

Situational Analysis of Socio-demographic Characteristics on Access to Pit latrines in Low Income Peri-urban Areas in Mzuzu City, Malawi

Rashid Chiposa,¹Elijah Wanda,¹Chimuleke Munthali² and Willy Chipeta³

¹Department of Chemistry, Mzuzu University, P/B 201, Luwingu, Mzuzu 2

²Department of Forestry, Mzuzu University, P/B 201, Luwingu, Mzuzu 2

³Department of Water Resources, Development and Management, Mzuzu University, P/B 201, Luwingu, Mzuzu 2

E-mail: crashid69@yahoo.com

***Corresponding Author:**
Rashid, Chiposa, as above

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Abstract

This study was conducted to determine the effects of socio-demographic characteristics in relation to access to improved pit latrine and desludging services in Area 1B, a peri-urban area of low-income settings in Mzuzu City, Northern Malawi. A total of 150 households were purposively sampled to assess the socio-demographic characteristics in terms of level of education, source of income and occupation in relation to the status of pit latrines. Data was analysed using SPSS version 16.0. The results revealed that 69% and 31% of the respondents had improved and unimproved pit latrines, respectively. The use of improved and unimproved type of pit latrines in Area 1B within Mzuzu City in Northern Malawi was attributed to the socio-demographic characteristics of households. Furthermore, the monthly income of the respondents revealed in the study cannot meet the costs of desludging services because it is far below the minimum service charge of one trip of a desludging truck. In order to progress with sanitation through improved types of pit latrines, especially to the vulnerable households, the Malawi Government and other stakeholders should come in and assist these households to access loans with reasonable interests.

Résumé

Cette étude a été menée à déterminer les effets des caractéristiques socio-démographiques de 150 ménages qui ont été évalué a propos de son niveau d'éducation, source de revenu et occupation en ce qui concerne le statut de fosse latrines. Des données ont été analysées par l'utilisation de version 'spss' vers 16.0. Les résultats ont révélé que 69% et 31% du interrogées avait des fosses latrines amélioré et non amélioré, respectivement. L'utilisation de fosse amélioré et non amélioré dans zone 1b au sein de la ville de Mzuzu ville au nord de Malawi a été attribué aux caractéristiques socio-démographiques des ménages. De plus, le revenu mensuel des interrogées ont révélé dans l'étude qu'on ne peut pas rencontrer le frais des services parce que c'est loin. Pour faire du progrès avec des installations sanitaires en ce qui concerne l'amélioration de ces types de fosse latrines, surtout aux ménages vulnérables, le gouvernement de Malawi et d'autre parties devraient aider ces ménages à avoir accès prêts dans ces locations peri-urbaines, avec raisonnable intérêts.

Introduction

Pit latrines are the most predominate mode of on-site sanitation technologies that are easily accessible to households from developing countries worldwide (WHO and UNICEF, 2015). Until recently, pit latrines provided basic sanitation to an estimated 2.6 billion people in developing countries and the number is expected to rise to 5 billion before 2050 (UNDESA, 2012). This is so because a pit latrine is the most affordable solution to basic sanitation provision to people living in densely populated areas in most parts of Africa owing to limited access to sewerage or water-borne sanitation technologies (Montangero *et al.* 2002). Access to improved pit latrines brings advantages for improved public health, livelihoods and human dignity (WHO and UNICEF, 2015). Furthermore, improved pit latrines safeguard the groundwater from contamination. Hence improved pit latrines can globally reduce under-5 mortality by 60% and mortality due to diarrheal diseases by 66% (WHO and UNICEF, 2015).

According to Cairncross *et al.* (2010), an improved pit latrine typically encompasses pit lining, concrete slab and a permanent shelter. These components particularly contain and preserve the human excreta from contact with the environment, hence minimizing the spread of several water and airborne diseases. In addition, improved pit latrines reduce the challenges of inadequate household space since they are designed to be emptied when they are filled up and then re-commissioned (Chiposa *et al.* 2017).

