

**Welfare Sanitary Facilities for Market Traders in Lusaka District, Zambia**

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**Department of Global Public Health and Primary Care**

**Faculty of Medicine and Dentistry**

**University of Bergen, Norway**

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This thesis is submitted in partial fulfilment of the requirements for the degree of  
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## **Abstract**

**Introduction:** Welfare sanitary facilities are important for the health, safety and wellbeing of workers. According to the literature, workers world-wide, and Zambia in particular, might be exposed to poor provisions of welfare sanitary facilities in workplaces. This study therefore aimed to assess provision of welfare sanitary facilities for market traders of Lusaka district and their perception on the provided facilities. Welfare sanitary facilities are important for the health of both the traders and their customers.

**Methods and materials:** A cross sectional study was carried out in Lusaka district that involved 12 markets run by the city council. Data on provided welfare sanitary facilities and perception of market traders on the provided facilities were collected through interviews of 12 market heads and 386 market traders using systematic interview guides and workplace observations using a checklist. In addition, a total of 22 samples of water were collected: two samples from each market to determine the bacteriological standards of drinking water. A total of 44 water analysis tests were conducted using membrane filtration technique, 22 for Total Coliform and another 22 for Faecal Coliform. SPSS was used both in data entry and analysis. Descriptive statistics such as frequencies, proportions and means were obtained from the analysis. Tests of associations between variables were also conducted using Chi-square, Fisher's exact test and ANOVA.

**Results:** The study established that welfare sanitary facilities were not provided in all markets as one out of 12 markets did not have any welfare sanitary facilities for traders. The majority of the markets did not comply with the laws of Zambia in terms of adequacy of toilets (11); hand washing facilities (10) and cleanliness (six). None of the markets complied with privacy of facilities and siting of sanitary facilities at appropriate distance from the stalls. Not all water provided for market traders complied with the Food and Drugs Act of Zambia's requirements

as water from two markets was contaminated with Faecal and Total coliform. Most of the traders perceived facilities as not being up to standard in terms of adequacy of toilets (73.1%); hand washing facilities (60.1%), cleanliness (78.2%) and privacy (72.0%). Most of the traders (69.2%) only used the facilities because they did not have any other option.

**Conclusion:** There is generally poor provision of welfare sanitary facilities for market traders in Lusaka district, Zambia. These results call for action by the various stakeholders to ensure that the health of the traders is protected.

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## **Acronyms and Abbreviations**

CDC	Centre for Disease Control and Prevention
CFU	Coliform Forming Unit
DALYs	Disability Adjusted Life Years
GRZ	Government of the Republic of Zambia
ILO	International Labour Organisation
LCC	Lusaka City Council
NIOSH	National Institute for Occupational Safety and Health
UNECE	United Nations Economic Commission for Europe
UNICEF	United Nations International Children's Emergency Fund
UNZA	University of Zambia
WHO	World Health Organisation
ZRA	Zambia Revenue Authority



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## **CHAPTER ONE: INTRODUCTION**

### **1.1 Background**

#### **Water and sanitation**

Water and sanitation are essential for human everyday life. There is generally poor provision of water and sanitation facilities for many people in the world, especially in developing countries in sub-Saharan Africa. About 2.4 billion people lack proper sanitation facilities and 748 million people lack access to safe drinking water sources around the world (WHO and UNICEF, 2014).

Water and sanitation form parts of the welfare sanitary facilities that are supposed to be provided at all workplaces including: water, washing facilities/hand drying facilities, soap, toilets, urinals, anal cleansing material/toilet paper and sanitary bins (Government of the Republic of Zambia (GRZ),1995 and Health and Safety Executive, 2011). According to the United Nations declaration, all people have the right to welfare sanitary facilities including workers at work places (UNECE and WHO, 2013 and Ontario, Ministry of Labour, 2012). Like many developing countries, Zambia is one of the countries where workers are exposed to poor provision of welfare facilities (Ministry of Local Government and Housing 2013; Lusaka City Council (LCC), 2014; Chaponda, 2014 and Kabemba, 2012).

#### **Markets and market traders in Zambia**

Zambia is one of the countries with a high rate of unemployment, which has led to people setting up small informal businesses (enterprises) for their livelihood. Informal businesses are not registered with the local authority, the Zambia Revenue Authority (ZRA) or other authorities in Zambia. In Zambia about 90 % of the people own informal businesses. The

majority of these businesses are solely owned with assistance from one or more workers or family members. Most informal businesses in Zambia lack proper water and sanitation, for example only about 30% of the people in the informal sector of Zambia have access to water (Shah, 2012 and Clarke et al., 2010).

Markets are part of the informal business sector in Zambia.

A market is a designated place where the sellers (market traders) of various goods or services meet with the buyers for trading. These places are usually run by the local authorities in Zambia (GRZ, 2007).

In Lusaka the capital city of Zambia, markets are found in all the residential areas with some located in the town centre (LCC, 2014).

Markets are made up of various business units called stalls. Market traders deal in various goods and services such as selling fresh fruits and vegetable, meat, fish and milk products, cosmetics, hardware and stationary, construction, ready to eat food, manufacturing, beauty parlours, 'salaula' (second hand clothing from the West sold to Africa), entertainment etc. (LCC, 2014 and Shah, 2012).

A report by Chaponda (2014) stated that market traders pay tax to the city council daily or monthly, even though most of the businesses in the markets are not formally registered with the authority (Shah, 2012). Some of the money that is raised through tax is used by the local authority to take care of the markets' needs such as water, sanitation, electricity and security. The market traders also pay money for using welfare facilities (LCC, 2014).

## Markets Categories

Markets in Lusaka district are categorised by the Lusaka city council into three categories which include central business, township and peri-urban, based on their various characteristics.

Markets in the:

1. Central category are found in the town centre and built by the government.
2. Township category are found in the planned residential areas of the city, with usually a combination of self and government built stalls. Self-built stalls are stalls built by the market traders even though the land belongs to the council.
3. Peri-urban category are found in the unplanned settlements and usually have very few shops compared to the other two categories. In addition, these markets are self-built (LCC, 2014).

## **Importance of welfare sanitary facilities**

Provision of appropriate workplace welfare sanitary facilities is important for the basic health, safety and welfare of employees. Toilets are important for basic health, welfare, privacy and dignity and washing facilities are important for personal hygiene (Work Safe Victoria, 2008). According to Astier et al. (1997) “safe disposal of faeces serves as a primary barrier to prevent faeces from contaminating the environment which results in water contamination. Diarrhoea cases can be reduced by more than 36% if the use of toilets is practiced. In addition washing of hands contributes to 35% or more reduction in diarrhoeal cases and even more reduction by about 20% when the water quality is improved.”

In Zambia most people including market traders carry out work activities outdoors and are exposed to heat, as temperature can be over 30 degree Celsius during certain parts of the year. People working outdoors in hot conditions are required to drink a lot of water to replace water lost from their bodies. Exposure to the sun and hot conditions may cause heat related illnesses such as heat stress, stroke and death (Centre for Disease Control and Prevention (CDC) and National Institute for Occupational Safety and Health (NIOSH), 2013). Some people in the markets also work with poisonous substances that require a lot of water in case of an accidental chemical spillage.

Poor sanitation and water quality affects the workers in a number of ways. It can result to spread of diseases resulting in fatigue, poor health and death (Water and Sanitation Program, 2012). “Unsafe water and poor sanitation contributes to 2.2 million deaths and 82 million disability adjusted life years (DALYs) as a result of diarrhoea. Worm infections also results to 5.9 million DALYS and 26,000 deaths” (Hutton, 2006). Example of diseases related to water poor sanitation and water quality are diarrhoea, typhoid, bilharzia, dysentery, worm infections, urinary tract infection, malaria and cholera to mention a few (Fewtrell et al., 2007). Poor health

results in absenteeism at work which leads to loss of money for the worker as well as for the employer. Improving work related facilities is also important because it is one of the factors that can motivate people to be more productive and work effectively (Water and Sanitation Program, 2012 and Forastieri, 1999).

### **Welfare sanitary facilities in markets and other workplaces in Zambia**

According to the Zambian laws, all markets should have some form of welfare sanitary facilities for traders. In Zambia, it is the responsibility of the local authority to provide welfare facilities for market traders in all markets run by the local authority (GRZ, 2007). Like many other countries in the developing world there is generally poor provision of welfare facilities in work places of Zambia. A report revealed that workers in one of the markets in the southern province of Zambia used unfinished buildings within the markets as toilets (Muvi TV, 2014). A report by Chaponda revealed that traders in one of the markets on the Copperbelt province of Zambia complained about absence of water in the market. In addition, market traders complained about the high cost of using the toilet and that they had to pay each time they visited the toilets (Chaponda, 2014). Another report reviewed an outbreak of cholera among the workers in a Zambian mine on the Copperbelt as a result of contaminated water from the company's borehole (Kabemba, 2012).

### **Welfare sanitary facilities for workers in countries outside Zambia**

In the case of provision of welfare sanitary facilities in countries outside Zambia only a few studies were found that addressed the issue. However, these studies show that the situation of welfare facilities is not too different from Zambia. A report from the Malawian news agency online revealed that market traders protested over having one toilet and one source of water for over 200 people (Kampeza, 2013). A study in Brazil on the prevalence and risk factors for intestinal parasite in food handlers reported poor sanitation for workers with a high prevalence

of intestinal parasites (Colli et al., 2013). Another qualitative study to determine access to sanitation for low income working women in Bangalore India showed that most workers were exposed to poor sanitation at work (Rajaraman et al., 2013). A study conducted in Ghana by Alfers in 2009 showed that markets traders and street vendors face problem of lack of access to running water and inadequate toilet facilities. This led traders to pay for use of private welfare facilities. Traders in these Ghanaian markets complained about the constant diarrhoea that was probably a result of the drinking water purchased from street vendors, water from storage tanks and insanitary conditions of the markets. A study in Nigeria also found that not all industries complied with the minimum requirements for sanitation for workers as specified in the study. Even though all the industries provided toilets for workers, toilets were dirty and soap and hand drying facilities were not provided. Another finding was that the workers in these workplaces pilfered hand soap whenever it was supplied (Adeleke, 2010). A study in Uganda by Sebudde et al. (2012) revealed poor sanitation in formal eating places. Most of the places did not have water (60%), no soap (77.7%) and no toilet paper tissue. The study also established that toilet facilities were not adequate and clean in most places.

### **Perception on welfare sanitary facilities**

How the workers experience the welfare sanitary facilities, their perception, is an important component in assessing provision and use of the facilities. Information about workers perception on provided sanitary facilities is scarce. This scarce literature indicates that workers are not happy with the facilities; which are not clean, not well maintained, are inadequate and lack privacy. For example a study conducted in India revealed that workers were not satisfied with the provided welfare facilities. More than 50% of the workers said that the facilities were poorly maintained, dirty, inadequate and lacked provision of hot water, hand sanitizers and tissues (Srinivas, 2013). Also, a factor of importance regarding perception, is the gender issue.

According to the literature, gender differences exist in perceptions of sanitary facilities, and indicates that females more often report poor facilities than men (Rajaraman et al., 2013). Studies have also revealed that women are more concerned than men about security, convenience, and aesthetic factors. According to Cairncross and Valdmanis most women avoid using facilities that are not maintained, not safe, and not private and clean causing them to risk developing urinary tract infections due to holding call to urinate (Cairncross and Valdmanis, 2006). A research brief on gender responsive in India revealed that woman are more concerned with the issue of security, cleanliness, privacy and location of facilities than men. The study revealed that most women had difficulties in using the facilities during their menstruation as most of the facilities did not offer good services for disposal of sanitary napkins. In addition women were less likely to use facilities located at far distances compared to men and separation of facilities by sex was considered as an important factors for use (Hartman et al., 2015). A study on struggles for sanitary reform in the Lancashire cotton mills 1920 to 1970 showed that women in the factory were concerned about the poor state of sanitary facilities and opted for better conditions (Hallett et al., 2004).

### **Laws governing provision of welfare sanitary facilities for market traders in Zambia**

In this study the laws that have relevance to provision of welfare sanitary facilities in workplaces of Zambia include: the Markets and Bus Station Act No. 7, 157 of 2007, Public Health Act Chapter 295 of 1995, Factory Act Chapter 441 of 1995, Food and Drugs Act Chapter 303 of 1995. The definition of the workplace in most of the laws of Zambia do not make it clear whether a market is part of the workplace. The laws highlights on formal workplaces and mentions very little on informal workplaces. However these laws are used in this study due to lack of specific legal frameworks that govern provision of facilities in markets.

- **Markets and Bus Station Act No. 7 of 2007 157**

The Market and Bus Station Act of 2007 consists of regulations about how the markets are supposed to operate. The act requires that there must be establishment and maintenance of sanitary conveniences and services and ablution facilities at each market. However, the regulation does not mention anything about the standards of the facilities to be provided in terms of type and adequacy and other requirements. The act also specifies that the Health inspectors have the right to enter any market at any time to check for health and safety issues including sanitary conveniences.

- **Factories Act Chapter 441 of 1995**

According to the Factory Act, welfare sanitary facilities must be provided at every work place. The facilities have to be well maintained, located at suitable points conveniently accessible to all employees and with adequate supply of wholesome drinking water. In terms of drinking water the act further requires that there should be a supply of drinking water in suitable vessels, which must be renewed at least once in each working day, and all practicable steps shall be taken to preserve the water and vessels from contamination. Adequate and suitable facilities for washing must also be provided and maintained including a supply of soap and suitable means of hand drying. In addition the facilities have to be kept in a clean and orderly condition. This act does not specify the exact facilities to be provided.

