

An ethical evaluation of the impact of the use of pit latrines on the health of the human and natural environment in kanyama

Noel Z. Daka¹ and Prof. Clive Dillon-Malone²

1. University of Zambia, Zambia

2. University of Zambia, Zambia, noeldaka12@gmail.com

ABSTRACT

This article is about pit latrines. In Zambia, pit latrines are among the most common human excreta disposal systems that have been in use for many decades especially in informal settlements. Kanyama is one of the largest informal settlements of Lusaka where pit latrines are largely in use. However, pit latrines have for long been widely associated with environmental pollution. The main aim of the study was to make an ethical evaluation of the impact of the use of pit latrines on the health of the human and natural environment in Kanyama compound. The specific areas that were investigated to achieve the main aim are: the current situation regarding pit latrines in Kanyama; the impact of pit latrines on the residents in Kanyama; the impact of pit latrines on the natural environment in Kanyama and making an ethical evaluation of the findings.

A case study design using a qualitative methodology along with an ethical component was used. Primary data was collected using in-depth interviews with 40 heads of households selected by systematic sampling and six key informants purposefully selected, focus group discussions selected by convenient sampling and observations. The six key informants were two officials from the Lusaka City Council (LCC), two officials from Kanyama Water Trust (KWT) and one official from Kanyama clinic. Three focus group discussions were conducted comprising seven discussants in each selected by convenience sampling. Sources of secondary materials involved literature obtained from the Zambia Environmental Management Agency (ZEMA) library, University of Zambia (UNZA) library, the School of Education, the School of Humanities and Social Sciences (HSS), the School of Natural Sciences and online resources. Focusing on the common themes emerging from the data, findings were analysed and discussed, and then evaluated using two ethical theories and two ethical principles namely: Utilitarian theory, the Land Ethic, the Precautionary Principle (PP) and the Principle of the Lesser Evil (PLE).

Findings revealed that the majority of Kanyama residents use pit latrines for human waste disposal; that because of the poor water and sanitation situation in the area, the impact of pit latrines on residents was not good, because inappropriate methods for constructing pit latrines and water wells were mostly used and because most pit latrines were constructed close to sources of water; and that although Kanyama residents are aware of the threats posed to the health of the human and natural environment by pit latrines, they still believe that they have no option but to continue using them because they are a better alternative for now.

The ethical evaluation revealed a tension between the Land Ethic and the Utilitarian theory as follows: while Utilitarianism would justify the presence and use of pit latrines because the majority of residents benefit from using them despite some negative consequences associated with them, the Land Ethic together with the Precautionary Principle would not justify their existence and use because they run the risk of polluting the environment and of harming human health.. By availing of the Principle of the Lesser Evil, this tension was resolved by concluding that, although pit latrines impact negatively on the human and natural environment in Kanyama, residents still need to use them because they are better alternative than open air urinating and defecation in the short term.

Consequently, the following recommendations were made: (i) the LCC should intensify the implementation of the Public Health Regulation (PHR) on drainages and latrines to reduce the risk of

pollution in informal settlements; (ii) the LCC should work hand-in-hand with the KWT to improve access by Kanyama residents to piped water; (iii) residents should use appropriate methods for constructing pit latrines and ensure that both pit latrines and shallow wells are lined with concrete blocks to minimise the risks of pollution; and (iv) the public health department of the LCC should provide Kanyama residents with health education and information regarding hygienic use and maintenance of pit latrines.

INTRODUCTION

Disposal of human excreta has been one of the major areas of concern in the last few decades. Originally, human excreta disposal existed in its crudest form as an open-air urinating and defecation activity that could be done anywhere especially in the open bushes (Thaddeus and Ochuko, 2013). However, the introduction of the pit latrine – defined as an onsite sanitation facility which collects human waste in one place - and was specifically created for dignity, privacy and convenience and safeguarding human health at large humans, was the earliest attempt at proper disposal of sewage (ibid). According to the World Health Organisation a pit latrine consists of three major parts namely: (i) a pit (at least two metres deep), (ii) a slab with a small inlet hole and (iii) a shelter or superstructure (WHO, 2000). An estimated 1.77 billion people worldwide had been using pit latrines as their primary mode of sanitation for well over five decades. However, with the prevalence of pit latrine use growing in developing countries, there has been heightened concern about their negative impact on the health of the human and natural environments (Tillett, 2013). Similarly, the WHO (2000) reported that pit latrines have the potential of impacting adversely on the environment.

