

## CURRENT STATE OF ENVIRONMENTAL SANITATION MANAGEMENT IN THE BAMENDA MUNICIPALITY

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### ABSTRACT

Environmental sanitation is a fundamental process with the intention of protecting the environment and promoting health and the quality of life of communities. Sanitation in the Bamenda municipality is worsened due to inadequate housing facilities: toilets, drainage, water supply and ubiquitous littering with domestic wastes. This study sets out to examine the current state of environmental sanitation across the municipality. The study employs both an explanatory and descriptive survey using qualitative and quantitative methods, SPSS version 20, Microsoft Excel and Microsoft Word 2016 to analyse the results. Findings reveal that majority of households (86.6%) use illegal dumpsites, while only 13.4% rely on approved dump sites. Over 67.8% households have access to pipe borne water while 32.2 use doubtful sources. 36.8% use pit latrines, 21.1% have access to flush toilets and 21.1% used both pit and flush toilet, while 13.1% practice open defecation. Over 68.4% dispose untreated wastewater into nature with only 31.6% using drains/gutters. Some 23.7% households with children under 5 safely dispose of their fecal waste. Treating drinking water is imperative and also crucial to implement proper hygiene and sanitation measures to safeguard the population's health in a quest to attain sustainable development of the municipality.

**Keywords:** Environmental Sanitation, waste management, Bamenda, Municipality, Dumpsite

### 1.0 INTRODUCTION

Environmental sanitation is one of the basic determinants of quality of life and human development index, poverty alleviation and constitutes necessary components of primary health care (Sheethal & Shashikantha, 2016). Basically, environmental sanitation is an overall culture of cleanliness, hygiene and healthy habits within the society at the level of households, schools, institutions, urban and rural areas and during festivals (Theingi, 2019). The provision of adequate sanitation services, safe water supply and hygiene education represents an effective health intervention that reduces mortality caused by diarrheal disease by an average of 65% and the related morbidity by 26% (WHO-UNICEF, 2019).

In Cameroon, The Ministry of Decentralisation and Local Development that supervises regional councils is charged with the responsibility to ensure good sanitation and waste management among other duties (Decree No. 98/147 of 17 July 1998). The Ministry of Urban Affairs (Decree No. 98/153 of 24 July, Section 22-25) is responsible for the general cleanliness and drainage, solid waste management, hygiene and sanitation of cities. Precisely, Section 24

assigns the Ministry with the responsibilities of elaborating plans for transportation and treatment of solid waste, carrying out research on improving and coordinating and sensitising the public on the practice of pre-collection of wastes. Unfortunately, the sanitation condition in the Bamenda municipality leaves much to be desired as a result of inadequate housing facilities like toilets, drainage, water supply and electricity. There is much littering with domestic wastes and garbage around areas of high economic activities such as markets where approximately half of the waste remains uncollected for long, damaging both sanitary conditions and the beauty of the city. The City Council running waste collection and treatment services is unable to keep pace with the situation. This is further compounded by the nonchalant attitude of urban dwellers towards the environment of the study area. The study sets out to examine the current state of environmental sanitation and to propose interventions that could help ensure good environmental sanitation in the Bamenda municipality.

## 2.0 CONCEPTUAL UNDERPINNING

Environmental Sanitation is the promotion of hygiene and the prevention of disease and other consequences of ill-health, relating to environmental factors (WHO, 2020). Environmental Sanitation is in two basic dimensions: environmental factors which impact on the infectious agents and transmission of diseases. These environmental factors include: disposal of human excreta, sewage, household waste and other wastes likely to contain infectious agents; water drainage, domestic water supply, as well as housing. The second dimension is sanitation practices; which are various hygienic practices of the communities, basic knowledge, skills and human behaviours as well as socio-cultural factors of health, life-styles and environmental awareness. These include: personal hygiene (washing, dressing, and eating), household cleanliness (kitchen, bathroom), community cleanliness (waste collection in common places).