- **Public Health Act Chapter 295 (Drainage and Latrine) Regulation of 1995**

The Public Health Act is the main act that indicates the various welfare sanitary facilities that are important in workplaces including: water, sanitary facilities including (Toilet, hand washing facilities, soap, and hand drying facilities / materials, urinals and sanitary bins). It also indicates that the facilities have to be appropriate, adequate, labelled, clean and well-lit. In addition there should be separation of female and male facilities. The facilities must also be located at appropriate distance from the user i.e. less than 30 meters and must offer privacy.



There should also be special facilities for the physically challenged people. In terms of number of the facilities in relation to workers the following is recommended; 1-25 workers require 1 latrine (water closet) for the first 100 and then >100 workers 1 added latrine for every 40 workers. In addition the wash hand basins and urinal must be provided for each water closet provided.

- **Food and Drugs Act Chapter 303 of 1995**

In Zambia, the main law that guide in provision of drinking water is the Food and Drugs Act. The parameters important for water quality determination include; chemical, physical and biological. The main biological parameters that are important and checked for concerning water quality include Total Coliform and Faecal Coliforms. Coliforms are bacteria that are found in the environment and faeces of man and warm blooded animals. Total and Faecal coliforms are used to assess the effectiveness of the water treatment as the presence of bacteria is important in causing water related diarrhoeal diseases. The drinking water quality Bacteriological Standards are as follows; less than 10 coliform forming units (cfu) for Total coliforms and zero cfu Faecal Coliforms per 100ml of drinking water tested.

## **1.2 Problem Statement**

Zambia has experienced problems related to water and sanitation. Only about 43% and 23% of Zambia's population have access to safe drinking water and sanitation, respectively (Post Zambia, 2011). Workers are not excluded from this problem of water and sanitation. A few assessments in Zambia have revealed poor provision of welfare sanitary facilities in the workplaces such as schools, markets, industries etc. (Ministry of Local Government and Housing, 2013; Chaponda, 2014). Inspections conducted by the Lusaka city council markets department in early 2014 revealed that not all markets complied with the Zambia minimum standards of welfare sanitary facilities provision. This is stated in a local report (LCC, 2014).

However, little is known on the actual state of provision and on the traders' perception of welfare sanitary facilities in Zambian work places and particularly in markets, as no study was found that had addressed the issue. This poses a gap which the current study seeks to investigate.

## **1.3 Study Justification**

This study aims to provide information that can be used to improve welfare sanitary facilities in markets of Lusaka district to make market traders work in a healthy environment. This study might help market policy makers and funding agencies concerned with providing welfare sanitary facilities in markets to come up with various policies or initiatives that might help to improve the state of welfare sanitary facilities. The findings might also be useful to other market stakeholders like the Lusaka city council, the water trust and other authorities involved in provision of water to improve the conditions of the facilities, if needed. The findings of the study might also add to the body of knowledge on welfare sanitary facilities.

## **1.4 Research Questions**

1. Which welfare sanitary facilities are provided for traders in different markets of Lusaka district, Zambia, and do the provided facilities adhere to Zambia's regulations for standards of welfare facilities at workplaces?
2. Does water provided for market traders comply with Zambia's bacteriological (Total and Faecal Coliform) standards of drinking water?
3. What are the perceptions of market traders' of provided welfare sanitary facilities at markets in Lusaka district, Zambia?

## **1.5 Research Objectives**

### **General objective**

To gain more knowledge on provision of welfare sanitary facilities for market traders and on the traders' perception of the provided facilities in markets of Lusaka district, Zambia.

### **Specific objectives**

1. To identify the provided welfare sanitary facilities for market traders at different markets of Lusaka district, Zambia.
2. To evaluate adherence of provided welfare facilities for market traders to Zambia's regulations for standards of welfare facilities at workplaces in Lusaka district, Zambia.
3. To determine whether the quality of the water provided for the traders complies with the Zambia's bacteriological (Total and Faecal coliform) standards of drinking water.
4. To determine market traders' perception of provided welfare facilities at markets in Lusaka district, Zambia.

## 1.6 Definition of Terms

**Welfare sanitary facilities:** Refers to facilities that are necessary for the well-being of market traders which must be provided at the market including drinking water, washing facilities/hand drying facilities, soap, toilets, urinals, anal cleansing material/toilet paper and sanitary bin.

**Market:** Refers to a designated place where the sellers (market traders) of various goods or services meet with the buyers for trading. These places are usually run by the local authority.

**Market trader:** Refers to a person involved in the selling of goods and services in the market.

**Market head:** Refers to a market trader elected by other market traders as their representative. The key custodian of market information.

**Perception:** Refers to what market traders think or their opinions on the facilities that are provided in terms of adequacy, siting, privacy and cleanliness.

**Stall:** Refers to a structure or building where market traders sell their goods and or services.

**Peri-urban markets:** Refers to markets located in the unplanned settlements of Lusaka.

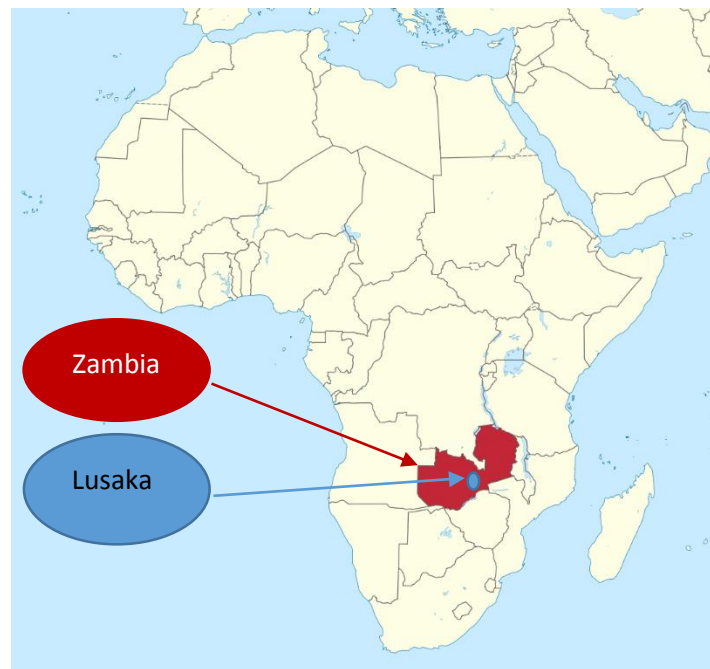
**Township markets:** Refers to markets located in planned residential areas of Lusaka.

**Central business markets:** Refers to markets located in the town centre of Lusaka.

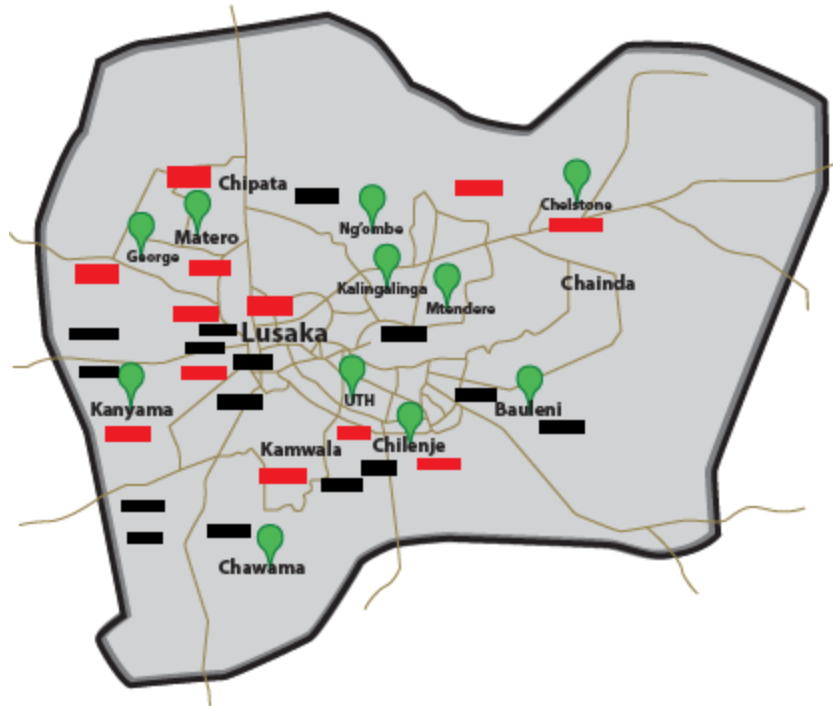
## CHAPTER TWO: METHODS and MATERIALS

**2.1 Study Design:** This study investigated the provided welfare sanitary facilities and perception of market traders on provided facilities using a cross sectional design. Data were collected from September to November 2014 through observations, using checklists and interviews, using systematic interview guides. The interview guides consisted of closed ended questions with a few open ended questions. In addition water samples were collected at each market and tested for the presence of Total and Faecal coliform bacteria.

**2.2 Study Area and Setting:** The study was carried out in Lusaka, which is the capital city of Zambia (figure 1). Lusaka is the most populated city in Zambia with more than 2 million people out of 13 million total country population (Central Statistics Office, 2011). There are 27 markets in Lusaka run by the local authority (figure 2). The markets are divided into 8 in central business, 9 in townships and 10 in peri urban areas (LCC, 2014).



*Figure 1: Shows the map of African indicating the location of Zambia and Lusaka the capital city.*



*Figure 2: Map of Lusaka showing the 27 markets in Lusaka district. The markets are indicated by rectangular structures in black and red. The markets in red are those included in the study while those in black are those not included in the study. The green structures represent the various townships in Lusaka district.*

*Source of maps: Google images.*

**2.3 Target Population:** The target population consisted of market traders and market heads in all markets run by the Lusaka city council.

#### **2.4 Study Population**

The study population consisted of 12 Market heads and 384 (386) Market traders above 18 years from 12 markets run by the Lusaka city council.

## 2.5 Sample Size Calculation, Approaching Markets, Sampling of Markets and Study

### Participants

#### Sample size calculation for market traders

The sample (participants) was calculated at 95% (1.96) confidence interval with predicted 50% (0.5) as the fraction of market traders with access to welfare facilities in Zambia and standard error set at 5% (0.05%). The 50% was used as the proportion of traders with access to welfare facilities was unknown. 50% is recommended as it gives the maximum number of participants that can be obtained using the survey formula used in this study (Bartlett et al. 2001). The number of participants was calculated using the formula below:

$$n_1 = \frac{Z^2 p (1 - p)}{e^2} = \frac{1.96^2 0.5 (1 - 0.5)}{0.0025} = 384 \text{ participants}$$

Where:

$$Z^2 = \text{Z score at 95\% Confidence (1.96)}$$

$$P = \text{predicted proportional of market traders with access to welfare facilities in this case 50\% for unknown proportion.}$$

$$e^2 = \text{predicted standard error 5\%}$$

#### Number of market traders included in each category

As the 384 traders were to be selected from different market categories, a calculation of the distribution of participants in each category was performed to come up with the required number in each category. The Stalls were used as an indication of the number of traders available in each market as the total number of traders was unknown.

#### Stalls in the various categories were as follows:

$$\text{Total sample (participants/stalls) required} = 384$$

$$\text{Total stalls in peri-urban} = 2293$$

Total stalls in township	=	3923
Total stalls in central business	=	8402
Total stalls in all market	=	14618

**To obtain the total number of market traders to be included in each category the following formula was used:**

$$TPG = TSC/TSTP \times SS.$$

Where:

TPG = Total required participants.

TSC = Total stalls in each category.

TSTP = Total number of stalls in all markets.

SS = Sample size calculated.

#### **Traders in each category**

Peri-urban	=	$2293/14618 \times 384$	=	60 traders
Township	=	$3923/14618 \times 384$	=	104 traders
Central Business	=	$8402 \times 14618$	=	220 traders

**Note:** The number of participants in each category was equally divided among the 4 markets.

#### **Approaching markets, sampling of markets and participants (market heads and traders)**

First the researcher contacted staff at Markets Department Lusaka city council explaining exactly what the study involved. The Lusaka city council then issued a letter of permission (appendix 3.1) to collect information from the various markets and a list of all the markets, including their location.

The researcher then used the list from the council to sample the markets to be included in the study. According to the list, markets were grouped in three categories, i.e. those in the central



business, township and peri-urban. Four markets from each category were drawn to be part of the study making a total of 12 markets. Four markets were selected to get an even distribution in each category. Only 12 markets out of 27 were included in the study due to time and financial limitations. The four markets from each category were picked using simple random sampling rotary method. The rotary method was done as follows; the names of the markets in each category were written on small pieces of papers and placed into a box. The researcher picked a piece from the box at random until the required number of markets to participate was attained.

After sampling the markets the researcher then visited the selected markets to obtain permission from the market heads before the day of the data collection. The researcher used the permission introduction letter from Lusaka city council to acquire entry authorization to the markets. The researcher then talked to the market head about the study explaining what the study involved and that they were also going to be part of the study if they gave consent. Market heads from all the 12 markets were included as they all gave consent to the study.

On the day of data collection the researcher started by having audience with the market heads who were asked to answer questions from the systematic interview guide (appendix 2.2). Prior to the interviews the heads were given all the information about the study as stated on the information sheets (appendices 1.1 and 1.2) and were also asked to sign a consent form (appendices 1.3 and 1.4).

After interviews with the market heads the researcher obtained a list of all market stalls and sampled the traders from the list. Systematic random sampling was used to select market traders at each market from the list of stalls with stall numbers arranged in ascending order which was used as a sampling frame. One participant at each stall was picked to participate in the study. In case the trader picked to participate could not answer the questions due to not consenting, absenteeism and other reasons, the data collectors asked the trader on the neighbouring stall on

the sampling frame was included in the study. In the case that there was more than one person at a selected stall, the first person the researcher met was asked to participate in the study. The data collectors managed to get the proposed number of participants at all the visited markets and only less than 10 traders did not consent to the study.

