with clearly defined roles and responsibilities of key actors with shared vision has proven to be one of the fundamentals of successful implementation of water supply and sanitation (Banik & Bhaumik, 2006; Harvey & Reed, 2007; Water and Sanitation Program, 2007; Obeng, Donkor & Mensah, 2009) and other infrastructure development initiatives (Edmonds & Johannessen, 2003; Luiz, 2010). Manda (2009) and DeGabriele (2009) indicate that the institutions responsible for water supply and sanitation in Malawi are the Ministry of Irrigation and Water Development, Water Boards, and City and District Assemblies; and the Ministry of Health is responsible for sanitation and hygiene. Civil society and international donors set up and fund their own water supply and sanitation projects (Manda, 2009). These institutions work towards the fulfilment of the Vision for Water and Sanitation Sector in Malawi which is '*Water and Sanitation for All, Always'* (GoM, 2007, 2008a). However, in the Malawian context the level of involvement of these institutions especially non-state actors (NGOs) is not detailed. A study conducted by Gutierrez (2006) found some duplication of efforts in WASH activities. Similar projects by different non-state actors were found to be implemented in the same area leading to lack of equity in their distribution.

Another concept of enabling environment is cross-sector linkages. Cross-sector linkage in terms of school WASH refers to the collaboration that exists between the education and other sectors

like health, environment, and water and sanitation. The emphasis, in this regard, is on how these sectors work together to achieve shared goals in water, sanitation and hygiene. Studies indicate that sector coordination is indispensable for the scaling-up of improvements in WASH projects (Gutierrez, 2006; Montgomery & Elimelech, 2007; Osumanu et al., 2010; WHO, 2012).

WHO (2012) indicated that political will is one of the key enabling environment to register successes in water, sanitation and hygiene implementation. World Bank (2005) support the concept of political commitment in school WASH projects and suggested that political commitment should be built on advocacy campaigns to put school water, sanitation and hygiene on political agenda.

Another premise of enabling environment for successful implementation of WASH projects is local capacity building of key stakeholders (Edmonds & Johannessen, 2003; Khan et al, 2008). It is argued that one way of enhancing capacity building for improved service delivery is to provide training (Nahar & Ahmed, 2006; Öman, Klutse´, Rabbani & Edward, 2010) to key stakeholders before, during and after the construction of the water, sanitation and hygiene facilities (World Bank, 2005). Edmonds and Johannessen (2003) state that training for new technology as well as specific skills is an effective measure of quality assurance. A study in Malawi and Zambia demonstrates that capacity building is one of the effective tools for delivering pro-poor water and sanitation services (Gutierrez, 2006).

The evidence from the literature suggests that establishment of public-private partnerships (PPP) can better manage delivery of water and sanitation services that meet users' demand (Obeng et al., 2009; Gbadegesin & Olorunfemi, 2011; Shafqat, 2011). Public-private partnership is defined as a public and private interaction to deliver a service. Brans (2010) states that public-private partnerships are agreements between public institutions and private sector aimed at operating public infrastructures or delivering public services. Groups that can play a role in PPP could be the government, the formal and informal private sectors; communities; and NGOs or community-based organizations (El-Fadel et al., 2003; WSSCC & WHO, 2005). Harvey and Reed (2007) while agreeing that PPPs may provide better service delivery argue that this may

not be a viable option in some cases. In order to study PPPs for education in Uganda Brans (2010) used critical discourse analysis technique in analysing document reviews, interviews and observations.

Andre´ et al. (as cited in Enserink & Koppenjan, 2007) refer to concept of participation as the involvement in a decision-making process, of individuals and groups that are either positively or negatively affected by a planned intervention such as a project or a program. Studies have indicated that involvement of all stakeholders (men, women and youth) in a participatory approach is significant for the successful implementation of water, sanitation and hygiene (Lansdown, Issae, Katala & Mwaisumo, 2005; Gabhainn et al., 2007; Hansen & Mäenpää, 2008).

World Bank (2005) argues that the involvement of all stakeholders is very important because it results in better service options and increased acceptance of such options. Stakeholder involvement increases the efficiency and effectiveness of projects (Fischer, 2010) and increases sense of ownership and responsibility (Mukheli et al., 2002; WHO, 2012). Although the research by Hansen & Mäenpää (2008) focused on the public participation in the river basin management, the findings are useful and the study can be replicated in any water, sanitation and hygiene development. Most studies recommend that stakeholder participation should be included in all stages of the water, sanitation and hygiene programmes (Kleemeier, 2000; Mara, 2003; Harvey & Reed, 2007; Osumanu et al., 2010; Shafqat, 2011).

2.3 Challenges Facing the Implementation of WASH Projects

Most WASH projects have been constrained by insufficient resource allocations and inefficient investments due to limited funds (Kalulu & Hoko, 2010; Osumanu et al., 2010; Gbadegesin & Olorunfemi, 2011). It is argued that more funding is needed to improve on delivery of water supply and sanitation services (Gutierrez, 2006; Montgomery & Elimelech, 2007; Shrestha & Wicken, 2008; Foster & Shkaratan, 2011). WSSCC and WHO (2005) underscores the establishment of financial policies to ensure that operation and maintenance of WASH projects can be sustainable.

Osumanu et al. (2010) indicate that adequate financing is critical for sustainable water and sanitation development. The study conducted by Pillitteri (2012) to assess the menstrual hygiene management of secondary school girls in Malawi indicates that sanitation and hygiene facilities are poorly maintained or to some extent there is no maintenance at all. This is due to lack of maintenance plan, insufficient financial resources and lack of ownership and sense of responsibility on the part of users (El-Fadel et al., 2003; Gbadegesin & Olorunfemi, 2011; Pillitteri, 2012). When users have no sense of responsibility operation and maintenance is hampered resulting into poor hygiene.

Poor hygiene negates hygiene promotion. WSSCC and WHO (2005) and World Bank (2005) defined hygiene promotion as a planned approach to prevent incidences of poor hygiene. Poor hygiene can be prevented through the adoption of safe hygiene practices such as proper disposal of excreta (faeces and urine), hand-washing with soap, safe handling and storage of drinking water (Howard & Bartram, 2003; Waterkeyn & Cairncross, 2005; DeGabriele, 2009; Au et al., 2010). Other studies have included menstrual hygiene management in school WASH programmes because of its impacts on adolescent girls' education (Mannathoko, 2008; UNICEF, 2009; Pillitteri, 2012; WHO, 2012).

For a school WASH project whose main users are learners, hygiene promotion should harness life skills-based education. World Bank (2005) emphasises that life skills-based hygiene education has to focus on the development of knowledge, skills and attitudes. The knowledge gained must be translated into appropriate skills and attitudes towards safe hygiene behaviours such as hand-washing with soap and safe disposal of human excreta.

Whilst numerous studies have been undertaken to investigate excreta disposal (Fewtrell et al., 2005; Ejemot-Nwadiaro et al., 2012) there is scanty information about anal cleansing. Unsanitary anal cleansing can lead to irritation of the surrounding skin, cystitis (mainly for girls and women), and embarrassment because of bad odour, and it is the main source of risk for transmission of infections among school children (World Bank, 2005).

Notwithstanding the importance of anal cleansing, its discussion is often ignored in many societies, perhaps because of different cultural perceptions. For example, Traore et al. (as cited in Ejemot-Nwadiaro et al., 2012) indicated that some cultures regard children's faeces as harmless. This misconception might result into planners and implementers ignoring the subject of anal cleansing in water, sanitation and hygiene projects.

The study by MoEST (2009) has taken no account of menstrual hygiene and anal cleansing in Malawi's primary schools. Menstrual hygiene is very crucial in adolescent girls because studies have shown that most girls miss classes, absent themselves from school or drop out of school completely due to lack of menstrual hygiene management (WSSCC & WHO, 2005, Nahar & Ahmed, 2006; UNICEF, 2009; Pillitteri, 2012; WHO, 2012). Adolescent school girls might be worried and humiliated due to poor menstrual hygiene management since they lack privacy and dignity (Pillitteri, 2012; WHO, 2012). There is need for a robust research that includes menstrual hygiene management and anal cleansing as integral parts of school water, sanitation and hygiene in Malawi. Access to menstrual hygiene management services is vital for the health and education of adolescent girls.

Mukheli et al. (2002), Montgomery and Elimelech (2007) and Osumanu et al. (2010) found that poor access to increased water supply and sanitation is also attributed to lack of political will. Political will is defined as the commitment of actors to undertake actions to achieve a set of objectives. Brinkerhoff (2000) argues that this commitment is manifested by appointed or elected leaders and public institutions senior officials. Studies have shown that political will to projects such as water, hygiene and sanitation creates an environment conducive to implementing, operating and maintaining such projects (World Bank, 2005). Since political will exhibits a latent quality measuring it can be done indirectly by identifying a set of indicators displayed by leaders in support of a course (Brinkerhoff, 2000). World Bank (2005) stresses the need for advocacy and information sharing as tools to build political will for improved WASH projects.

In order to create demand for WASH improvement several strategies are adopted, for example, social mobilisation, community participation, social marketing, communication and advocacy.

Social mobilization is defined as a process of raising awareness of a particular development by bringing together all feasible social partners to identify needs and demand for such a development (World Bank, 2005). Waterkeyn and Cairncross (2005) and Waterkeyn (2006) show that community health clubs are effective tools for community mobilisation in demand for sanitation and hygiene behaviour change. Other studies support the use of generic tools for community level intervention for WASH such as participatory hygiene and sanitation transformation (PHAST), community-led total sanitation (CLTS), and health clubs (Sidibe & Curtis, 2002; WSSCC & WHO, 2005; WHO, 2012) and specific social tools like schools-led total sanitation (Khan et al., 2008).

