EVALUATING THE IMPACT OF COMMUNITY LED TOTAL SANITATION IN IMPROVING SELECTED HYGIENE AND SANITATION RELATED HEALTH OUTCOMES IN TRADITIONAL AUTHORITY MWADZAMA IN NKHOTAKOTA DISTRICT, CENTRAL MALAWI

M.Sc. (WATER RESOURCES AND SUPPLY MANAGEMENT) THESIS

ALEXANDER KAMESU MWANGONDE

UNIVERSITY OF MALAWI

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M.Sc. (Water Resources and Supply Management) Thesis

BY

Alexander Kamesu Mwangonde
B.S.c (Environmental Health) University of Malawi

Submitted to the Department of Physics and Biochemical Sciences, Faculty of Applied Sciences in partial fulfilment of the requirements for the degree of Master of Science in Water Resources and Supply Management

University of Malawi

The Polytechnic

February, 2017

DECLARATION

I, **Alexander Kamesu Mwangonde**, declare that this is my own work and has not been presented or submitted elsewhere for any academic award. All sources of information used have been acknowledged.

SIGNATURE:

DATE :

CERTIFICATE OF APPROVAL

We hereby declare that this thesis is the student's original work and where assistance has been sought, this has been acknowledged. It is therefore submitted with our approval.

Postgraduate Dean :

Signature :

Date :

Name of Main Supervisor :

Signature :

Date :

Name of Co-Supervisor :

Signature :

Date :

Head of Department :

Signature :

Date :

DEDICATION

To my wife, Fanny and my two children, Lusekero and Cecilia, for missing a husband and father respectively during the entire two-year programme of study.

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ABSTRACT

Sanitation and hygiene-related diseases are one of the greatest challenges to the achievement of the Millennium Development Goals for Nkhotakota District. The overall coverage of access to adequate sanitation in the District is 20%. To increase coverage of hygiene and sanitation, Hygiene Village Project (HVP) is implementing a five-year hygiene and sanitation project in Traditional Authority (T/A) Mwadzama in Nkhotakota District of Malawi using the Community Led Total Sanitation (CLTS). Although there has been high coverage in hygiene and sanitation related indicators as a result of implementing CLTS in the area, not much is known about the impact on health outcomes. The study therefore, aimed at evaluating the impact of CLTS in improving hygiene and sanitation related health outcomes in the area by comparing data collected before and after CLTS implementation. Data for this study were collected from 247 households using a questionnaire based survey, 19 focus group discussions, 7 key informant interviews and a review of relevant documents. All the collected quantitative data were processed and analysed using International Business Machine Statistical Package for Social Sciences (IBM SPSS) Modeler 14.0 (IBM Corp., 2013) and Stata 14 (StataCorp., 2015). Qualitative data was transcribed and later word processed using Microsoft Word package.

The findings showed that there was an increase in latrine coverage from 75% in 2012 to 95% in 2015. The occurrence of diarrhoea decreased from 19% in 2012 to 13.4% in 2014. The prevalence of acute respiratory infections (ARI) increased from 33% in 2012 to 58% in 2014. Sanitation and hygiene related mortality rates from diseases such as ARI, malnutrition and diarrhoea decreased from 21 to 12, 31 to 12, and 30 to 24 per 1,000 respectively. These findings showed that there was significant improvement in most of the health outcomes after CLTS was implemented in the study area. The study therefore, recommends that government and its implementing partners should consider scaling up the implementation of this initiative to all the remaining Traditional Authority areas in the District.

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ABBREVIATIONS AND ACRONYMS

ARI	Acute Respiratory Infections
ACCO	Assistant Centre Coordinator
CDC	Centre for Disease Control and Prevention
CLTS	Community Led Total Sanitation
DCDO	District Community Development Officer
DHC	Drop Hole Cover
DHO	District Health Officer
DSIP	District Strategic Investment Plan
DWO	District Water Officer
GDP	Gross Domestic Product
GoM	Government of Malawi
HESP	Hygiene Education and Sanitation Promotion
HMIS	Health Management and Information System
HSA	Health Surveillance Assistants
HTH	High Test Hypochlorite
HVP	Hygiene Village Project
HWF	Hand Washing Facility
IBM SPSS	International Business Machine Statistical Package for Social Sciences
ICTC	International Coalition for Trachoma Control
KAP	Knowledge Attitude and Practice
MDG	Millennium Development Goals
OD	Open Defecation
ODF	Open Defecation Free
PHAST	Participatory Hygiene and Sanitation Transformation
PSU	Primary Sampling Unit
STH	Soil Transmitted Helminth
T/A	Traditional Authority
UNICEF	United Nations Children's Emergency Fund
WASH	Water Hygiene and Sanitation
WHO	World Health Organization

CHAPTER ONE
INTRODUCTION AND BACKGROUND

This chapter highlights and introduces the research related issues of sanitation, health outcomes and problem statement in order to throw light on the subject matter. At the end of the chapter, study objectives are also stated.

1.1 Sanitation and Hygiene

Sanitation and hygiene promotion is defined as an intervention involving behaviour and facilities aiming at interrupting the disease cycle (Sandec, 2008). It is the collecting and disposing of excreta and community liquid waste in a hygienic manner so as not to endanger the health of individuals or the community as a whole (Cotton and Saywell, 1998). One of the interventions that has proved to be more efficient in sanitation promotion is the use of the community led total sanitation (CLTS) approach. The CLTS is an innovative approach for mobilising communities to completely eliminate open defecation (OD). Under the CLTS approach, communities are facilitated to conduct their own appraisal and analysis of OD and take actions to become open defecation free (ODF) (Kar and Chambers, 2008).

Around the world, poor sanitation remains a major threat to development, impacting countries' progress in health, education, gender equity and social and economic development (United Nations Children's Emergency Fund [UNICEF]/World Health Organization [WHO] Joint Monitoring Programme [JMP], 2014). Globally, 2.5 billion people do not use improved sanitation; 1 billion, almost a fifth of the world population, practice open defecation (UNICEF/WHO, 2014). OD and its public health, social and economic impacts, can create a vicious cycle of illness, high expenditure on health care, loss of work and school hours and poverty (UNICEF, 2009). Women, adolescent girls, children and infants suffer the most consequences from inadequate hygiene and sanitation facilities. The two main causes of mortality among children under the age of five – acute respiratory infections and diarrhoeal diseases are closely linked to poor water, hygiene and sanitation. Out of 1.8 million people who die each year from diarrhoea, 1.5 million are children (UNICEF, 2009). Repeated diarrhoea episodes are a significant underlying cause of malnutrition, leading to weakened immunity, impaired growth and development (Ejemot and Regina, 2008). Human faeces are the main source of diarrhoeal pathogens, which cause many common gastrointestinal infections. Sanitation and hand washing are the best barriers to faecal-oral contamination, while food handling, water purification and fly control provide secondary barriers. The elimination of OD

is shown to reduce diarrhoeal morbidity by 36% (Jenkins and Sugden, 2008). Globally around 2.4 million deaths could be prevented annually if everyone practiced appropriate hygiene and had good health, reliable sanitation and drinking water. These deaths are mostly from children in developing countries and are as a result of diarrhoea and subsequent malnutrition, and from other diseases attributed from malnutrition (Betram and Cairncross, 2010).

In Malawi, diarrhoea and pneumonia are the second and third most common causes of death and morbidity among children of less than five years respectively (National Hand Washing Campaign 2011-2012). In 2010 alone, 224,354 under-five cases of diarrhoea with 369 deaths and 860, 809 under-five cases of ARI with 958 death were reported from the primary and secondary health care levels (National Hand Washing Campaign 2011-2012).

1.2 Health Outcomes

Health outcomes can be defined as changes in the health status of an individual, group or population which is attributable to a planned intervention or a series of interventions, regardless of whether such an intervention was intended to change the health status (Definition of wellness.com, 2013). Approximately 8% of all deaths in Malawi in 2013 were attributed to water, sanitation and hygiene related diseases, with diarrhoeal diseases contributing to approximately 6.6% of the total (CDC, 2013). The Malawi National Sanitation Policy's strategic objective is to achieve improved sanitation and safe hygiene practices whilst ensuring sustainable environmental management for economic growth (ODF Strategy, 2011). The policy advocates the use of participatory methods in delivering health and hygiene interventions. Men, women and children are encouraged to participate effectively in policy, programme and project design and implementation in order to enhance their role in sanitation and hygiene management activities.

The ultimate goal of Malawi Government is to achieve ODF status for all households in Malawi by the year 2015. With 11% of the population still defecating in the open, the Government of Malawi developed several strategies and initiatives to ensure complete elimination of open defecation in rural areas (ODF Strategy, 2011). Several efforts have been applied by the Government to control open defecation and increase latrine coverage since independence using different approaches such as hygiene education and sanitation promotion (HESP) and participatory hygiene and sanitation transformation (PHAST). Both HESP and PHAST have made remarkable strides in making Malawi ODF in the past but the only drawback to these approaches has been the overreliance on subsidies. Subsidies were good in the sense that they

were accelerating improved sanitation coverage. However, the subsidies did little in instilling a sense of ownership to the community. Since 2008 the Government along with its development partners adopted the CLTS approach. This approach enabled local communities to analyse their sanitation conditions and collectively internalise the negative impact of open defecation on public health and on the entire environment without hardware subsidy.

1.3 Problem Statement

In Nkhotakota, OD coverage is higher (17.5%) as compared to the national coverage (11%). Sanitation and hygiene-related diseases in the District are a big challenge towards the achievement of the Millennium Development Goals (MDG) for Malawi. The overall coverage of access to improved sanitation is 20% (Nkhotakota DSIP, 2013). Despite the low coverage, the District faces a problem of inequitable distribution of water and sanitation services in communities, schools and health facilities due to lack of coordination amongst several players in water and sanitation sector. In spite of the lack of coordination, the District has several strengths and opportunities which can lead to an increase in sanitation coverage. To contribute towards the achievement of target 10 of the MDG number 7 (which is to reduce by half the proportion of people without sustainable access to safe drinking water), the District Council in collaboration with several stakeholders in water and sanitation sector is implementing CLTS approach in order to accelerate the latrine coverage and eliminate open defecation.

Nkhotakota District Council estimates that 86% of the households will stop defecating in the open by 2019. To improve on sanitation coverage and eliminate open defection, the District Council is implementing water, sanitation and hygiene (WASH) activities around four components namely: water supply; sanitation; hygiene promotion and institutional development and support. Despite all the strides made towards achieving the ODF and the aspiration of reaching 86% coverage by 2019, there has been no assessment of the effectiveness of the CLTS approach and the impact it has brought on the health outcomes of the Nkhotakota community. This study was therefore conceived in order to undertake such an assessment in Traditional Authority area of Mwadzama, Nkhotakota District where the CLTS approach has been implemented since 2011.

1.4 Study Objectives

1.4.1 Main Objective

The main objective of this study is to evaluate the effectiveness of using the CLTS approach in improving sanitation related health outcomes in T/A Mwadzama area in Nkhotakota District.

1.4.2 Specific Objectives

Specific objectives of the study were to:

1. Assess knowledge, attitude and practice (KAP) on hygiene and sanitation by community members of T/A Mwadzama area, Nkhotakota District.
2. Determine the incidence of sanitation related diseases in T/A Mwadzama before and after implementation of CLTS approach.
3. Compare mortality rates due sanitation related illness before and after CLTS was implemented in T/A Mwadzama area, Nkhotakota District.
4. Assess the impact of sanitation related diseases on the community (using absenteeism among school-going age children and economic activities in adults as indicators).