**Table 1: Number of markets, market heads and market traders included in the study**

Markets		Market Heads		Market Traders			
Total	From Each Category	Total	From Each Market	Total	From Each Category		
					Peri-Urban	Township	Central Business
12	4	12	1	384 (386)	60 (61)	104	220 (221)

## 2.6 Data Collection

Data was collected by the principle investigator with the help of two research assistants' students from the University of Zambia through interviews, observations and water sampling.

Data collection tools included:

- a. Systematic interview guides for interviews of market traders and market heads.
- b. Checklist for observations of the work place.
- c. Water sampling forms for water sampling.

## Interviews

Both participants, the market heads and traders were provided with all the information about the study before the interviews from the information sheet. Participants who wanted to participate signed the consent forms. The interviews commenced immediately after the consent was given. Market heads were interviewed in their offices while the traders whilst selling at their respective stalls (Images 1 and 2).

The study used two types of systematic interview guides one for market traders and another one for market heads. Both interview guides were created by the principal investigator because no standardised tools were found. Most of the questions in the interview guides were adopted from a master dissertation by Nansereko (2005) on sanitation in schools of Uganda. The two questionnaires from Nansereko's one for the school heads and another for students were used for market heads and market traders respectively after being modified to suit with the required information of the current study.

Market trader's systematic interview guides included the following issues: provided facilities, and level of provision of facilities that is tissue, soap, water adequacy of facilities, siting, cleanliness, privacy, paying for facilities and use of facilities (appendix 2.1). Nansereko's questions on the knowledge of participants on water and sanitation related diseases, hand washing practices and effects of poor sanitation were not included in the interview guide used in the current study. On the other hand questions on the basic information of the traders and whether the traders paid for using the facilities were added in the interview guide.

The systematic interview guides for market heads addressed the following issues: provided facilities and level of provision, type and number of provided facilities, challenges in provision of facilities, appropriateness and adequacy of the facilities, frequency of visits by the Health Department and whether there was a program or committee that addressed water and sanitation issues in the markets (appendix 2.2). The issues that were excluded in the heads interview guide included practice of sanitary use by the participants, blame on the participants on poor sanitation and sanitation awareness of participants.



*Image 1*



*Image 2*

*Image 1 and 2: The principal investigator interviewing market traders in one of the visited township market.*

### **Observations**

The researcher also inspected the provided welfare sanitary facilities at each market accompanied by the market head or the person assigned. The observations were conducted between 10 and 12 AM at all markets. Data gathered during the inspection were recorded on the checklist which included the following issues: provided facilities, type and number of provided facilities, privacy, cleanliness or maintenance, siting, and separation of facilities by sex (appendix 2.3) the checklist was also adopted from Nansereko (2005). Photographs of the provided facilities were taken with permission from the market heads. The market heads were

informed that some of the pictures taken during the inspections would be used in the thesis and that all would be shown to supervisors in Norway for discussion. The photographs taken during the data collection from the various markets were used in their original form without modifications.

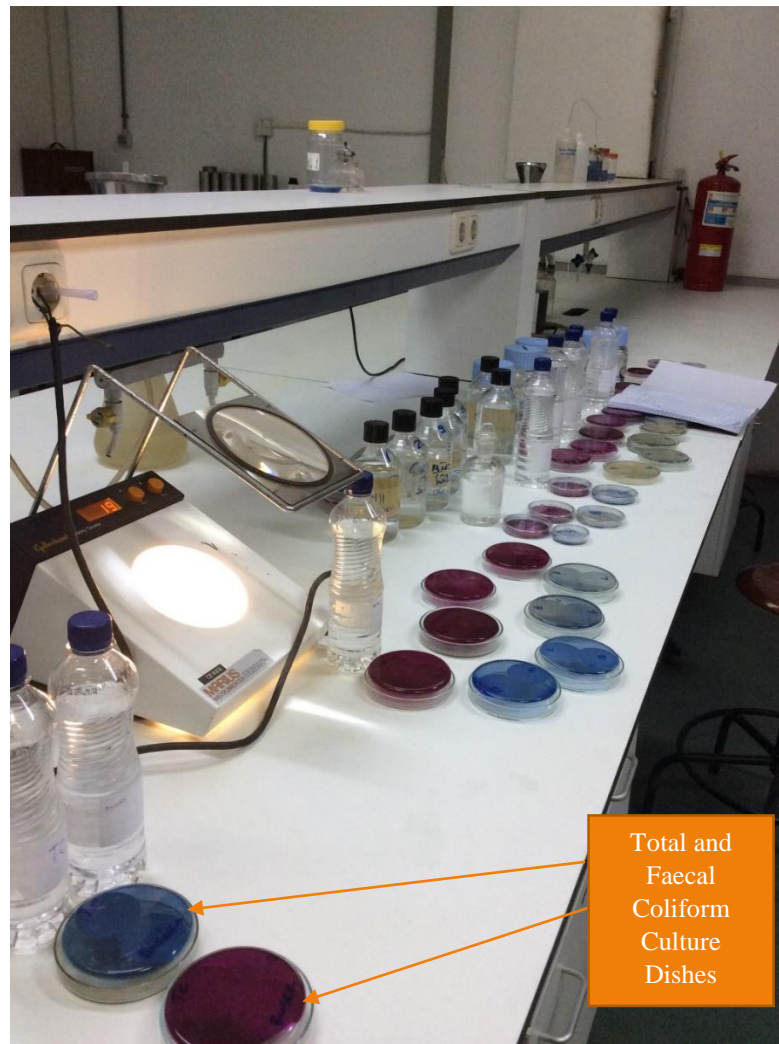
### **Water sampling**

Two water samples, 500 ml each, were collected at two weeks intervals at each market amounting to a total of 22 samples from all markets visited. Only 22 samples were collected because one of the visited markets did not have any water point. The water was collected at the sources where market traders got water for drinking and general use. The taps were disinfected by means of heat before collection and the water was collected in sterilised bottles. The samples were stored in a cooler box with ice blocks at temperature below 10 degrees Celsius to avoid occurrence of reactions that could interfere with bacteriological quality of water during transportation. Information about the samples collected was recorded on the Food and Drugs sampling form (appendix 2.4). The collected water samples were delivered to the laboratory within 24 hours of collection.

### **Water analysis**

The samples were analysed at University of Zambia School of engineering Environmental science laboratory. A total of 44 water analysis were conducted, 22 for Total Coliform and 22 for Faecal Coliform. Membrane filtration technique was used to test water samples for both total and faecal coliform bacteria. For each sample, 100 ml of water was filtered through a membrane made of cellulose compound of pores 0.45 microns. After filtration the membranes were incubated on the appropriate selective medium, Endo medium selective medium for Total Coliform and MFC agar medium for Faecal Coliform, The coliform bacteria were left to replicate and form colonies for 24 hours on the medium. The mediums were incubated at 35

degrees Celsius for Total Coliform and 44.5 degrees Celsius for Faecal Coliform. The number of colonies formed after incubation represented the Total and Faecal Coliforms in the sample. A low power microscope was used to count the number of colonies formed on each media after 24hours.



*Image 3: The laboratory in which water was analysed. The plastic bottles in the image contained water that was sampled and dishes contained the cultures just after being removed from the incubator.*

## 2.7 Study Variables and Measurements

The information obtained from the observations was used to define different variables used in statistical presentations and analyses of this study. The definitions of privacy, cleanliness, siting, water and requirements for toilets and wash hand basins are given in Table 2.

**Table 2: Classification (measurement) of selected variables**

<b>Variable</b>	<b>Information from observations</b>
<b>Privacy</b>	<ul style="list-style-type: none"> <li>• <b>Privacy:</b> all the toilets cubicles have lockable doors.</li> <li>• <b>Not private:</b> Those without doors or with non-lockable doors.</li> </ul>
<b>Cleanliness</b>	<ul style="list-style-type: none"> <li>• <b>Not clean:</b> presence of water, urine or faecal matter on floor and or wall, plus offensive smells and flies.</li> <li>• <b>Clean:</b> No water, urine or faecal matter on floor and or wall, plus absence of offensive smells and flies.</li> </ul>
<b>Siting</b>	<ul style="list-style-type: none"> <li>• <b>Far:</b> more than 30 meters from facilities to the furthest shop</li> <li>• <b>Near:</b> less than 30 meters from the facilities to the furthest</li> </ul>
<b>Requirements for toilets and wash hand basins according to the Public Health Act</b>	<ul style="list-style-type: none"> <li>• 1-25 workers require 1 latrine (water closet) for the first 100 and then &gt;100 workers 1 added latrine for every 40 workers. In addition the wash hand basins and urinal must be provided for each water closet provided.</li> </ul>
	<b>Information For Water Analysis</b>
<b>Water</b>	<ul style="list-style-type: none"> <li>• <b>Total coliform:</b> less than 10cfu per 100ml.</li> <li>• <b>Faecal coliform:</b> 0 cfu per 100ml.</li> </ul>

## 2.8 Data Management and Analysis

Data were checked immediately after collection by the principle investigator for completeness and accuracy. Data and tools used during the data collection were kept under lock and key at the residence of the principal investigator in Lusaka, Zambia and thereafter carried to Norway. Data was entered, cleaned and analysed in Statistical Package for the Social Sciences (SPSS)

version 22 and data from open ended questions were analysed manually. Data was analysed at both the market and traders level.

### **Analysis at market level**

Data from observations and market head interviews were used at the market level to assess the provided facilities and adherence of provided facilities to law. Under here frequencies and proportions of the type, number of the provided facilities and adherence of markets to requirements of the laws of Zambia on welfare sanitary facilities for traders were obtained. The variables used to determine adherence included: Provision of facilities, adequacy of toilets and hand washing facilities, privacy, siting, separation of facilities by sex and traders and customers, provision of facilities for the physically challenged, cleanliness and provision of water. The information about how the various variables were rated is presented in table 2. For example determining adherence of the markets to adequacy of facilities (toilets and hand washing facilities) was done by getting the number of facilities available at each market and comparing it with the number of stalls. Markets that had the required ratio of number of facilities to number of stalls according to the laws of Zambia (table 2) were said to be adhering to law whilst those that had ratios not according to the law not adhering with standards (table 5). Information on the challenges in provision of facilities were also determined using information from the market heads.

In addition water results from the laboratory were checked and analysed manually to get the frequencies and proportion of markets complying with Zambians bacteriological standards of drinking water. The standards of drinking water are also presented in table 2.



### **Analysis at trader's level**

At traders level the data obtained from market trader's interviews was used. Perception of traders on provided facilities in terms of adequacy, cleanliness, privacy, siting and use of facilities was determined.

### **Difference among markets**

As the variables were many, sum scores of seven variables were calculated for each market. The sum scores were calculated at market and market trader's levels. Data from observations was used to calculate the sum score at market level and data from market trader's interviews at traders' level. The seven variables included in the sum score were: 1) Provision of toilets 2) provision of hand washing facilities, 3) adequacy of toilets 4) adequacy of hand washing facilities, 5) cleanliness, 6) siting and 7) privacy. Each variable was assigned a score of one for positive outcome and zero for negative outcome, with total scores of seven at both levels. The sum scores at market level and mean sum score at traders' levels were computed for each market. The mean sum scores were also calculated for each market category i.e. peri-urban, township and central business at both market and traders level.

### **Statistical analysis**

The data were analysed using descriptive statistic such as frequencies and proportions. For categorical variables, statistical difference among groups was determined using chi-square or Fisher's exact test. Fisher's exact test was used for variables that had cells with less than 5 observation counts. One way ANOVA was also used to find out whether there was significant difference between the mean sum scores of the market categories. P-value less than 0.05 was considered significant.

## **2.9 Pretesting and Quality Assurance**

The research assistants were trained in the correct way of data collection. They got familiar with the tools during pretesting. The data collection tools comprising the checklist and interview guides were pretested at one of the markets in Lusaka which was not included in the study. One market head and 10 market traders were included in the pretesting. The following information was collected during the pre-test: The time it took to interview and complete the interviews, clarity of the instructions, if any questions were unclear or ambiguous, any objection to answering any question(s), layout clarity and whether the data obtained was able to address the proposed research objectives. The tools were corrected in line with the information that was collected during the pre-test. The correction made after the pretesting included removing the question on level of attendance of the traders and dichotomizing answers to question on privacy. In addition the information sheets and consent form were translated to the local language Bemba as most of the traders were unable to read and understand English.

## **2.10 Ethical Consideration**

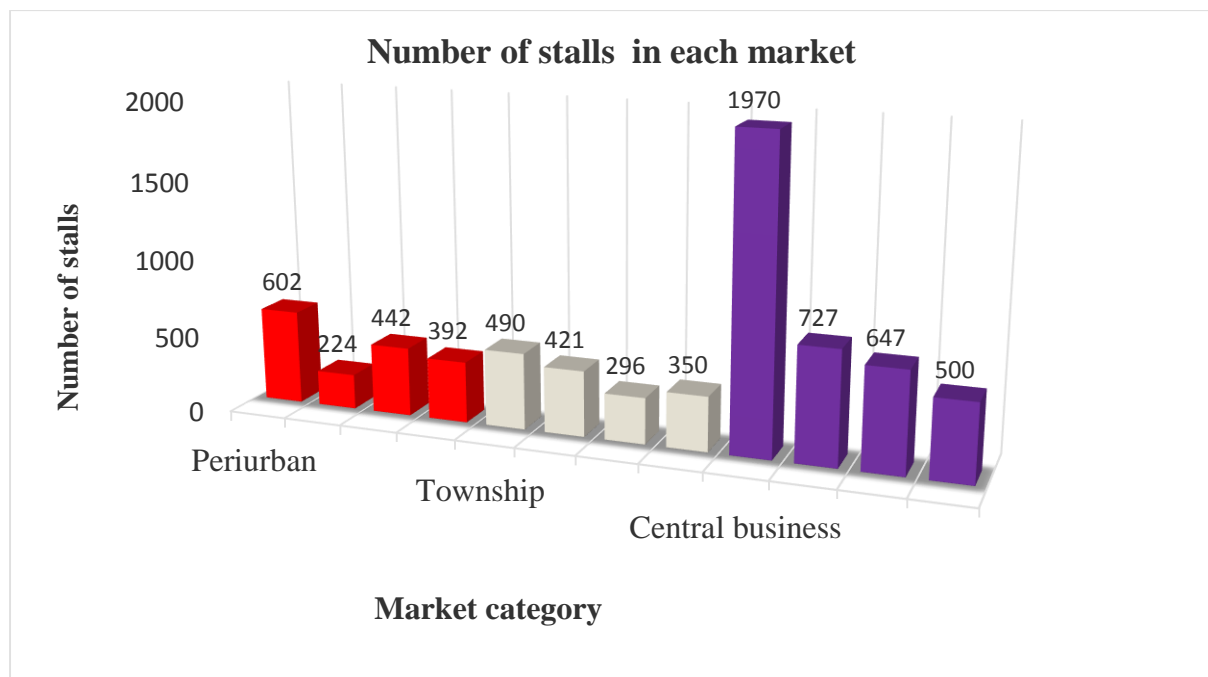
Ethical approval was sought from the Committee for Medical and Health Research Ethics West research in Norway (REK) (appendix 3.2) and Excellence in Research Ethics and Science (ERES) (appendix 3.3) in Zambia before data collection. Market names, water samples and participants were treated with confidentiality as numbers were strictly allocated to them for identity instead of their names. The participants were given all the information about the study, explaining exactly what the study involved, and that they were allowed not to participate in the study if they did not feel like. They were also told that they could withdraw from the study at any time and not to answer questions they were not comfortable with. Only individuals who consented to the study were given the information sheets and asked to sign the consent form.