The scope of environmental sanitation is wide and complex, encompassing a wide range of activities to promote health, wellbeing and clean physical environment. In simple parlance, environmental sanitation is the sum of activities embarked upon by people to promote healthy living conditions. The focus on environmental sanitation in this study addresses waste management practices, water sources and sanitation facilities within the municipality. Therefore, this study considers environmental sanitation as the art of collecting, disposing and managing wastes in order to keep the environment clean and control of all sources and factors that aid the spread of diseases.

## 3.0 METHODOLOGY

This paper adopted both the explanatory and descriptive survey methods. Data was analysed by use of qualitative and quantitative methods. Primary data was obtained from Council Development Plans, observations, interviews with resource persons and Focus group discussions held with varied household groups. Literature from scientific journals, articles, dissertations and government offices were invaluable for this study. Households constituted the primary units sampled with questionnaires (n=380) administered to household heads using the purposive and snowball techniques. Photographs of premises and toilets were taken using GPS camera and data analysed with the help of the Statistical Package for Social Sciences (SPSS) version 20, and Microsoft Excel.

## 4.0 STUDY AREA

The study covers the three municipalities of the Bamenda city located in Mezam division of the North west Region of Cameroon. The city is located between latitude 5o56” N and 5o58” North of the Equator and Longitude 10.09o and 10.11o East of the Greenwich Meridian, situated at an elevation of 1,258 meters above sea level (Master plan of Bamenda city council, 2011-2027). Figure 1 illustrates the layout and various municipalities of the Bamenda urban space.

5.0 RESULTS AND DISCUSSIONS

5.1. Types of Solid Wastes Generated at Household Level

Figure 1. Layout of the Bamenda urban space illustrating the three municipalities



Source: Bamenda City Council (2020) and administrative limits of Cameroon (NIC, 2020)

Different types of solid waste generated at household levels are presented on Figure 2. Most of the organic waste generated are from food remains, rotten fruits and vegetable peelings (42.0%) and papers (14%). Inorganic waste is also generated in small quantities consisting of plastics (12%) and empty bottles (12%), while 20% of waste is from broken and obsolete cutlery (plates, spoons and cups), glass and metal as well as discarded furniture.

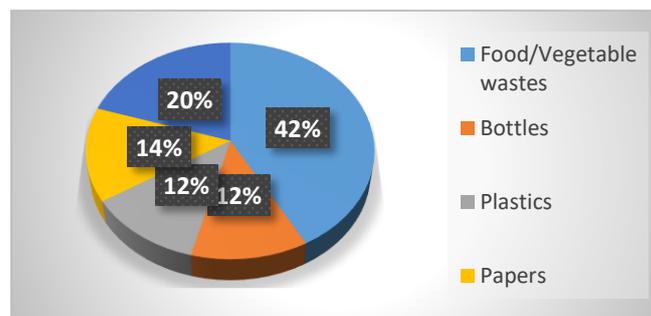
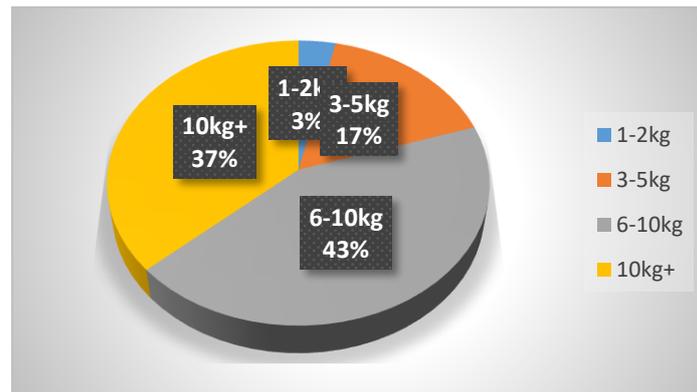