CHAPTER TWO
LITERATURE REVIEW

2.1 Review of Related Literature

Generally there have been several studies conducted in Malawi to determine the impact of water, sanitation and hygiene on health outcomes but none has been done to establish the impact of CLTS as an approach on these outcomes. A study conducted by Jasper, Tam Le, Bartram (2012) to evaluate how water for hand washing and water for hand washing and drinking combined influenced health and education outcomes. The study revealed that provision of water for hand washing and hand washing materials such as soap related to decreased absenteeism and reported illnesses to increased hand washing knowledge. Schools with scarce resources for hand washing such as water provision, soap or towel reported less hand washing. The availability of toilets within the school premises also showed a great impact on health and education in school. Samwel and Gazibon (2009) highlights the need to build sustainable toilet facilities indoors in rural areas in Eastern Europe nations due to avoidance of outdoor toilets located far from school buildings. A study by Lundblad (2007) in the United Kingdom also documented avoidance of toilets observed as smelly, unclean and lacking privacy. Overcrowding in school was also associated with avoidance of toilets. Students were reported to have been avoiding using toilets due to the anxiety of waiting in line during recess or lack of privacy (Lundblad, 2007).

In the study carried out to determine sustainability and impacts of water, sanitation and hygiene interventions in India, Colford (2009) observed that despite improvements in water and sanitation infrastructure, hygiene behaviour and health outcomes in intervention villages did not appear to change. After the programme, households in villages that received hygiene education exhibited similar poor hygienic conditions as compared to those household that never received any intervention comparison villages. The study was based on the programme interventions comprising village-wide hygiene education, construction of toilets at primary schools, technical support and local training for toilet construction, and renovation of community water pumps. While the approach taken in this project was focusing much on the provision of subsidies in the construction of toilets, CLTS focused on igniting change in sanitation behaviour rather than constructing toilets. This is done through a process of social awakening that is stimulated by facilitators from within or outside the community. It is based on stimulating a collective sense of disgust and shame among community members as they confront the crude facts about mass open defecation and its negative impacts on the entire

community (Kar and Chambers, 2008). This process of putting the community to shame and disgust helps to educate the people on how diseases are spread. It also makes the people to realise that they eat their own shit which is brought to their food by flies. This being the case, the community is bound to quickly change its behaviour thereby stopping open defecation. Colford (2009) observed that there was little change in the behaviour of the community possibly because the project which was evaluated came with the component of construction of toilet infrastructure. In such projects people generally fail to attach the importance of the toilet to the health outcomes (Kar and Chambers, 2008).

Another similar study carried by Cordier, Kenward and Zahangir, (2013) which concentrated on the provision of essential infrastructure in North Western Bangladesh to ensure access to adequate sanitation, revealed a more complex situation in terms of improving access to sanitation. The study showed a significant move away from open defecation in adults even though not many are using sanitary latrines. Interestingly, the data indicated high levels of open defecation in children as stools were not being disposed of safely and sanitarily (Cordier, Kenward and Zahangir, 2013). The CLTS approach has the potential to bring about positive health outcomes in the community. Its basic principle is to first of all create a community which is ODF and then climb on the sanitation ladder. The ultimate goal is to create demand for water, sanitation and hygiene services. It inspires communities to construct simple basic latrines as they move from OD to ODF with an aim of attaining adequate sanitation. Adequate sanitation is attained through sanitation marketing.

In contrast, CLTS focuses on the behavioural change needed to ensure real and sustainable improvements –while investing in community mobilisation instead of hardware, and shifting the focus from toilet construction for individual households to the creation of ODF villages. By raising awareness that as long as even a minority continues to defecate in the open everyone is at risk of disease, CLTS triggers the community's desire for collective change, propels people into action and encourages innovation, mutual support and appropriate local solutions, thus leading to greater ownership and sustainability (Kar and Chambers, 2008).

At the heart of CLTS lies the recognition that merely providing toilets does not guarantee their use, nor result in improved sanitation and hygiene. Earlier approaches to sanitation prescribed high initial standards and offered subsidies as an incentive. But this often led to uneven adoption, problems with long-term sustainability and only partial use. It also created a culture

of dependence on subsidies and handouts. Open defecation and the cycle of fecal–oral contamination continued to spread disease (UNICEF, 2014).

The construction and acquisition of simple pit latrines is not the end to achieving satisfactory and adequate sanitation. CLTS aims at the need to climb the sanitation ladder through the creation of demand for sanitation facilities and change of behaviour by advancing sanitation marketing in the community. Devine and Kullmann (2011) defines sanitation marketing as the application of the best social and commercial marketing practices to change behaviour and to scale up the demand and supply for improved sanitation, particularly among the poor. To achieve a successful sanitation marketing results a formative research must be carried out. A research objective of specific interest in sanitation marketing is determining which factors influence open defecation or other behaviours in a given population. The factors that influence behaviours must be understood if they are to be changed through sanitation marketing. These factors called behavioural determinants include social norms, what society views as acceptable behaviour; access to sanitation suppliers such as hardware stores; and social drivers such as economic status, among others. CLTS has been used in combination with sanitation marketing to stop open defecation practices and help households move up the sanitation ladder.

Environmentally caused mortality and malnutrition have substantial economic cost. In Ghana and Pakistan, for example, the indirect effect of environmental risk factors mediated by child malnutrition on child mortality adds more than 40% to the cost of directly caused child mortality (Acharya and Paunio, 2008). If one takes into account effects of such malnutrition on impaired school performance and delayed entry into labour market, the cost doubles to 9% of gross domestic product (GDP). Lack of sanitation also leads to intestinal helminth infections, which cause stunting, late entry to school, and impair cognitive functions. Furthermore, inadequate sanitation and water supply with much loss of time spent on water collection or seeking a place to defecate also negatively impacts on productivity of households (Nokes, Grantham-McGregor, Sawyer, Cooper, Bundy, 1992). The study conducted by Strunz, Addiss, Stocks, Ogden, Utzinger (2014) discovered that access and enhanced practices are generally associated with reduced odds of soil transmitted helminthes (STH). Pooled estimates from all meta-analyses, except for two, indicated that at least 33% reduction in odds of infection associated with individual WASH practices or access. Although most WASH interventions for STH have focused on sanitation, access to water and hygiene also appears to significantly reduce odds of infections.

Campbell, Savage, Gray, Atkinson and Soars (2014) outlines the significance of provision access to WASH services as being critical in the control and prevention of STH. For WASH interventions to be effective against STH there is need for a safe water supply, appropriately constructed sanitation infrastructure that ensures safe disposal of human excreta, and promotion of hygiene (defined as personal and household practices such as hand washing, bathing and management of stored water in homes, all aimed at preserving cleanliness and health). He figures out the shortfall in using chemotherapy as the sore control measure of STH. To ensure proper hand washing behaviour, numerous individual and contextual barriers and interactions demand attention. For example, the study carried out by Lopez-Quintero, Freeman and Neumark to assess the knowledge, attitude and practice on hand washing among school children in Bogota, Colombia, it was observed that only 3% percent of students surveyed met the CDC recommendations for effective prevention of disease transmission through hand washing. Joshi and Amadi (2013) reviewed recent evidence of the impact of access to safe water, hand washing facilities and hygiene education on absenteeism and health outcomes among school-aged children. Of the five studies that assessed WASH and absenteeism, the author found that incorporating an educational component in interventions was very effective in reducing absenteeism. Access to hand washing instruction and facilities improved primary school attendance during flu season. The benefit of hand washing appeared greater in female students who had higher absenteeism rate. These studies relied on safe report of compliance and illness. Those with low socioeconomic index had worse access to safe water and improved sanitation and hygiene infrastructure compared to higher indices.

Recent disease control successes have shown what can be achieved through collaboration; however, the gains that have been made are fragile. Hamilton and Valleman (2013) underscore the importance of multi-sectoral collaboration in the control and prevention of WASH related infections. As long as the risk factors such as environments contaminated by human and animal waste, poor hygiene practices and poverty remain, there is a risk of diseases such as trachoma returning to communities that have been declared disease free after disease interventions. The fact that trachoma elimination was achieved in European countries without the use of antibiotics serves a reminder of the need for comprehensive approaches to disease control.

For example, the Ghana Trachoma Control Programme, part of a joint programme targeting trachoma, guinea worm and cholera, reduced the prevalence of active trachoma from 9.7-16.1% to less than 3.0% in endemic districts between 2000 and 2010 (International Coalition for Trachoma Control, 2011). Interventions included water and school latrine provisions, sanitation

promotion using CLTS and hygiene promotion through the use of community health workers, volunteers and mass media broadcasting (Hamilton and Valleman, 2013). Of particular importance is the need to articulate the lessons learned from Millennium Development Goals on health. Generally, the MDGs for health have resulted in much progress generating political momentum globally and contributed to considerable improvements in health outcomes in low and middle-income countries. However, with about 19, 000 children under the age of five, and approximately 800 pregnant women dying due to preventable ill- health there is still more work to be done (The World We Want, 2013). A central critique of the health sector under the MDGs has been in relation to their focus on specific diseases and reducing mortality rates.

CHAPTER THREE
METHODOLOGY

3.1 Study Design

This was a cross-sectional study that collected both qualitative and quantitative data. The study mainly aimed at assessing the impact of implementing CLTS approach in T/A Mwadzama area on selected health related outcomes. This was done by comparing data collected before CLTS (baseline) and after CLTS (evaluation) was implemented in the area.

3.2 Study Area

The study was conducted in T/A Mwadzama area in Nkhotakota District. The area is situated to the south of the District bordering Salima District to the south, Lake Malawi to the east and T/A Mwansambo to the west (Figure 1).

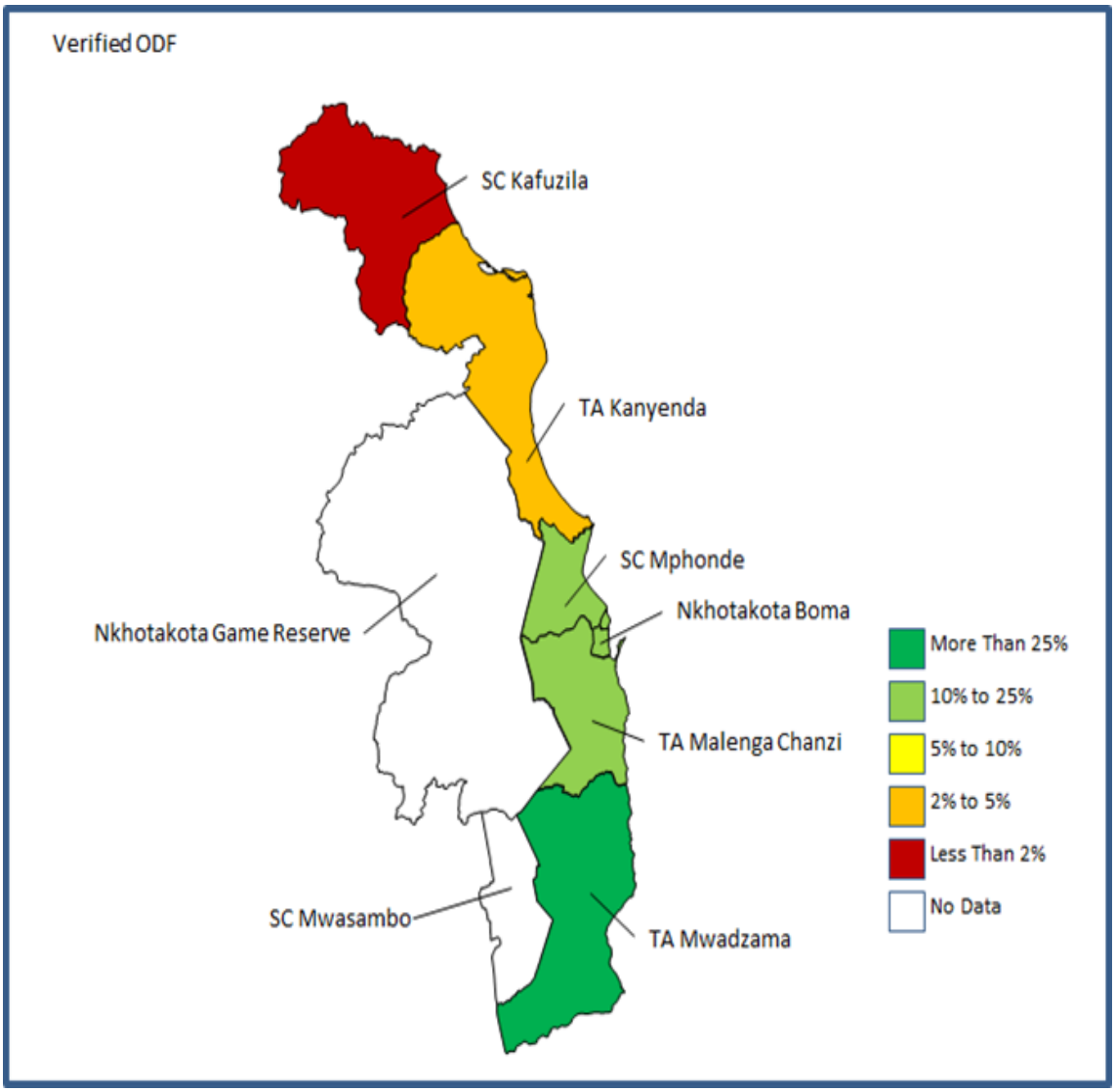

Figure 1: Map of Nkhokakota District Showing the Study Area – (***Source:*** Nkhotakota DSIP, 2013)

3.3 Study Population

The area has a total population of 83,572 comprising six group village heads and 37 villages and a total of 2,213 households. The water and sanitation coverages in the area at 81% and 98% respectively.