The study did not involve any direct risks to the participants. However, there was a loss of time for the traders during interviews and walk through visit. To address and reduce this risk the researcher made sure that a maximum of time of 10 min was spent during the interviews and that the walk through lasted only 5 to 10 minutes. The other risk might have come about due to identification of participants and markets. This risk might cause the public to be sceptic buying food and accessing other services related to water and sanitation in fear of adverse health effects. The other risk was that market heads might be blamed in case their markets were not up to standards set by the various authorities such as the local authority. These risks were dealt with by making sure that no names were indicated on the questionnaires, checklists, water sampling bottles or other materials and forms used in the study and the final report. In addition the findings of the study are presented at group level.

## CHAPTER THREE: RESULTS

### Characteristics of markets

Totally 12 markets were included in the study, 4 from each of the three categories of central business markets (221 stalls), township markets (104 stalls) and peri-urban markets (61 stalls). The total number of stalls in all markets was 7061 with an average of 588 (figure 3). All markets had a mix of building structures made of temporal (wood, plastics and grass) materials (image 4) and permanent (block and brick) (image 5). Traders in these markets sold different goods and services such as food and groceries, beauty products and services, stationery, hardware, electronics and other businesses. The market traders paid money in form of levy every day for selling in the market and rent every month to the local authority. In addition the traders paid for use of welfare facilities (image 6).



**Figure 3:** Number of stalls in each market, participating in the study.

**Source:** Observations and market head interviews.



**Image 4:** Market stalls made of temporal material (wood, plastic and grass). This is an example of a self-built township market.

**Source:** <http://www.panoramio.com/photo/21086313>.



**Image 5:** Market stalls made from permanent materials. This is an example of government built township market.

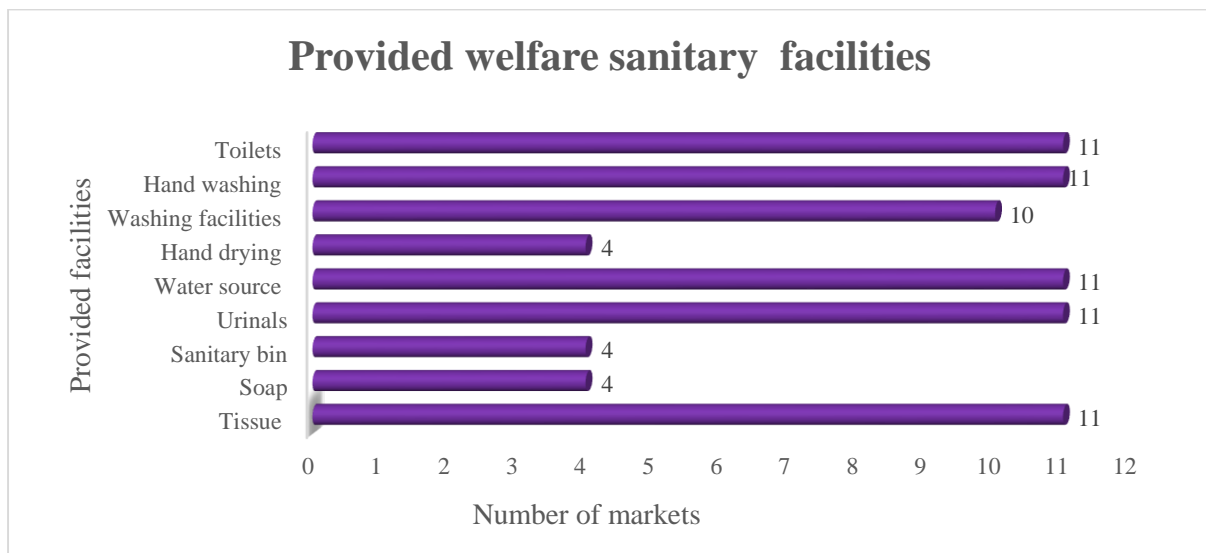
**Source:** <http://www.panoramio.com/photo/21110339>.



**Image 6:** Sign for fee paying toilets at a visited central business market. Traders at all markets had to pay for using the welfare sanitary facilities.

### 3.1 Provided Welfare Sanitary Facilities

All markets, except for one, had some form of welfare sanitary facilities (figure 4).



**Figure 4:** Provided welfare sanitary facilities in twelve markets of Lusaka.

**Source:** Observations and market head interviews.

## Type of provided welfare sanitary facilities

The majority of the markets provided either water closets or a combination of water closets and waterborne toilets (table 3). Nine markets provided wash hand basins, one market only a standing pipe tap, one a bucket filled with water and one did not provide any hand washing facility (table 3). Nine of the markets had piped water for drinking, two had a borehole water source and one provided no drinking water (table 3). Images 7 to 12 show the various types of welfare sanitary facilities provided for market traders.

**Table 3: Types of provided welfare sanitary facilities (n = 12)**

<b>Type of facility</b>	<b>Frequency (n)</b>	<b>Proportion (%)</b>
<b>Toilets</b>		
Water closets	5	41.7
Waterborne	1	8.3
Waterborne and water closet	5	41.7
Not available	1	8.3
<b>Hand washing facilities</b>		
Wash hand basins	9	75.0
Stand taps	1	8.3
Buckets	1	8.3
Not available	1	8.3
<b>Source of Drinking Water</b>		
Piped or local authority	9	75.0
Borehole	2	16.7
Not available	1	8.4
<b>Hand drying facilities</b>		
Electrical hand dryers	4	33.3
Not available	8	66.7
Total	12	
<b>Urinals</b>		
Trays	11	91.7
Not available	1	8.3
<b>Washing facilities</b>		
Showers	9	75
Showers and bathtubs	1	8.3
Not available	2	16.7

**Source:** Observations.



*Image 7: Water closet*



*Image 8: Wash hand basins*

*Image 7: A water closet in a central business market. Water closets were the most common toilets in the visited markets.*

*Image 8: Wash hand basins in a central business market. Wash hand basins were the most common hand washing facilities in most of the markets visited.*





***Image 9: Urinal***

***Image 9: A urinal in a central business market male toilet.***



***Image 10: Hand dryers***

***Image 10: Hand dryers in a central business market. All the markets that hand drying facilities had these types of facilities.***



***Image 11: Waterborne toilet and shower***



***Image 12: Bathing tab***

***Images 11:*** A combination of a waterborne toilet and shower in a township market. Waterborne toilets were the second most common type of toilets in the visited markets.

***Image 12:*** A bathing tab provided for traders at one of the central business markets.

## Number of welfare sanitary facilities provided

Markets had different number of facilities. Markets in the Central business had more facilities than the other categories even though one of the markets did not have any facilities (table 4). The study revealed that all but one of the markets had cleaning personnel in charge of the welfare sanitary facilities. Most of the markets (n=9) cleaned the facilities more than three times daily while two cleaned three times daily, one twice per day the rest were not applicable. The majority of the markets (n=9) had a committee in charge of water and sanitation as opposed to three without such committee. The majority (10 markets) did not have any program that helped in provision of facilities. All the markets had at least one visit by the health inspectors to check for provision of facilities though none of the markets had been visited for the past 3 months until the day of the study. None of the markets had special facilities for the physically challenged.

**Table 4: Number of facilities provided at each market (n = 12)**

Market category	Welfare Facilities			
	Toilets	Wash hand basin	Showers and or bathtub	Urinals
<b>Peri-urban</b>				
1	9	1	N/A	1
2	8	6	2	1
3	2	1	2	1
4	4	2	2	1
<b>Township</b>				
1	8	1	2	1
2	16	16	4	1
3	12	12	2	1
4	4	2	N/A	1
<b>Central Business</b>				
1	36	63	42, 6 Tubs	6
2	22	10	10	6
3	10	2	2	2
4	N/A	N/A	N/A	N/A

N/A: Not available.

**Source:** Observations.

## **Challenges in provision of facilities**

When the market head at each market were asked about the challenges in provision of facilities the following was revealed: Most of the market heads mentioned that there was inadequate supply of cleaning materials such as gloves and tissues by the local authority. One head revealed that the centralized system of market management was not good. The market head said that certain issues could be dealt with more easily at the market level instead of involving the council. This was the case for example regarding supply of tissues and fixing small damages. The market heads had to report to the council whenever there was a damage. The response to the request concerning damages was however always delayed by the council. Another challenge mentioned was blockages of sewer systems and septic tanks for markets not connected to the main local authority sewer line. The lack of man power to fix broken facilities, lack of running water, vandalism, stealing of sanitary ware and other accessories such as soap and tissue, inadequate water points and toilets and intermittent water supply (images 13 and 14), were other challenges that were mentioned. In the market which had no facilities, the market head indicated that the lack of facilities had resulted in traders using plastic bags and beer boxes as toilets, as well as the unfinished buildings and walls for urinating. Other challenges mentioned were poor drainage system and inconsistent waste collection.



***Image 13***

***Image 13:*** A queue of containers at one of the peri-urban market. The traders had to queue for water in the morning. Water was only supplied from 7 AM to 10 AM. The source of water at this markets was also the main water source for the surrounding community.



***Image 14***

***Image 14:*** A trader getting water from the reserve drum for pour flush after using the toilet at a peri-urban market. The water pressure at most of the markets was low and the supply was intermittent. This led to Storing of water in reserve drums for use during the period without water.

### 3.2 Adherence of Provided Welfare Facilities for Market Traders to Law

The study revealed that only one market adhered to Zambian laws for number of toilets provision. Only two markets adhered to the required number of hand washing facilities (table 5). The study also revealed that none of the markets adhered to law concerning privacy, recommended siting of facilities, separation of facilities for traders and customers or to provision of facilities for the physically challenged. Only six markets adhered to cleanliness but the majority (11 markets) were adhering to provision of water. Lastly all markets were adhering to separation of facilities by sex (images 18 and 19).

**Table 5: Number of facilities available and required according to the Zambian laws**

Market Category	Welfare facilities					
	Available	Toilets Required	Comment	Available	Required	Comment
<b>Peri-urban</b>						
1	9	14	Inadequate	1	14	Inadequate
2	8	12	Inadequate	6	12	Inadequate
3	2	9	Inadequate	1	9	Inadequate
4	4	10	Inadequate	2	10	Inadequate
<b>Township</b>						
1	8	17	Inadequate	1	17	Inadequate
2	16	7	Adequate	16	7	Adequate
4	12	13	Inadequate	12	13	Inadequate
4	4	11	Inadequate	2	11	Inadequate
<b>Central Business</b>						
1	36	51	Inadequate	63	51	Adequate
2	22	20	Inadequate	10	20	Inadequate
3	10	18	Inadequate	2	18	Inadequate
4	0	14	NP	0	14	NP
<b>Total</b>	<b>131</b>	<b>196</b>	<b>Adequate:1 Inad:11</b>	<b>116</b>	<b>196</b>	<b>Adequate: 2 Inad:10</b>

NP: Not provided.

**Source:** Observations.



*Image 15: A dirty water closet stained with urine and faecal matter at a peri-urban market. This was the state of facilities at most of the markets visited.*



*Image 16: Shows a dirty and stained urinal in a male toilet at one of the visited peri-urban market.*



***Image 17:*** Lack of privacy at one of the peri-urban market visited a toilet cubicle with broken door. Traders had to hold the door whilst using the toilet this was the condition of the doors in most of the markets visited.





*Image 18*



*Image 19*

*Images 18 and 19: Signs showing the male and female toilets in a central business market.*

*All markets had facilities separate for each sex as required by the law.*

### **3.3 Bacteriological (Total and Faecal Coliform) Standards of Drinking Water**

Totally 44 water tests were carried out, 22 for Total Coliform bacteria and 22 for Faecal Coliform. Water samples from two of the markets one from peri-urban and another from central business were contaminated with both Total and Faecal coliform bacteria, representing (9%) of the water samples. The level of contamination ranged from 30 to 54 cfu per 100mls for Total Coliform and 15 to 22 cfu per 100mls for Faecal Coliform (table 6). All the samples

contaminated were from the first sample while the second sample did not have any contaminated samples (table 6). All the contaminated samples were from borehole water.