Figure 2: Types of waste generated

**5.1.1. Quantity of Household Waste Generated Daily**

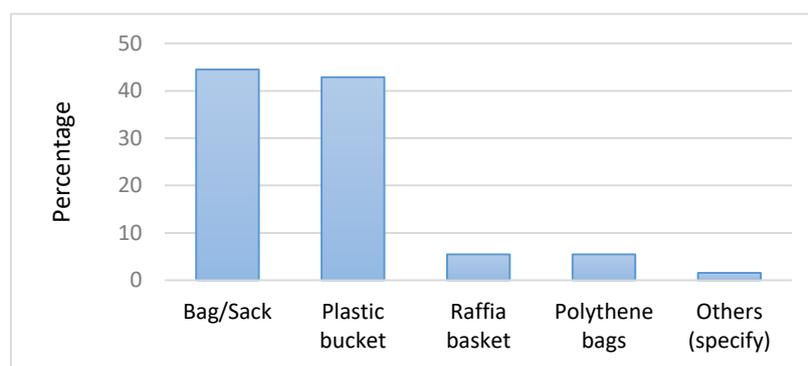
Solid waste generated daily varied per household depending on the household size and composition of the waste. Figure 3 shows that the quantity of solid waste generated range from 1-2kg to 10kg per day. Field evidence indicates that, few urban dwellers generate little waste of 1-2 kilograms daily. As the household size increases from 4 to more than 7 persons, so does the amount of solid waste.



**Figure 3: Quantity of Wastes Generated Daily**

**5.1.2. Waste Storage Facilities**

As indicated on Figure 4, majority (44.5%) use bags/sacks for waste storage, 42.9% use plastic/bucket containers, while 11% use raffia baskets (bamboo) and polythene bags.



**Figure 4: Types of solid waste storage containers**

A small proportion of the population (1.6%) do not use storage containers, but dump waste in pits behind their houses. However, only 22% of households possess waste containers with lids while more than half of the population (78%) do not.

**5.1.3. Waste Separation**

Waste separation was not found to be a common household practice. However, majority of the households recover plastics and unbroken bottle containers by securing them aside for reuse, sale or used as a gift as indicated on Figure 5.



**Figure 5: Handling of recyclable waste materials**

While 29.2% kept the recyclables for personal use, 26.3% sell to market vendors, 23.7% give out to others, 20.8% carry with other wastes to dump sites. Majority of households (45.3%) indicate that this practice of separation is not common. Another reason for non-separation is due to lack of time (24.7%) as household heads noted that even if they separate the waste, waste collectors will later mix them up at the dump sites.

**5.1.4. Waste Disposal Methods**

Mostly unsafe solid waste disposal methods such as dumping in the open (69.7%), open pits and burning (36.8%) are used within the residential environment. Over 53.4% households dump along streets/roads while 42.9% dump wastes into nearby streams irrespective of the effects with only 13.4% of the population using approved dump sites for waste disposal.

Field evidence in the neighbourhoods revealed that open space dumping and dumping into nearby streams are common practices within all municipalities. The situation in the study area is pathetic as every corner is spotted with heaps of garbage which have become an eyesore and constitute health issues (Figure 6).

Majority of the population (30.5%) noted that skips are 1km away from their homes, 26.3% indicate that it is less than a kilometer, while 28.9% consider that it is a distance of 2km away and the rest 14.3% say their distances are above 2km.



**Figure 6: Consistency of garbage dumping along major road axis over the years**

(A-Indicates a reduction of road width and B- degrading the asphalt)

**5.1.5. Role of Households dwellers in Waste Management Practices**

As indicated in Table 2, solid waste generated at home is handled by different household dwellers. Mostly children (53.4%) dispose household wastes, mothers (34.2%) and a few (7.4%) reported that waste disposal is every one’s responsibility while only 5.0% of household heads (fathers) are involved in waste disposal.