Concerning existing knowledge with regard to the impact of pit latrines on the health of the human and natural environment from the global perspective, a study in the United Kingdom by Lawrence et al., (2001) whose main aim was to provide guidance on how to assess and reduce the risk of contamination of groundwater supplies from on-site sanitation systems reported that on-site systems often represented a significant hazard to groundwater because faecal matter accumulated in one place, thereby causing leaching of contaminants into the subsurface environment. Similarly, a global study by Cave and Kolsky (1999) aimed at assessing the main health risks associated with water quality degradation from pit latrines reported that the two main health risks commonly associated with water quality degradation from pit latrines were faecal-oral disease transmission and nitrate poisoning. Further, another global report by Harvey et al.

(2002) whose main aim was to explain the design of a well-constructed pit latrine and the impact pit latrines have on the natural and human environment revealed that a single pit design is poses health risks because leachate can contaminate groundwater; stagnant water in pits may promote insect breeding and pits are susceptible to failure and/or overflowing during floods.

From the African perspective, a report by Ahaneku and Adeoye (2012) following a study whose main aim was to determine the impact of pit latrines on groundwater quality in Nigeria revealed that there was an indicator gradient in faecal bacteria with distance from pit latrines, and that pit latrines impacted on shallow well water at lateral distances of 19.75m from the location of a pit latrine. Similarly, a report by Still and Nash (2010) based on a study whose main aim was to investigate the hazards posed by pit latrines and the real risk situations in South Africa found that there were a number of pathogens in faecal waste including viruses, bacteria, protozoa and helminths although the latter two types of pathogens were effectively filtered out by soil while the former two could be carried some distance with seepage water. Further, a report by Hoko et al., (2006) based on a study whose main aim was to assess the impact of pit latrines on groundwater quality in Zimbabwe found that pit latrines were microbiologically impacting on groundwater quality up to 25m lateral distance, and that the shallow water table increased pollution potential from pit latrines.

In Zambia, pit latrines are among the most common human excreta disposal systems that have been in use for many decades. In a report drawn up for the WHO, Lusaka is one of the places mentioned where sanitation provision was grossly deficient as most residents did not have access to hygienic toilets and large amounts of faecal waste was being discharged into the environment without adequate treatment (Hutton et al., 2007). It was also reported that between 2008 and 2009, only 17% of the population serviced by the Lusaka Water and Sewerage Company (LWSC) had adequate sanitation, which was markedly below the national average of 34 percent for urban areas (ibid.). A 1997 study of nine non-regularized informal settlements in Lusaka including Kanyama, found that over 90 percent of people used poorly ventilated pit latrines and over 60 percent of households shared these latrines (Sinkala et al., 2004).

With regard Kanyama, Elliot (2014) reported that the compound emerged in the early 1960s when many poor families escaping from the high cost of living, established what were meant to be informal settlements in the western part of the Central Business District. The settlements were initially illegal and haphazard with no provision for water and toilet facilities. Generations have grown up in this area since then and as many as six to seven family members live in one modest shelter with the capacity of one to two rooms (ibid). As at 2013, Kanyama compound had grown to about 15 square kilometres in size and it was home to more than 300,000 people of which only half had access to clean water and good sanitation (Kellner, 2013). Similarly, Drable (2014) reported that the state of sanitation in Kanyama compound was dire with 90% of residents depending on pit latrines. Currently, the water and sanitation situation in Kanyama is not satisfactory as there are no proper drainage systems, a majority of households lack proper toilet facilities and they depend on communal taps as their main source of water (ibid.).

STATEMENT OF PROBLEM

In view of the pollution widely associated with pit latrines, and despite the fact that some studies have been carried out in Kanyama compound with respect to pit latrines, as well as the known resultant risks to the health of the human and natural environment, the existence and use of pit latrines by residents of Kanyama has continued. However, it may probably not be known to residents how existing methods of constructing and maintaining pit latrines and wells, as well as how methods of management of pit latrine sludge and the distance between pit latrines and wells may be contributing to the pollution of the human and natural environment. Neither has any ethical evaluation been made of these practices. The purpose of the study was to contribute towards filling these knowledge gaps in the available literature.