3.4 Sample Size and Data Collection

Multi-stage cluster sampling method was used to identify study units (household heads) for the household survey in this study as follows:

A two-stage cluster sampling technique was used to sample the households and the sampling frame comprised of all households in T/A Mwadzama. All the five health facility catchment areas in T/A Mwadzama namely, Benga, Kapiri, Malowa, Mtosa and Alinafe were used to randomly sample the villages that participated in the study. The following villages were sampled from each health centre catchment area: Chimbalu, Mnyangwa and Tchale from Alinafe Health Centre; Benga 1 and Kamongo from Benga Health Centre; Chizongwe and Chilipula from Kapiri Health Centre; Chalunda, Chiperera and Zambwe from Malowa Health Centre; and Chiponda, Tembwe and Mkulumimba from Mtosa Health Centre. In total, 13 villages were sampled and each randomly provided 19 households to participate in the study. Consequently, a total of 247 households were sampled from a total of 2,213 households in T/A Mwadzama.

The T/A area was the entry point to obtain access to the health facilities that participated in this study. A list of households was obtained from a Health Surveillance Assistant (HSA) for that village (using the village health register) from which 19 households were randomly selected to participate in the study. The primary sampling unit (PSU) was a village in the health facility. A household survey questionnaire was administered to sampled households in the villages where CLTS was being implemented.

The evaluation also captured qualitative data through 19 focus group discussions (FDG) and seven key informant interviews (KII) that were conducted. A total of 24 participants were purposively recruited for each discussion session. The 19 FGDs were held in T/A Mwadzama across all 12 group village heads and the participants were drawn from three committees namely: partnerships committee, village development committees and water partnership committees. The principal investigator recognised and emphasised inclusiveness and active participation in the discussions. Each committee on average sent a total of ten members to the

discussion, i.e., five men and five women. The people living with disability were drawn from partnership committees. The respondents to the seven key informant in-depth interviews were: Group Village Headman (GVH) Chiperera, Nkhotakota District Water Officer (DWO), Water, Sanitation and Hygiene (WASH) Coordinator, Benga Assistant Centre Coordinator (ACCO), Hygiene Village Project (HVP) Project Manager, Nkhotakota District Community Development Officer (DCDO), Mtosa Senior HSA and Malowa Primary School Head Teacher.

As for documents reviewed, the available information from the District Health Office and District Council Office were also used. Health and Management Information System (HMIS) registers and Water and Sanitation reports with most of these indictors being studied were also be used.

3.5 Data Analysis

All quantitative data collected during the study were processed and analysed using IBM SPSS Modeler 16.0 (IBM Corp., 2013) and Stata 14 (StataCorp., 2015). Analyses involved generating tabulations, cross-tabulations, frequency, graphs, chi-square tests and analysis of variance (Anova). Qualitative data from FGDs and KIIs were transcribed and later word processed using a standard Microsoft Word package. Data was analysed using approaches rooted in grounded theory and in particular, coding and content analysis technique was used.

3.6 Ethical Consideration

The study sought permission from relevant authorities both at Nkhotakota District Health Office and District Council before implementation. At community level, permission was obtained from traditional leaders and all research participants were assured that the information they would give would be treated as confidential and anonymous.

3.7 Limitations of the Study

The following limitations were identified during this study:

i. The enumerator's translation of questions from English to Chichewa may have varied from enumerator to enumerator.
ii. The enumerators influenced the results in one way or the other such as showing verbal or non-verbal response to correct answer.
iii. Project literature was lacking baseline data on some indicators. The evaluation team had to use alternatives like Government and District Reports, i.e., Nkhotakota DSIP (2012) to consolidate the missing data.

iv. Poor design of some indicators hampered the verification exercise to ascertain performance level during the evaluation. The challenge was further exacerbated by unavailability of the proxy indicators.

In the interest of minimising bias in the facilitation of the survey, the following measures were employed: The Principal Investigator selected and trained highly qualified but also experienced enumerators. Secondly, field testing of the tools was done and necessary revisions were made. Lastly, all questionnaires were verified by line supervisors on daily basis and feedback was given to enumerators before conducting field work the next day.

3.8 Health Outcomes Evaluated

3.8.1 Knowledge, Attitude and Practice

In assessing knowledge, attitude and practice the study measured knowledge on use of soap or sanitizer, latrine coverage in community and households, hand washing frequency, sanitation practice, like use of latrines and prior knowledge of hygiene practices, household water treatment and water treatment practices. The study collected data related to this outcome through a household questionnaire survey administered to heads of households.

3.8.2 Incidence of Sanitation and Hygiene Related Diseases

The most common diseases related to sanitation and hygiene are diarrhoea, intestinal worms, schistosomiasis and respiratory infections. The study assessed water access, sanitation and hygiene practices in relationship to diarrhoea prevalence and other infections in the community. The study further examined the risk factors predisposing the community to diarrhoeal diseases. This data was collected through a questionnaire survey as well as by reviewing relevant health records obtained from the health facilities.

3.8.3 Impact of Sanitation and Hygiene Related Diseases on School Absenteeism and Economic Activities

In assessing the impact of sanitation and hygiene related diseases on economic activity, household members were asked whether they had lost any productive days due to diarrhoea. School absenteeism was also measured among school-going age children. The study also assessed the impact of WASH practices on reducing absenteeism to both adults on economic activity and pupils in school.

3.8.4 Impact on Child Mortality

Since diarrhoea is directly linked to unsafe disposal of human faeces, under five deaths was measured in the study area for specific period. This was compared to number of deaths occurred in the community before and after CTLS was implemented in the study area.

CHAPTER FOUR
RESULTS

This chapter presents the results or findings of the evaluation study. These results are drawn after processing and analysis of the collected data and applying interpretations.

4.1 Sample Characteristics of Survey Respondents

The demographic characteristics of individuals included in the evaluation and baseline surveys in T/A Mwadzama and T/A Malengachanzi areas are shown in Table 1. The evaluation study included individuals drawn from T/A Mwadzama while those for the baseline were sampled from two areas of T/A Mwadzama and T/A Malengachanzi.

Table 1: Sample Characteristics for Evaluation and Baseline Surveys

	EVALUATION	**BASELINE**
n	**=247**	**=900**
Mean age (SD)	=38.99 (14.93)	
Respondent Gender		
Male (%)	=129 (52.2)	=483 (53.7)
Female (%)	=118 (47.8)	=417 (46.3%)
Employment status		
Unemployed	=229 (92.7)	=831 (92.3)
Employed	=18 (7.3)	=69 (7.7)
Level of education		
Primary and below	=247 (99.6)	879 (97.7)
Above Primary	=1 (0.4)	28 (2.3)

The total number of households studied was 247 translating to approximately 24.7 households per village. The mean age of the respondents was 38.9 with the standard deviation (SD) of 14.9. In terms of gender, more households were male headed (52.2%) as compared to those headed by females (47.8%). Regarding employment status, 92.7% of the respondents were unemployed. Education levels were low as depicted by 99.6% who attained primary and below education level. Only 0.4% of the respondents had reached above primary level of education.

4.1.1 Age Distribution of the Respondents

As shown in Figure 2 below, the study observed that the majority of the respondents were in the age range 21 to 40 years. Out of the total number of respondents 172 (69.6%) were household heads and 75 (30.4%) just represented the household heads to answer the questionnaire.

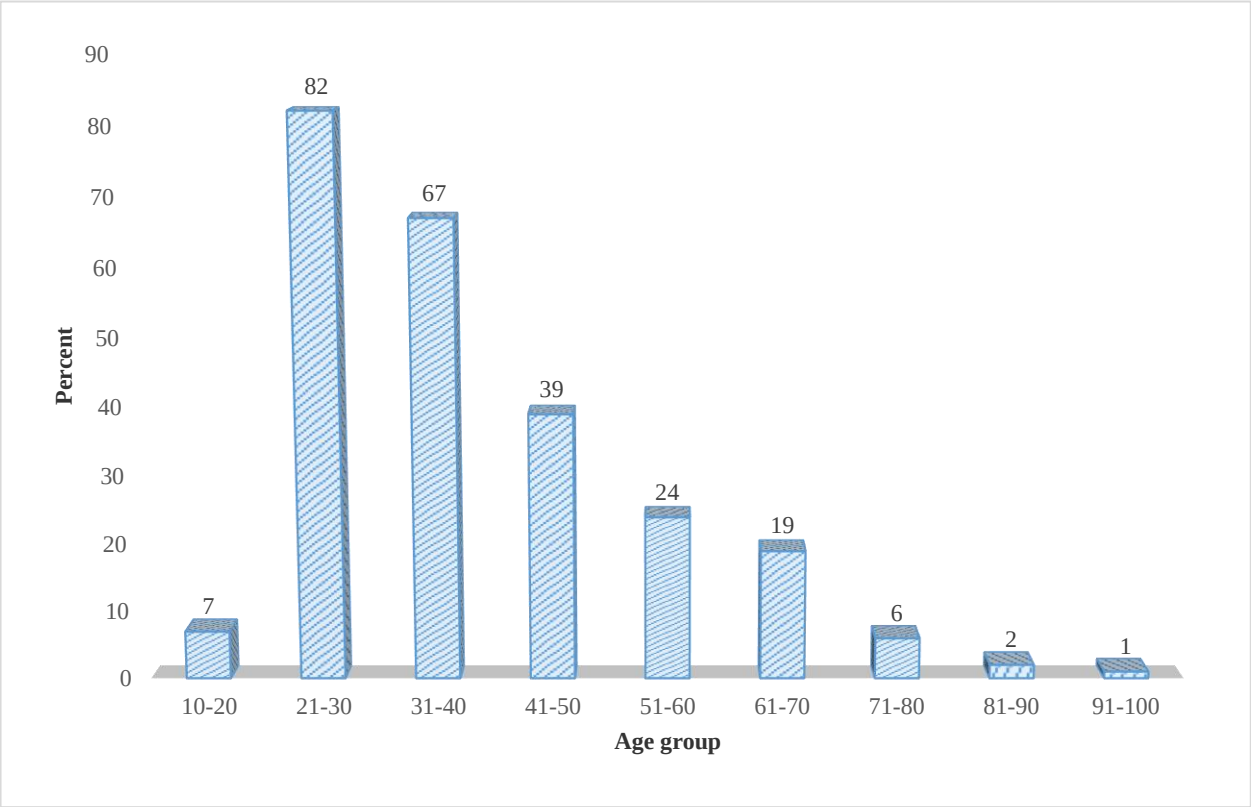

Figure 2: Age Distribution of the Respondents

4.1.2 Economic Status of the Respondents

It was observed that the majority of the respondents were not employed. The study established that only 7.3% were in formal employment. Apart from being employed some respondents were involved some sort of business. The data collected showed that 16.2% of the respondents were involved in doing some business as a way of earning a living. Furthermore, the results showed that the majority of those who were not employed in T/A Mwadzama (50%) had a monthly income of less than K5,000.00 per month as depicted in Figure 3 below.