**Table 6: Laboratory results for Total and Faecal Coliform in water tested**

Market Category	Sample 1		Sample 2	
	Total Coliform cfu per 100mls	Faecal Coliform cfu per 100mls	Total Coliform cfu per 100mls	Faecal Coliform cfu per 100mls
Peri-urban	30	15	0	0
Central-Business	54	22	0	0

cfu: coliform forming unit.

**Source:** Laboratory tests results.

### 3.4 Market Traders' Perception on Provided Welfare Facilities

#### Demographic and baseline characteristics of market traders

A total of 386 market traders participated in the study. The majority of the participants were female (53.6%). The age of the participants ranged from 18 to 70 years and 50.5% were between 18 and 33 years representing 50.5%. The other two groups 34-49 and 50 -75 represented 41.5% and 7.5%, respectively. The highest proportion of the participants were married (50%), while single, divorced and widowed represented 38.1%, 6.2% and 5.7% respectively. In terms of the type of business 42.2% were dealing in food and groceries, 32.9% in beauty, 19.4% in stationery, hardware and electronics and the rest 4.4% in others business with 1.0% missing.

#### Perception of traders on the provided welfare sanitary facilities

The majority of the traders (86%) mentioned that they were provided with toilets, but 73% said that the provided toilets were inadequate (table 7). Similarly, 84% of the trader's interviewed mentioned that hand washing facilities were provided but 60% revealed that they were inadequate (table 7). Most of the traders revealed that water was provided but only sometimes.

72.0% of traders perceived facilities as not private. Most of the traders (61.4%) perceived the facilities as being located at appropriate distance from their stalls. A high proportion of traders (78.2%) said that the facilities were not clean. Most of the traders (69.2%) responded that they only use the facilities sometimes since they had no other option (table 7).

**Table 7: Perception of traders on the provided welfare sanitary facilities (n = 386)**

<b>Facility</b>	<b>Frequency(n)</b>	<b>Proportion(%)</b>
<b>Toilets</b>		
Available	331	86.0
Not available	55	14.0
<b>Adequacy of toilets</b>		
Adequate	104	26.9
Not adequate	282	73.1
<b>Hand washing facilities</b>		
Available	327	84.7
Not available	59	15.3
<b>Adequacy of hand washing facilities</b>		
Adequate	95	24.6
Inadequate	232	60.1
Not provided	58	15.0
Missing	1	0.3
<b>Provision of water</b>		
Provided	359	93.0
Not provided	27	7.0
<b>Level of water provision</b>		
Always	109	28.2
Sometimes	246	63.7
Not provided	27	7.0
Missing	4	1.0
<b>Privacy of facilities</b>		
Private	108	28.0
Not private	278	72.0
<b>Siting of facilities</b>		
Far	148	38.3
Near	237	61.4
Missing	1	0.3
<b>Cleanliness of facilities</b>		
Good	84	21.8
Poor	302	78.2
<b>Use of facilities</b>		
Always	96	24.9
Sometimes	267	69.2
Do not use	23	6.0

**Source:** Market traders' interviews.

**Table 8: Description of use of sanitary facilities among 386 traders and associations between the use and their perception of the provided facilities**

Variable	Use of facilities						Total		P - value
	Always		Sometimes		Do not use		N	%	
	n	%	n	%	n	%			
<b>Cleanliness</b>									
Clean	55	65.5	26	31.0	3	3.6	84	100	<0.001 <sup>2</sup>
Not clean	41	13.6	241	79.8	20	6.6	302	100	(84.448)
<b>Privacy</b>									
Private	57	52.8	47	43.5	4	3.7	108	100	<0.001 <sup>2</sup>
Not private	39	14.0	220	79.1	19	6.8	278	100	(57.748)
<b>Siting</b>									
Far	16	10.8	124	83.8	8	5.4	148	100	<0.001 <sup>1</sup>
Near	80	33.8	142	59.9	15	6.3	237	100	(26.877)
<b>Adequacy (Toilets)</b>									
Adequate	38	36.5	61	58.7	5	4.8	104	100	0.006 <sup>1</sup>
Inadequate	58	20.6	206	73.0	18	6.4	282	100	(10.385)
<b>Adequacy (HWF)</b>									
Adequate	48	50.5	43	45.3	4	4.2	95	100	<0.001 <sup>2</sup>
Inadequate	48	16.5	224	77.0	19	6.5	291	100	(40.523)

<sup>1</sup>Chi square test <sup>2</sup>Fishers' exact test, HWF: Hand Washing Facilities.

With information from the interviews with the market traders, the factors significantly associated with use of facilities were cleanliness, privacy, siting, adequacy of toilets and hand washing facilities (table 8).

**Table 9: Factors associated with sex of among 386 traders**

Variable	Sex				Total		Pearson Chi-square	P value
	Male		Female		n	%		
	n	%	n	%				
<b>Use of facilities</b>								
Always	46	25.7	50	24.2	96	24.9	2.513	0.285
Sometimes	126	70.4	141	68.1	267	69.2		
Do not use	7	3.9	16	7.7	23	6.0		
<b>Adequacy (toilets)</b>								
Adequate	34	19	70	33.8	104	26.9	10.714	0.001
Inadequate	145	81.0	137	66.2	282	73.1		
<b>Adequacy (HWF)</b>								
Adequate	39	21.8	56	27.1	95	24.6	1.434	0.231
Inadequate	140	78.2	151	72.9	291	75.4		
<b>Siting</b>								
far	74	41.6	74	35.7	148	38.4	1.372	0.241
Near	104	58.4	133	64.3	237	61.6		
<b>Cleanliness</b>								
Clean	48	26.8	36	17.4	84	21.8	5.008	0.025
Not clean	131	73.2	171	82.6	302	78.2		
<b>Privacy</b>								
Private	60	33.5	48	23.2	108	28.0	5.084	0.024
Not private	119	66.5	159	76.8	278	72.0		

HWF: Hand washing facilities.

The study revealed that there was significant difference in perception between men and female on the adequacy of toilets, cleanliness and privacy (table 9). No association was found between sex and the other variables including use of facilities, adequacy of hand washing facilities and siting (table 9).

## Differences among markets

The variables significantly associated with category of markets in this study included provision of toilets adequacy of toilets and provision of hand washing facilities, adequacy of hand washing facilities, cleanliness, privacy siting and use of facilities (table 10).

**Table 10: Factors associated with categories of markets among 386 traders**

Variable	Categories						Total		Pearson Chi-square (p-value)
	Central Business		Township		Peri-urban		n	%	
	n	%	n	%	n	%			
<b>Provision (Toilets)</b>									
Provided	166	75.1	104	100	61	100	331	85.8	60.295 (<0.001)
Not provided	55	24.9	0	0	0	0	55	14.2	
<b>Adequacy (toilets)</b>									
Adequate	23	10.4	51	49.0	30	49.2	104	26.9	71.81 (<0.001)
Inadequate	198	89.6	53	51.0	31	50.8	282	73.1	
<b>Provision (HWF)</b>									
Provided	202	91.4	85	81.7	40	65.6	327	84.7	25.609 (<0.001)
Not provided	19	8.6	19	18.3	21	34.4	59	15.3	
<b>Adequacy (HWF)</b>									
Adequate	30	13.6	44	42.3	21	34.4	95	24.6	35.229 (<0.001)
Inadequate	191	86.4	60	57.7	40	65.6	291	75.4	
<b>Cleanliness</b>									
Clean	36	16.3	29	27.9	19	31.1	84	21.8	9.333 (0.009)
Not clean	185	83.7	75	72.1	42	68.9	302	78.2	
<b>Privacy</b>									
Private	46	20.8	38	36.5	24	39.3	108	28.0	13.321 (0.001)
Not private	175	79.2	66	63.5	37	60.7	278	72.0	
<b>Siting</b>									
Near	111	50.4	19	18.3	18	29.5	148	38.4	33.357 (<0.001)
Far	109	49.6	85	81.7	43	70.5	237	61.6	
<b>Use of facilities</b>									
Always	32	14.5	42	40.4	22	36.1	96	24.9	70.876 (<0.001)
Sometimes	187	84.6	54	51.9	26	42.6	267	69.2	
Do not use	2	0.9	8	7.7	13	21.3	23	6.0	

HWF: Hand washing facilities.

The sum scores for hygienic facilities included seven variables (1) Provision of toilets 2) provision of hand washing facilities, 3) adequacy of toilets 4) adequacy of hand washing facilities, 5) cleanliness, 6) siting and 7) privacy), and varied from zero to seven , where seven was the best score.

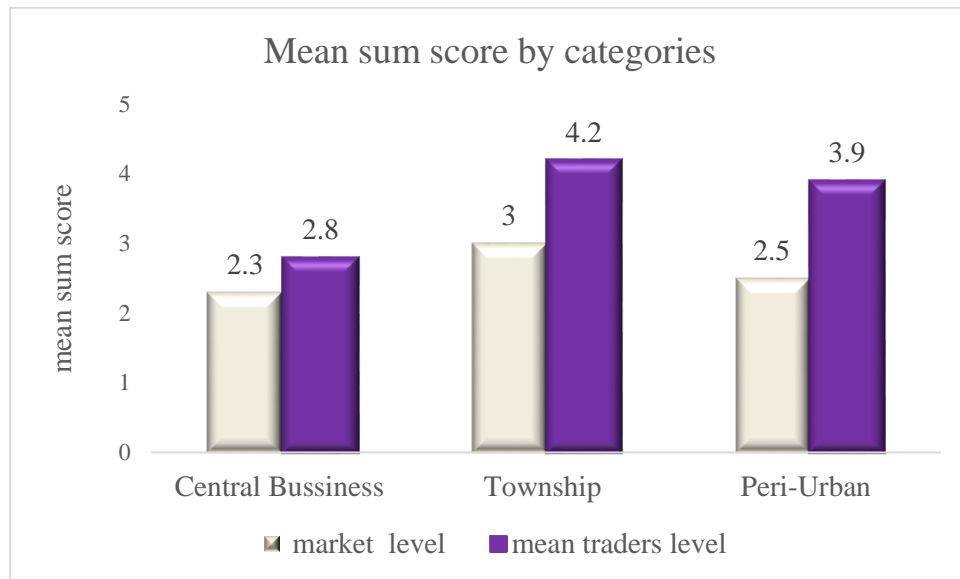
According to the sum scores, the best market at the market level was a market from the township with score of five. The best market at trader’s level was a market in the central business with a mean score of 5.2 (table 11). The worst market at both levels was a market from the central business with scores of zero and 2.1 at market and traders level, respectively (table). The majority of the markets (nine) had higher scores at trader’s level compared to the market level and none of the markets reached the maximum score of seven at either levels (table 11).

**Table 11: Sum scores at market and mean sum scores at trader’s level**

<b>Market Category and market</b>	<b>Sum Score Market Level</b>	<b>Mean Sum Score Traders Level</b>
<b>Central Business</b>		
1	4	4.1
2	2	2.8
3	3	2.2
4	0	2.1
<b>Township</b>		
1	2	3.2
2	5	4.4
3	3	5.1
4	3	4.1
<b>Peri-urban</b>		
1	2	3.9
2	2	2.3
3	3	5.2
4	3	4.3

The best category at both levels was township with means of 3 and 4.2 at market and traders levels, respectively (figure 5). The worst category was the central business with means of 2.3 and 2.8 at market and traders levels, respectively (figure 5). ANOVA test revealed a significant

difference between the categorical mean scores at traders level ( $P < 0.001$ ) but no significant difference was found at market level (0.725).



**Figure 5:** Mean sum scores by category



## CHAPTER FOUR: DISCUSSION

The study found that among the 12 markets that participated in the study all except for one had some form of welfare sanitary facilities for traders. However, none of the markets complied completely with the laws of Zambia regarding provision of welfare facilities for workers and two markets had contaminated drinking water with both Faecal and Total Coliforms. Additionally, most of the trader's perceived facilities as not up to standard.

### 4.1 Provided Welfare Sanitary Facilities

This study revealed that more than half of the markets had toilets, hand washing and washing facilities, source of water, urinals and toilet tissue. However, most of the markets did not have hand drying facilities, sanitary bins and hand washing soap. The results of the current study are similar to a study in Nigeria in 2010 which revealed that most of the workplaces did not have soap and hand drying facilities. In addition, the study in Nigeria reported that soap was stolen by employees whenever provided, similar to what the market heads in the current study revealed. In general, the current findings are in line with reports and assessments in Zambia by Shah, (2012); LCC (2014) and Chaponda (2014). These reports described poor provision of sanitary facilities in workplaces and markets of Zambia, although the level of details was less than in the present study. The reports from Zambia did not specify the type of workplaces and did not give the details of provision of welfare sanitary facilities as they only reported that the workplaces lacked proper sanitation. The report by the Lusaka city council, however, mentioned that markets and schools were part of the workplaces assessed.

Reports and studies in low-income countries outside Zambia are also in agreement with the results of the current study even though most of them were conducted in more formal workplace settings. A report from Malawi in markets in 2013 and a study on food handlers in Brazil the same year showed that most of the workplaces had some form of facilities for

workers even though they were in poor state of maintenance (Kampeza, 2013 and Colli et al., 2013). A study by Mulugeta et al. (2012) in Ethiopian food establishments indicated that more than 10% of these establishments did not have piped source of water and toilets, which is similar to our study findings.

In Nigerian food industries all factories included in the study had toilets, indicating that these facilities were better than in the present study (Adeleke, 2010). The difference might be attributed to a stronger reinforcement of the laws in such food industries than the markets. Also, the food industries included in the Nigerian study were formal workplaces which are likely to be more monitored by the Health Departments compared to the markets which are informal workplaces. A study by Sebudde et al. (2012) in Uganda found that a higher proportion of public eating places did not have drinking water (60%) and toilet tissue. This shows even worse sanitary conditions than in our study. A study in Ghana by Alfors (2009) reported that most of the markets and street vendors were not provided with water and toilets. This is possibly because the study in Ghana included street vendors. We have no knowledge on the situation for vendors, but know they represent a group which is difficult to reach as street vendor's sale in undesignated places and no facilities are provided for these people.