Social marketing as a strategy for hygiene promotion uses marketing techniques to create end user demand for water, sanitation and hygiene facilities and services (World Bank, 2005). In a study to assess the short and long-term successful strategies to improve hand hygiene compliance, Gould et al. (2011) revealed that social marketing campaigns are more effective than those without elements of social marketing. Two studies in Pakistan and India found that successful sanitation projects involved social marketing strategies (WSSCC & WHO, 2005).

The viewpoint of communication in the context of hygiene promotion refers to a process of designing and conveying appropriate hygiene messages to target audience using effective communication channels (World Bank, 2005; Terefe & Welle, 2008). Hygiene promotion using a two-way communication (interactive and dialogue-based) approach has demonstrated to be successful (Sidibe & Curtis, 2002; WSSCC & WHO, 2005).

Advocacy is defined as an action of presenting an argument in order to gain acceptance and commitments for a development programme from political and social leaders and educate a society so that they are prepared to accept the programme (World Bank, 2005; WSSCC & WHO, 2005; Terefe & Welle, 2008). Advocacy methods include the following common tools like meetings, lobbying, leaflets and posters, drama and mass media (World Bank, 2005; Ishii, Hossain & Rees, 2007).

Literature suggests that stakeholders in the advocacy process include those who use the projects, those who are indirectly affected by them, those who implement them, and those who pay for them (Enserink & Koppenjan, 2007).

Practitioners who advocate for successful and sustainable WASH projects recommend the use of hygiene improvement framework model for improved hygiene (WSSCC & WHO, 2005).

2.4 Hygiene Improvement Framework

The Hygiene Improvement Framework (HIF) was originally a strategy for the prevention of childhood diarrhoea. Its focus was on health benefits through improved hygiene. The idea was that when beneficiaries use and maintain WASH facilities as intended their hygiene and health status would improve. Later it was further adapted by UNICEF and Water and Sanitation Program (WSP) of World Bank to become a holistic approach for all aspects of WASH programmes (Amhara National Regional State Health Bureau, 2008). An illustration of the conceptual model for Hygiene Improvement Framework is shown in Figure 1 below.

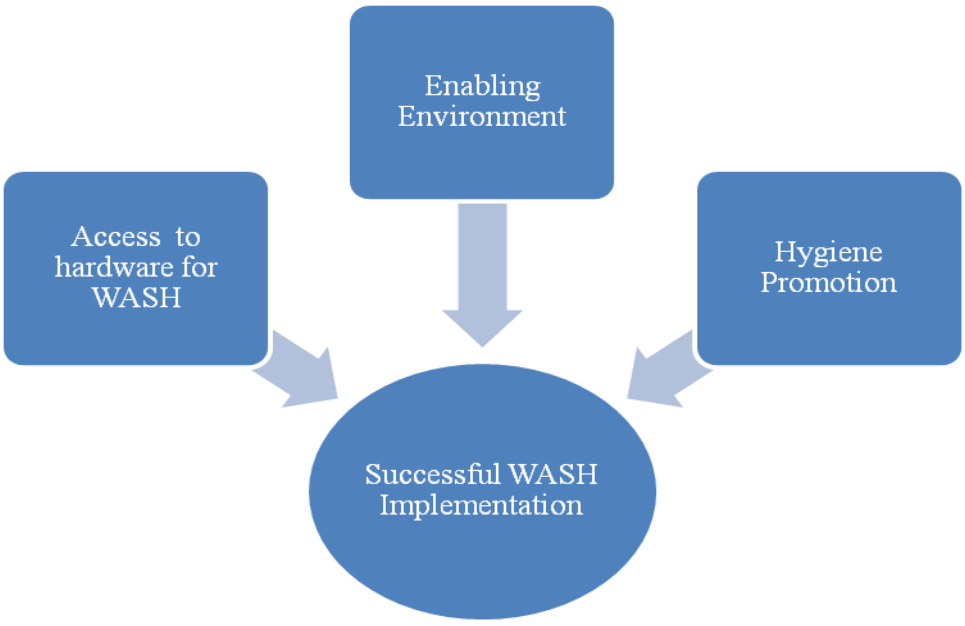

Figure 1: The Hygiene Improvement Framework (Adapted from: WSCC & WHO, 2005)

2.5 Conceptual framework

The conceptual framework for successful implementation of WASH projects is based on the following assertions:

- Access to hardware for WASH, hygiene promotion and enabling environment will jointly lead to successful WASH project implementation.
- The main users of school WASH facilities are children. Therefore child-friendly designs and life skills-based hygiene education should be integral components of a holistic school WASH project.

The conceptual model in Figure 1 above shows that there are two major features of WASH implementation namely: the hardware part with access to hardware for WASH; and the software part with enabling environment and hygiene promotion.

Hardware inputs include site location, physical implementation of water points and latrines, safe water containers (water storage facilities), anal cleansing materials, hand-washing facilities and soap for hand-washing (WSSCC & WHO, 2005; Graham & VanDerslice, 2007; Au, Suen, & Kwok, 2010; Ejemot-Nwadiaro et al., 2012). These hardware inputs are referred to as supply side of WASH projects. Access to this supply side would contribute to successful WASH implementation.

On the other hand software inputs relate to the management and organisation of WASH activities through several aspects of enabling environment and hygiene promotion such as policies and regulatory frameworks, coordination and collaboration, social mobilization, participation of key stakeholders, capacity building (Slaymaker & Newborne, 2004; World Bank, 2005; Ministry of Water and Environment, 2007; Osumanu et al., 2010).

The appropriate integration of hardware and software activities facilitates the effective implementation of water and sanitation investments (Slaymaker & Newborne, 2004; WSSCC & WHO, 2005; Terefe & Welle, 2008). It is argued that the construction and continued access to WASH facilities (hardware) is not enough to achieve improved hygiene unless coupled with

good hygiene practices (software) (Khan, Syed, Riaz, Casella and Kinyanjui, 2008). Improved hygiene is one of the characteristics of successfully implemented WASH projects. Other characteristics include sustainability of the facilities and the fulfilment of users' requirements in terms of usage, quality and quantity (WSSCC and WHO, 2005; World Bank, 2005; House, Mahon & Cavill, 2012).

2.6 Conclusion

Improved access to hardware for WASH, enabling environment, and hygiene promotion are the three building blocks for successful implementation of WASH projects as presented in the Hygiene Improvement Framework (HIF). Most studies in the literature review have supported the HIF by demonstrating that the three features should occur simultaneously if the projects are to be successful. Rukunga and Mutethia (2006) argued that the mere provision of facilities alone does not lead to a successful project but also the use of the facilities and change in hygiene behaviours. This affirms the importance of the synergy between hardware (facilities) and software aspects of WASH projects.

It is revealed that some of the successful approaches to water, sanitation and hygiene projects may not be successful in other settings (Edmonds & Johannessen, 2003; Osumanu et al., 2010). Through this literature review it has also been established that there is inadequate information about menstrual hygiene and anal cleansing in primary schools in Malawi. Therefore, further research is required in exploring factors affecting water and sanitation projects in primary schools -that include menstrual hygiene management and anal cleansing as integral parts of school water, sanitation and hygiene.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Introduction

Chapter three discusses the study methodology, the research design and the study area. It describes the type of data collection tools, the study sample and the study procedure- indicating the means by which data was collected, processed and analysed. In addition ethical considerations have been discussed.

3.2 Research Design

This survey used mixed method approach which is a research methodology that combines qualitative and quantitative techniques in collecting and analysing data within a single study (Creswell, 2009). This approach is useful because it strengthens the findings and inferences made for understanding social phenomena in more depth than using a single method (Jogulu & Pansiri, 2011) and provides a high level of representativeness (Fowler, 2001). Berg (2001) underscores that researchers using this multiple-methods approach called triangulation can "*obtain a better, more substantive picture of reality; a richer, more complete array of symbols and theoretical concepts; and a means of verifying many of these elements."(*p.4)

3.3 Study Area

The area under study included seventeen zones of Zomba Rural educational district. The zones are as follows: Chikala, Chikomwe, Chilipa, Chimwalira, Chingale, Mchengawedi, Namadidi, Namatapa, Namiwawa, Nsondole, Ntonda, Ntungulutsi, Songani, St Anthony, St Martins, St Michaels and St Pauls.

Zomba Rural District (Figure 2) was chosen because of several reasons. Firstly, it is one of the districts with diverse soil structure and terrain. Secondly, Zomba Rural has huge investments in rural water supply and sanitation in the district but it is facing problems in the implemented projects. For example, some of the water points are no longer in use and the constructed latrines are unhygienic. It is rational to find out why and inform similar projects in future.