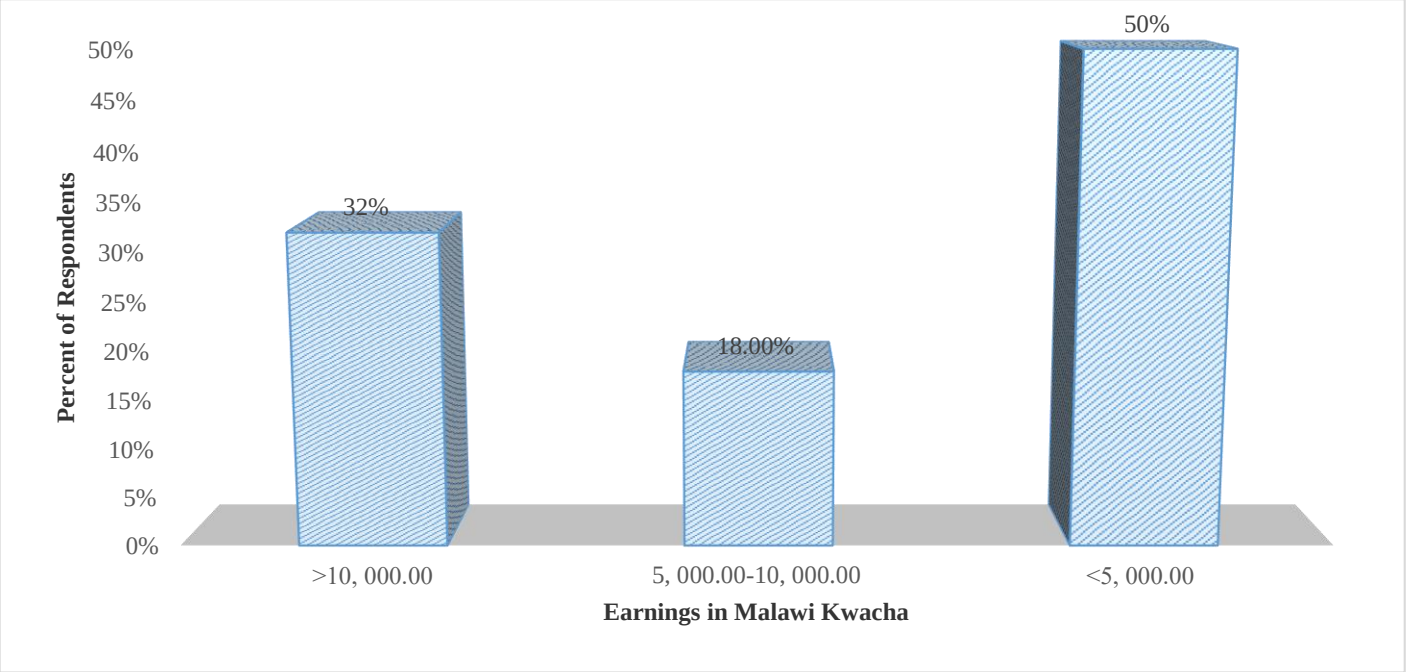

Figure 3: Monthly Earnings of Respondents

4.1.3 Alternative Source of Income

It was reported that those respondents who were neither employed nor doing business earned their living through other economic activities as depicted in Table 2.

Table 2: Alternative Sources of Income for Respondents

ITEM	FREQUENCY	PERCENTAGE
Farming	124	62.0
Fishing	4	2.0
Farming and piece work	68	34.0
Farming and fishing	1	0.5
Others	3	1.5
Total	**200**	**100**

4.1.4 Level of Education

When asked about the level of education the majority of the respondent reported to have attended school between Standards five and eight, accounting for 35.2% of the study population (Figure 4). This was seconded by those that had attended junior primary education (Standards 1-4) which accounted for 28.7%. Only one person reported to have attended tertiary education

and this was 0.4% of the respondents sampled. Of 18.2% of the respondents reported to have not attended any form of education.

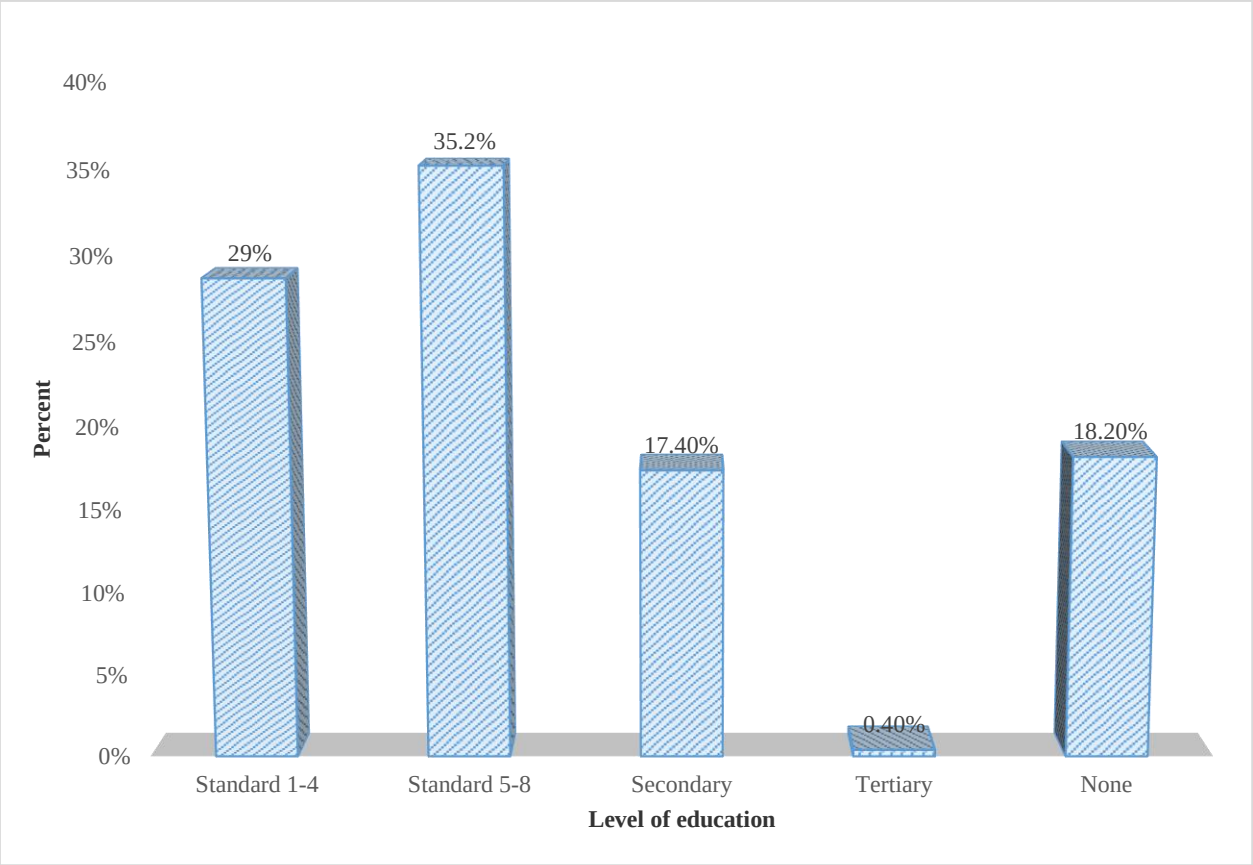

Figure 4: Level of Education of Respondents

4.2 Knowledge, Attitude and Practice

4.2.1 Level of Sanitation and Hygiene Knowledge

In order to determine their level of knowledge on sanitation and hygiene issues respondents were asked several questions related to this. When asked if they had ever heard about sanitation and hygiene, 97.2% said they had heard about the topic before. When asked to give the meaning of hygiene and sanitation 53.8% (n=133) gave the correct meaning, 46.2% gave the wrong meaning and 0.4% were not sure about the meaning. 82.6% said they had received hygiene education messages with 17.4% saying they have never received any hygiene education message. The source of the messages was also assessed and it revealed that a big proportion got the messages from health workers as shown in Figure 5 below.

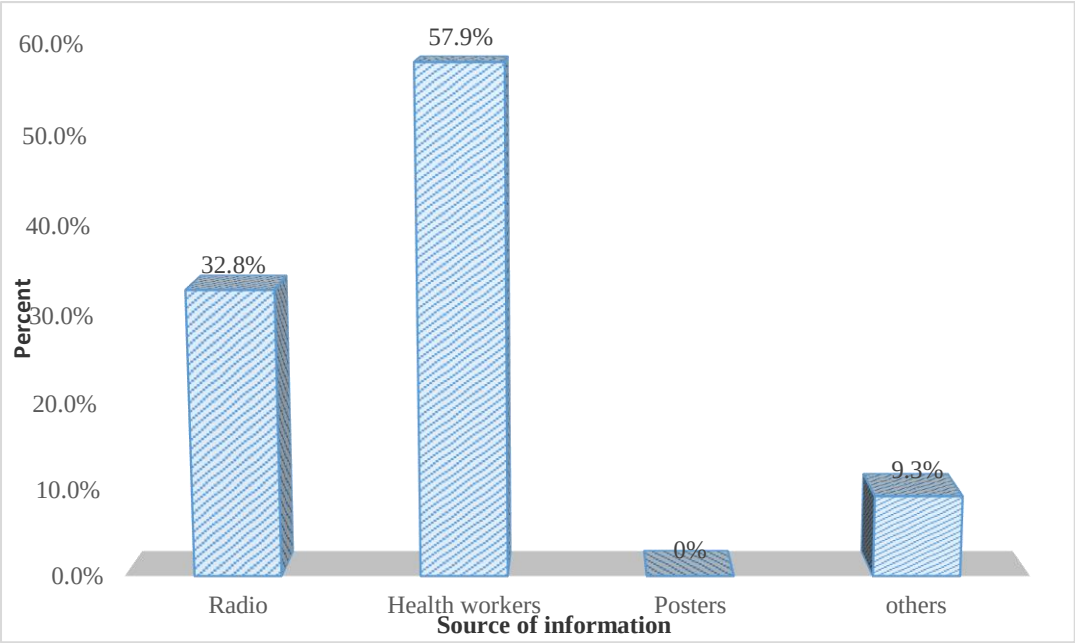

Figure 5: Source of Information on Sanitation and Hygiene Issues

4.2.2 Latrine Coverage and Hygiene Practice

The availability of the latrines among the households interviewed was also assessed and 85.4% were observed to have latrines in their homes. It was observed that availability of both latrines and hand washing facilities were increasing over the years. Latrine and hand washing facilities coverage increased from 76.1% and 6.0% in 2012 to 85.4% and 26.4% in 2015 respectively as shown in Figures 6 and 9 and from the Chi-square test results in Table 11 (Annex 3). The relationship between the latrine and HWF is statistically significant (p-0.036). This therefore, means that having a latrine influence a household to have a HWF besides the latrine. By observation, 26.4% of the respondents having the latrine had a hand washing facility besides their latrine where as 73.6% did not have the hand washing facility (Figures 6-9). The source of this data was WASH annual reports from the District Council.