**Table 1: Household Dwellers Responsible for Waste Disposal**

	<b>Variables</b>	<b>Frequency</b>	<b>Percentage</b>
Who disposes household waste	Children	203	53.4
	Mother	130	34.2
	Father	19	5.0
	Every one's responsibility	28	7.4
	<b>Total</b>	<b>380</b>	<b>100.0</b>
When do you dispose household waste	Every Morning	26	6.8
	Every Evening	29	7.6
	Once a week	147	38.7
	Any time	170	44.7
	Others, Specify	8	2.1
	<b>Total</b>	<b>380</b>	<b>100.0</b>

**5.2. Methods of Household Wastewater Disposal**

About 32% of households have sewers for grey/waste water disposal while the overwhelming majority (68%) do not and resort to other means of disposing waste water from their kitchens, laundry and bathrooms as indicated on Table 2.

**Table 2: Liquid Waste Disposal Methods**

<b>Disposal Methods</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Safe Disposal Methods</b>		
In a suck-away pit	50	13.2
Enclosed sewer system	30	7.9
Into toilet facility	40	10.5
<b>Unsafe Disposal Methods</b>		
In an open space out of compound	80	21.1
Unto compound yard	70	18.4
On the street/road	110	28.9
<b>Total</b>	<b>380</b>	<b>100.0</b>

Based on Table 2, an overwhelming majority (68.4%) use unsafe wastewater disposal methods which include: street/road surfaces (28.9%), an open space out of their compounds (21.1%) or open ditch (18.4%) in the yard.

**5.3. Household Water Sources and Consistency of Flow**

Many water sources exist in the municipality for drinking, cooking and other purposes. They include: CAMWATER (32%), Community water (27.1%), wells (19.5%), borehole (7.9%) as well as Council Purified water (8.7%) with other sources (3.9%) such as rain harvesting and springs. Besides CAMWATER, boreholes, wells and community water compliment and serve the population due to irregularities from CAMWATER, the main water supplier as shown on Figure 7.

Flow consistency is mirrored through the frequency of water cuts, weak communication of water rationing schedules. Water flows through the taps for approximately one hour daily. While a small fraction (1.8%) of the population does not experience flow at all, 6.6% noted that water flows through their taps for almost 30 minutes between 1-2 days per week. Some (14.2%) indicated that water flows for 3-5days. In rare cases (25.8%), water flows throughout the week. The quantity of water consumed ranges from 50 liters to over 200 liters per day. However, majority (51.6%) of the households consume water below 50 liters daily, indicating that there is a critical household water situation in the study area.

### 5.3.1. Distance Covered

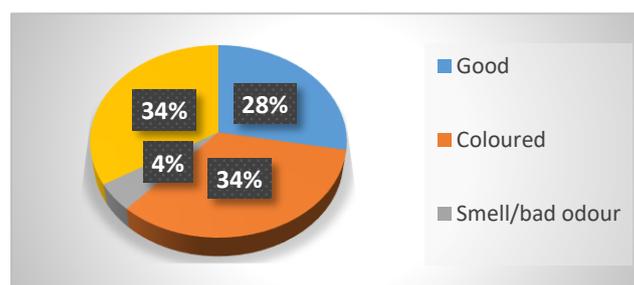
Field investigations reveal that a minority (45.9%) of households have access to water within a distance of 500m or less while the majority (54.1%) trek between 500 to over 1000m (Table 3.)

**Table 3: Distance of Water Source from Dwelling**

Distance to Water Source	Frequency	Percentage
Have water at home	100	26.3
Less than 100m	23	6.1
200-300m	31	8.2
400-500m	20	5.3
600-1000m	97	25.5
Above 1000m	109	28.6
<b>Total</b>	<b>380</b>	<b>100.0</b>

### 5.3.2: Nature and Quality of Water Supply

While population’s perception on the nature and quality of water supply produced different results as shown on Figure 8, a greater part of the population (68%) indicates that water contains particles and colour. About 28% of the total population admits that their water source is good while 4% says it has bad odour/smells.