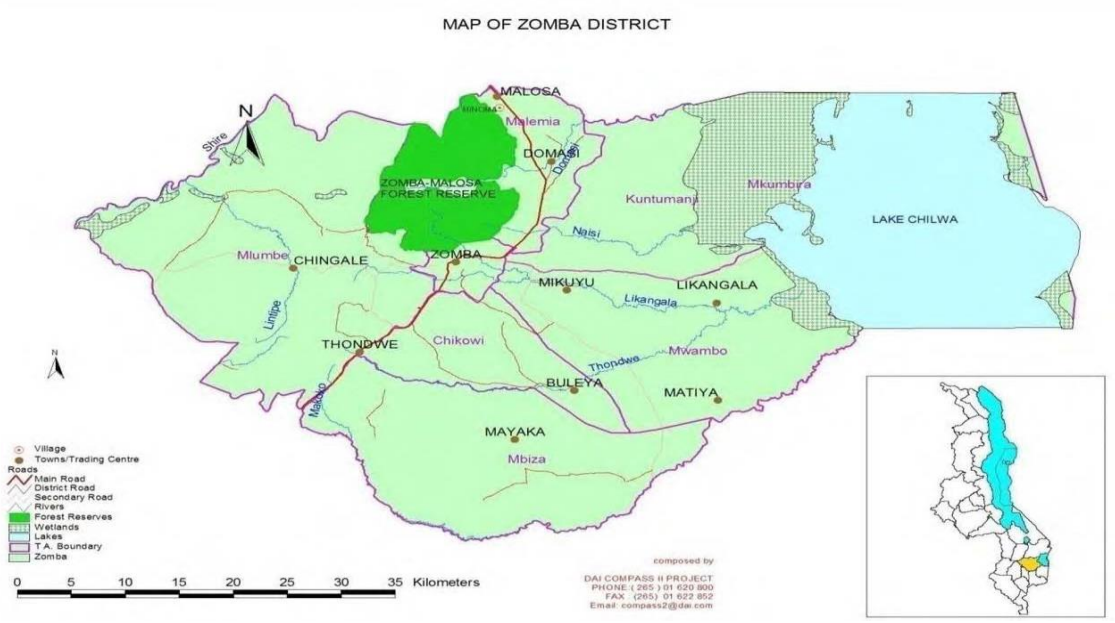

Figure 2: Map of study area- Zomba District (Source: Zomba District Council, 2010)

3.4 Study population and sampling

In order to gather the necessary data, the researcher sought knowledge, views and experiences of key stakeholders of the school water, sanitation and hygiene projects. Key stakeholders in this case refer to actors who were considered to have significant influence on the school WASH projects. In order to come up with a sample of participants, two sampling techniques were adopted. Both purposive and random sampling techniques were used.

Purposive sampling technique was appropriate in the study because it examined the key stakeholders of WASH projects which were initiated in primary schools only; in spite of those that were initiated in other communities. In so doing it eliminated participants who may not have provided useful information related to WASH in primary schools in Zomba Rural.

The implementing agencies of school WASH projects in Zomba Rural at the time of this research work were thirteen in total. These implementers were the district council, the district water office, UNICEF, Save the Children, Inter-Aide, World Vision Malawi, Red Cross, Emmanuel International, Gopa, Zamu-zamu, the district health office, Catholic Health Commission and Millennium Villages Projects. A total of seven out of thirteen officials from

these implementing agencies were randomly selected. Names of each of the thirteen implementing agencies were written on a piece of paper and put in a container. A paper was picked without replacing until seven papers were picked representing seven participants from implementing agencies. The seven participants were drawn from the district council, the district water office, the district health office, Save the Children, Inter-Aide, World Vision Malawi, and Millennium Villages Projects.

A simple random sampling approach was also used to select ten zones from a total number of seventeen. Each of the seventeen zones had a name written on a piece of paper and put in a black plastic bag. A paper was picked without replacing until ten papers were picked. The schools that had implemented WASH projects were the ones chosen in these zones. It was appropriate to investigate from the schools that had implemented WASH projects in order to find out the success stories, and unearth the bottlenecks in the implementation of these projects.

Each of the ten zones selected gave out two schools making a total sample of twenty schools. The schools were selected mechanically. All names of schools from each zone were written on strips of paper and put in a bag. With eyes closed two strips of paper were picked one at a time. These sampled schools gave out a total of twenty sanitation teachers who participated in the interviews and twenty head teachers who filled in the questionnaire. In primary schools, the sanitation teachers are appointed to be responsible for Participatory Hygiene and Sanitation Transformation (PHAST) at their respective schools (GoM, 2008a). The head teachers were chosen because they are directly responsible for record keeping and day-to-day operations of the school - linking up the school and community (UNICEF, 2009).

In addition a total of five schools were randomly selected from the twenty targeted schools in order to have samples of school management committee and learners for separate focus group discussions. There were five sessions of focus group discussions for school management committee. Each of the five sessions comprised seven members of the school management committee giving a total of thirty five participants for focus group discussions. The school management committee carry out needs assessment of the schools and are implementers of school projects at the grassroots level (GoM, 2009a).

A sample of learners from five schools was gender segregated. This gave out five groups of female learners and another five of male learners. Each group had a total number of eight participants from all classes (standard one to eight). In total there were eighty learners (forty girls and forty boys) who took part in the focus group discussions. The learners were separated by sex so as to give representative information on individual gender perspectives and experiences. The learners were chosen because they are the direct beneficiaries of the WASH projects in schools.

3.5 Data Collection Instruments

3.5.1 Primary Data

The following are the instruments that were used to collect the primary data in this study:

3.5.1.1 Focus Group Discussions

Focus group discussions were utilized to collect qualitative data from the school management committee and learners. There were five focus groups of school management committee with seven members each, five focus groups of female learners with eight members each and five focus groups of male learners with eight members each. Discussions with the focus groups were open-ended and done face to face. In addition they were tape-recorded with consent from the participants.

The school management committee supplied information on their commitments and participation (involvement) in school WASH projects. In addition they also gave information on the challenges they face in the implementation of school WASH projects and how they dealt with them.

Learners gave information on the following: their access to WASH facilities, safety and usage of the WASH facilities, the WASH promotional activities they are engaged in, their hygiene practices and menstrual hygiene management on the part of adolescent girls.

3.5.1.2 In-Depth Interviews

Qualitative data was also collected by means of face to face, open-ended in-depth interviews with the sanitation teachers and implementing agencies (both from government and non-government organisations). The interview questions were open-ended to provide detailed

information in respondents' own words. The in-depth interviews were audio-taped with an approval from the interviewees. The interviewer was able to come up with probing questions depending on the responses given.

The sanitation teachers provided information on their role in school WASH promotional activities, and the challenges they face. The implementing agencies furnished information on the successes and challenges of the WASH projects they undertook in various schools within the district. In addition they also provided information on enabling environment for school WASH in terms of financing, intersectoral collaboration, capacity building, policy and institutional frameworks. Both the teachers and implementers gave information on how they dealt with the challenges they encountered.

3.5.1.3 Questionnaire

Data was also collected through self-administered questionnaire with close-ended questions. The close-ended questionnaire was chosen because as Creswell (2009) observed it provides the exact information needed by the researcher. In addition the questions are easy to quantify and analyse. Cohen, Manion and Morrison (2000) state that closed questions are quick to complete and straight forward to code hence can be useful in generating frequencies of responses during analysis. A total of twenty copies of the Survey questionnaire were hand-delivered to the head teachers. All copies were completed and returned giving a response rate of 100 per cent. They gave data on the account of management of school WASH facilities and promotion of sanitation and hygiene in their respective schools.

3.5.1.4 Observation Checklist

In addition to the other data collection tools an observation checklist was prepared and completed by the researcher. This instrument was used to collect information on the availability and physical conditions of water, sanitation and hygiene infrastructure, learners' existing hygiene practices and promotional activities on the day of visit. This was done in order to directly observe what was on the ground without relying solely on what was provided by the head teachers and learners themselves. This provided a moderate degree of realism in schools' WASH situation.

The language used in the instruments was English except for focus group discussions with learners and school management committee. The focus group discussions were in Chichewa due to the level of English proficiency of the participants. This was later translated into English during data management and analysis.

The instruments for collecting primary data were critically examined by experts familiar with the study's subject matter. This facilitated the identification of poorly worded items and any other items that were not suitable.

An interview and focus group summary forms (Appendices 2 and 3) were filled as soon as the interviews or discussions had taken place. The forms included details for time, place, duration, content and emerging themes. This was used as an evaluation tool so as to improve on the next interview or focus group discussion.

3.5.2 Secondary Data

The secondary data were collected through subsequent review of findings from published and unpublished documents related to the research problem. The data was obtained from the following secondary sources: newspaper articles from print media, publications and reports from government departments and non-government organisations so as to complement and strengthen the primary data collected.

3.6 Pilot Testing

The data collection tools were pilot tested to establish their validity and reliability. In this way the instruments were evaluated in terms of their accuracy and consistency. This was done to obtain the intended results with a similar group of subjects under the same condition.

The instruments were pilot tested at the District Education Office, Catholic Health Commission, Red Cross and Emmanuel International for face to face in-depth interviews. Six schools from three zones were also pilot tested.

The schools gave six head teachers who completed the questionnaire, six sanitation teachers for in-depth interviews; three focus group sessions for school management committee and learners

respectively. The researcher completed an observation checklist in all the six schools. The participants in the pilot test had similar characteristics to those of the target population so as to enhance the validity and reliability of the inferences made from the data collected.

3.7 Data Analysis

Data from questionnaire were analysed using Statistical Package for the Social Sciences (SPSS 16.0). Descriptive statistics for both categorical and continuous variables were generated. Frequencies counts formed part of descriptive statistics that characterized the sample. Measures of central tendency such as mean and standard deviation were provided for continuous variables like school enrolment, latrines in use and teachers trained for water, sanitation and hygiene promotion. Categorical data such as anal cleansing methods were presented on pie a chart.

The audio-taped responses from in-depth interviews and focus group discussions were transcribed (transformed into text by word processing). Meaningful segments in the transcripts were coded manually (using paper and pencil) with words and short phrases on hard-copy printouts for further analysis. Prior to actual coding the transcripts were pre-coded by encircling, underlining and highlighting significant data excerpts (quotes). The data excerpts from in-depth interviews are labelled, IDI, with participant number; for example, IDI.4. Alternatively, data excerpts from focus group discussions with learners and school management committees are labelled, LNR and SMC respectively with a participant number.

The number of times a code was applied to the data was identified in order to describe qualitative findings in words such as many, some, few, almost and among others. This kind of enumeration provided a means of getting ‘frequencies’ in the qualitative data. Codes were transformed into categories. Similar phrases, patterns, relationships, and commonalties or disparities were identified through these categories.

To determine factors contributing towards the implementation of WASH projects in primary schools in Zomba Rural, the variables were subjected to principal component analysis (PCA), a form of factor analysis. The principal component analysis used Statistical Package for the Social Sciences (SPSS) version 16.0.