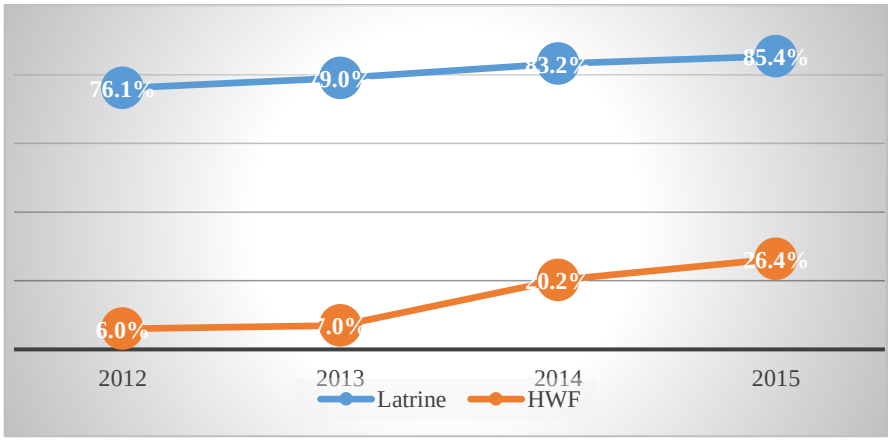

Figure 6: Latrine and HWF Availability Trends in T/A Mwadzama Area

Figure 7: An Improved Pit Latrine

Figure 8: A Household Member using a HWF

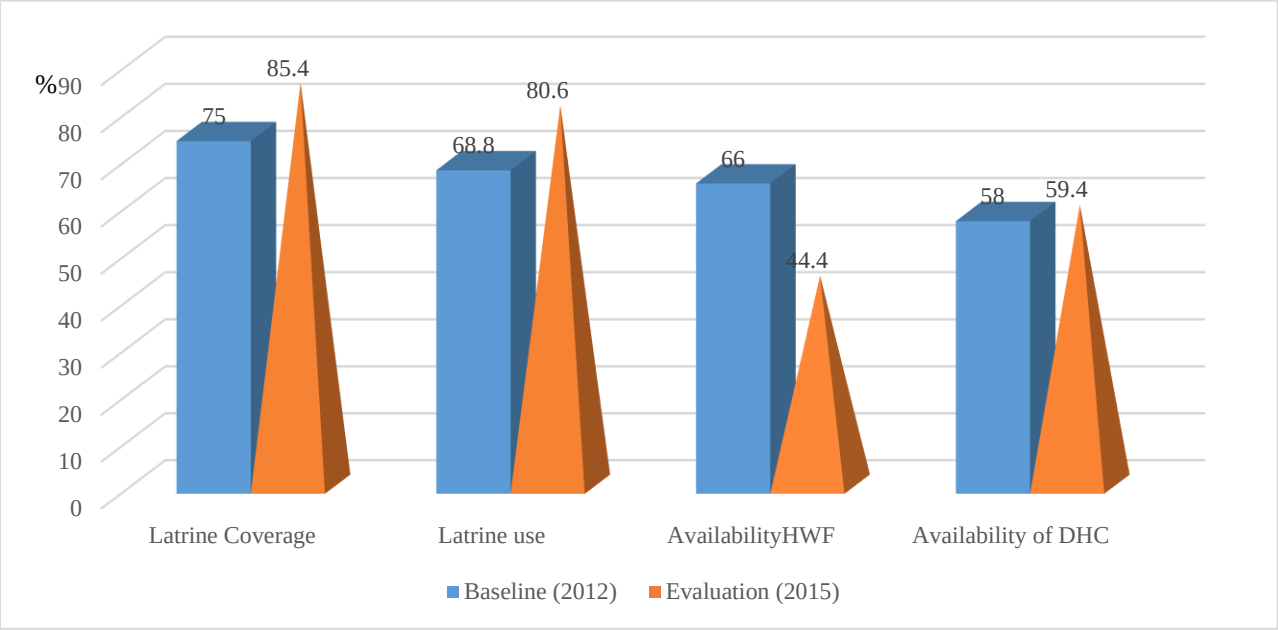

Figure 9: Latrine Coverage and Use, Availability of HWF and DHC

4.2.3 Correlation Between Availability of a Latrine and Employment Status of Respondents

From the cross-tabulation as shown in Table 3, it is clear that there was a significant relationship between employment status and the ability for one to own a latrine because the p-value was 0.019 (p-<0.05) as can be seen in Table 10 (Annex 3). This means that if a respondent was employed it was more likely that he or she would own a latrine.

Table 3: Significance Test for Availability of Latrine versus Employment

		Does the household have a latrine?		
		Yes	No	Total
Are you employed?	Yes	12	6	18
	No	199	30	299
Total		211	36	247

The household were also observed in order to find out whether they were using the hand washing facilities or not. It was discovered that there was 100% usage of the HWF as opposed to the usage during the baseline data collection with only 66% of the household using the HWF. For those who were using the hand washing facilities, 3.6% (n=9) reported to have been using

soap for washing hands after visiting the toilets. Despite 99.2% of the households indicating knowing the importance of using soap after visiting the latrine, 96% of those washing hands with soap knew the correct importance of this behaviour (the importance is to prevent diarrhoeal diseases). On whether the available latrines had a tight fitting DHC, by observation only 59.4% were seen to practice this behaviour while 40.6% did not practice it as can be surmised from Table 4 below.

Table 4: Comparison of Availability of DHC During Baseline and Evaluation

	Baseline 2012		**Evaluation 2015**	
Item	**Frequency**	**Percent**	**Frequency**	**Percent**
Available	399	58.8	133	59.4
Not available	280	41.2	91	40.6
Total	**679**	**100**	**224**	**100**

4.2.4 Significance Testing Level of Education against Availability of a Hand Washing Facility

In Table 5 below it is clear that level of education does not necessarily influence the practice of using the hand washing facility which is beside the latrine. This is because $p>0.05$ (p-0.065) therefore the association might be by chance.

Table 5: Level of Education versus HWF Cross Tabulation

		Use of a hand washing facility		Total
		Yes	No	
Level of education	Standards 1-4	33	29	62
	Standards 5-8	37	51	88
	Forms 1-4	27	23	50
	None	20	27	47
Total		117	130	247

On how often do the household members wash their hands, 23.5% indicated to have been washing their hands at all the five critical times, thus after visiting the toilet, before eating food, after removing baby's nappies, before preparing food and before breastfeeding (Figure 10). The majority (30.8%) wash their hands before eating food only.

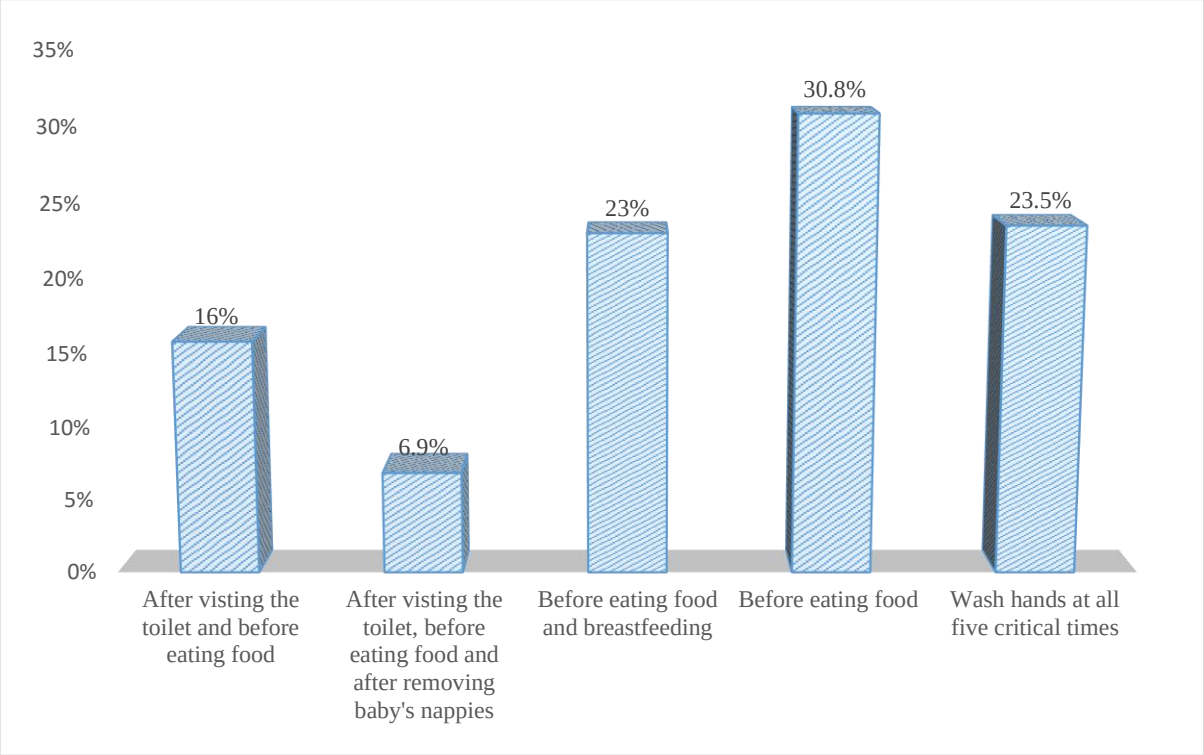

Figure 10: Critical Times for Hand Washing Amongst the Respondents

4.2.5 Respondents Having Received Hygiene Education Messages Before

Respondents were also asked whether they have ever received hygiene education messages for which 82.6% indicated to have received such messages and 17.4% indicated to have never received the message (Table 6).

Table 6: Hygiene Education Messages amongst Respondents

	Frequency	Percent	Valid Percent	Cumulative percent
Yes	204	82.6	82.6	82.6
No	43	17.4	17.4	100
Total	**247**	**100**	**100**	

4.3 Assessment of Disease Incidence

4.3.1 Disease Prevalence of Some Sanitation and Hygiene Related Diseases

When asked if there was any member in the house who had suffered from diarrhoeal diseases in the past one month, 35.2% reported to have encountered a diarrhoeal episode as indicated in the Table 7 below:

Table 7: Incidence of Diarrhoea over the Past Years

	Frequency	Percentage	Valid Percentage	Cumulative Percent
Diarrhoea incidence	87	35.2	35.2	35.2
No diarrhoea incidence	160	64.8	64.8	100
Total	**247**	**100**	**100**	

Three sanitation and hygiene diseases were assessed to ascertain their incidences over the years. Diarrhoeal diseases decreased from 19% in 2012 to 13.4 in 2014. Surprisingly the prevalence of ARI increased drastically from 33% in 2012 to 58% in 2014. Prevalence for Dysentery remained almost unchanged over the years as summarised in Figure 11 below.