**Figure 7: Quality of water supplied**

**5.3.3: Water Treatment Methods by Households**

An overwhelming majority (78.9%) of households in the city of Bamenda does not treat drinking water. 21.1% households practice some form of water treatment, while 5.3% make use of a water filter, 10% filter through a cloth, 3.2% use chemical disinfectants (bleach/chlorine or aqua tablets) and 2.6% boil before drinking. Water is stored in plastic buckets (77.3%), some (7.0%) use storage tanks while 15.7% store it in plastic drums. Households that treat water, do so daily (6.6%), every three days (9.2%) or less in a week (23.7%), while some cannot remember the last time they treated water (7.9%). Majority (60.5%) of the households, clean their water containers prior to each filling.

**5.4. Household Sanitation Facilities**

**5.4.1. Toilet Facilities**

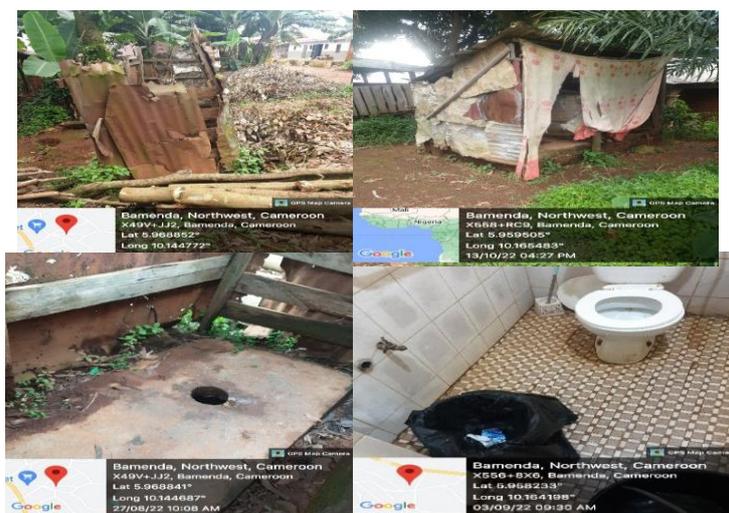
Table 4 shows the type and condition of toilets in households.

**Table 4: Toilet Facilities and Hygienic Practices in Households**

Toilet Type/Facility		Frequency	Percentage
Type of toilet/latrine facility	Flush toilet	80	21.1
	Ventilated Improve Pit Latrine	30	7.9
	Traditional Pit Latrine	140	36.8
	Flush & Pit latrine (why?)	80	21.1
	No facility (bush/playground)	45	11.8
	No response	5	1.3
	<b>Total</b>	<b>380</b>	<b>100.0</b>
Shutters on pit toilets	Always	116	30.5
	Sometimes	63	16.6
	Never	174	45.8
	No Response	27	7.1
	<b>Total</b>	<b>380</b>	<b>100.0</b>
How often toilets are cleaned	Every day	8	2.1
	Once a week	143	37.6
	Twice weekly	83	21.8
	Monthly	146	38.4
	<b>Total</b>	<b>380</b>	<b>100.0</b>

Based on Table 4, majority (89.5%) are equipped with a household toilet while 13.1% do not have household latrines. Over 36.8% use traditional pit latrines while 21.1% of households have access to flush toilets. Just 7.9% make use of ventilated improved pit latrine while 21.1% use both pit and flush toilets. 13.1% do not have any toilet facility at all, but rather use a public space.

Field investigations further reveal that majority of the toilets (45.8%) do not have shutters. Few households wash their toilets on a daily basis (2.1%) with the use of detergent/soap (13.2%). Over 38.4% of the available toilets are cleaned once a month. One quarter of the surveyed households use only water (45.8%), 22.4% use water and brooms to clean their toilets while 18.7% use ash/salt to help reduce foul odour in their toilets. From households with toilets, over 56.6% share the toilets. The toilets are open spaces caged with all sorts of materials ranging from partially decayed zinc through planks to old blinds and bags to partially shade the occupants from full view of passers-by (Figure 8).