Prior to performing PCA the suitability of data for factor analysis was assessed. Further, factor extraction was used. According to Pallant (2005) factor extraction involves determining the smallest number of factors that can be utilized to best represent the interrelations among a set of variables. Factor extraction enabled the identification of major variables from any other factors using eigenvalue rule. An eigenvalue is an amount of total variance explained by the factor. Only factors with an eigenvalue of 1.0 or more were considered for analysis. This is the threshold at which major variables were separated from mere ones.

In order to interpret the factors identified, a technique known as factor rotation was used. The factors were rotated using Varimax approach.

The factors analysed were generated from the three broader elements of the conceptual model of Hygiene Improvement Framework namely: access to hardware for WASH; enabling environment and hygiene promotion. These broader elements were further broken down into smaller themes. The smaller themes under each broader element were as follows: access to hardware for WASH (access to latrines and their supplementary products, location/soil structure and terrain, quality of the facilities, access to water supply); enabling environment (resource allocation, institutional roles and responsibilities, coordination, policies and legislations, political will, public-private partnerships) and hygiene promotion(capacity building, key stakeholder involvement, learners' hygiene practices, sanitation clubs).

The themes were transformed so that if the characteristic was found to be under a particular theme the score was 1 otherwise a score of 0 was assigned.

3.8 Limitations

Since this study is for primary schools in Zomba Rural, the results may not be generalized in other areas and or Malawi in general. The study is also limited in that it did not investigate on the causal links among the factors. In addition data collection was done at single point in time as such its interpretation is limited in that the results could possibly differ if another time-frame had been chosen.

CHAPTER FOUR

4.0 RESULTS

4.1 Introduction

This chapter contains sections of results and its discussions on the findings of the study of factors affecting WASH projects in primary schools in Zomba Rural. It contains the findings of the data which was collected from research participants, document review and observations. The findings are presented in the results section.

4.2 Findings

The principal component analysis (PCA) with varimax rotation revealed the presence of seven components with eigenvalues more than 1, explaining 71.30% of the total variance. Under access to hardware for WASH facilities the PCA revealed that quality of the latrines constituted 15.452% variance and access to latrines and their supplementary products with 1.534 % variance; enabling environment had three components: resource allocation with 10.796% variance, political will with 7.544% variance and policies and legislations with 2.917% variance, and while hygiene promotion revealed that components of key stakeholder involvement constituted 29.71% variance and learners' hygiene practices had 3.451% variance.

4.2.1 Access to Hardware for WASH

The emerging issues investigated under access to WASH facilities were: accessibility to latrines and their supplementary products, quality of the facilities and water supply. The main facilities studied were the latrines and water points. The water points comprised taps and boreholes.

4.2.1.1 Access to latrines and their supplementary products

An inspection of the latrines (*n = 309*) showed that 304 latrines (representing 98%) were accessible. The five latrines (2%) that were not in use had collapsed due to the effects of heavy rains. An observational checklist on the days of visit revealed that all the twenty targeted schools (100%) had separate latrines for both boys and girls. Some head teachers (95%) reported that the latrines were separated according to class levels. For instance, junior classes had separate latrines from senior classes.

It was revealed through the questionnaire by head teachers that 100% of the schools allowed learners to access these existing latrines anytime they needed them. There were no specific times as to when learners could use them. During the visits learners were observed making use of the latrines even during class times. On the day of visit, all the twenty targeted schools (100%) had no soap or any substitute for hand-washing, only 10% had at least one hand-washing facility for both boys and girls and the rest (90%) had no hand-washing facilities. Some learners claimed that they washed hands directly from the water points. Some sanitation teachers (35%) indicated that schools had buckets for hand-washing but were vandalised or stolen and never got replaced. The teachers said that soap for hand-washing is rarely provided. One of the teachers, for example said:

> *"We had soap for hand-washing on the day when the borehole was handed over to us. Since then we haven't had soap." IDI.20.*

Some of the schools did not have access to suitable anal cleansing materials. On the most common anal cleansing materials used, 45% of the head teachers indicated stones, 25% indicated notebooks, 15% reported leaves and 10% indicated that pupils never use any materials for cleaning the anus after defecation (figure 3).

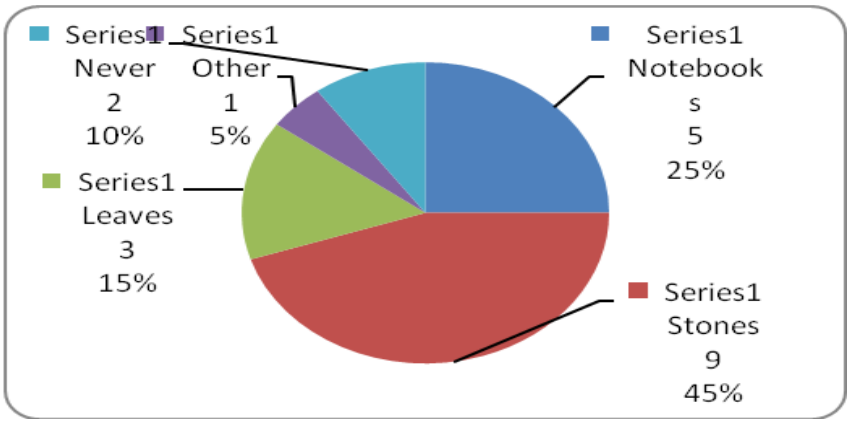

Figure 3: Anal Cleansing Materials

The discussions with pupils themselves also confirmed that stones were the most frequently used material for cleaning the anus. One of the pupils had this to say:

"I clean my anus with stones because they are found within the region of the toilet." LNR.3

The interviews with all the sanitation teachers, discussions with adolescent girls as well as the questionnaire with the head teachers revealed that the schools did not have any facilities for menstrual hygiene management. This represented 100% of the studied schools that did not have any private wash rooms for adolescent girls who were menstruating. All the adolescent girls expressed displeasure because the latrines were not providing privacy for removing their soiled menstrual pads. These girls reported that they just went home whenever they wanted to clean themselves. One of the pubescent girls expressed this:

"When my [menstrual] period starts, I tell my teacher that I am sick so that I can go home and stay" LNR.5

One implementing agency indicated that they had started carrying out a construction project in menstrual hygiene facility on a pilot phase in one school but would roll out to other schools later. One officer from the implementing agency said:

"We have embarked on girl-friendly water, sanitation and hygiene facilities project for menstrual hygiene management in schools." IDI.6

The relationship between total enrolment and latrines in use was investigated using Pearson product-moment correlation coefficient. There was a medium, negative correlation between the two variables ($r = -0.49$, $n = 20$, $p<0.05$), with high enrolment associated with few latrines in use. This indicated that in most schools the number of latrines in use did not match with the required number of pupils. An investigation of pupil to latrine ratio revealed that only 30% and 45% of the schools met the minimal requirement of pupil to latrine ratio for girls and boys respectively. In some cases the ratio was so huge, for example, one school had a ratio of 141:1 for girls and 100:1 for boys (Table 1). Ratio statistics for girls enrolment to latrine showed a mean ratio of 68, median (68) and weighted mean (66). In addition boys to latrine ratio revealed a mean ratio of 70, median (69) and weighted mean (66). All these statistics demonstrated that

there were more pupils than the required number of latrines to meet the 60:1 target as presented in Table 1 below.

Table 1: Pupil to latrine ratio based on gender

School	Ratio of girls to latrine	Ratio of boys to latrine
A	42.3	38
B	48.3	40.5
C	48.6	48.57
D	49.28	49.1
E	55.56	50.42
F	56.75	55.89
G	62	57
H	64.75	57.14
I	65	60
J	66.33	64.17
K	70.33	65.25
L	75	68.54
M	75.71	69.86
N	76.8	71.57
O	78.57	72.67
P	83.83	77
Q	84.8	78
R	85	81.4
S	90	86.67
T	141.75	100

4.2.1.2 Quality of the latrines

The observation checklist revealed that 95% of the latrines were of acceptable standard (good quality). The standard constituted 55% ventilated improved pit (VIP) latrines, 40% improved latrines with impermeable floors (floors with concrete slab or cement) and the rest (5%) were of permeable mud floor otherwise known as basic latrines which are of poor quality and not acceptable

Some of the learners reported that during the rainy period of 2012 to 2013 some of the basic latrines were full of water and at some point the water was overflowing due to seepage. The sanitation teachers in these schools informed that these basic latrines became breeding grounds for mosquitoes. This was never experienced in schools with the ventilated improved pit (VIP) latrines since the VIP latrines discourage breeding of insects like mosquitoes and flies.

Several schools (60%) had at least a special latrine with access ramps and grips inside them for physically challenged learners (figure 4). Therefore learners with physical disabilities had no difficulties accessing the latrines since special adaptations were incorporated in the designs of the latrines.

Figure 4: Quality latrines with access ramps for physically challenged learners

The study through the observation checklist revealed that 75% of the latrines in use had roofs, 95% had brick walls, 40% had lockable doors and 100% had sizeable drop holes. Roofs provided

access even during rainy season while brick walls and sizeable drop holes offered safety, and lockable doors gave privacy and dignity.

All the latrines in use had enough light creating a good environment where learners including minors could not fear anything. Almost all the learners said they were pleased with the latrines. In other words these latrines were user (child) friendly. However, adolescent girls felt uncomfortable during menstruation because there were no private rooms to change pads, take a bath and clean their soiled clothes.

An observation checklist exposed that the latrines in 15% of the schools, were not deep enough as a result of being on rocky and mountainous areas. Latrines for four schools (representing 20%) were on sandy areas. Some school management committees reported that some of the pits were caving in during excavation in sandy soils and excavators had to abandon the place and tried other areas whose pits could not cave in. Two of the schools (10%) had their latrines on dambo (wetland) areas but had pits that were not deep enough due to the nearness of the water table. The rest 55% of the schools had their latrines on clay or a mixture of clay and sand (loam) soils. In these schools the soils were good for excavation and construction of the latrines.