However, unimproved pit latrines present challenges to most currently used desludging equipment (Nwaneri, 2009). Furthermore, households with inadequate space cannot manage to build pit latrines often when their pit latrines eventually fill up, hence the majority resort to open defecation. Sometimes when pit latrines fill up in household with inadequate space, people resolve to desludge them manually exposing themselves to potential hazards and possibly contaminating the environment (Sugden, 2012).

In Malawi, a developing country in Southern Africa, a pit latrine is the most common form of excreta disposal at the household level. According

to Manda (2009), 94% of the total population of the three Malawian cities of Blantyre, Lilongwe and Mzuzu rely on pit latrines. The employment of pit latrines in these areas helps the control of spread of faecal pathogens which results into reduced morbidity and mortality especially amongst children under-five. While Malawi has launched broad ranging sanitation reforms and stepped up investment in pit latrines, the country still faces considerable challenges in faecal sludge management in peri-urban areas where majority of low-income earners live (Holm, 2015). The major contributing factor to poor faecal sludge management is construction of un-improved pit latrines in the peri-urban areas because of financial resources. In developing countries such as Malawi, pit latrines fill up quickly as a result of large numbers of persons living in households. The filled up pit latrines need to be replaced or desludged, particularly in the peri-urban areas where the space is inadequate (Still and Foxon, 2012). This has been reported to pose a big challenge to sanitation engineers providing desludging services in these areas (Still and Foxon, 2012). With the exponential increase in population of the peri-urban areas in Malawi, there is need for the construction of improved pit latrines which can be easily be desludged thereby prolonging the lifespan of the pit latrines. There is a dire need to conduct a situational analysis of the state of pit latrines being used in peri-urban areas in Mzuzu City, Malawi and the social-demographic factors that affect access to pit latrines. Hence this study was conducted to assess the effects of socio-demographic characteristics of the households in relation to access to pit latrines and desludging services with an aim of promoting proper faecal sludge management in low-income peri-urban areas. Such information would contribute towards the solutions for pit desludging and subsequent sludge management in Malawi and beyond.

Materials and Methods

Description of the study area

This study was carried out in Area 1B, a low income peri-urban area in Mzuzu City in Northern Malawi. Mzuzu City has an estimated population of 176,000 people in the northern

region of Malawi (Population of Cities in Malawi, 2017). Mzuzu is the third largest urban area in Malawi and the hub of government administration, business, industry and services for the northern region (Mpoola *et al.*, 2011).

Mzuzu City has a total of 26,858 numbers of households with an average household size of 5.2 person. In Mzuzu City, the population is composed of high income, middle income and low income households (Manda, 2009). The major economic activities encompass salaried employment, bicycle taxis, farming, tobacco grading and vending of second hand clothes. Faecal sludge management in the city is mainly through on-site sanitation facilities such as pit latrines and septic tanks.

Mzuzu City faces the challenge of rapid urbanization, which has led to the establishment of informal urban settlements within the City. The informal settlements cover about 48.3 % of Mzuzu City with 94 % of households using pit latrines or septic tanks. Mzuzu City has no sewerage system (Manda, 2009; UN habitant, 2011). The responsibility of faecal sludge management services in the city lies within the jurisdiction of Mzuzu City Council, which fails to provide meet the demand due to a number of reasons such as lack of adequate financial resources, technology options (vacuum tankers) and technical capacity for emptying pit latrines (UN-habitant, 2011). As a consequence, the private actors who use vacuum tankers dominate in provision of pit desludging services in the City mainly on emptying septic tanks in easily accessible formal areas. Hence households in peri urban Mzuzu primarily rely on manual pit emptying or digging a new pit latrine with associated health risks and amidst space constraints. The city was selected as the study site because it is in transition with multiple

homes on a small plot with household owners of different socio-economic activities.

Ethical Considerations

The Malawi National Commission for Science and Technology Ethics Committee approved the study prior to implementation. Any participation in the study was carried out with full consent of the respondents involved. The information obtained was used for academic purposes only, and was treated with utmost confidentiality.