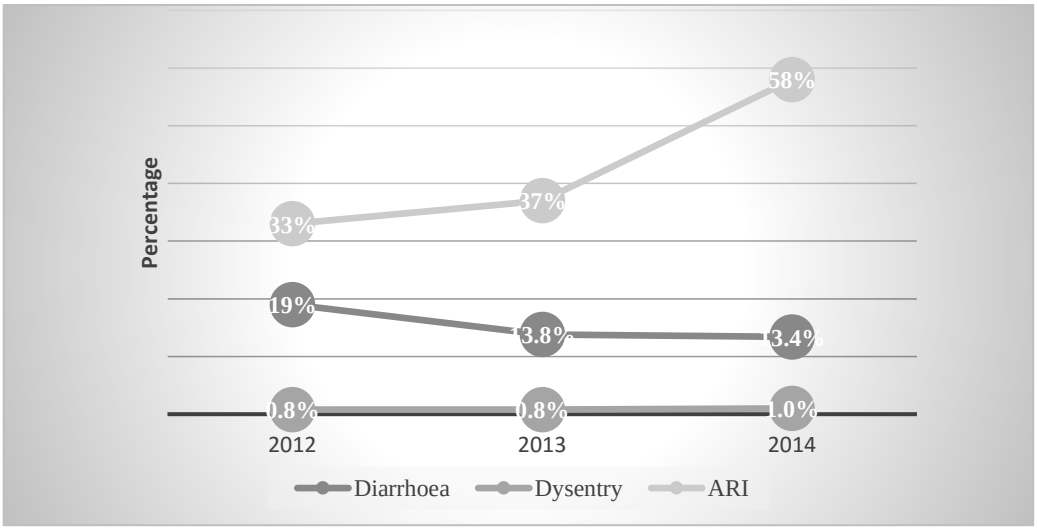

Figure 11: Prevalence of Sanitation and Hygiene Related Diseases Over 3 Years

4.4 Assessment of Mortality Rates

Data from the District's Health Management and Information System (HMIS) was analyzed to compare the mortality rates amongst the leading causes of death among the under five children in T/A Mwadzama. It was discovered that over the years malaria has been topping the list and is still rising. Sanitation and hygiene related diseases like ARI, diarrhoea and malnutrition were lower and decreasing over the years (Figure 12).

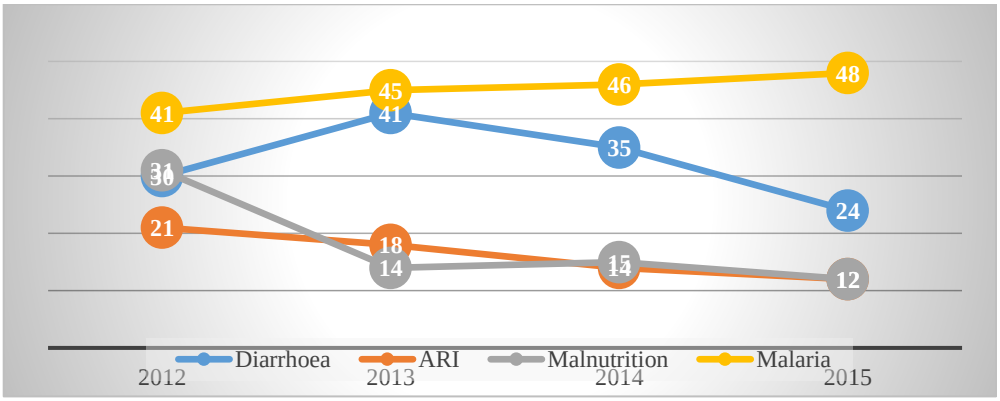

Figure 12: Child Mortality Rates Due to Selected Major Child Killer Diseases

4.5 Water Source

The majority of the respondents draw water from a borehole (Figure 13) representing 72.1% (n=178) of the study population (Table 8). A small percentage (27.9%) drew their water from either rivers or unprotected shallow well.

Table 8: Sources of Water for Households

	Frequency	Percent	Valid Percent	Cumulative Percentage
Borehole	178	72.1	72.1	72.1
Unprotected Water source	69	27.9	27.9	100
Total	247	100	100	

Figure 13: A Safe Water Facility

4.5.1 Distance to Water Source

The barriers (distance and time of waiting) to access safe water were also assessed. When asked how far the water source was from their houses, 98.8 indicated to be drawing water within 500 meters of the distance. Only 1.2% indicated to be drawing water from a distance more than 500 meters as show on Figure 14.

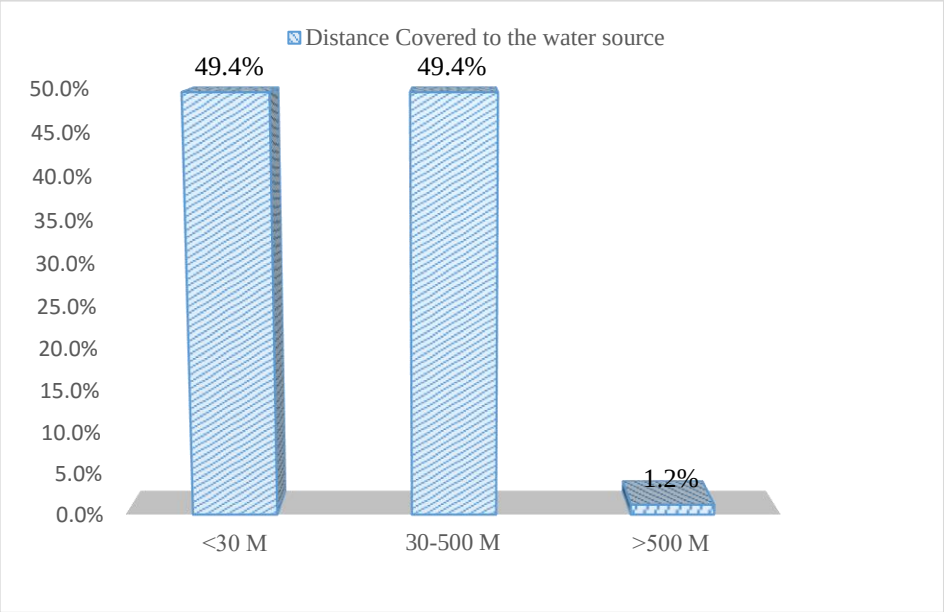

Figure 14: Distance Covered to the Water Source

4.6 Impact of Hygiene and Sanitation Related Diseases on School Absenteeism and Economic Activity

4.6.1 Child Absenteeism in the Past One Month

When asked whether there was any child who was absent from school due to illness, 38.5% (n=92) of those who answered this question reported to have some children who were absent while 61.5% did reported not to have children who were absent on medical reasons. 45.7% of all absenteeism was due to hygiene and sanitation related illnesses and the rest were due to other diseases like malaria, eye conditions and injuries as shown in Table 9 below:

Table 9: Child Absenteeism Due to Illness

	Frequency	Percentage	Relative Frequency
Yes	92	37.2	38.5
No	147	61.5	100
Total	**239**	**100**	

The relationship between child sickness and owning a latrine was significant in the sense that the p-value was less than 0.05 (P-0.0024). This means that those who had a latrine had fewer incidences of their children getting sick. ANOVA- Adult sickness versus having a latrine was equally insignificant (p-4186) as seen in Table 13 (Annex 3).

4.6.2 Length of Absenteeism from School

The majority of those who were absent stayed away from school for less than one week (85.9%) and only 14.1 percent stayed longer than one week. For adults, 24.1% did not work due to illness while 75.9% did not report any illness in the past one month. 69% of all the illnesses were due hygiene and sanitation related diseases and the rest were mainly from malaria and other conditions. In adults, length of illness was higher in the more than one week-category (51.7%) as compared to the children.

4.6.3 Comparison of Some Common Indicators Before and After Implementation of the Project

Figure 15 shows that the incidences of hygiene and sanitation related disease in adults were high before the project (69.3%) compared to 2015 after the evaluation of the project which was at 23.5%. In children, the trend was the same with fewer children having reported an episode of hygiene and sanitation related disease after the project was implemented as compared to the situation when the project was not there. Length of absence to an economic activity was slightly higher (49.8%) before the project as compared to the time after the project was implemented. In children, the trend was the opposite with the length of absenteeism being higher after the project was implemented (85.9%) and lower before the intervention. This could be due to different reasons other than hygiene and sanitation diseases. Knowledge on the importance of having and using latrine and hand washing facilities increased from 66.8% during the baseline to 99.2% during the evaluation of the project which resulted into reduction of hygiene and sanitation related diseases from 69.3% to 23.5% in adults and from 45.6% to 37.2% in children.

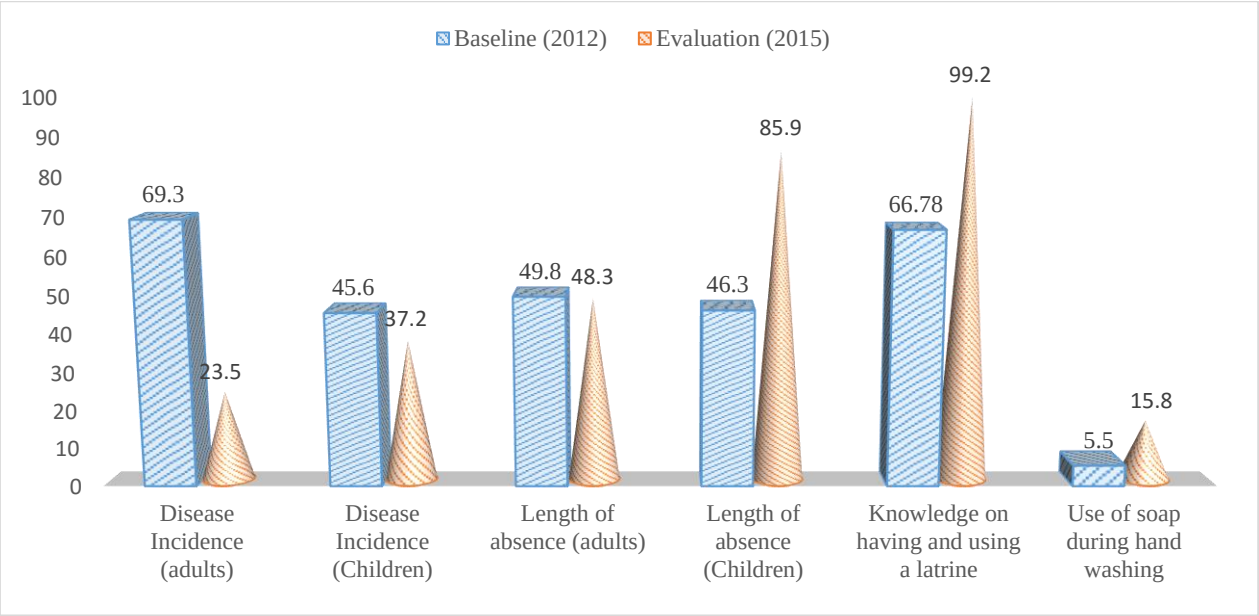

Figure 15: Comparison of Selected Indicators Before and After CLTS

Before the project, only 5.5% of the households were using soap during hand washing compared to 15.8% of the household during the evaluation of the project activities, and the incidences of hygiene and sanitation related diseases for adults was at 69.3% compared to 23.5% during the evaluation of the project activities. Furthermore, the incidences of hygiene and sanitation related diseases amongst children had been reduced to 37.2%, from 45.6%.

During the regression analysis, the relationship among the three parameters (Child illness, have latrine and water source) was statistically significant because the p-values was less than 0.05 (p-value=0.006) (Table 14, Annex 3). This means that illness was less likely to occur if the household that had a latrine and at the same time drew water from protected water sources.

CHAPTER FIVE
DISCUSSION

This chapter discusses the study's main research findings in relation to sanitation and hygiene and links the subject matter to other authors' research findings.

The study in general revealed that implementation of the CLTS approach has contributed in improving sanitation and hygiene related indicators in T/A Mwadzama in Nkhotakota District. The study revealed that a bigger proportion of the population in the study area have ever heard about sanitation and hygiene. This represented 97.2% of the study population which demonstrates existence of high knowledge level about sanitation and hygiene issues in the area. Further, the study revealed that 53.8% of this population knew the correct meaning of hygiene and sanitation. This confirms the increase in knowledge to the study population after hygiene education was introduced in the area. The study further showed that 82.6% of the study population has received hygiene education messages with 17.4% saying they have never received any hygiene education messages. The source of the messages was largely health workers as compared to other sources which the study assessed. In a study conducted by Talaat et al (2011) in Egypt which assessed the effect of hand hygiene campaigns on the incidence of laboratory confirmed influenza and school absenteeism in school children showed that there is a significant reduction in illness related absenteeism, infection rate including diarrhoea, conjunctivitis and influenza.