Although these latrines were excavated in diverse soil structure and terrain, they were all in suitable locations for young children to have access. The distance from classrooms to where the latrines were located was within 200 metres which is considered ideal for children.

4.2.1.3 Water Supply

Most of the sampled schools (90%) had running water on the day of visit. Two schools (10%) had non-functioning water points. The sanitation teachers reported that the non-functioning taps and boreholes were either vandalised or had their accessories stolen.

The observation checklist showed that the most common water source were boreholes (70%), a combination of tap and borehole (25%) and taps only (5%). These taps were those of rural gravity fed piped scheme by the water users' association (WUA). Learners were allowed to access the water anytime without restrictions.

In the focus group discussions with the learners it was found that 100% of the schools had boreholes or taps that were easy to operate. However, the discussions with the learners revealed that 80% of the schools shared the water with the surrounding community. Sometimes the learners were told to wait for their turn in order to make use of the water. One of the learners said:

> *"When we want to drink water, some women tell us to wait until they fill their buckets" LNR.3*

Figure 5 shows the state of affairs at one school tap where learners waited until the pails of villagers were filled.

Figure 5: Water being filled in the pails as pupils waited for their turn at a school tap

From focus group discussions, views expressed by pupils showed that water was available in adequate quantity. The observation checklist and the questionnaire from head teachers revealed that eighteen out of twenty schools had running water. Some schools had more than one water source. On the day of the visit there was no indication of congestion in using water among the pupils. However, in schools that use tap water, sanitation teachers reported that they experienced water shortages especially during summer. In addition, the focus group discussions with the learners revealed that intermittent water supplies were indeed experienced during the months October and November.

It was revealed that tap water from the water users' association was never treated from the source to the point of use (POU). Interviews with implementers revealed that some of them supplied chlorine and WaterGuard for water treatment at the point of use; however, they were quick to mention that these were not in adequate supplies. All head teachers in the twenty schools (100%) reported that they did not register any cases of cholera after the WASH project. The water facilities were observed to be of good quality in their designs. Some water points such as boreholes had features attractive to children.

The study through the observation checklist revealed that taps and boreholes were located in strategic positions (within a distance of 200 metres) suitable for young learners. All these water points were located within the school campus. Views expressed from learners in focus group discussion showed that they were satisfied with the locations of the water points.

4.2.2 Enabling Environment

Several strategies for WASH implementation were examined in order to determine whether they contributed to the success or failure of the projects in various primary schools.

4.2.2.1 Resources Allocation (Material and Financial)

All the head teachers (100%) reported that they had no difficulties in mobilising adequate locally available materials such as water, sand and bricks to contribute to the projects during the construction phase. This work was done in conjunction with the school management committee and parents whose wards were in those respective schools. A few (35%) school management committees reported that the ordinary community also supplied water, sand and bricks regardless of having a ward at the school. The head teachers also reported that local masons such as builders, plumbers and carpenters were available to carry out the work in their respective trades.

Interviews with government agencies and non-governmental organisations revealed that financial resources were a major constraint in the provision of WASH facilities in terms of quantity and quality. The research exposed that sources of funding to the water and sanitation sector were typically donor-driven and most of them were funded externally (figure 6).

Sanitation teachers and school management committee stated that operation and maintenance of the facilities was hampered by lack of financial resources. The questionnaire indicated that 60% of the schools did not put in place mechanisms for maintenance. Interviews and discussions with sanitation teachers and school management committee respectively showed that spare parts for boreholes and taps were available but schools lacked funds for the purchase of materials when maintenance was needed. Sanitation teachers reported that they lacked resources such as disinfectants like chlorine, mops and buckets.

4.2.2.2 Institutional Roles and Responsibilities

Interviews and document reviews disclosed that the main institution responsible for the provision of water, sanitation and hygiene facilities in primary schools at the district level is the District Water Office. This institution is under the Ministry of Water Development and Irrigation which is a lead ministry in water, sanitation and hygiene sector.

Figure 6 shows a signboard for one of the projects under the Ministry of Water Development and Irrigation in a primary school in Zomba Rural District.

Figure 6: Signpost for a sanitation and hygiene facilities project in Zomba

For school WASH projects the District Water Office works in a joint venture with the District Education Office of the Ministry of Education, Science and Technology which is a lead agency

in the education sector and District Health Office of the Ministry of Health which is a lead ministry in public health sector.

The District Education Office leads in the identification of gaps in water, sanitation and hygiene in the schools. The District Health Office promotes health and hygiene education in water and sanitation services. However, other bodies responsible for the provision of water, sanitation and hygiene facilities and services are non governmental organizations (NGOs) and the District Council. The District Council receives the project proposals from actors in water, sanitation and hygiene investments.

The review of documents confirmed that the District Council promotes government policies by drafting them into strategies for implementation through the District Development Planning System (DDPS) among the rural population at the grassroots level. The District Council fulfils its role by coordinating the implementation of the school water, sanitation and hygiene projects through the District Coordinating Team (DCT). In addition it also mobilises resources within and outside the district (GoM, 2009b). The District Council is responsible for mobilisation, sensitisation and marketing of WASH services to communities in order to generate demand driven response.

The school management committees reported that their role in WASH projects was to contribute locally available resources such as bricks, sand and quarry stone. The school management committees also informed that they produce School Improvement Plans (SIPs) and submit the same to the District Education Office for further scrutiny.

4.2.2.3 Coordination

All the head teachers in the selected schools indicated that staff from the District Council, the District Health Office and the District Water Office (DWO) worked together in the implementation of the projects. This represented a 100% involvement of the District Council, District Water Office and District Health Office in the implementation of water, sanitation and hygiene projects in these primary schools. The interviews revealed that school WASH project

implementers worked in liaison with the District Council. One officer from the implementing agency said:

> *"All our projects pass through the District Council. It is against the law to bypass them (District Council)."IDI. 4*

Interviews and discussions revealed that there was no evidence of coordination and collaboration among the non-state service providers (partners) in water, sanitation and hygiene. This lack of proper coordination and collaboration among the non-state service providers resulted into duplication of efforts as portrayed in Table 2 where Emmanuel International, Catholic Health Commission and World Vision seemed to be operating within the same catchment areas with similar projects.

Table 2: Zomba District Partner Intervention in WASH

Partner	**Type of Project**	**Impact area**
World Vision	WASH and capacity building	Chingale (Mlumbe) and Namachete (Mwambo)
Save the Children	WASH and capacity building	Ngwelero
Millennium Villages Project	WASH and capacity building	Upper Mlumbe
Red Cross	WASH and capacity building	Kimu and Mbalu (Mwambo)
Emmanuel International	Sanitation	Whole district
Inter Aide	Water and capacity building	Chikowi
Catholic Health Commission	Sanitation	3 Parishes (Mlumbe)
Tikonze Mijigo Maintenance System (TIMMS)	Capacity building and spare parts selling point	Whole district

Source: Zomba District Council, 2012

Most of the partners were implementing WASH projects in their own selected impact areas because there are inadequate efforts in synergizing interventions. Not only does lack of proper coordination and collaboration among the non-state service providers result into duplication of efforts but also results in lack of sustainability of the activities after the projects have phased out.

There is need for coordination in WASH projects among various actors in order to ensure consistency of policy and strategy through to implementation, and to bring coherence to complex situations such as funding and other cross-cutting issues. One way to demonstrate coordination is through sector wide approach (SWAP) where funds are channelled via the treasury.

4.2.2.4 Policies and Legislations

The review of published and unpublished documents and interviews with implementing agencies (both government and non-governmental organisations) exposed that strong policies and pieces of legislations were put in place for water, sanitation and hygiene programmes. It was found that the government developed several policies and legal frameworks related to improvement in all aspects of water supply, sanitation and hygiene.

The actors in water, sanitation and hygiene in schools were guided by the following key national development policies, regulatory frameworks and development strategies: the National Water Policy, the National Sanitation Policy, Malawi Growth and Development Strategy (MGDS), Malawi Vision 2020, Water Resources Act, the National Decentralisation Policy, the Public Health Policy, the Land Policy, Policy and Investments Framework (PIF), National Education Sector Implementation Plan (NESP), the Environmental Policy and the Local Government Act, just to mention but a few key policies and strategies.

At the district level it was established that development strategies exist such as the District Development Plan (DDP), and the WASH District Strategic Investment Plan (DSIP). Apart from the availability of local policies the implementers were also directed by the existing international protocols such as the Millennium Development Goals and the Johannesburg Declaration of the World Summit on Sustainable Development (WSSD). In all these policies and legal frameworks,

there was no clear evidence of the inclusion of menstrual hygiene despite its impact on adolescent girls' education.

Most implementers reported that it is problematic to apply and implement the policies harmoniously because of different priorities set in their respective implementation plans. The review of the implementation plans indicated that they contained well stipulated goals and objectives including sections of measures of performance.

4.2.2.5 Political Will

The study found that there was enormous support by leaders at different levels to advance the implementation of school WASH projects. The review of Zomba District Development Plan of 2010-2013 and District Education Plan of 2012 demonstrated that WASH projects in primary schools were prioritised. Further review of published and unpublished documents unveiled that District Council provided support through budgetary allocation to water, sanitation and hygiene programmes.

In addition the District Council deployed its staff to train artisans, school management committee and teachers. The school management committees reported that they produce School Improvement Plans (SIPs) in which water, sanitation and hygiene were included. Views expressed by all the school management committees in the focus group discussions showed that traditional leaders support the initiatives of school WASH projects.

4.2.2.6 Public-Private Partnership

On public-private partnerships, the study revealed that one private company, Unilever, was engaged in a hand-washing promotion campaign in some designated schools. One implementing agency disclosed that it once worked in partnership with two private companies of Coca-Cola and Colgate Palmolive on a Global Hand-washing Day when the companies only sponsored the activities on that particular day. None of the head teachers in the selected schools revealed that they got engaged with any private company in water, sanitation and hygiene programmes at a school level.