#### **4.2 Adherence of Provided Facilities to the Laws of Zambia**

One of the twelve markets in the current study did not have any facilities which is required by law in Zambia. The lack of facilities results in the traders either using facilities from the nearby market, unfinished or unoccupied buildings or 'Shakeshake' (empty opaque beer packages) as toilets. These results are in line with a report by muvi TV in 2014 who reported that traders in a market in southern province of Zambia used unfinished building as toilets.

More than 80% of the markets in our study did not have adequate toilets and hand washing facilities. Only one market complied with adequate toilets and hand washing facilities, and

another to hand washing facilities only. None of the market facilities in our study had lockable doors for privacy. This was possibly due to poor maintenance.

Even though the results show that most of the markets had personnel in charge of cleaning, and that the facilities were cleaned more than three times daily, the problem of dirty facilities still existed. This could be the result of traders using the facilities continuously, and the limited number of cleaners were unable to meet the demand for continuous cleaning. These findings are in agreement with a study of markets in Ghana by Alfers in 2009 which found that most of the markets lacked adequate cleaning personnel. In addition, the Ghana study revealed inadequate cleaning equipment just as revealed by the market heads in our study. Welfare facilities in all markets were located more than 30 meters from the furthest stall which is not in compliance with the Public Health Act requirement.

Even with this poor sanitation the market heads in the current study revealed that there was very little enforcements of the laws by the Health Department. This might be a contributing factor to the poor sanitations in markets as the markets were not monitored regularly. The market heads in the current study also revealed that none of the markets had been visited by the Health Department in the past 3 months as required by the law. The results of the current study are in line with the reports by the Ministry of Local Government and Housing (2013) and LCC, 2014 of Zambia which found that most of workplaces and markets in particular did not comply with the laws of Zambia concerning provision of facilities. These two assessments, however, did not indicate how adherence to the law by the markets was measured. To our knowledge no previous studies have done any exact evaluation of adherence to the laws in terms of provision of facilities in markets and other workplaces neither in nor outside Zambia. The reason why the markets did not follow the laws of Zambia in terms of provision of facilities might be due to none consideration of markets as formal workplaces. It is difficult to regulate

them due to lack of specific laws with requirements for provision of welfare sanitary facilities in Zambian markets. The Markets and Bus Station Act does not specify the detailed requirements of the facilities as it only indicates that the markets have to be provided with facilities without giving all the requirements in detail. Also, traders and market heads might be ignorant of the law and reasons why the welfare sanitary facilities are important.

#### **4.3 Bacteriological Quality of Drinking Water**

The current study established that not all water tested complied with the bacteriological standards of drinking water, as specified in the Food and Drugs laws of Zambia chapter 303 of 10 Total Coliform and Faecal Coliform cfu per 100mls of water. Water from two (2) markets was contaminated with both Total and Faecal coliforms, thus indicating the presence of different bacteria in the water. A previous report by Kabemba in 2012, reported similar results of drinking water in a Zambian mine being contaminated. This report however showed that the water was contaminated with Vibrio Cholera, which indicates that the tests were more specific than in our study.

#### **4.4 Perception of Traders on Provided Facilities**

More than half of the traders reported that both toilets and hand washing facilities were provided, though inadequate. These results are in agreement with the findings in Ghana where the traders reported that the toilets were inadequate (Alfers, 2009). The study in Ghana also found more than 50% of the traders' said the facilities were not clean and private, and water was not always provided. The majority of the traders in the current study perceived facilities being appropriately located from their stalls. Most of the traders also mentioned that they were not happy with the provided facilities, and that they only used the facilities because they did not have any other option. A study in India found similar results as more than 50% of the company workers said that the facilities were poorly maintained, dirty, inadequate and lacked

provision of hot water, hand sanitizers and tissues (Srinivas, 2013). A report from Malawi showed that market traders had filed petitioned over the poor sanitation in the market as the market had only one toilet and one source of water for over 200 traders (Kampeza, 2013). Other studies with similar findings include a report by Rajaraman et al. (2013) in India comprising different work places (construction, domestic, factories and street); Sedudde et al. (2012) in public eating places of Uganda and Adeleke (2010) from different food factories of Nigeria.

### *Associations and gender issues*

The present study found that the important factors associated with use of facilities include cleanliness, privacy, siting and adequacy, and the perception of these factors was associated with the use/or not use of the facilities. Traders who mentioned the facilities being clean and private did not have a problem using the facilities compared to those who reported that the facilities were not clean. A higher proportion of traders who reported that the facilities were located near always used the facilities compared to those who said the facilities were located far. Most of the traders who mentioned that the facilities were adequate always used the facilities compared to those who said they were inadequate. This is possibly because both the siting and inadequacy of facilities led to loss of time during walking or waiting for use of facilities, hence possibly caused traders not to always utilise the facilities. The results are in line with the research brief by Hartman et al. (2015) in India who also reported women to less likely use facilities sited far compared to when sited near.

Few studies were found that have studied sanitary factors associated with sex of workers. Most of the studies found seemed to be more important for women than men similar to the findings of the current study. The current study found that higher proportion of female mentioned that the toilets were adequate compared to males. This is possibly because most of the markets had more toilets for women than men even though males also had additional urinal(s). On the other

hand, more male traders reported that the facilities were clean and private compared to female, indicating that females were more concerned with cleanliness and privacy compared to males. Similar findings were reported by Rajaraman et al. (2013) in India; Cairncross and Valdmanis (2006) in developing countries; Hallett et al. (2004) in cotton mill factory of England and Hartman et al. (2015) in India. These former studies were mostly qualitative and therefore not totally comparable to our current quantitative study. However, these studies at least give an idea of findings by others.

### ***Differences among markets***

Traders from all the township and peri-urban markets reported that they were provided with toilets compared to 75% in central business. A higher number of traders from the central business reported inadequate toilets and hand washing facilities compared to the other categories. This is possibly because the central business markets had a lot of stalls mostly with more than one trader working at each stall as well as vendors from outside the markets and customers who also used the same facilities. This extra need for sanitary facilities at central markets should be considered by the authorities. Most traders in the peri-urban considered facilities as clean compared to township and central business. This finding could be because the peri-urban markets facilities could be easily cleaned due to a smaller number of facilities, and that there were relatively few traders using the facilities compared to the other categories. Peri-urban markets were reported to provide more private facilities compared to township and central business. Facilities in central business were reported to be located near the stalls compared to those in peri-urban and township. This might be due to the presence of multiple ablution blocks as most central business markets had more than one block located at different points within the market allowing easy access to the facilities by traders. The majority of traders who said they always used the facilities were from the township which might be because the township had better facilities than the other categories.

According to the sum scores none of the markets scored 100% in provision of facilities at the market or trader's level, which means that no market complied completely with provision of facilities. Most of the markets had higher sum scores at trader's level than market level. The reason behind this difference might be because the data collectors were strict in determining satisfactory score since they had knowledge on the required standards of facilities, while the traders had little knowledge on the standards. It is also important to note that since traders came from different places (homes) this might influence the perception of the state of facilities as some of the traders had possibly worse facilities at their homes compared to the ones provided at the markets.

The sum scores according to categories of markets showed township as the best category followed by peri-urban and finally central business. The townships were the best possibly because most of them were reconstructed in recent years, and most of them had two sets of facilities both old and new which reduced overcrowding. Significant differences in mean sum score when comparing the markets categories at trader's level were found, but not at market level. This lack of differences at market level is possibly because at the market level the numbers were low, with only 12 observations used in the calculation.

#### **4.5 Discussion of Methods; Study Limitations and Strengths**

The study was confined to markets run by the Lusaka city council only. Generalisation is therefore restricted to this type of organisation of markets. Only 12 markets out of 27 were included in the study, but as they were randomly selected from the three market types, the selected markets are probably representative for this type of markets in Lusaka. Only 386 markets traders and 12 markets heads were included in the study out of a total of about 14618 estimated market traders. However, also the participants were randomly selected and are assumed to be a representative of this study population. In addition, all market heads and

majority of traders approached to participate in the study consented willing with only less than 10 traders declining to the study.

Although most of the data were based upon subjective statements from persons at the market, the study also included objective measures like the water analysis. This is a strength, and the findings indicate an important hygienic weakness at the markets, with bacteria in the drinking water. However, only Faecal and Total coliform bacteria were tested, hence not a full bacteriological analysis was carried out in this study. On the other side, these two parameters are the most important indicators used in water quality monitoring and give a good basic indication of water quality. The analyses were also performed in a high quality laboratory. The contaminated water samples were only found in the first round of sampling. In the second round, no contamination was found, suggesting that contamination is varying.

It was a limitation that during the interviews no private room were provided, which might have led to participants not responding to some sensitive questions. Some market heads and traders were not comfortable sharing certain information that was related to personal hygiene practices and information that was political in the case of market heads. However, the researchers did a lot of efforts to make the informants of the study to feel that the information would be treated with confidence, giving clear information about the study. Also, the information about the markets was obtained both by observation and interviews and this probably helped in coming up with reliable information. The interview guides and checklist for observation used in the study were not standardised or validated however, pretesting was done to ensure internal validity, and much of the content was extracted from previous studies.



#### **4.6 Implication of the Findings of the Current Study**

The poor provision of welfare facilities in markets revealed in this study might have a negative impact on the health and productivity of the traders. The use of unfinished building as toilets by traders as revealed by one of the market head can lead to diarrhoea and other faecal-oral diseases as flies carrying human excreta from these unoccupied building can move to stalls where food is prepared contaminating the food. According to Astier et al. (1997) use of toilets can reduce diarrhoea by 36% which illustrates the importance of using toilets. The absence of water sources at some of the markets is dangerous as traders might not always manage to buy water for drinking resulting to dehydration and other heat related disorders especially during the hot season. In addition, the traders might consider buying cheap drinking water from the street vendors with questionable quality which might result to diarrhoea as reported by Alfers (2009) in Ghana markets. Presence of Total and Faecal Coliform bacteria in the drinking water as found in the current study might result in serious diarrhoea diseases related to water like the cholera outbreak in the Zambian mine as reported by Kabemba (2012), and both the market traders and their customers could be affected, as the markets sell a lot of food. The poor state of facilities might also led to females shunning facilities which can lead to urinary tract infection. Moreover, some traders especially women might possibly go outside the market in search of more private and clean facilities, especially during menstruation resulting in loss of time as found by Hartman et al. (2015). Since many people from different places come together to sell and buy goods in the visited markets any disease outbreak in these places can affect a lot of people and spread to the population in large areas.

## **CONCLUSION and RECOMMENDATIONS**

### **Conclusion**

In conclusion the study showed that markets in Lusaka lacked proper welfare sanitary facilities in general. Most of the markets did not comply with required facilities for workers in terms of provision and state of facilities such as adequacy, privacy, cleanliness and siting according to the laws of Zambia. In addition two markets did not provide safe drinking water for traders. Most of the traders perceived facilities as not up to standard in relation to adequate, privacy and cleanliness.

### **Recommendations**

Based on the findings of this study the following recommendation are given to the various stakeholders:

#### **Lusaka City Council**

- Make sure the markets follow the law by Inspecting markets regularly, preferably every after three months.
- Build more facilities in the markets to reduce inadequacy.
- Provide sanitary accessories such as soap and tissue at all times.
- Regular maintenance of facilities.
- Increase the number of people in charge of cleaning facilities at each market.
- Decentralise the running of markets to ensure that some of the small responsibilities are given to the markets such as simple repairs and provision of accessories such as soap and tissue.
- Sample water provided for markets traders at regular intervals, especially the borehole water and have it tested to ensure the water provided for traders is safe.

## **Market Heads**

- Reporting all facility damages to the council in due time for quick repair.
- Monitor the facilities regularly to ensure that the facilities are always in good conditions.

## **Market Traders**

- Stop vandalism of facilities and pilfering of accessories such as soap and tissue.

## **Future Studies**

Further studies are recommended on the following issues:

- Provision of welfare sanitary facilities in markets not run by the council in Lusaka district.
- Factors affecting provision of welfare sanitary facilities in markets of Lusaka district.
- Provision of welfare sanitary facilities in government workplaces of Lusaka district.
- More long term studies, describing the situation for a longer period.
- Studies on health among market traders; diarrhoea for instance.

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## APPENDICES

### 1. Information Sheets and Consent forms

#### 1.1 Information sheet in English

##### **Study Title: Welfare Sanitary Facilities for Market Traders of Lusaka, Zambia**

**Introduction:** I am a student at the University of Bergen studying Master of Philosophy in International Health. I am carrying out a study to assess availability and quality of water as well as accessibility and conditions of sanitary facilities in the market (provision of welfare sanitary facilities in the markets). You have been selected to take part in the research. Your voluntary participation is requested so we may learn more about the provided welfare sanitary facilities in the market. Please understand you do not have to decide to agree to participate today, you may take your time to discuss the research with anyone you feel comfortable with before deciding. If at any point there are words or concepts you do not understand please stop me and I will clarify to the best of my ability. If questions should arise at a later time you may contact me or another one of the researchers to answer or clarify your questions or concerns.

**Purpose:** The purpose of the study is to look at the water and sanitation facilities (hand washing facilities, hand drying facilities, soap, toilets, urinals, toilet paper and sanitary bin) provided for market traders in Lusaka district and make recommendations to improve provision of facilities based on the findings.

**Procedures:** The study will involve checking the provided welfare facilities in the market. Water samples will be collected from the market and taken for bacteriological analysis. The study will also involve asking you a number of questions that will help us to find out the provided welfare facilities at work and your perception concerning the provided facilities. The

questions on the questionnaire will be read to you and your responses will be recorded on the questionnaire. The interview will take approximately 10 minutes.