Sample size and recruitment

A total of 150 households were purposively selected in the study area based on the presence of pit latrine representing 30% of the total number of the households in the study area.

Data collection

Two instruments were used for data collection: (1) a 20-item questionnaire which was used to conduct face-to-face interview for the head of each household, and (2) a checklist (Table 1). The items in the questionnaire consisted of the demographic information including level of education, source of income and occupation. The checklist (Table 1) was used for the assessment of pit latrines to determine whether improved or unimproved.

The key hole and superstructure dimensions were measured by a measuring tape ruler in centimetres to determine the accessibility to desludging equipment.

Data analysis

We conducted analysis and performed measurements on pit latrines. All copies of questionnaire administered in the field were

Table 1: Checklist of Pit Latrine

Characteristics	
Improved	Unimproved
Presence of pit lining	Absence of pit lining
Availability of concrete slab	Lack of concrete slab
Shelter wall made of burnt bricks	No shelter wall with burnt bricks
Shelter wall well cemented	Shelter wall not cemented
Iron roofed facility	Non - iron roof

verified for completeness. Open-ended questions were coded and the data were entered into a computer. The SPSS version 16.0 was used to perform descriptive analysis. The number of respondents on demographic characteristics under educational level and occupation in Table 3 were averaged to determine the percentages of improved and unimproved pit latrines which are reflected in Figure I. Pit latrine without pit lining, concrete slab, shelter wall with cemented burnt bricks and iron roof was deemed unimproved. Cross tabulation and chi-square analysis were run on the type of pit latrine and socio-demographic characteristics at 95% confidence level. Chi-square test was performed to test for association between types of pit latrine and the socio-demographic characteristics.

Results

The results of the demographic profile of the respondents are presented in Table II. The results in Table 2 revealed 55 % of the respondents (n= 150) were household heads while 45 % were not household heads. The age of respondents ranged from 20 – 40 years with a mean of 30. The results in Table 2 revealed 48 % of respondents were between 30 and 40 years. Only 3 % were about 20 years of age. The results in Table 2 revealed 56 % of the respondents were male and 44 % were females. The majority of respondents (77%) were married, 17% were single, 6% and 5% were widows/widower and divorced. The results in Table 2 revealed that all respondents (100%) were Christians in the study area.

Table 2: Demographic Profile of the Respondents in Area 1B

Age	= 20	20-30	30-40	>40
	3%	48%	36%	13%
Gender	Male	Female		
	56%	44%		
Marital status	Single	Married		
	23%	77%		
Religion	Christian	Muslim	Other	
	100%	0%	0%	

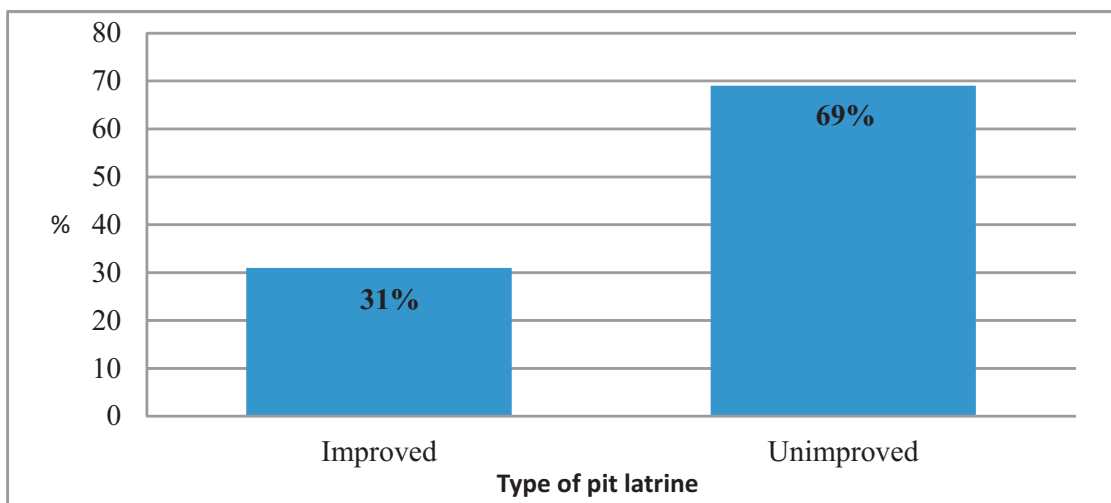


Figure 1: Percentage of households with improved and unimproved pit latrine

The results in Figure 1 indicate the percentages of households with improved and unimproved pit latrines. The results revealed 69 % of the respondents had unimproved pit latrines and 31% had improved pit latrines.