The study further revealed that currently the latrine coverage is 85.2% in the area. In essence, this means that the area is not yet Open Defecation Free (ODF) despite that all the villages in the area have been triggered, verified and declared ODF. By definition, the Open Defecation Free status means that latrine coverage in the area should have been at 100%. This declaration, that the area has attained the ODF status, contradicts the assertion of Kar and Pastuer (2005) who alludes that once an area has been declared ODF the latrine coverage is 100%.

The study has further found that although the latrine coverage in T/A Mwadzama area was very high, most of the households did not provide for hand washing facilities besides the latrines. Of particular concern was the slow pace among the communities towards adopting the hand washing behaviour observed in the area. Since the start of the implementation CLTS in the area, there has been a very small change in people having hand washing facilities besides their latrines. Some, despite having the hand washing facilities, rarely use them after visiting the

toilet. Of particular importance is the fact that people do not use soap during hand washing. These behaviours have had a very huge impact in improving the sanitation and hygiene related health outcomes. Out of all the households that were studied only 26.4% had hand washing facilities besides the latrine. Jenkins and Sugden (2013) used a formative research to investigate the need and demand for dedicated hand washing in Cambodia households. They found that most households that depended on stored water lacked a dedicated hand washing place and materials, which made hand washing cumbersome, time-consuming and required some assistance to perform. Respondents were interested in and considered buying hand washing equipment suggesting a demand for such materials.

Hand washing materials which improves ease, convenience and is of low cost and takes variable water availability into account may enable better hand washing behaviour. The households in T/A Mwadzama area were also observed to see if they were using the hand washing facility, it was discovered that there were 100% usage of the HWF as compared to the usage during the baseline with only 66% of the household using the HWF. For those using the hand washing facilities only 3.6% (n=9) reported to have been using soap for washing hands after visiting the toilet. Despite 99.2% of the households indicating knowing the importance of using soap after visiting the latrine, 96% of those washing hands with soap knew the importance of this practice (to prevent from diarrhoeal diseases). On whether the available latrines had a tight drop hole cover, by observation, 59.4% were seen to practice this behaviour. On how often do the household members wash their hands 29.5% indicated that they wash their hands at all four critical times, thus after visiting the toilet, before eating food, after removing baby's nappies and before preparing food and only 23.9% were observed to wash hands before eating food. Greenland (2013) carried out a qualitative study in Indonesia that found that first time mothers infrequently wash hands with soap. If they did wash hands, they primarily washed after food preparation, household chores or after eating or cleaning baby's bottom. They rarely washed with soap before preparing food or eating. The authors observed different types of hand-washers' (washer, reactive washer, rinser, reactive rinser and avoider) who may have different motivators and hypothesised that disgust and comfort were main drivers of hand washing in the study population. Generally, mothers in the study did not seem prompted to wash hands by having a new child. While mothers cited being too busy as a barrier to hand washing with soap, the observers found that mothers had considerable time post-birth and were almost exclusively concerned with childcare. Midwives and senior women, such as grandmothers were important and influential sources of information for childcare and could be important targets for hand washing promotion.

This study has also ascertained the incidence of sanitation and hygiene related diseases in the study population. It was found that 35.2% of the households had at least one member encountering a diarrhoeal episode in the past one month. Further, the study collected data from Health Management and Information Systems and the trends of three sanitation and hygiene diseases consisting diarrhoea, ARI and dysentery were compared to ascertain their prevalence over the years from 2012 to 2014. Diarrhoeal diseases decreased from 19% in 2012 to 13.4% in 2014. Surprisingly the prevalence of ARI increased drastically from 33% in 2012 to 58% in 2014. Prevalence for dysentery remained almost unchanged over the years. Even though it is sometimes argued that there is lack of an overall decline in diarrhoea morbidity rates despite increasing coverage of water and sanitation promotion the health benefits of WASH are illusory. However, there are other possible explanations for the apparent contradictions as can be observed in the current study. Firstly, coverage has not advanced as rapidly as one would wish or as some official figures suggest. Secondly, diarrhoea data are subject to a variety of interpretation. For example, reviews for apparent geographical variations could be explained by different study designs (Bern, Martins and Zoyla, 1992). Third, if challenge by diarrhoea can cause tropical enteropathy without diarrhoea, a reduction in that challenge could reduce mortality risks without necessarily reducing diarrhoea morbidity (Sedgwick and Macnutt, 1908).

Mortality rates were also compared amongst the leading cause of death among the under five children in T/A Mwadzama. It was discovered that over the years malaria has been topping the list and is still rising. Sanitation and hygiene related diseases like ARI, diarrhoea and malnutrition were lower and were decreasing over the years. The study conducted by Liu (2012) and colleagues found that of all infectious disorders, pneumonia, diarrhoea and malaria were the leading cause of death worldwide – of all deaths of children younger than five years, pneumonia caused 1.396 million (18.3% of total deaths) deaths, diarrhoea caused 0.801 million (10.5% of total deaths) deaths, and malaria caused 0.564 million (7.4% of all deaths) deaths worldwide in 2010.

The study further explored the impact of sanitation related diseases on school absenteeism among school going children. The study discovered that 38.5% (n=92) of those who answered this question reported to be absent while 61.5% reported not to be absent and 45.7% of all absenteeism was due to hygiene and sanitation related illnesses and the rest were due to other diseases like malaria, eye conditions and injuries. School attendance is a strong predictive factor of academic success for elementary school pupils (Reid, 2003) and absenteeism due to illness

has been shown to be reduced by implementation of mandatory hand hygiene and sanitary procedures based on the results of previous interventions (Nandrup-Bus, 2009). The availability and utilization of alcohol-based sanitizers in schools have also been shown to reduce absenteeism by about 20–50%. A hand hygiene intervention in two public elementary schools in Chicago involving instructions in hand hygiene practices and provision of hand hygiene facilities significantly reduced absenteeism among students in pre-kindergarten to the eighth grade (ages 4–14) (Lau, Springston and Sohn, 2012).

Further, the study determined length of stay for the school-going age children in these households in order to determine the economic impact of the sanitation and hygiene related diseases on their livelihood. The majority of those who were absent stayed away from school for less than one week (85.9%) and only 14.1 percent stayed longer than one week. For adults, 24.1% did not work due to illness while 75.9% did not report any illness in the past one month and 69% of all the illnesses were due to hygiene and sanitation related diseases and the rest were mainly due to malaria and other conditions. In the adults, length of illness was as higher as more than one week (51.7%) compared to the children. In both groups absenteeism was higher before CLTS was introduced in the area as compared to the time of this study, it had been fully implemented. In both cases, diarrhoeal diseases contributed highly to lengthy of sickness than any another diseases.

CHAPTER SIX
CONCLUSION AND RECOMMENDATIONS

This chapter draws conclusions of the study from the results and discussions in the preceding chapters. The recommendations from the study are also presented at the end of the chapter for consideration and possible adoption by authorities.

6.1 Conclusions

This study has shown that CLTS approach had an impact in improving some sanitation and hygiene related indicators in Traditional Authority Mwadzama in Nkhotakota District. From the results it can also be concluded that hygiene education campaigns have assisted in increasing the knowledge about water and sanitation. The introduction of CLTS has positively impacted people in the area by reducing school absenteeism among children and increasing adults' participation in economic activities.

Despite having a higher percentage of households with latrines, the communities have not moved up the ladder by having improved latrines in their homes. From the assessment, no single household has an improved latrine except in schools and other public places where the sanitary facilities are constructed through a project. Of particular concern is the slow pace among the communities towards adopting the hand washing behaviour as observed in the area. Despite CLTS, many people do not use soap during hand washing. These behaviours have had a very big impact in improving the sanitation and hygiene related health outcomes.

6.2 Recommendations

The study would like to put forward the following recommendations:

- Since it is clear that CLTS has a great impact improving hygiene and sanitation related indicators in T/A Mwadzama, The District Council and its implementing partners should consider scaling up the implementation of this approach in the remaining Traditional Authority areas in the District. This will allow the benefits of CLTS to spread to the rest of the District thereby positively impact the sanitation and hygiene related indicators for the District.

- Despite people knowing the importance of hand washing after visiting the toilet and the other four critical times, very few wash their hands during these times. Needless to say also is the fact that those who wash their hands do so without soap. The District Coordinating

Team (DCT) needs to intensify hygiene and sanitation campaigns in order to disseminating these messages to the rural masses. Particular attention should be paid to the fact that people should change their behaviour towards hand washing as it has been ragging behind despite being a critical component in CLTS campaigns. The DCT in its sanitation marketing strategy should emphasise the importance of using soap as one way of encouraging the communities to prioritise its usage at all times.

- Basic pit latrines have higher coverage in areas where CLTS has been implemented. There is a need for people to now climb up the ladder to have improved sanitation facilities. District Council and its implementing partners should consider training extension workers and masons in sanitation marketing in order to enable communities to make meaningful acceleration towards provision of improved sanitation facilities. These masons should be availed a start-up capital given as soft loans and should be paid after realising some profits from their trade.

- The study shows that a good proportion of latrines in the sampled communities, schools and market places lack privacy. For instance 39% of sampled latrines of the households having latrines have no doors while for schools the percentage stands at 39.9%. Therefore, Information, Education and Communication materials that specify good conditions of latrines must be developed and distributed to the communities, schools and market places.

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ANNEXES

Annex 1: Household Questionnaire

Evaluating the Effectiveness of Community Led Total Sanitation in Improving Some Selected Sanitation Related Health Outcomes in TA Mwadzama in Nkhotakota, Malawi.

Household Questionnaire

Prepared by:

Alexander Kamesu Mwangonde

The questions in this survey are designed for the main care giver of children in the household, or one of them if several families living together or polygamous households. If there are no children in the household aged 0-18 years, the household head can be interviewed instead.

Guidance for introducing yourself and the purpose of the interview:

- My name is _____ and I work for Ministry of Health
- Your household has been selected by chance from all households in the area for this interview. The purpose of this interview is to obtain current information about households in this area and the well-being of children in the area ***[for example, water (boreholes), health, sanitation and open defecation free].***
- The survey is voluntary and the information that you give will be confidential. The information will be used to prepare reports, but will not include any specific names. There will be no way to identify you that you gave this information.
- **Could you please spare some time (around 30 minutes) for the interview? Consent given ☐**

Please DO NOT suggest in any way that household entitlements could depend on the outcome of the interview, as this will affect the answers.