AIM

The main aim of the study was to make an ethical evaluation of the impact of the use of pit latrines on the health of the human and natural environment in Kanyama compound.

RESEARCH OBJECTIVES

- § To establish the current situation regarding pit latrines in Kanyama compound.
- § To examine the impact of pit latrines on the residents of Kanyama compound.

§ To examine the impact of pit latrines on the natural environment in Kanyama compound.

§ To make an ethical evaluation of the findings.

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SIGNIFICANCE OF THE STUDY

Although **Drable (2014)**, Kellner (2013) and Elliot (2014) had focused on the state of sanitation in Kanyama in their studies, no study had been carried out with regard to an ethical evaluation of the impact of the use of pit latrines on the health of the human and natural environment in the compound. Hence, findings of this study will contribute to the literature in this respect. These findings will also help in alerting local government authorities as well as the residents of Kanyama to the implications of the threats posed by pit latrines to the health of the human and the natural environment.

METHODOLOGY

The study was conducted in Kanyama is located approximately four kilometres from the central business district of Lusaka city in the western direction. It is one of the oldest informal high density areas sharing borders with John Laing (another informal compound) in the south eastern part, Chibolya in the east, Makeni in the southern part, Lusaka west in the western part and the industrial area in the northern part.

A case study design was used involving a qualitative methodology with an ethical component. The methods used to collect data involved both primary and secondary sources. Primary source materials were obtained through the following methods: in-depth interviews, observation and focus group discussions (FGDs). The total sample for interviews was 45 as follows: 40 heads of households from Kanyama compound who were systematically sampled on the basis of every tenth household and comprised 28 male and 12 female heads of households. In addition, five officials were identified on the basis of convenience sampling, namely: two officials from the Lusaka City Council, two officials from the Kanyama Water Trust and one official from Kanyama clinic.

Observations were made as a way of taking note of all the relevant landmarks (i.e., buildings, toilets, and water sources) and activities taking place there (i.e., digging and construction of pit

latrines, emptying of filled up pit latrines and sourcing of water). Three FGDs comprising seven members each from selected community groups were conducted. Convenience sampling was used to select members of the FGDs. FDG1 comprised five female and two male members of the United Church of Zambia (UCZ). A church member was used as a contact person in the selection of participants from the UCZ. The discussion was conducted after a church service. FDG2 comprised seven members of a local soccer team aged between 20 and 30 years of age. Permission was sought from the team coach to select discussants from the football team and the discussion was conducted before the start of training involving the seven players that accepted to participate. FDG3 comprised four male and three female marketeers from Masauko market. Permission was also sought from the chairperson of Masauko market. Only those who accepted were involved and the discussion was conducted at lunchtime when the business is usually slow. The researcher personally conducted these FGDs and group responses were elicited with reference to the same questions used during in-depth interviews with heads of households.

Secondary source material involved literature obtained from internet resources, the Zambia Environmental Management Agency (ZEMA) library, University of Zambia library, the School of Education, the School of Humanities and Social Sciences, the School of Natural Sciences and online resources. Findings were analysed by identifying common themes.

The two ethical theories and two ethical principles that guided the collection of data for the study and acted as a basis for conducting an ethical evaluation of the findings are: Utilitarianism, the Land Ethic, the Precautionary Principle and the Principle of the Lesser Evil.

FINDINGS, DISCUSSION AND ETHICAL EVALUATION

FINDINGS

The Water and sanitation conditions in Kanyama

The researcher found that all the households visited during the study used pit latrines as their primary means for human waste disposal and that the area had no drainage networks. Both officials from the LCC noted that since independence, city planning - including water and

sanitation issues - have been the responsibility of the LCC.¹ They further noted that the Zambian government has put in place the PHR on drainages and latrines which the LCC has been implementing. However, they also said that they are not fulfilling their obligation because the implementation of this policy is hampered by lack of adequate funding and qualified manpower.

All of the householders interviewed acknowledged the fact that the majority of residents in the compound used pit latrines and they also regretfully noted that the general sanitation condition in their area was not good as the compound did not have any drainage. A total of 38 heads of households said that pit latrines are the only sustainable alternative available to them at present for human waste disposal in view of the absence of adequate water and sanitation services. They bemoaned the fact that the compound did not have proper drainages and water supply services. The group feelings from all three FGDs were that the water and sanitation condition in Kanyama was not adequate.