4.2.3 Hygiene Promotion

Various approaches in hygiene promotion that contribute towards the implementation of WASH projects in primary schools have been examined in this section.

4.2.3.1 Capacity building

The following results on capacity building were found: the study revealed that 30% of the head teachers and 45% of the sanitation teachers got training in water, sanitation and hygiene promotion. In the discussions with school management committees it was discovered that 60% of them attended trainings related to issues of water, sanitation and hygiene. The school management committee that attended training disclosed that training raised their awareness on their roles and importance of water, sanitation and hygiene in schools. One of the members of the school committee in the focus group said:

"We never thought water and sanitation is linked to the education of children." SMC.1

Head teachers indicated that there has never been any follow-up on the trainings to assess their impacts on schools' water, sanitation and hygiene improvements.

Interviews with sanitation teachers and focus group discussions with school management committees revealed that these people did not possess any technical skills for maintenance of the boreholes and taps.

The study through the focus group discussions with learners revealed that they (learners) did not have any formal training in WASH activities.

4.2.3.2 Key Stakeholder Involvement

The sanitation teachers and the school management committee reported that they were involved in selecting the site for either water points or latrines prior to project execution. The revelation by the school management committees and sanitation teachers supported the findings from the questionnaire which indicated that 85% of the schools had their committees involved in the project implementation.

The focus group discussions showed that learners were not involved at all in the design, site selection and construction of water, sanitation and hygiene facilities. Learners who reported participating in collecting sand, water and bricks were doing so as part of punishment.

The 60% of school management committees that attended the water, sanitation and hygiene training explained that they hired watchmen to be patrolling the school campuses. These school management committees further reported that they mobilised parents and agreed that all parents should be contributing money for the payment of the watchmen. However, the committee revealed that it was not easy to persuade parents to be contributing towards the wages of watchmen because some parents argued that primary education is for free.

4.2.3.3 Learners' Hygiene Practices

The observation checklist indicated that 100% of the schools had duty rosters for cleaning the latrines on daily basis. Learners reported that both boys and girls were responsible for cleaning the latrines but had no proper cleaning materials except brooms. A few learners (20%) from schools with basic latrines (latrines with mud floor) reported that they never used water to clean their latrines. Further, learners indicated that disinfectants like chlorine were rarely used.

Interviews and questionnaire revealed that sanitation teachers and head teachers were responsible for the supervision of the latrines. Although there were duty rosters for cleaning the latrines, the conditions of the latrines did not portray this.

An observation checklist revealed that 55% of the latrines had faeces outside the drop holes and that anal cleansing materials were not discarded properly (figures 8 and 9). Some live maggots appeared on faecal matter outside the drop holes of some latrines.


Figure 7 and 8: Faeces and anal cleansing materials outside drop holes

Almost 80% of the latrines had bad smell. It was only some of the ventilated improved pit (VIP) latrines (20%) that had no bad odours. Urine was not correctly directed into the drop holes. It was established from the observation checklist that 70% of the latrines had urine all over them.

4.2.3.4 Sanitation Clubs

The questionnaire revealed that 80% of the schools had no sanitation clubs. In school that did not have sanitation clubs pupils stated that they got messages of water, sanitation and hygiene from their respective class teachers. In the schools where sanitation clubs existed, learners reported that they were reciting poems, performing drama and music on hygiene promotion messages. There was evidence that those schools with sanitation clubs had cleaner latrines than the ones without.

CHAPTER FIVE

5.0 DISCUSSION

5.1 Introduction

This section attempts to interpret and discuss the findings of this study. The discussions of the results will focus much on the seven factors that emerged from the principal component analysis. Nonetheless, other factors revealed by thematic analysis (exploratory stage, data reduction) have also been discussed later.

5.2 Discussions

The discussions are centred on the following factors: key stakeholder involvement, quality of the latrines, resource allocation, political will, learners' hygiene practices, policies and legislations, and access to latrines and their supplementary products

5.2.1 Key Stakeholder Involvement

There existed a link between the involvement of school management committees and the success of the implementation of the water, sanitation and hygiene projects in most schools. Those projects whose school management committees were involved had a positive impact on the implementation of the projects and had the following elements: a sense of ownership and responsibility was increased as local materials like sand, quarry stone and bricks were mobilised for the construction of the facilities and the work was completed within the allocated time frame.

These findings are similar to the preceding studies (Njuguna et al., 2008) which found that the participation of school management committee in three districts of Kenya had a positive impact on the implementation of water and sanitation projects in schools. Comparable studies though not conducted in schools but in other different localities, found community participation central to sustainable urban water and sanitation projects in Sub-Saharan Africa (Harvey & Reed, 2007) and Pakistan (Shafqat, 2011). Ahmad and Talib (2010) described community participation as an integral part and ideal practice of democracy since it reflects the basic aspirations of people while Osumanu et al. (2010) expressed that community participation is a key component of sustainable development.

In addition, the participation of private companies in any WASH initiatives was insignificant in this study considering that their involvement is only noticed during the commemoration of Global Hand-washing Day. Single, one- time interventions are not only ineffective but also may have limited intended outcomes.

5.2.2 Quality of the latrines

The WASH facilities (both latrines and water points) were of good quality in their designs. They were generally fit for purpose - they met user's requirements. Designs of the facilities in this research were found to be appealing to school-going children of all ages. Such designs are classified as user (child) friendly. The easiness in operation of the boreholes and taps means that the water sources were child friendly.

Extant literature characterize child friendly designs as those that meet children's needs, attract and keep hold of children from different backgrounds (inclusive of children), are secure and protective, and are sensitive to gender (World Bank, 2005; Yates, 2008; UNICEF, 2009; House et al., 2012).

The fact that many projects in this study had sanitation platforms with a mixture of cement, sand and quarry stone indicates that the children were safe when visiting latrines. However, a few latrines with wooden base and mud floors become unsafe over time and permeable floors cannot be hygienically cleaned.

The separation of the latrines according to gender and age and the availability of lockable doors provided dignity and privacy to older children especially adolescent girls. A user inside the latrine which cannot be locked experiences constant interruption especially in a school setting where latrines are insufficient.

Although learners had access to latrines anytime, the ratio of learners to latrine was above the minimal required ratio of 60:1. A mean ratio of 68 and above for both girls and boys means that in most primary schools there are more than 60 learners using one latrine. Such inadequate proportions compel children to drop out of school and stop attending classes regularly. This finding supports previous studies (MoEST, 2009; DeGabriele, 2009; House et al, 2012; Pillitteri,

2012) which also found that WASH projects in Malawi are hampered by insufficient quantities which lead to drop out or erratic attendance in schools.

The latrines with access ramps and grips indicate that physical needs and abilities of learners were incorporated in the designs hence providing user friendly designs. Designs that include the needs of physically challenged learners encourage them (learners) to attend classes thereby enhancing equitable access to education. The inclusiveness of children promotes gender equality in schools and equitable access to education (Gutierrez, 2006; UNICEF, 2009; World Bank, 2010; Göttelmann-Duret & Bahr, 2012).

However, the absence of menstrual hygiene facilities in the studied projects has been a drawback to the concept of child-friendly designs. The findings of lack of menstrual hygiene facilities in primary schools in this study do not contradict the results of Pillitteri (2012) that schools in Malawi lack menstrual hygiene management facilities even though the study was done in secondary schools.

Although in general, the latrines were child-friendly, partly they were not adolescent girl-friendly due to the absence of private rooms for menstrual hygiene management. Adolescent girls reported missing classes due to menstruation. Previous studies have also shown similar results (Mannathoko, 2008; UNICEF, 2009; Pillitteri, 2012). House et al. (2012) found that seven per cent of the adolescent girls in Malawi miss classes in the face of severe menstruation.

5.2.3 Resource Allocation

The allocation of funds for WASH projects in primary schools has been limited. For example, the budgetary allocation did not match with the quantity of improved latrines needed to meet the minimally accepted ratio of pupils to latrine (60:1) in Malawi (MoEST, 2009).

Low financing is hindering the provision of adequate facilities, products and services for water, sanitation and hygiene projects. This in turn has led to limited access to improved water supply and sanitation. This in itself is a threat to the fulfilment of the Malawi Growth and Development Strategy which is likely to contribute negatively to the attainment of Millennium Development Goal 7c.

The findings in this study support the previous studies (Montgomery & Elimelech, 2007; Manda, 2009; Kalulu & Hoko, 2010; Pillitteri, 2012 and WHO, 2012) which found that insufficient funding affected the construction, rehabilitation, operation and maintenance of water and sanitation facilities in developing countries.

Where the financing is low the success of the projects is compromised. This compromise has also been noticed in the capacity to maintain the facilities as reported by most head teachers in this study. This finding is consistent to the earlier studies in Sub-Saharan Africa (Slaymaker & Newborne, 2004) and Malawi (Manda, 2009) which reported that under-funding in water and sanitation projects resulted in poor maintenance of the facilities.

5.2.4 Political Will

The implementation of water, sanitation and hygiene projects in primary schools in Zomba Rural gets support and commitment (political will) from leaders at different levels.

All the head teachers disclosed that all the WASH projects were implemented with support from the district council officials. This therefore, gives a clear picture that the district WASH coordinating team was supportive and committed to the implementation of school WASH projects.

The participation of the school management committees in resource mobilisation is another indicator of their (the committees') commitment to the implementation of the projects. Some school management committees mobilised parents to participate in raising funds for the wages of watchmen in order to curb vandalism and theft. This was one way of showing commitment and support from both parents and school management committee in WASH activities.

When groups put strengths, resources and best practices together they create effective, large scale and sustainable projects. The findings are consistent with previous studies in developing countries which found that commitment and support by different actors are means to sustained success (Slaymaker & Newborne, 2004; Montgomery & Elimelech, 2007; Osumanu et al., 2010; WHO, 2012).