**Risk Factors and Discomfort:** The study will not generate any concrete risk to our knowledge. However, there is loss of work time during the interviews and when guiding us for checking provided welfare facilities.

**Confidentiality Anonymous:** Your name will not be recorded on the questioner instead; you will be given identity number for identification purposes only. The information revealed will be used purely for academic purposes and treated with the strictest confidentiality possible. In addition, all the water samples collected from your premises will be assigned anonymous identification numbers to ensure confidentiality.

**Benefits:** This study will not offer direct benefits for you as a participant. However, the information generated will be used to give advice to you, market management and the local authority to improve provision of welfare facilities in the markets.

**Voluntary Participation:** Your participation is voluntary and you may choose not to answer all of the questions that you are not comfortable with even after signing the consent form. You are also allowed to withdraw from the study at any time if you wish without any penalty.

**Disposal of Data Collection Tools:** All the questionnaires and checklists will used in this study will be destroyed at the end of the study by 31<sup>st</sup> December 2015.

**Results or New Findings:** The results of the study and all the samples will be made available after the study by the principle investigator, in case you would like to refer to them or enter them into your laboratory or other market files. In addition, the laboratory will be asked to keep samples in case you wish to check and or confirm the results with what will be reported by the principle investigator.

Yours faithfully

Chisala Meki

**Address of researcher:** Chisala D. Meki. C/O Universitetet i Bergen. Centre for International Health. P.O. Box 7804. N-5020 Bergen, Norway. Cell number: +47 939 97 950. E-mail: [chisala.meki@student.uib.no](mailto:chisala.meki@student.uib.no)

Chisala D. Meki. C/O University of Zambia. School of Medicine. Public Health Department  
P.O. Box 50110. Cell number: +260977 37 1143. E-mail: [chisalameki@yahoo.com](mailto:chisalameki@yahoo.com).

**Ethics committee address:** ERES Converge IRB 33 Joseph Mwilwa Road, Rhodes Park  
Lusaka. Phone Numbers: +260955155633, +260955155634, +260966765503.

**Email:** [erescoverge@yahoo.co.uk](mailto:erescoverge@yahoo.co.uk)

**Sponsors of study:** University of Bergen.

## 1.2 Information Sheet in Bemba

**Umutwe We Sambililo:** Ubwafwilisho Mufyakubomfya Mu Fisankano Fya Mucitungu Ca Lusaka

**Icitendekelo:** Ine ndimwana wesukulu pe sukulu likalamba ilitwa university of Bergen, apo ndesambilila amasambililo ya pa mulu, master of philosophy pa bumi bwa calo, (International Health) mukukuminkana pamo nesukulu likalamba ilya university of Zambia. Ndimukusambilila nokufwailisha pamulandu wa kusangwa kwa menshi yasuma nokwakuposa ubusali bwakumubili pamo ngefimbusu, mufisankano. Namusalwa ukwafwilisha muli ubu bufwailisho, mwalombwa ukuiipela mukuiposamo muli ili sambililo pakutila tusambilile mo ifingi pa bwafwilisho bwa fyakubomfya mu cisankano. Mwipamfiwa ukusumina ubu bwite, lelo kuti mwayatontokanyapo mumutetatima no kwipushako abo mwacetekela ukumupandako amano pali ubu bufwailisho, ilyo mushila sala ukuitumpamo. Ngakuli ifyo mushumfwikishe mubulondoshi, kuti mwaipusha pakutila nalondolola bwino. Nangula kuntashi ngamwayakwata amepusho kuti mwatutumina lamya nangula mwatwita pakutila mwasanga ubwasuko.

**Umulandu Wa Bu Fwailisho:** Icikalamba ca ubu bufwailisho nipakulolekesha pa menshi, ifyakuposa ubusali bwaku mubili pamo nga ukusamba kuminwe, ukumika iminwe, isopo, ifimbusu, amapepala ya mu fimbusu no mwakuposa ifisoso, ifyapelwa mufisankano kuli bashimakwebo nabana makwebo mu fisankano fya muno Lusaka. Ububwine bufwailisho bulingile nokupelako amano ayo begawamishamo ififintu mukutwala ubumi bwamu fisankano pantashi.

**Ubutantiko:** Muli ubu bufwailisho, kukaba ukumona ifikulwa ne fintu ifyapelwa mufisankano. Kukaba ukubulalako amenshi nokuya yapima mukumona ngamwaliba utushishsi. Elyo kabili abakaitumpamo bakepushiwa, nokumfwako imitontonkanishishe yenu

pali ifi fintu. Tukamubelengela amepusho elo nokulemba amasuko yenu pa cipepala ca mepusho. Uku kumipusha kukasenda inshita ba mineti mutanda.

**Ububi Nangula Ifyakumusakamika:** Tatwakacitepo ifintu ifingamuletela ububi nangula ifya kumusakamika, lelo tukasendako inshita yenu pa mepusho napakutulanga ifikulwa ne fibombelo mwapelwa.

**Ukusunga Inkama:** Ishina lyenu talyakalebwe pacipepala ca mepusho, muli nokupelwa inmbala eikalembwa pakumwishiba. Amasuko yenu yonse yaka bombafye kumasambililo kweka tayakasabankanishiwe ukulikonse iyo elyo na menshi ayakasendwa pamwenu, yakapelwa inambala pakutila tamwishibikwe.

**Ubusuma Bukasagwamo:** Aya masambililo tayakafwilishe imwe iyo, lelo ifikatumbukamo fikafwilisha ukupanda amano imwe, mwebabombela pafisankano naba lolekesha pafisankano mu kanfulumende pakuwamya amenshi nefimbusu mu fisankano.

**Ukuitumpamo Mwebene/Ukuipela:** Pakuitumpamo mwebene muli ubu bufwailisho, nakukwata insambu ishakukana yasuka amepusho yonse aya musekesha nangula mwalisumina ukwafwako.elyo namukwata nensambu shakufumamo mubufwaisho ilyo lyonse ilyo mwafwaya ukuleka.

**Ukuposa Ifibombelo:** Amapepala ya mepusho nefibombelo fyonse ifikabomfishiwa muli ubu bufwailisho, fili nokuonaulwa pakupwa kwa ili sambililo ilya ubushiku bwa 31 December, 2015 tabulati bupite.

**Ifikasangwamo:** Ifikatumbukamo muli ubu bufwailisho fili no kupelwa kuli bakafwilisha mukalamba (principle investigator) pakutila ngacakuti mwafwaya ukushininkisha nangula ukusungako umo musungila ifipepala fimbi ifya cisankano, kuti bamupela. Elyo kabili

bakasunga ifi kapimwa pakutila ngamwafifwaya kuti mwaya shininkisha kafwailisha mukalamba akalanda nga fishinka.

Twatasha mukwai

Nine muntu wenu

Chisala Meki

**Nganakukwata ifipusho kuti mwalembela nangula ukutumina ba kafwailikisha**

**bakalamba:** Ba Chisala D. Meki. C/O Universitetet i Bergen. Centre for International Health.

P.O. Box 7804. N-5020 Bergen, Norway. Lamy: +47 939 97 950.

**E-mail:** [chisala.meki@student.uib.no](mailto:chisala.meki@student.uib.no) Chisala D. Meki. C/O University of Zambia. School of Medicine. Public Health Department. P.O. Box 50110. Cell number: +260977 37 1143. E-mail: [chisalameki@yahoo.com](mailto:chisalameki@yahoo.com).

**Nangula:** Ethics committee address: ERES Converge IRB 33 Joseph Mwilwa Road, Rhodes Park Lusaka.

**Lamy:** +260955155633, +260955155634, +260966765503.

**Email:** [eresconverge@yahoo.co.uk](mailto:eresconverge@yahoo.co.uk).

### 1.3 Consent Form

#### **Study Title: Welfare Sanitary Facilities for Market Traders in Lusaka District, Zambia**

I have read the information provided above or it has been read to me. The main purpose of the study has been explained to me, including the benefits and the issue of confidentiality I was given the opportunity to ask questions regarding the study and all my questions have been answered to my satisfaction.

I am voluntarily willing to participate in this study and am well informed that I do not have to answer any questions I am not comfortable with and that I can withdraw from the study at any time without any penalty.

Signature/ thumb print of participant.....

Signature of witness (if applicable).....

Date: .....

Researcher's name: Chisala Meki

Data collector's name.....

Signature of data collector: .....

## 1.4 Consent Form in Bemba

### Ukusumina Ukuba Mubufwailisho

**Umutwe We Sambililo:** Ubwafwilisho Mufyakubomfya Mu Fisankano Fya Mucitungu Ca Lusaka

Nimbelenga nagula nabambelengela ifilembele pa lwa kuitumpa mu bufwailisho. Ningumfwa necikalamba ca ubu kufwailisho, elyo no busuma bukabamo pamo pene nenkama shikasungwa ngatwaitumpanmo. Nacipelwa nakashita akapepusho pa lwesambililo, nokwasuka nabanjasuka ukufikapo.

Naipela ukuitumpa muli ubufwailisho, ningishiba nokuti ninkwata insambu shakukana yasuka amepusho ayo nshisekelemo elyo nokufuma kuti nafumamo lyo lyonse ilyo nafwaya ukuleka.

Ukusaina nangula ukudinda icikumo .....

Ukusaina kwa ba kambone (ngekobali).....

Ubushiku.....



## 2. Data Collection Tools

### 2.1 Systematic interview guide for market traders

Dear Respondent,

I am a post graduate student studying a master in international health at university of Bergen in collaboration with the University of Zambia. I am carrying out a research on welfare facilities in markets of Lusaka district. The information revealed will be used for purely academic purposes and treated with the strictest confidentiality possible. You have been selected to take part in the research. You are requested to give honest answers to all the questions. Your co-operation will be highly appreciated. Thanking you in advance.

Yours Faithfully,

Chisala .D. Meki

Tick [√] and Fill Appropriate Opinions in Spaces Provided

#### **Basic Information**

Questionnaire ID/Number: \_\_\_\_\_

Market name/ID: \_\_\_\_\_

Category: a. Central Business [ ] b. Township [ ] c. Peri Urban [ ]

Date of interview: \_\_\_\_\_

Name of interviewer \_\_\_\_\_

Type of business \_\_\_\_\_

Sex a. Male [ ] b. Female [ ]

Age at last birthday: \_\_\_\_\_

Marital status: a. Single [ ] b. Married [ ] c. Divorced [ ] d. Widowed [ ]

## **Provision of Welfare Facilities**

### **Hand Washing Facilities**

2.1 Comment on the availability of hand washing facilities

a. Available [ ] b. Not available [ ]

### **Soap**

2.2 Is soap for washing hands after using the toilet provided?

a. Yes [ ] b. No [ ]

2.2.1 If yes to the previous question Comment on the level of provision

a. Always [ ] b. Sometimes [ ]

### **Hand Drying Facilities**

2.3 Are hand drying materials/facilities provided?

a. Yes [ ] b. No [ ]

2.3.1 If yes to the previous question what type?

a. Paper towels [ ]

b. Electrical hand dryers [ ]

c. Ordinary cloth towels [ ]

d. Others specify \_\_\_\_\_

**Anal cleansing materials (toilet paper etc.)**

2.4 Does the market provide toilet paper? a. Yes [ ] b. No [ ]

2.4.1 If yes to the previous question how often?

a. Always available [ ] b. Sometimes [ ]

**Water**

Does the market provide water for sanitary use and drinking?

a. Yes [ ] b. No [ ]

2.5 If yes to the previous question comment on level of availability?

Always available [ ]

Not available at all times [ ]

**Note: Applies to female only: Sanitary Bin**

2.6 Are sanitary bins available? a. Available [ ] b. Not available [ ]

**3. Level of Cleanliness**

3.1 What can you say about the level of cleanliness of sanitary facilities?

a. Good [ ] b. Average [ ] c. Poor [ ]

3.2 Do toilets produce bad (offensive) smells?

a. Yes [ ] b. No [ ]

**4. Privacy of sanitary facilities**

4.1 Are the sanitary facilities enclosed for privacy?

- a. Yes user completely not seen whilst using [ ]
- b. No user completely seen inside while using the facility [ ]

## **5. Adequacy of the Sanitary Facilities**

### **Toilets**

5.1 What can you say about number of toilets here in market?

- a. Adequate [ ] b. Inadequate [ ]

### **Urinals: Applies to male pupils only**

5.2 What can you say about the adequacy of the urinal?

- a. Adequate [ ] b. Inadequate [ ]

5.3 What can you say about the adequacy of hand washing facilities?

- a. Adequate [ ] b. Inadequate [ ]

## **6. Siting of Sanitary Facilities**

6.1 What can you say about the distance between your shop and the welfare facilities?

- a. Facilities are Far away [ ] b. Facilities are near [ ]

## **7. Use of Toilet Facilities (Toilets and Urinals)**

7.1 Do you always use the toilet/urinal here at work?

- a. I always use the toilet (do not have a problem) [ .]
- b. I sometimes use the toilet (I hate going there but I have no choice) [ ]
- c. I do not use the toilets at all [ ]



## 2.2 Systematic interview guide for market heads

Dear Respondent,

I am a post graduate student studying a master in international health at university of Bergen in collaboration with the University of Zambia. I am carrying out a research on welfare facilities in markets of Lusaka district. The information revealed will be used for purely academic purposes and treated with the strictest confidentiality possible. You have been selected to take part in the research. You are requested to give honest answers to all the questions. Your co-operation will be highly appreciated. Thanking you in advance.

Yours Faithfully,

Chisala .D. Meki

Instruction

Tick [] and Fill Appropriate Opinions in Spaces Provided

Basic Information

Questionnaire ID/Number: \_\_\_\_\_

Market ID: \_\_\_\_\_

Location: \_\_\_\_\_

Date of interview: \_\_\_\_\_

Name of interviewer: \_\_\_\_\_

Sex a. male [] b. female []

Age at last birthday of respondent: \_\_\_\_\_

Category of market a. Central business [] b. Township [] c. Peri urban []

Number of shops: \_\_\_\_\_

## **Welfare Sanitary Facilities Available in markets**

### Section A

What type of welfare facilities are available?