The researcher also observed that the majority of households had no access to a supply of tap water apart from shallow wells and a few communal taps, and that residents were drawing water from these shallow wells most of which had no proper lids or no lids at all. Furthermore, all 40 householders said that the shallow wells were not lined with concrete blocks. Nevertheless, the researcher also observed that the area had a few communal taps sparsely located in different places where residents could access clean and treated tap water. The general manager of KWT said that his company was given the authority by the LWSC to supply water to Kanyama compound. He further noted that his company was meeting at least 60 percent of the water needs through the supply of communal taps, and that residents who had the financial capacity were allowed to connect water into their yards at a fee. The second official from KWT agreed with the general manager but noted that the major challenges the company was facing were lack of compound planning, vandalism of water pipes and difficulties in laying water pipes because the area is rocky. To overcome these challenges, he said that the KWT places the communal taps only along the main roads and that each tap is provided with a locking system at night and manned by an individual during the day.

¹Personal communication, 12/04/2015

Methods of constructing pit latrines

Regarding the construction methods used by Kanyama residents, the researcher observed that most of the pit latrines were constructed using concrete blocks, were covered with latrine slabs and were provided with superstructures. Of the 40 householders interviewed, 38 acknowledged that latrine superstructures were constructed using concrete blocks. Concerning the depth and lining of pits, it was difficult for the researcher to check because most of the pit latrines were already constructed at the time of the study. However, the builder found on site noted that most of the pit latrines in the area were at least two metres deep². A total of 35 out of the 40 householders said that pit latrines in their area were at least two metres deep, that concrete blocks were used to line the walls up to the slab level, and that the methods used were appropriate enough to make them strong and prevent them from collapsing during the wet season. Although both FGD1 and FGD3 agreed with these claims, the overall group response of FGD2 was that some residents used sacks and boxes as superstructures.

Although most of the pit latrines in Kanyama were well constructed using concrete blocks, the researcher also noted that the majority of them had incomplete superstructures and without proper doors, floors and roofs. The researcher also observed that filled up pit latrines were emptied manually when they are full using untrained pit emptiers. This practice was confirmed by the KWT general manager who also noted that his company was involved in the practice for the purpose of collecting human waste which was later treatment into manure.³ All the 40 heads of households interviewed and all the three FGDs confirmed that filled up pit latrines were emptied so that they could be reused. They further noted that most of the emptied human waste was buried inside other pits which were usually dug next to the pits themselves, while some was dumped in the open within the community.

²Personal communication, 14/04/2015

³Personal communication, 15/04/2015

Distance between pit latrines and water sources

The researcher observed that the distance between water sources and pit latrines for the majority of households visited during the study was less than ten metres. Furthermore, most of the shallow wells were not lined with concrete blocks and they either had improper lids or no lids at all. All the 40 householders confirmed the fact that residents did not line the shallow wells with concrete blocks and that most of these wells were not provided with proper lids while in most cases, they were left uncovered. A total of 32 out of the 40 householders interviewed reported that they understood the importance of the distance between sources of water and pit latrines for health reasons. Nevertheless, all choose to ignore the requirement because their plots were too small to allow for the 20 metres spacing. The builder also confirmed that Kanyama residents ignored this requirement due to lack of space.⁴ All the three FGDs agreed with this and further, FGD1 noted that, in some instances, the distance is as short as four metres.

DISCUSSION OF FINDINGS

Negative aspects of pit latrines

The widespread use of pit latrines and the absence of drainages in Kanyama as observed by the researcher and acknowledged by all the 40 heads of households has the potential of impacting negatively on the environment and compromising its ability to perform these functions. This fact was mentioned in the literature by Banerjee (2010) who reported that pollution travels from onsite pits in both horizontal and vertical directions. Similarly, Harvey et al. (2002) said pit latrines pose health risks because leachate can contaminate groundwater; whereas stagnant water in pits may promote insect breeding and pits are susceptible to failure and/or overflowing during floods. In view of the large number of pit latrines in Kanyama, large amounts of human waste are deposited within the area thereby increasing the risk of pollution. This fact was confirmed by Kellner (2013) who stated that sanitation services in Kanyama were poor and that the discharged material normally remained in the area when someone went to the toilet, thereby posing a threat to the local environment. Other than groundwater, air, is the other aspect of the natural