Although Nah, Lau and Kuang (2001) conducted a study on business software systems in United States of America, the findings do not contradict those in this study. Nah et al., investigating on factors for successful implementation of enterprise resource planning system found that support and commitment by top management is critical in the success of the project. WHO (2012) argues that in order to meet the MDG target on sanitation, political will (support and commitment) is essential to the advancement of the implementation of basic sanitation.

5.2.5 Learners' Hygiene Practices

The presence of excreta (faeces and urine) with live maggots and also the existence of anal cleansing materials outside the drop holes is an attribute of poor sanitation and hygiene behaviours on the part of learners. Learners are likely to turn away from using the latrines that are filthy and resort to open defecation. This could also be a sign of so many parameters such as lack of supervision on the part of teachers, insufficient attention to behavioural change on the part of service providers and lack of practical knowledge and skills on proper use of the latrines by the learners.

Faecal matter outside the drop holes encouraged the proliferation of flies that are a major known vector for the transmission of various diseases. This finding conforms to the preceding studies by Rabiu, Alhassan, Ejere and Evans (2012) in Gambia, Mali, Tanzania, Niger and Ethiopia. The flies eventually hatch eggs to produce maggots. Maggots scare children especially girls and hence they can avoid using the latrines.

Mara and Ryan (1999) described that the vent pipes, which are an extra feature on the ventilated improved pit (VIP) latrines, have the capacity to drastically reduce the odour in the superstructure as the dented air is systematically siphoned out. The study also established that the ventilated improved pit latrines did not produce serious odour owing to their proper use. They had no faeces outside dropping holes. However the bad smells were evident in those ventilated improved pit latrines due to improper usage. The excreta could be seen outside dropping holes as such the vent pipe lacked capacity to control the odour emanating from outside the pit of the superstructure.

The use of stones as anal cleansing materials can fill up the latrines as quickly as possible. Therefore, the latrines may not be used for a long time. This is a critical challenge to the sustainability of the latrines. In addition the 10 % of the sampled schools that do not use any anal cleansing materials (figure 3) is significant considering that without cleaning the anus after defecation is not only embarrassing due to odours but also leads to irritation of the surrounding skin (World Bank, 2005). Usage of stones and leaves put learners at risk to pathogens. Disease causing organisms may be present in stones and leaves that are used for anal cleansing. However, using papers from notebooks and text books is also a bad practice since this removes the notes that would be used as reference material when studying.

5.2.6 Policies and Legislations

Malawi in general and Zomba District in particular is endowed with several policies and regulatory frameworks as outlined in the findings. The presence of policies, implementation plans and pieces of legislations for water, sanitation and hygiene programmes signifies that there is a clear direction or focus for the development of water and sanitation. Where there is planning chances of succeeding are high as the saying goes "*failing to plan is planning to fail*." Coherent policies and implementation plans provide guiding principles to the actors in water, sanitation and hygiene programmes. This finding is consistent with the previous studies (Manda, 2009).

Although Malawi has several policies and legal frameworks in support of water and sanitation investments in schools, issues of menstrual hygiene management are not clear. For example, the National Sanitation Policy and the Water Policy do not vividly include menstrual hygiene management for the adolescent girl-child in schools. Various studies have shown the benefits of menstrual hygiene management for girls in schools such as reduction in absenteeism, greater participation in class and retention of girls (Khan et al., 2008; Mannathoko, 2008; NICEF, 2009; House et al., 2012)

5.2.7 Access to latrines and their supplementary products

The findings of this study demonstrated that the facilities were accessible to all children. The fact that learners used water, sanitation and hygiene facilities anytime is a positive contribution towards improved access to water and sanitation.

When learners are given restricted time to use the facilities such as latrines which are inadequate at that particular time they sometimes push each other to get a chance to go into the latrine. Younger learners are at a disadvantage hence may find other alternatives such as open defecation.

The usage of water, sanitation and hygiene facilities at any time reduces congestion among learners (users) thereby allowing equal access. Learners access to WASH facilities and services anytime fulfils the vision of the water and sanitation sector which is "*Water and Sanitation for All, Always*" (GoM, 2007; 2008a).

This access, therefore, promotes the fulfilment of the MDGs and World Summit on Sustainable Development (WSSD) targets that seek to halve the proportion of people without sustainable access to safe drinking water and basic sanitation by 2015 (United Nations, 2002; WHO, 2012).

Lack of access to hand-washing facilities by 90% of the schools and lack of private rooms for menstruating girls in this study have been drawbacks in the projects. From the findings as well as previous studies it seems some project implementers do not incorporate hand-washing and menstrual hygiene in school WASH programmes. For example, in Kenya the study by Rukunga and Mutethia (2006) found that over 90% of primary schools did not have even the simplest handwashing facility and more than half of the girls in the upper primary classes dropped out of school due to lack of menstrual hygiene facilities. In a related study SNV (Netherlands Development Cooperation), WaterAid and UNICEF (as cited in House et al., 2012) found that 92% of the schools in Tanzania had no functional handwashing facilities.

5.3 Discussion on other Factors

5.3.1 Location /Soil Structure and Terrain

The study found that the WASH facilities were located within reach of the learners including those with physical disabilities. However, the implementation of WASH projects in general and latrine excavation and construction in particular was affected by the soil structure and topography of the area studied. In sandy places for example, excavation of pit latrines was obstructed by caving in of the pits. The collapse of the five latrines in the findings could be due

to poor soil structure. It was also difficult to excavate pit latrines in rocky places while in wetland (dambo) areas excavation was easier but because the water table was near it was problematic to have deep pits as the water kept coming out uncontrollably. These results do not contradict the findings of Zomba District Council (2012) which characterised Zomba District as an area with diverse soil structure and terrain.

5.3.2 Institutional Roles and Responsibilities

Clearly defined roles and responsibilities for actors in water, sanitation and hygiene have generally contributed positively to the implementation of water, sanitation and hygiene projects. Institutional capacity has made tremendous reforms in water, sanitation and hygiene. The inception of Decentralization process has seen the Ministry of Water Development and Irrigation devolve its powers, resources and responsibilities to the Local Council as such the district authorities have more control over allocation of sectoral resources. This finding does not support the earlier studies of Slaymaker and Newborne (2004) which found that the Ministry of Water Development and Irrigation in Malawi had more powers over allocation of resources than district authorities. The institutional capacity to implement water, sanitation and hygiene projects had been found to be associated with successful results in previous studies in Malawi and other developing countries such as Nigeria, Caribbean and Ghana (Banik & Bhaumik, 2006; Obeng et al., 2009; Manda, 2009; Luiz, 2010; Gbadegesin & Olorunfemi, 2011; WHO, 2012). Although maintenance of the facilities was the sole responsibility of the individual schools through the school management committee, this responsibility was not fully practised as most schools lacked funds for the maintenance programmes.

5.3.3 Coordination

The study has unearthed an effective coordination between the district council and other implementers. However, the cooperation among non-state (NGOs) actors was found to be fragmented. These disjointed efforts among non-state actors resulted in duplications of similar projects within same areas as evidenced in Table 3. This finding is similar to the previous studies in Malawi and other developing countries (Manda, 2009; WHO, 2012). Osumanu et al. (2010) in their study of urban water and sanitation in Ghana found that collaborative efforts of actors in

water and sanitation were key to sustainable projects. Similarly, the findings of Khan et al. (2008) revealed that collaboration among UNICEF and other stakeholders in sanitation promotion using School Led Total Sanitation (SLTS) approach in Pakistan brought successful and sustainable sanitation improvements in schools. SLTS approach is similar to any sanitation initiative but has an additional schools/child focus that capitalizes on the role that learners play as promoters of sanitation and hygiene both in schools and their communities (UNICEF, 2010).

High level of coordination and collaboration between the Ministry of Education, Science and Technology and other stakeholders is essential. All schools fall under the Ministry of Education, Science and Technology while the implementation of school WASH projects is under the Ministry of Irrigation and Water Development; Ministry of Local Government and Rural Development; and Ministry of Health in collaboration with non-state actors.

5.3.4 Capacity Building

Training of primary stakeholders (learners, teachers and school management committees) was not adequate as revealed from the findings. When stakeholders lack the capacity in any intervention the likelihood of failing to achieve the desired outcomes is high. Perhaps the answer to why there were poor hygiene behaviours among learners is a result of lack of systematic training in hygiene promotion.

Lansdown et al. (2005) studied the impact of capacity building on teachers and pupils about Trachoma and health education in Tanzania. After the trainings, a follow-up was done and it was found that the behaviours of both teachers and pupils changed for the better. In addition the knowledge and skills gained were passed on to their colleagues. These results do not contradict those of Osumanu et al. (2010) who found that through education and training the leadership skills of community members in Ghana, strengthened. The members were able to initiate programmes on their own. MoEST (2009) and UNICEF (2010) stated that learners can be change agents in their community if given hygiene education and training in their respective schools.

5.3.5 Sanitation Clubs

Similar to previous studies in Zimbabwe (Sidibe & Curtis, 2002) and Pakistan (Khan et al., 2008) this study has also established evidence that schools with sanitation and health clubs had cleaner latrines than those without the clubs. This finding paints a positive picture of the existence of the active clubs on the learners' hygiene behaviours. Learners that are actively involved in sanitation and health clubs are more likely to display better hygiene behaviours. This finding is consistent with the earlier study by Waterkeyn and Cairncross (2005) which found that community health clubs in Zimbabwe significantly changed hygiene behaviours and created rural demand for sanitation. Similarly, Population Services International (2009) studied safe water clubs in Neno District of Malawi and found that there was 90% reduction in absenteeism due to diarrhoeal diseases in schools that had these clubs. Waterkeyn (2006) describes community health clubs as cost-effective hygiene promotion strategies that can change risky hygiene behaviours and improve on socio-economic development.