SECTION 1

CONTROL PANEL IDENTIFICATION (CPI)			
Question Number	**Question**	**Option**	**Skip**
CPI 01.	Research Assistant Name		
CPI 02	Date of the Interview	_____/_____/_____ DD/MM/YY	
CPI 03	Start Time_____/_____ HH/MIN	End Time_____/_____ HH/MIN	
CPI 04	Name of the Supervisor Checking the Questionnaire		
CPI 05	Date when the Questionnaire was Checked	_____/_____/_____ DD/MM/YY	
CPI 06	Name of Data Entry Clerk		
CPI 07	Date Data Entry Completed	_____/_____/_____ DD/MM/YY	

SECTION 2

HOUSEHOLD BASIC INFORMATION (HBI)

Question Number	Question	Option	Skip
HBI 01	District		
HBI 02	Traditional Authority		
HBI 03	Cluster Number/Village Number		
HBI 04	Cluster Name/Village Name		
HBI 05	GVH/Commitment Area		
HBI 06	Gender of the Respondent (*please observe and Record)*	1=Male 2=Female 888=No response	
HBI 07	Age of the Respondent		

SECTION 3

EFFECTIVENESS-EFFV			
Question Number	**Question**	**Option**	**Skip**
Part I: **Economic Status**			
EFFV 01	Are you employed?	1=Yes 2=No	
EFFV 02	Do you run any business	1=Yes 2=No	*If no skip to EFFV 04*
EFFV 03	Approximately how much do you earn in a month?	1=K10, 000 and above 2=K5, 000 to K10, 000 3=K5, 000 and below	
EFFV 04	How do you earn your living?	1=Farming 2=Piece works 3=Others (specify)	
Part 2: **Knowledge, Attitude, Practice, Access and Usage of Sanitary Facilities**			
EFFV 05	How far have you gone with your education	1=Std 1-4 2=Std 5-8 3=Form 1-4 4=Attended tertiary education	
EFFV 06	Have you ever heard of sanitation and Hygiene	1=Yes 2=No	*If no skip to EFFV 08*
EFFV 07	What do you understand by the terms sanitation and hygiene?	1=Having a latrine, rubbish pit and a HWF that are properly used 2=Having a latrine 3=Don't know 888=No response	
EFFV 08	Does the household have a latrine? (observe)	1=Yes 2=No	*If no skip to EFFV 16*
EFFV 09	Do you share this facility with others who are not members of this household?	1=Yes 2=No	
EFFV 10	Is the latrine an improved one	1=Yes 2=No	
EFFV 11	Is the latrine being used? (observe)	1=Yes 2=No	

EFFV 12	Is the hand washing facility outside the toilet? (observe)	1=Yes 2=No	
EFFV 13	Is the hand washing facility being used? (observe)	1=Yes 2=No	
EFFV 14	Does the latrine have a drop hole cover and properly used? (observe)	1=Yes 2=No	
EFFV 15	Does the household use soap when washing hands after visiting the latrine? (observe)	1=Yes 2=No	
EFFV 16	Does the household members know the importance of using the latrine and hand washing facility	1=Yes 2=No	*If no skip to EFFV 18*
EFFV 17	What is the importance of hand washing	1=To control waterborne diseases 2=For prestige 3=For hygiene 4=improved sanitation 5=others (specify) 888=No response	
EFFV 18	At what critical times do the household members wash their hands (probe and record all)	1=After visiting the toilet 2=Before eating any food 3=After removing baby nappies 4=Before preparing food 5=Before breast feeding 888=No response	
EFFV 19	Have you ever received hygiene education messages?	1=Yes 2=No	*If no skip to EFFV 22*
EFFV 20	What were the messages that you heard?	1= 2= 3= 4= 888=No response 999=Not applicable	
EFFV 21	From whom did you receive the messages?	1=health worker 2=Read from poster 3=Radio 4=Friends 5=Others (specify)	
Part 3: **Access to Safe Water**			
EFFV 22	Where do you draw water for household use? Check for sanitary nature	1=Borehole 2=Standpipe 3=Unprotected water source 4=Others (Specify)	
EFFV 23	How far is the water source from the household?	1=Less than 30 meters 2=30 to 500 meters 3=More than 500 meters	
EFFV 24	How long do you stay on the queue before you draw water	1=less than 5 minutes 2=5 to 30 minutes 3=More than 30 minutes	
EFFV 25	Is it a safe water sources?	1=Yes 2=No	

EFFV 26	If the household does not have access to safe water, how does it treat water? (Do you do anything to the water to make it safe?) Record all mentioned	1=Use water guard/chlorine/add bleach 2=Boiling 3=Use water filter (ceramic, sand, composite etc) 4=Solar disinfections 5=Let it stand and settle 888=No response	
EFFV 27	Do you store your drinking water in a container only used for drinking water?	1=Yes 2=No	*If no please skip to EFFV 30*
EFFV 28	May I see the container	1=Yes, permission granted 2=No permission not grated 888=No response	
EFFV 29	Based on the observation, record whether the container has the following: wide mouth, spigot/tap and lid or fitted cover	1=Wide mouth(>10cm) 2=Spigot/tap 3=Lid or fitted cover 888=No response	
Part 4: **Impact of hygiene and sanitation on school absenteeism and economic activity on pupils and adults respectively**			
EFFV 30	Has any child failed to attend school because he or she was sick in the past one month?	1=Yes 2=No	*If no please skip to EFFV 33*
EFFV 31	What was the cause of his/her suffering	1=Diarrhoeal diseases 2=Helminth infections 3=Trachoma 4=Others (specify)	
EFFV 32	How long was the child absent	1=Less than a week 2=More than 1 week	
EFFV 33	Has any adult failed to work in the household because he or she was sick?	1=Yes 2=No	*If no please skip to EFFV 36*
EFFV 34	What was the cause of his or her suffering?	1=Diarrhoeal diseases 2=Helminth infections 3=Trachoma 4=Others (specify	
EFFV 35	What was the age of those who got sick	1=5 to 10 years 2=10 to 20 years 3=20 to 30 years 4=More than 30 years	
EFFV 36	Has any death occurred in the household due to sanitation and hygiene related diseases in the past one month?	1=Yes 2=No	*If no go to the end*
EFFV 37	If yes to *5a* what was the age of the family member	1=5 to 10 years 2=10 to 20 years 3=20 to 30 years 4=More than 30 years	
EFFV 38	What was the gender of the family member	1=Male 2=Female	

The End of Household Questionnaire

Annex 2: Focus Group Discussion Checklist

EVALUATING THE EFFECTIVENESS OF COMMUNITY LED TOTAL SANITATION IN IMPROVING SOME SELECTED SANITATION RELATED HEALTH INDICATORS IN T/A MWADZAMA IN NKHOTAKOTA, MALAWI

FOCUS GROUP DISCUSSION FOR ORDINARY MEN AND WOMEN INCLUDING PEOPLE LIVING WITH DISABILITY

Prepared By:

Alexander kamesu mwangonde

Hello! My name is …… And I am working for Ministry of Health

I am conducting Focus Group Discussion in sampled villages as part of an evaluation exercise, in order to assess whether the HVP-Global Sanitation Fund project has achieved the set objectives.

The information provided herein will remain confidential and will be used for this study only. Please note that there are no correct or wrong numbers. The discussion will take probably 2 hours. Thank you.

SECTION 2: **GENERAL DETAILS OF THE RESPONDENTS**

Group Name			**Number of Participants**	**Date of FGD**
		Venue:		
		Names of participants		

No	**Names**	**Sex**	**No**	**Name**	**Sex**
1.			**2.**		
3.			**4.**		
5.			**6.**		
7.			**8.**		
9.			**10.**		
11.			**12.**		
13.			**14.**		
15.			**16.**		
17.			**18.**		

PROJECT IMPACT

Access to and use of safe water

1. ***Drinking and water treatment***

- What is the main source of drinking water in your village?

- Is the main source of water safe for drinking? If yes, explain why? If not, explain why?

- In your opinion, how do people in your village treat water to make it safe?

- Why are these treatment practices highlighted preferred?

- Out of ten seeds, how many seeds would represent people using treatment practices highlighted? 3 people required.

- In your opinion, out of ten seeds how many seeds would represent those that are accessing safe water? 3 people required

- What are the situations when people drink unsafe water and why?

2. Drinking water storage

- Do people store water for drinking in this village?

- Where do people store their water for drinking?

- How do people get drinking water from storage containers? If I were to visit your house today, will I find two cups?

- Out of 10 seeds, how many seeds would represent household with two cups hanging above the container containing drinking water?

Access to sanitation facilities and hygiene materials

3. Access to sanitary facilities

- Out of 10 seeds, how many seeds would represent people in your village with access to latrine?

- Are the toilets regularly used?

- What types of toilets are used in our village? Basic latrine or improved

- Out of 10 seeds, how many seeds would represent basic latrine or improved

- Why do people have a latrine in your village? Rank the reasons?

- What constraints/problems, if any, do people with toilets face in our village?

4. No access to toilets/latrine

- Out of 10 seeds, how many seeds would represent those households without latrines?

- In your opinion, why some households do not have toilets? Rank the reasons?

- Since they do not have latrines, where do members of such households defecate?

- When/what time of the day is this usually done?

- What problems do people without latrine face?

- How do people in our village dispose young children's faeces?

Hand washing practices

- Do households own HWF at least 10 paces to latrine or near toilets?

- Is there soap/ash at HWF?

- Why is soap/ ash not available at HWF station?

- Out of 10 seeds, how many seeds would represent HH owning a HWF?

- When do people wash hands?

- Can you identify 4 critical times for hand washing?

- Out of 10 seeds, how many would represent those that wash hands at critical times mentioned?

PROGRAMME RELEVANCE- *let people vote*

To what extent do you think HVP Programme was relevant to your household in as far as Water, Sanitation and hygiene is concerned?			
	Not relevant at all	0	
	Somehow	1	
	Relevant	2	
	Very Relevant	3	
	Extremely Relevant	4	

CUSTOMER SATISFACTION

CUSTOMER SATISFACTION –*let 3 people do the exercise*				
How satisfied are you with the following aspects of water sanitation and hygiene services to citizens in this community	**2- Very Satisfied**	**1 – Somehow satisfied**	**0 – Not satisfied**	**Compare/comment**
a) Distance to the nearest main source of water				
b) Availability of water at main water source				
c) Quality water, i.e., colour, taste				
d) Yield at main water point				
e) Time taken to water source, draw water and back				
f) Functionality of main water source/point				
g) Women representation in Water committee				
h) How many women are there in committees?				
i) Tariff attached to access to water?				

Annex 3: Statistical Analysis Outputs

Table 10: Chi-square Test for Trends of Latrines and HWF

	Value	df	Asymp. Sig (2-Sided)	Exact Sig (2-sided)	Exact Sig. (1-Sided)
Pearson Chi-Square	5.487	1	.019		
Continuity correction	3.982	1	0.46		
Likelihood ratio	4.388	1	.036		
Fisher's Exact Test				.031	.036
Linear-by-Linear Association	5.465	1		.019	
N of valid cases	247				

a. 1 cells (25.0%) have expected counts less than 5. The minimum expected count is 2.65.

b. Computed only for 2x2 tables.

Table 11: Chi-square Test

	Value	df	Asymp. Sig (2-sided)
Pearson Chi-Square	7.213	3	.065
Likelihood ratio	7.313	3	.062
Linear-by-linear	2.163	1	.141
N of valid cases	126		

Table 12: Significant Testing - Safe Water versus Child Illness

Number of obs	=239	R-squared	= 0.0111
Root MSE	=.485901	Adj R-squared	=0.0070

Source	Partial SS	df	MS	F	Pro> F
Model	.630019583	1	.630019583	2.67	0.1037
Water source	.630019583	1	.630019583	2.67	0.1037
Residual	55.9557545	237	.23610023		
Total	56.5857741	238	.237755353		

ANOVA- Child illness vs safe water is insignificant because p-value is more than 0.05 (p-0.1037).

Table 13: ANOVA - Testing Child Illness Against Availability of Latrines

Number of obs	=239	R-squared	= 0.0383
Root MSE	=.479177	Adj R-squared	=0.0343

Source	Partial SS	df	MS	F	Pro> F
Model	2.16814954	1	2.16814954	9.44	0.0024
Have latrine	2.16814954	1	2.16814954	9.44	0.0024
Residual	54.4176245	237	.22961023		
Total	56.5857741	238	.237755353		

Table 14: Regression Analysis - Child Illness, Have Latrine and Water Source

Source	SS	df	MS	Number of obs	=239
Model	2.3394333	2	1.16971665	F (2, 236)	=5.09
Residual	54.2463408	236	.229857376	Prob > F	=0.006
Total	56.5857741	238	.237755353	R-squared	=0.0413
				Adj R-squared	=0.0332
				Root MSE	=47943

Child sickness	Coef	Std Err.	t	P>|t|	[95% Conf. Interval]	
Have latrine	.2454395	.0900016	-2.73	0.007	-.4227486	-.0681304
Water Source	.0306619	.0355198	0.86	0.389	-.0393144	.1006383
-cons	1.849106	.1339354	13.81	0.000	1.585244	2.112968