⁴Personal communication 15/04/2015

environment threatened by the widespread use of pit latrines. In addition to the liquid faecal waste that could be seen overflowing from filled up pit latrines in some instances, the researcher detected a bad smell emanating from pit latrines every time he bypassed or visited a pit latrine. This fact was acknowledged by all the 40 heads of households as well as all the three FGDs. The bad smell contaminates the surrounding air and all this is due to the fact that the human waste remains within the compound. A total of 22 out of 40 householders interviewed were of the opinion that pit latrines impacted negatively on both the human and natural environment and believed that pit latrines were the cause of contamination of groundwater and frequent outbreaks of cholera and diarrhoea in their compound. They also acknowledged the fact that pit latrines produced a bad smell which polluted the air and also made their area look unsightly because most of them were poorly constructed and not well looked after. Nevertheless, they also reported that most of the residents did not care much about these negative effects as they had learnt to live with them for a longer period of time.

In addition to the harm done to the natural environment with reference to soil, air and water pollution, the absence of drainage networks and the widespread use of pit latrines in Kanyama equally threatens the human environment. The major health risks associated with pit latrines are outbreaks of bacterial and viral diseases such as cholera, dysentery and diarrhoea. This fact was highlighted in the literature by Cave and Kolsky (1999) who stated that the two main health risks commonly associated with pit latrines were faecal-oral disease transmission in the form of diarrhoea, and nitrate poisoning which is a condition in which oxygen cannot be effectively transported or released by the bloodstream. Although nitrate poisoning was difficult to confirm in Kanyama, cholera outbreaks were confirmed by both the health off. Further, Sasaki (2009) reported that insufficient drainage networks were statistically associated with cholera incidences. This could partly explain why Kanyama compound is a common place for the disease as earlier noted by the health official.

Further, the harm to the human environment was due to the fact that the area looked unsightly because a majority of pit latrines were incomplete with no proper doors and roofs. Thi fact was confirmed by a total of 22 out of 40 heads of households interviewed. As a matter of fact, if the superstructure is not properly constructed, it can discourage the use of the latrine by family

members, especially visitors. Again, children can be discouraged from using such latrines if the slab is not designed with them in mind especially if the hole is too big and it is an extended version whereby ladders have to be used because such latrines are a risk to their physical wellbeing. Although the majority of Kanyama residents claimed that they had gotten used to the negative impacts of pit latrines, the bad smell makes the area very uncomfortable to live in for everyone. In fact, the researcher observed that in some instances, the bad smell could be detected within homes when the doors and windows are open because most of the pit latrines are located close to where people live. The worst places contributing to this are bars because patrons urinate from anywhere outside pit latrines instead of inside thereby contributing to the production of a bad smell in the area. This practice is contrary to the recommended requirement that pit latrines should not be nearer than 6 metres to the house⁵. However, owing to the smaller sizes of most of the plots, most of the pit latrines are located less than three metres from houses in Kanyama.

Most of the superstructures in the area were found to be unsatisfactory with no doors and roofs. In most situations, sacks were used to cover the doorways for pit latrines. The result of unsatisfactory superstructures is that rats, dogs and flies can easily enter these facilities thereby increasing the chances of contamination of the human environment as they also access households where they come into contact with pots and dishes. Further, these incomplete structures put women and young ladies at risk of being assaulted or raped especially at night because they have to leave the house to use the toilet. Lawrence and Macdonald (2001) highlighted this risk when they reported that the majority of pathogens that affect humans were derived from human waste transmitted by the faecal-oral route and that the transmission may occur through a variety of routes including food, water, poor personal hygiene and flies. In Kanyama, as in other parts of the city, residents sell foodstuffs including fruits and meat on the streets, and most of these are not properly covered. Hence, flies can come into contact with these foodstuffs and contaminate them. Further, considering that most of the superstructures are not properly constructed and faulty doors are used, there is the risk of these doors and walls becoming weakened and eventually collapsing due to exposure to rains, thereby endangering the physical wellbeing of all residents there.