**Figure 8: Varied appearances of and state of household toilets**

(A & B: Outer view of a pit latrine; C: The interior of a pit latrine D: Internal water closet toilet)

### 5.4.2. Management of Fecal Waste

This study also assessed where children defecate and how it is disposed of, since it can impact on the sanitation situation of the immediate environment of the study area. It begins by looking at the attitude of the population on child defecation.

#### 5.4.2.1. Handling of Children’s Fecal Waste by Households

As indicated on Table 5, 33.2% of the population believe that the use of improved toilet is mandatory for the safe management of fecal waste of children under 5 while 66.8% note that the use of improved toilet is not mandatory for children under five. Over 68.4% of the population feels that fecal waste of children under five years should be disposed of immediately after defecation, while few (21.1%) agree that in open dumps can lead to faeco-oral diseases.

**Table 5: Handling of Children’s Fecal Waste**

Handling method	Agree		Disagree	
	N	%	N	%

Improved toilet is not mandatory for under 5 children since they can defecate in sanitary napkins/diapers	126	33.2	254	66.8
Faeces passed by children under 5 should be disposed of immediately after defecation	260	68.4	120	31.6
Disposing child's faeces on open dumps can lead to faeco-oral diseases	80	21.1	300	78.9

When asked where households usually dispose children's fecal waste, 47.4% indicated that they drop the stool into a garbage can, while 18.4% opine that they dispose of it into drains/gutters. About 13.1% of households dispose their children's fecal matter in the toilet, while 5.3% make use of toilet/latrine facility. In all, only 23.7% practice improved fecal waste disposal methods, while 76.3% practice unsafe disposal methods.

## 6.0 DISCUSSIONS

Findings on the current state of environmental sanitation in Bamenda reveal that the generation of municipal solid waste has kept on increasing and is expected to double in the nearest future if appropriate and adequate management measures are not put in place by the municipal authorities. About three quarters of waste generated in the municipality are biodegradable from leftover foodstuffs and vegetables depending on household size. However, the management of waste remains a challenge as only a small fraction of it is disposed of at the designated points. Illegal solid waste disposal practices are attributed to the poor service delivery by council authorities as reflected by the low frequency of waste collection. Poor attitude of residents also plays a crucial role in poor solid waste disposal by discarding or burning waste without knowledge of the harmful imprints likely to be caused by these environmentally unfriendly methods such as open dumpsite, open pits and burning, dumping along major streets/roads as well as into nearby streams or gutters. This finding is in accordance with that of Gideon and Kuma (2020) where in Bamenda II subdivision, over two thirds of the population disposed their waste in unapproved dumpsites. Disposing waste in open dumpsite often encourage environmental pollution, emission of offensive odour, flies and rodent infestation that can likely affect the overall health of the population and the environment, including environmental aesthetics. It is noted that the present socio-political crisis has had more streets and road junctions to become hot spots for waste dumping and deteriorating quality of the environment. It is essential for households to adopt a more appropriate method of waste disposal so as to avert the adverse health effects that come with indiscriminate waste disposal.

With respect to waste storage, it was most households have a waste storage facility. However, most containers used as waste bins do not have lids and were observed to be located outside the yard of homes before disposal. This is in consonance with the findings of Ivy (2018) who discovered that storage containers used by respondents in Coastal Ghana did not have lids, leaving them unprotected and exposing household members to the risk of waste contamination.

The study also revealed that most household waste is disposed by children and women though few men were engaged. Ivy (2018) revealed similar tendency in Ghana, where children help by taking waste to the dump sites. This perhaps is due to culture where most house chores are carried out by women and children while the men are responsible for providing finances; a practice which spans across most of Africa. Furthermore, the attitude towards waste separation

in the present study was poor as more than three quarters felt it unnecessary to do so prior to disposal. Ignorance on the importance to separate waste before disposal seems to be a common trend across African countries. This is probably due to the lack of appropriate education on its benefits, absence of the technology/services to treat wastes and the cost associated with purchasing and maintaining separate disposal receptacles has been an issue of concern.