#### 1.1 Toilets

Water closets [ ] b. Pit latrines [ ] c. Others specify: \_\_\_\_\_

#### 1.2 Hand washing facilities

Wash Hand basins [ ] b. stand pipe(s) [ ] c. Buckets [ ]

d. Others specify \_\_\_\_\_

#### 2. Specify number of facilities

##### 2.1 Toilets

Total number of toilets \_\_\_\_\_

Male: \_\_\_\_\_ b. Female: \_\_\_\_\_

##### 2.2 Wash Hand Basins/Hand washing points

Male \_\_\_\_\_ b. Female \_\_\_\_\_

Do you offer the following?

##### 3.1 Urinals for male

Yes [ ] b. No [ ] c. If yes, specify number: \_\_\_\_\_

### 3.2 Anal cleaning material

a. Yes [ ] b. No [ ]

3.2.1 If yes to the previous question, specify the level of provision.

a. Always [ ] b. Sometimes [ ]

### 3.3 Soap

a. Yes [ ] b. No [ ]

3.3.1 If yes to the previous question, specify the level of provision

a. Always [ ] b. Sometimes [ ]

3.4 Do you provide sanitary bins for female traders?

a. Yes [ ] b. No [ ]

3.5 Do you offer separate welfare facilities for traders and customers?

a. Yes [ ] b. No [ ]

3.6 Do you offer separate welfare facilities for male and female traders?

a. Yes [ ] b. No [ ]

## Section B

### **Maintenance of Facilities**

3.7 Are there people in charge of cleaning and maintaining facilities?

a. Yes [ ] b. No [ ]

3.8 Who is in charge of cleaning the welfare facilities?



Workers employed [  ]

Market Traders [  ]

Any other specify: \_\_\_\_\_

Specify number of cleaners \_\_\_\_\_

3.9 How often are the welfare facilities cleaned?

3 times a day [  ]

Twice a day [  ]

Once a day [  ]

Others specify: \_\_\_\_\_

Repairs

4.0 When do you conduct repairs of welfare facilities? \_\_\_\_\_

4.1 Do you have Maintenance schedules (for cleaning and repairing facilities)?

a. Yes [  ]    b. No [  ]

4.1.1 Evidence

a. Available [  ]    b. Not available [  ]

4.2 Are the sanitary facilities appropriate in the market circumstances or you could do otherwise if you were given more resources? \_\_\_\_\_

(In case of a negative answer to the latter part of the above question). Do you think this inappropriateness could be affecting how marketeers use the facilities? \_\_\_\_\_

\_\_\_\_\_

4.3 Are the facilities you have enough or you could do more if given more resources? \_\_\_\_

---

4.4 Do you think if you had such complementary facilities they would be fully utilized by the marketeers? \_\_\_\_\_

4.5 What are the major challenges you face in providing sanitary facilities for marketeers?

---

4.6 Are there people (committee) in charge of welfare facilities?

a. Yes [ ] b. No [ ]

4.6.1 If yes what do they do? \_\_\_\_\_

4.7 Do you have current running program (s) in market that look at market sanitation?

a. Yes [ ] b. No [ ]

4.7.1 If yes from the previous question, name the program available and the support provided by the program in terms of water and sanitary facilities in markets \_\_\_\_\_

4.8 Do you have health inspectors visit the market to check for welfare facilities?

a. Yes [ ] b. No [ ]

4.9 When last were they here a. <3 months ago [ ] b. >3months ago [ ]

#### Source of water

5.0 What is the main source of water for the market?

Piped water from the local authority [ ]

Borehole [ ]

---

Well [ ]

Others specify \_\_\_\_\_

5.1 Do you offer special welfare facilities for physically challenged individuals?

a. Yes [ ] b. No [ ]

5.2 If yes what type of facilities are provided? \_\_\_\_\_

THANK YOU

## 2.3 Checklist

### Basic Information

Checklist Number: \_\_\_\_\_

Time of observation: \_\_\_\_\_

Market ID: \_\_\_\_\_

Category: Central-business [ ] Township [ ] Peri-urban [ ]

Location: \_\_\_\_\_

Date of observation: \_\_\_\_\_

Name of observer: \_\_\_\_\_

Welfare Facilities Provided Female.....Male.....			
Type of facility	Available/Number	Not available	Comments
Toilets			
Urinal			
Sanitary bins			
Wash hand basin			
Hand drying facility			
Soap			
Water			

Anal cleaning materials			
Others			
Siting Of Welfare Facilities			
Distance from furthest shop to the sanitary facility	<30 meters	>30 meters	Comments
Maintenance Schedule			
Sanitary facilities maintenance schedule	Available	Not Available	Comments
State of Facilities			
State sanitary facilities (repair)	Number of functional toilets	Number of non-functional toilets	Comments
	Number of Functional Wash Hand Basins	Number Of None Functional Wash Hand Basins	Comments
Privacy			

Evidence of doors	Lockable doors	Unlock able doors	Absence of doors	Comments
State of cleanliness				
Evidence of one of the following (urine and excreta on walls and floor)	Yes	No	Comments	
General cleanliness of environment of the facilities				
Toilet rooms	Good	Average	Poor	Comments
Type of water source (drinking water)	Comments			
Facilities for physically challenged individuals	Comments			
Others				
Labels on wash hand basins and toilet doors				
Presence of flies				
Evidence of offensive smell from toilet				

## 2.4 Water sampling form

REPUBLIC OF ZAMBIA

MINISTRY OF HEALTH

SAMPLING FORM

FOOD AND DRUGS ACT CAP 303 OF THE LAWS OF ZAMBIA


1. Sample No.		2. Date Collected:	
3. (a) Product name and description:.....			
(b) Method of collection: .....			
(c) Collector's identity on package and seal: .....			
4. Reasons for collection:			
5. Manufacturer:		6. Dealer:	
7. Size of lot sampled:		8. Date dispatched:	
9. Delivered to:	10. Date:	11. Laboratory:	
12. Records obtained	(a) Invoice No. and date		
	(c) Other documents:		
14. Sample cost:		15. Collector ( <i>Print Name &amp; Signature</i> )	

**Source:** Food and Drugs Act Cap 303 of the laws of Zambia.

### 3. Letters from the Study Area and Ethical Approval

#### 3.1 Letter form study area

*Personal*



**LUSAKA CITY COUNCIL  
MEMORANDUM**

**TO** : The Director of Housing and Social Services  
**FROM** : The Director Human Resource & Administration  
**DATE** : 25<sup>th</sup> July, 2014  
**REF** : TCD/7/59/1/KNG/kng

---


**SUBJECT: RESEARCH PROJECT – CHISALA MEKI**

The above named individual is a student at the University of Bergen pursuing a Master in International Health that is run in collaboration with the Department of Public Health of the University of Zambia. She is currently carrying out a research on Welfare Facilities among Market Traders in Lusaka City.

She has since paid K73.21 as research fee on receipt number BV51614.

Kindly assist her with the needed information so that she fulfills the necessary requirements towards the award of her degree.

Yours faithfully,

*PP*   
Namukolo M. Kalufyanya (Mrs)



## 3.2 Ethical approval Norway



<b>Region:</b> REC Western Norway	<b>Executive officer:</b> Trine Anikken Larsen	<b>Telephone:</b> +4755978497	<b>Our date:</b> 25.06.2014	<b>Our ref.:</b> 2014/816/REK vest
			<b>Your date:</b> 25.06.2014	<b>Your ref.:</b>

To whom it may concern

### Confirmation

We hereby confirm that the project "Welfare facilities for market traders in Lusaka district, Zambia" with project manager Bente Elisabeth Moen, Professor, at the Department of Global Public Health and Primary Care, University of Bergen, is reviewed and approved by the Regional Committee for Medical and Health Research Ethics, Western Norway. The project will be implemented by master student Chisala Meki.

Sincerely

Trine Anikken Larsen  
Executive officer

This letter is approved for electronic dispatch without signature.

Telephone: 55975000  
E-mail: [res-vest@uhb.no](mailto:res-vest@uhb.no)  
Web: <http://helseforskning.etikk.com.no/>

Kindly address all mail and e-mails to the  
Regional Ethics Committee, REK vest,  
not to individual staff!

### 3.3 Ethical approval Zambia



33 Joseph Mwilwa Road  
Rhodes Park, Lusaka  
Tel: +260 955 155 633  
+260 955 155 634  
Cell: +260 966 765 503  
Email: eresconverge@yahoo.co.uk

I.R.B. No. 00005948  
FWA. No. 00011697

19<sup>th</sup> September, 2014

**Ref. No. 2014-July-018**

The Principal Investigator  
Ms. Meki Chisala Deborah  
C/O University Of Zambia, School Of Medicine  
Department Of Public Health  
P.O. BOX 50110  
**LUSAKA.**

Dear Ms. Chisala,

**RE: WELFARE FACILITIES FOR MARKET TRADERS IN LUSAKA DISTRICT, ZAMBIA.**

Reference is made to your corrections dated 14<sup>th</sup> September, 2014. The IRB resolved to approve this study and your participation as principal investigator for a period of one year.

Review Type	Ordinary	Approval No. <b>2014-July-018</b>
Approval and Expiry Date	Approval Date: 19 <sup>th</sup> September, 2014	Expiry Date: 18 <sup>th</sup> September, 2015
Protocol Version and Date	Version-Nil	18 <sup>th</sup> September, 2015
Information Sheet, Consent Forms and Dates	<ul style="list-style-type: none"> <li>English, Bemba.</li> </ul>	18 <sup>th</sup> September, 2015
Consent form ID and Date	Version-Nil	18 <sup>th</sup> September, 2015
Recruitment Materials	Nil	18 <sup>th</sup> September, 2015
Other Study Documents	Questionnaire, Checklist, water Sampling Form.	18 <sup>th</sup> September, 2015
Number of participants approved for study	384	18 <sup>th</sup> September, 2015

Where Research Ethics and Science Converge

### 3.3 Ethical approval Zambia

Specific conditions will apply to this approval. As Principal Investigator it is your responsibility to ensure that the contents of this letter are adhered to. If these are not adhered to, the approval may be suspended. Should the study be suspended, study sponsors and other regulatory authorities will be informed.


#### Conditions of Approval

- No participant may be involved in any study procedure prior to the study approval or after the expiration date.
- All unanticipated or Serious Adverse Events (SAEs) must be reported to the IRB within 5 days.
- All protocol modifications must be IRB approved prior to implementation unless they are intended to reduce risk (but must still be reported for approval). Modifications will include any change of investigator/s or site address.
- All protocol deviations must be reported to the IRB within 5 working days.
- All recruitment materials must be approved by the IRB prior to being used.
- Principal investigators are responsible for initiating Continuing Review proceedings. Documents must be received by the IRB at least 30 days before the expiry date. This is for the purpose of facilitating the review process. Any documents received less than 30 days before expiry will be labelled "late submissions" and will incur a penalty.
- Every 6 (six) months a progress report form supplied by ERES IRB must be filled in and submitted to us.
- ERES Converge IRB does not "stamp" approval letters, consent forms or study documents unless requested for in writing. This is because the approval letter clearly indicates the documents approved by the IRB as well as other elements and conditions of approval.

Should you have any questions regarding anything indicated in this letter, please do not hesitate to get in touch with us at the above indicated address.

On behalf of ERES Converge IRB, we would like to wish you all the success as you carry out your study.

Yours faithfully,  
**ERES CONVERGE IRB**

  
pp. Dr. E. Munalula-Nkandu  
BSc (Hons), MSc, MA Bioethics, PgD R/Ethics, PhD  
**CHAIRPERSON**

## 4. Laboratory Results

### 4.1 Laboratory results first samples



SCHOOL OF ENGINEERING  
CIVIL ENGINEERING DEPARTMENT  
ENVIRONMENTAL ENGINEERING LABORATORY  
P.O Box 32379, Lusaka

#### BACTERIOLOGICAL EXAMINATION OF WATER

Reference : A14233  
Attn : MEKI CHISALA  
UNZA  
Lusaka  
Sampled by : Client  
Received date : 01.10.2014  
Report date : 06.10.2014

#### Laboratory Results

Sample ID	Total coliforms (#/100ml)	Fecal coliforms (#/100ml)
Sample1	0	0
Sample2	0	0
Sample3	0	0
Sample4	0	0
Sample5	0	0
Sample6	0	0
Sample7	30	15
Sample8	0	0
Sample9	54	22
Sample10	0	0
Sample11	0	0

Tests carried out in conformity with "Standard Methods for the Examination of water and Wastewater APHA, 1998".

  
J. Kabika  
Co-ordinator- Environmental Engineering Laboratory



## 4.2 Laboratory results second samples



SCHOOL OF ENGINEERING  
CIVIL ENGINEERING DEPARTMENT  
ENVIRONMENTAL ENGINEERING LABORATORY  
P.O Box 32379, Lusaka

### BACTERIOLOGICAL EXAMINATION OF WATER

Reference : A14235  
Attn : MEKI CHISALA  
UNZA  
Lusaka  
Sampled by : Client  
Received date : 09.10.2014  
Report date : 13.10.2014

#### Laboratory Results

Sample ID	Total coliforms (#/100ml)	Faecal coliforms (#/100ml)
Sample1	0	0
Sample2	0	0
Sample3	0	0
Sample4	0	0
Sample5	0	0
Sample6	0	0
Sample7	0	0
Sample8	0	0
Sample9	0	0
Sample10	0	0
Sample11	0	0

Tests carried out in conformity with "Standard Methods for the Examination of water and Wastewater APHA, 1998".



Handwritten signature of J. Kabika in blue ink.

J. Kabika  
Co-ordinator- Environmental Engineering Laboratory