⁵[http://www.open.edu/...](http://www.open.edu/) (accessed 13/12/2015)

With regard to the emptying of filled up pit latrines, the Public Health Regulation on drainages and latrines requires that they be emptied using the hydraulic method which sucks the human waste through the pipe directly into the tank mounted on the vehicle. However, this is only possible if water closets and not dry pit latrines are used. In Kanyama, most of the pit latrines are dry with the result that the human waste cannot be sucked out because it is nearly solid. Although the manager for KWT noted that his company was using trained pit emptiers to do the job, the builder noted that the majority of residents used untrained pit emptiers who usually did not wear protective clothing when performing the act. He further noted that most of the untrained pit emptiers dumped the emptied human waste in the open. This practice exposes the pit emptier and others to health risks. It also pollutes the environment through the production of a bad smell. What makes the situation worse is the fact that most of the shallow wells are located close to pit latrines and are not lined with concrete block. Sadly, however, the emptying option is preferred by most of the residents because it is cost effective and it enables them to reuse the same pit latrine instead of digging a new one. Furthermore, most of the plots do not have enough space for constructing new pit latrines. However, the literature is clear on the dangers of coming into contact with human waste. Hence, the practice of emptying pit latrine runs a greater risk of polluting both the human and natural environment.

Research findings have shown that Kanyama residents do not observe the recommended distance between pit latrines and sources of water. This runs a risk of polluting groundwater in the area. Lawrence et al. (2001) reported that where hydraulic loads are high, the liquid part of the waste infiltrates into the soil and represents a hazard to groundwater. Banerjee (2010) in his study reported that pollution travels from pits in both horizontal and vertical directions and that a minimum travel of pollutants of 2.055 metres was found in clay silt soil, whereas a maximum travel of 10.20 metres was observed in gravel/sand composition of soils in a ten-day period. Further, Still and Nash (2010) in their study indicated that although their findings had shown that all pathogens were removed within metres of the disposal site, there were cases where the right combination of conditions led to pathogens being detected as far away as 30 metres. Considering that Kanyama residents are in the habit of emptying pit latrines and using water from poorly constructed shallow wells that are usually located near the pit latrines, the chances for the pollution of the human and natural environment to occur are high. However, their situation is

difficult because they need both the pit latrines and shallow wells on the same small plots. Nevertheless, in confirmation of these fears of pollution, the health official at Kanyama clinic confirmed that cholera, dysentery and diarrhea were the diseases commonly associated with pit latrines in the compound.⁶

However, he said their major responsibility as a community based healthcare provider was to supply healthcare services and information to Kanyama residents. He noted that the clinic occasionally visited the residents to sensitise them on the best practices with regard to the use of pit latrines. He further noted that to mitigate the impact of pit latrines on the human environment, the clinic distributed hydrated lime and chlorine to Kanyama residents to sprinkle in the pit latrines and pour into the drinking water respectively. All of the 40 householders confirmed that they sprinkled lime, ashes and used oil on the floor and around the inlet hole to the pit to prevent or minimize the negative effects of the pit latrines. But 32 out of the 40 householders interviewed reported that apart from distributing chlorine and lime when there is a cholera outbreak, the local clinic was not providing information regarding health education and hygienic maintenance of the pit latrines. The health official acknowledged, however, that although the clinic was trying its best to fulfill its obligations, it was facing a lot of financial and manpower challenges. The failure by the health centre to fulfill its obligations means that there is no proper health education and standardised way of using pit latrines in the compound. Given the magnitude of risks associated with pit latrines, the absence of proper health care exposes residents of Kanyama to these risks.

ETHICAL EVALUATION

Act Utilitarianism

Utilitarianism focuses primarily on consequences in determining the moral rightness or wrongness of an action (Pojman, 2002). It focuses on maximizing the good for the majority of people in its claim that a morally right action is one that produces more good consequences and fewer bad consequences than any alternative action for the majority.

⁶Personal communication, 18/04/2015

The practices of Kanyama residents with respect to pit latrines carry many risks to the health and wellbeing of both the humans and natural environment. These include the following: inability by residents to observe the recommended distance between sources of water and pit latrines; the practices of using sacks instead of providing doors for some superstructures; the use of toxic chemicals like used oil; the practice of emptying pit latrines; and the practice of using water from shallow wells. Cave and Kolsky (1999) noted that among the health risks associated with water quality degradation from pit latrines were faecal-oral disease transmission and nitrate poisoning which could lead to methaemoglobinaemia⁷ and diarrhoea disease. Hoko et al. (2006) noted that the shallow water table increase pollution potential from pit latrines. Used oil has the potential to cause health problems because it produces a pungent smell which pollutes the air and may lead to residents falling over because it is slippery. Similarly, the contamination of water can lead to outbreaks of some bacterial and viral diseases such as cholera and diarrhoea. Even more, the beauty of the human environment is affected by unsightliness of some of the poorly constructed and maintained pit latrine structures.