The results in Table 3, indicate the type of pit latrine (improved or unimproved) owned by households was significantly influenced by educational level of the respondents ($\chi^2 = 33.59, DF = 4, P < 0.01$). The results revealed the respondents who had attained primary and secondary schools ranged from 82 % to 91 % and used unimproved pit latrines. The results further revealed 85.7% of the respondents who had attained tertiary education owned improved pit latrines.

Statistical analysis in Table 3, indicates the type of pit latrine (improved or unimproved) owned by households was significantly influenced by occupation of respondents ($\chi^2 = 73.45, DF = 4, P < 0.01$). The results revealed the respondents who were doing trade, farming, fishing, and pension recipients ranging from 79 % to 95 % were using unimproved pit latrines. The results further revealed 77 % of the

respondents who were receiving salaries owned improved pit latrines. The results in Table III, indicates the type of pit latrine (improved or unimproved) owned by households was significantly influenced by monthly income of households ($\chi^2 = 47.71, DF = 4, P < 0.01$). The results revealed the majority (92% - 98%) of respondents who had their incomes ranging from MK10, 000.00 to MK40, 000.00 owned unimproved pit latrines. Those who were receiving salaries above MK40, 000.00 owned improved pit latrines.

Discussion

The socio-demographic characteristics of respondents have been used to show the extent of access to pit latrines. The results from this study have shown that all households in the study area have pit latrines. This implies that all households interviewed set priorities in managing human wastes properly. The presence of improved or unimproved type of pit latrine in Area 1B did not defeat the exclusive purposes of pit latrine i.e. that of keeping the human wastes

Table 3: Relationship Between Socio-demographic Characteristics of the Households in Relation to Condition of Pit Latrine

Demographic Characteristic	Condition of Pit latrine		χ^2 test	DF	P-value
	Improved %	Unimproved %			
Educational level			39.59	4	< 0.01
Primary	9	91			
Secondary	18	82			
Tertiary	85	15			
Occupation			73.45	4	< 0.01
Farming	16	84			
Fishing	7	93			
Trade	5	95			
Salary	77	23			
Pension	21	79			
Monthly income			47.71	4	< 0.01
Less 10,000 (Kwacha)	2	98			
20,000-30,000	6	94			
30,000-40,000	8	92			
above 40,000	100	0			

χ^2 = Pearson Chi-Square, DF = Degrees of freedom, P-value = Probability

from human contact and eliminating the practice of open defecation. UNICEF and WHO (2015) reported 964 million people globally practice open defecation in developing countries because they still do not have access to pit latrines. The results in the current study have revealed that there is no practice of open defecation in Area 1B. Access to pit latrines provides advantages given that worldwide observations indicate popular disposal of human faecal waste is one of the factors that determine the human existence especially child survival (UNICEF and WHO, 2015). Use of pit latrines in area 1B also brings advantages for public health and human dignity. The advantages for public health and human dignity are, in fact, central advantages which extend beyond households (UNICEF and WHO, 2015).

Socio-economic status is often measured as a combination of education, income and occupation. And it is commonly conceptualized as the social standing or class of an individual or group (American Psychological Association, 2015). The economic status of the household plays an extremely important role on the type of facilities they own. Lawrence *et al.* (2002) reported that economic status is an important determinant of household access to water and basic sanitation in households. This study revealed that the majority (85.7%) of respondents, who had attained tertiary education, used improved pit latrines while a few (14.3%) used unimproved pit latrines.