CHAPTER SIX

6.0 CONCLUSION

6.1 Introduction

This chapter draws the conclusion and implications of the results of the study. The conclusions were arrived at through an inductive approach using interpretivism philosophy.

6.2 Conclusions

The study was aimed at exploring factors affecting the implementation of water, sanitation and hygiene projects in primary schools in Zomba Rural. The implementation of water, sanitation and hygiene in primary schools in Zomba Rural had been affected by the following factors namely: child friendly designs, stakeholder involvement (school management committee, teacher and learners), institutional capacity, commitment and support by leaders at different levels, availability of strong development policies and implementation plans, financial resource constraints, soil structure and terrain, and learners hygiene practices (behaviours).

Nonetheless, the following were found to be factors that enhance the successful implementation of water, sanitation and hygiene projects in primary school in Zomba Rural: involvement of school management committee, child friendly designs, commitment and support by leaders at different levels (political will), availability of strong development policies and implementation plans, and institutional capacity.

Challenges to the implementation of WASH projects were: insufficient financial resources, poor learners' hygiene practices, lack of operation and maintenance mechanism, poor supervision of the latrines resulting into poor hygienic conditions, inadequate capacity building (training) for key stakeholders (teachers, learners and school management committees) in hygiene promotion, vandalism and theft of WASH facilities, natural disasters and climate change.

The implications of the findings are that for WASH projects to be successful in primary schools in Zomba:

- Implementers should involve key stakeholders (school management committee, teachers and learners) throughout the project cycle.
- The facilities should be child friendly for instance the facilities should meet children's needs.
- The implementers should persuade leaders at different levels for their support.
- Provision of infrastructure alone is not sufficient if not accompanied by hygiene promotion.

CHAPTER SEVEN

7.0 RECOMMENDATIONS

In order to scale up the successful practices and address the challenges facing the implementation of water, sanitation and hygiene projects the following recommendations to various international development partners, government and non governmental organisations that implement WASH projects in schools are proposed:

- The District Education Office in liaison with the District Council should establish a financing mechanism to sustain operation and maintenance of WASH facilities on a participatory and demand responsive approach. Increasing funding alone is not a universal remedy for financial challenges facing school water, sanitation and hygiene projects. However, there is need to implement demand-based projects where school communities show commitment in the operation and maintenance of the facilities. When school communities (teachers, parents, learners and school management committees) are responsible for the operation and maintenance of the facilities chances of sustaining the facilities are very high.

- While the WASH facilities adopt child-friendly designs, more attention should also be paid to girl-friendly designs where menstrual hygiene management facilities are prioritised in the implementation plans so that girls should not miss classes during menstruation. Girls staying and learning in schools eliminate gender disparity and fulfil Education for All (EFA) and Millennium Development Goals on universal access to primary education.

- Key stakeholder involvement in school WASH projects should be encouraged in order to increase ownership of the projects and hence sustain them (projects). The involvement of learners, parents, teachers and school management committees in WASH projects is a paradigm shift from the tendency to link projects with service providers and expect that the same (service providers) would be responsible for the repairs and maintenance. So

knowledge transfer through school community mobilisation is one of the essential strategies to achieve this paradigm shift.

- Poor sanitation and hygiene practices in schools could be successfully eliminated by public and private sectors working in partnership to create effective, large scale, and sustainable and best sanitation and hygiene practices. The government through the Ministry of Education, Science and Technology should promote public private partnerships in WASH services especially soap manufacturing companies in hand-washing promotion. For example, one way to make hand-washing with soap an all-inclusive custom and school community rule is that the District Education Office should partner with soap manufacturing companies and other state and non-state actors in water, sanitation and hygiene services.

- Stakeholders should also intensify awareness campaigns on hygiene promotion through fun based activities such as drama, debates, awareness raising walks, puppet shows and school or inter-school competitions to promote behaviour change intervention so as to curb poor sanitation and hygiene practices and thereby enhancing hygiene education. These activities will eventually expose learners to life skills-based hygiene education which is fundamental to sustainable good hygiene practices.

- The Environmental Office at the District Council should engage school communities in climate change mitigation and adaptation strategies such as integrated water resources management (IWRM) and water use efficiency measures.

This research work contributes to the literature on water, sanitation and hygiene projects in rural primary schools by identifying key factors in their implementation. This will provide useful information to Zomba District Education Office (Rural) as a lead agency in education sector at a district level, and other implementers of school water, sanitation and hygiene projects in up-scaling the plans for projects in Zomba Rural.

The study is limited to the context of a rural setting of one district. Although findings can be useful in similar environments they can not be generally applied. In addition the findings do not

present causal relationships between the identified factors and the success or failure of the project. Further research is needed that can cover wider contexts and that would determine the causal relationships between variables.

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LIST OF APPENDICES

Appendix 1: Interview Summary Form

Interviewee: _____ Date of Interview: _____

Place: _____ Time of Interview: _____

Duration of Interview: _____

1. Was the venue suitable?

2. Were there any problems and how can this be improved for next interview?

3. Did the interview schedule work well?

4. Does it need to be altered or improved?

5. What were the main themes which arose in the interview?

6. Did any issues arise which need to be added to the interview schedule for next interview?

7. Is the interviewee willing to be contacted again?

Appendix 2: Focus Group Summary Form

Date: _____ Time: _____

Venue: _____ Duration: _____

Group: _____

1. Was the venue suitable?

2. How many people participated in the group discussions?

3. Did they work well as a group or were there any adverse group dynamics?

4. What can I learn from this for the next group?

5. Did the group discussion schedule work well?

6. Does it need to be altered or improved?

7. What were the main themes which arose during the focus group discussions?

8. Does anything need to be added to the discussion schedule for the next focus group?

Appendix 3: Questionnaire for Head Teachers

Instruction: Please put a tick in the appropriate box

1. State your sex

1	Male	
2	Female	

2. What is your age group?

1	15-20	
2	21-25	
3	26-30	
4	31-35	
5	Above 35	

3. How long have you been head teacher at this school?

1	Less than 1 year	
2	1-5 years	
3	6-10 years	
4	More than 10 years	

4. Indicate the enrolment for

1	All girls	
2	All boys	

SANITATION AND HYGIENE

8. Indicate the year when the latrines at this school were constructed? ----------

9. How many latrines were constructed?

1	Less than 6	
2	6-10	
3	11-15	
4	16-20	
5	More than 20	

10. Do you have separate latrines for boys and girls?

1	Yes	
2	No	

11. Do older girls have separate latrines from younger girls?

1	Yes	
2	No	

12. At what time are learners allowed to use the latrines? ***(Tick whichever applies)***

1	Any time	
2	During break times	
3	Before classes	
4	After classes	

13. Does your school provide learners with materials for cleaning the anus after defecation?

1	Yes	
2	No	

14. Which of the following materials do learners use when cleaning their anus at this school? ***(Tick as many as applicable)***

1	water	
2	stones	
3	leaves	
4	Notebooks	
5	Toilet papers (tissue)	
6	None	
7	Other (specify)	

15. Is soap for hand-washing available all the time?

1	Yes	
2	No	

16. Who provides the soap for hand-washing?

1	School	
2	School committee	
3	Other (specify)	
4	None	

17. Who is responsible for the cleaning of latrines? ***(tick as many as applicable)***

1	Learners on punishment	
2	Learners on duty roster	
3	Volunteer learners	
4	Nobody	

18. How often are the latrines cleaned per week?

1	Once	
2	Twice	
3	Three times	
4	Four times	
5	Daily	
6	Never	

19. Who is responsible for supervising the latrines? ***(tick as many as applicable)***

1	The head teacher	
2	School committee	
3	Sanitation teachers	
4	All teachers	
5	None	
6	Other (specify)	

20. Has your school ever registered cases of cholera before this water, sanitation and hygiene project?

1	Yes	
2	No	

21. Has your school ever registered cases of cholera after this water, sanitation and hygiene project?

1	Yes	
2	No	

22. Is there any operation and maintenance mechanism for the latrines?

1	Yes	
2	No	

23. Who pays for the operation and maintenance of water, sanitation and hygiene facilities?

1	School	
2	School committee	
3	Parents	
4	Other (specify)	
5	None	

WATER SUPPLY

24. Which of the following is a source of drinking water at this school? ***(Tick all those that are available)***

1	Tap water	
2	Borehole	
3	Dug well	
4	Water from the river	
5	None of the above	

25. Who provided the water source (s) at this school? ***(Tick as many as applicable)***

1	World Vision	
2	UNICEF	
3	MASAF	
4	Inter-Aide	
5	Save the Children	
6	Other (specify)	

26. Is there water available all the time at the water source(s)?

1	Yes	
2	No	

CAPACITY BUILDING

27. Did you have any training in water, sanitation and hygiene promotion?

1	Yes	
2	No	

28. How many other teachers got trained in water, sanitation and hygiene promotion at this school?

1	None	
2	1	
3	2	
4	3	
5	More than 3	

29. Are all the teachers oriented on water, sanitation and hygiene promotion by fellow teachers who got trained?

1	Yes	
2	No	

30. Are learners trained on safe water, sanitation and hygiene practices?

1	Yes	
2	No	

MENSTRUAL HYGIENE MANAGEMENT

31. What programmes are there in the school for promoting safe and private menstrual hygiene for older girls? ***(Tick as many as applicable***)

1	Menstrual hygiene education sessions for girls	
2	Napkin distribution programme	
3	Other (specify)	

4	None	

32. What facilities are there in the school for promoting menstrual hygiene practices? ***(Tick as many as applicable***)

1	Disposal/incineration facilities for napkins	
2	Rooms for managing soiled clothing	
3	Washing facilities for napkins	
4	Other (specify)	
5	None	

33. Is there any care taker for menstrual hygiene facilities?

1	Yes	
2	No	

Thank you for taking your time to complete this questionnaire.