However, despite these negative effects of pit latrines, all the 40 heads of households interviewed reported that the majority of residents in Kanyama were largely benefiting from using them regardless of whether they are well constructed or not. Although some of the pit latrines in Kanyama are incomplete, the benefits to residents included privacy, convenience and a dignified environment. While privacy to users is achieved because pit latrines (whether lockable or not) provided users with a private room which they can personalise for the period of time they are inside; convenience is achieved because pit latrines are always constructed within a few metres from the household making it easy for users to access them; and a dignified atmosphere is attained because in the absence of proper water and sanitation services, pit latrines (whether well-constructed or not) provide the only decent option for human waste disposal in the area as compared to open air urinating and defecation.

⁷ Blue baby syndrome

Hence, while not ignoring the possible negative impacts of pit latrines, act utilitarianism would justify their presence and use because they maximise the good (privacy, convenience and a dignified environment) in view of the lack of viable alternatives at present.

The Land Ethic

Unlike utilitarianism which restricts its focus to human wellbeing without including the natural environment, the Land Ethic of Aldo Leopold presents a more comprehensive and inclusive ethical framework of the natural environment which includes humans. Leopold formulated the environmental ethical principle that “a thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong if it tends otherwise”. This ethic goes beyond the traditional relationship of humans to one another to encompass the holistic ecosystem to which humans belong and whose actions towards the natural environment are morally significant. As pit latrines have been associated with soil, air and water pollution, the integrity of the biota is at high risk. The Land Ethic emphasizes that all life forms that live in the soil and water are affected when the soil or water are polluted because every element in an ecosystem is interacting with every other. Hence, the widespread use of pit latrines in Kanyama poses a danger of large scale pollution to the natural environment in the following ways: (i) air pollution: this occurs when the bad smell produced by a pit latrine is released into the atmosphere; it also occurs when the pungent smell of used oil is released; (ii) water pollution: pit latrines collect human waste in one place in the underground which comes into contact with groundwater or surface water during floods; (iii) soil pollution: the destruction caused to trees and plants in the clearing and digging of pits in addition to the life forms that depend on the soil. Consequently, the Land Ethic would not justify the presence of pit latrines.

The Precautionary Principle

The precautionary principle is a principle that states that when an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically. The weak version allows preventive measures to be taken in the face of uncertainty, but does not require them. To satisfy the threshold of harm, there must be some evidence relating to both the likelihood of occurrence

and the severity of consequences. Hence, although it is not absolutely certain that pit latrines cause serious harm to the environment in Kanyama, there is adequate evidence relating to the “risk” of harm to both the natural and human environment.

The report by Drable (2014) stated that the situation of sanitation in Kanyama compound was dire with 90% of residents depending on pit latrines. He further noted that flooding in the rainy season was causing the pits to overflow thereby polluting the local environment. Similarly, the health official from Kanyama clinic noted that health problems such as cholera and diarrhoea were common in Kanyama during the rainy season due to flooding. Further, Kellner (2013) reported that sanitation services in Kanyama were poor and that every square metre of land received an average of 1 kilogram of excreta every year, not including urine which freely trickled into the underground water body which in most parts was very shallow. It has also been noted that pit latrines pose risks of causing viral and bacterial diseases such as cholera and diarrhoea, air pollution and water pollution. The precautionary principle would therefore recommend that precautionary measures should be taken to avoid the risks posed by pit latrines in Kanyama.