The majority with primary education (95.1%) owned unimproved pit latrines. The results compared favourably with Koech *et al.* (2013) who reported that households whose heads had low educational level owned unimproved types of sanitation facilities in Bomet municipality, Kenya. In the current study, the low level of education of household heads in Area 1B reveals that the majority (95.1%) of the residents owned unimproved pit latrines because they had low income, hence compromised the standards of sanitation. In South Africa, the principles in the strategic framework for sanitation services provides the chance to the low income households to access

basic sanitation services for free and that these sanitation services are maintained at government expenses (Still and Foxon, 2012).

In 2001, households with low-income in three cities in Vietnam were accessing loans from a Sanitation Revolving Fund (SRF) component which was incorporated in the World Bank project (Evans, 2009). The Sanitation Revolving Fund (SRF) in Vietnam proved effective, which has now seen those cities with improved pit latrines. Likewise, the Government of Malawi can emulate from the Governments of South African and Vietnam and provide the same free sanitation services or loans to the people who own unimproved type of pit latrines in Area 1B.

Occupation is another important parameter which is often used for measuring the social standing or class of households or an individual (American Psychological Association, 2015).

The results revealed that people who are employed with high level of education such as tertiary education in the study possessed improved type of pit latrines. The work of Kimenyi *et al.*, (1995) reported that low education level coupled with unskilled occupation results into low income, hence determines the affordability of services and facilities like sanitation facilities owned by households. Water and Sanitation Programme (2013) reported that households with limited financial resources prioritize household basic needs as opposed to sanitation facilities. Similarly, this study, revealed that 93.2% of the respondents who were doing trade, farming, fishing and pension recipients did not prioritize sanitation facilities; and hence owned unimproved pit latrines. A similar research conducted by Holm (2013) in Area 1B, concluded that sanitation is not always a priority for poor households.

The results revealed that people with low income (K 10,000.00–K 40,000.00) were unable to construct improved pit latrines. The cost of constructing a new pit latrine in urban areas is USD\$72 (Manda, 2009). The inability to construct improved pit latrines could be due to the very high cost of the construction materials. Similarly, work by Mukwaya *et al.*, (1998)

reported that people with low income have unimproved pit latrines because they cannot afford to purchase building materials for improved facilities.

Meanwhile, the low income levels of residents in the study area does not match with the cost of living in Mzuzu, which according to Centre for Social Concern (2012) reported that an average household requires a minimum of MK 73,670 per month. This is far beyond the minimum income revealed in this study of less than MWK 10,000.00 per month of the households in Area 1B. Furthermore, the monthly income of the respondents revealed in the study cannot meet the desludging service costs because it is far below the minimum service charge of one trip of a desludging truck. Mr. Clean Malawi quotation for one full tanker removed from any sanitation facility is MK 35,000.00 per trip to the designated disposal site (Mr Mkanda Wire whose trade name is Mr. Clean, personal communication, 2014).

Conclusion and Recommendations

The access to pit latrines in Area 1B in Mzuzu City does not depend on the diversity of demographic characteristics of households. Access to pit latrines is the same to for all respondents in Area 1B as each and every household has its own pit latrine although of different types. In order to progress with sanitation through improved types of pit latrines, especially to the vulnerable households, the Malawi Government and other stakeholders should come in and assist these households to access loans with reasonable interests. With the loans, people with unimproved pit latrines will construct improved pit latrines which will be easily desludged and re-commissioned thereby addressing issues of inadequate space and open defecation in these peri-urban areas. In this regard, some of the innovative and alternative methods of faecal sludge management which can be advocated and promoted with the loans are the ecological sanitation which encompasses arborloo, composting and fossa alterna. These methods make out the significant value of faecal sludge as

manure. In this case, the households will sell manure and earn money which they can use to build improved pit latrines. Furthermore, the authorities should provide special attention to households with low-income when implementing strategies for access to basic sanitation. The government should promote inclusive and sustainable human development and work to reduce poverty in all its dimensions. As such, inclusive growth and sustainable human development are key important parameters for the achievement of the newly adopted sustainable development goals.

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