The Principle of the Lesser Evil

The Principle of the Lesser Evil states that when we are faced with selecting from two or more unpleasant options, we must choose the one which is the least harmful. With regard to Kanyama, the two evils at play are pit latrines which have been largely associated with environmental pollution on the one hand, and the need of Kanyama residents for appropriate structures for urinating and defecation. Even though pit latrines pose threats to both the human and the natural environment in Kanyama, lack of pit latrines would result in the need for urinating and defecating in the open environment. The Principle of the Lesser Evil would justify the existence of pit latrines as the option that has less negative results for the following three reasons: (i) open air urinating and defecation would be far more hazardous than pit latrines; (ii) badly constructed superstructures would be preferable to open air urinating and defecation; and (iii) emptying of pit latrines when full would be preferable to abandoning them and resorting to open air urinating and defecation. Hence, given to choose between disrupting the biotic community and maximising the good for the majority of residents in the short-term as described earlier, the Principle of the Lesser Evil would support retaining pit latrines in Kanyama.

Summary of evaluation

In applying Utilitarianism and the Land Ethic to the findings, a tension was discovered between them. Whereas Utilitarianism would justify the existence and use of pit latrines for the overall benefits they supply to the residents of Kanyama regardless of how they are constructed, the Land Ethic would not justify their presence in view of their negative impact on the health of the human and natural environment. Even though these impacts may not be obvious or immediately evident, the precautionary principle would urge caution in view of the potential risks involved. In the end, however, it is the ethical Principle of the Lesser Evil that would help to partly resolve the tension between the Utilitarian and Land Ethic approaches by opting for the alternative that is less harmful, namely, retaining pit latrines in the short-term while acknowledging that neither option is the desired situation in the long-term.

This overall ethical evaluation, however, does not exonerate Kanyama residents from doing nothing to improve upon their current pit latrine situation. There is clearly need to improve upon the unhealthy structures of many of the pit latrines in their present condition risky practices of residents (i.e., manual emptying of human waste from pits) and to follow the recommended guidelines when building, using and maintaining them. There is also need to ensure greater protection and privacy for women in particular as discussed earlier.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The findings revealed the following: (i) that the majority of Kanyama residents use pit latrines for human waste disposal as a better alternative to open air urinating and defecation; (ii) that the water and sanitation situation in the area is not good; (iii) that inappropriate methods for constructing pit latrines are mostly used; (iv) that most of the pit latrines are constructed close to sources of water instead of the recommended spacing of 20 metres; and (v) that although Kanyama residents are aware of the threats posed to the health of the human and natural environment by pit latrines, they still believe that they have no option but to continue using them. These findings led to the conclusion that although some pit latrines impact negatively on the health of the human and natural environment in Kanyama, total absence of pit latrines would

result in greater harm to the health of the human and natural environment. However, there is need for residents to take steps to improve on the structures and maintenance of these pit latrines to reduce on the threats to human health and contamination of the natural environment.

The ethical evaluation of these findings brought out two positions. On the one hand, Utilitarianism would justify the presence and use of pit latrines in Kanyama because the majority of residents benefit from using them despite some negative consequences associated with some of them, and also because of failure to implement more appropriate alternatives regarding human waste disposal. On the other hand, the Land Ethic would not justify the existence and use of pit latrines because they run the risk of polluting the environment and harming human health thereby disrupting the stability, integrity and beauty of the biotic community. The precautionary principle would support the Land Ethic in that there is adequate evidence of potential harm to the health of the human and the natural environment. However, given the tension between Utilitarianism and the Land Ethic, the Principle of the Lesser Evil helps to resolve the tension by choosing to act on the basis of a choice that although recognised not to be good - that is, to retain pit latrines - is rather the better of two bad alternatives (i.e., pit latrines and open air urinating and defecation) for the present.

Generally, this study provided additional information to previous studies with regard to the impact of the use of pit latrines on the health of the human and natural environment in Kanyama compound. Further, the ethical evaluation of the findings helped to fill a gap in the existing body of knowledge relating to pit latrines. Future researchers should focus on conducting biological and chemical tests to supplement the findings of this study.

Recommendations

Based on these conclusions, the following recommendations were made:

- (i) The LCC should intensify the implementation of the PHR on drainages and latrines to reduce the risk of pollution in informal settlements.
- (ii) The LCC should work hand-in-hand with the KWT to improve access by Kanyama residents to piped water.

- (iii) Residents should be more proactive in their practices by using more satisfactory methods for constructing and maintaining pit latrines and shallow wells to avoid environmental pollution.
- (iv) The Department of Public Health at LCC should provide to Kanyama residents with information regarding health education and hygienic maintenance of the pit latrines.

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