Efficient wastewater management is vital for safeguarding public health and the environment. The evacuation method for wastewater in various households are important factors that highlight the shortcomings in the sanitation system. Wastewater management in households is individual due to lack of equipment, basic services and adequate framework. Regardless of factors such as education, religion, or lifestyle, more than two thirds of households in Bamenda use unsafe wastewater disposal methods. This untreated wastewater often ends up in streams or evaporates, which is a factor in the proliferation of various disease vectors, particularly mosquitoes that propagate malaria.

Water is at the core of sustainable development and as such is important in enhancing sanitation. Understanding the source of safe drinking water is crucial for human health as contaminated water leads to illnesses such as typhoid, cholera, dysentery, diarrhea and hepatitis (WHO/UNICEF, 2019). This study further identified CAMWATER, Community and Council purified water as major pipe borne water sources used by households. This implies that more than half of the population have access to pipe borne water. However, most town dwellers trek over a distance of 1,000m (1km) to access water which is contrary to WHO/UNICEF (2017) guidelines of 1,000m from the user's dwelling. Beyond such a threshold, the people are considered not to have access to water.

Storage and quality of drinking water in plastic containers was another issue. The perception of water quality available varied. The water supplied to the population is either coloured, has particles, odorous or taste. There is however, problem with the quality of some of the water sources as indicated by the presence of colour, particles, smell and taste contrary to the reports made by Raimi et al; (2018) that water of satisfactory quality should in addition to its chemical and microbiological qualities be colourless, odourless and tasteless.

Environmental sanitation facilities available to households was also assessed in this study. This is necessary because availability of facilities may influence resident's environmental sanitation practices. A greater proportion of the population have a household toilet of some sort while very few (13.1%) do not. This becomes clear that the integration of toilet facilities as a construction norm is not yet viewed as mandatory by a small proportion of the population. Pit latrine without covers are areas that could be highly vulnerable to unpleasant odours/smells and breeding grounds for houseflies, mosquitoes and rodents. This violates the guidelines of WHO (2002) on the compulsory provision of pit covers for users of simple unimproved pit latrines.

In terms of building material, the toilets are mainly open spaces caged with all sorts of materials ranging from partially decayed zinc through planks to old cloths and plastics which partially shade the occupants from full view of passers-by. This has resulted to poor ventilation, air pollution, limited privacy and poor environment quality. This finding reveals the vulnerability of some toilets within the municipality, which can easily collapse. Multiple of households also

share toilets, thereby contradicting the UN-Habitat (200b) regulations which states that “excreta disposal system is considered adequate if it is private or shared by a maximum of two households. The finding is also contrary to the sanitation regulation of April 1994 Town Planning Law Chapter IV, Article 36 (1) in Cameroon, which stipulates that a distinct toilet equipment and sanitation, inside or outside the house, must be installed in any dwelling of more than one main room as opined by Nformi et al; (2019) in an earlier study in Bamenda.

This study also explored fecal waste management practices for the under five years since it can contribute to environmental health and sanitation within neighbourhoods in Bamenda. According to the World Bank Group (2015) report, the safest way to dispose of a child’s fecal matter is to help the child use a toilet or latrine or for very young children to put or rinse their faeces into a toilet or latrine. This is important for the hygienic improvement of a household and the community at large as it lowers the risk of disease pathogens in the environment. Therefore, safe disposal of children’s fecal waste is as important as that of adults. From households with children under five years of age, 76.7% were poorly disposed of using gutters/drains, dumped in the open or into a garbage can. Only about 5.3% of the households had the children’s stools contained and dropped into a toilet facility; an indication of good hygienic practice. This trend is likely associated with maternal perceptions that infant stools are less harmful and allow their infants to practice open defecation in the vicinity.

## 7.0 CONCLUSION

The current state of environmental sanitation management in the city of Bamenda was assessed and it was observed from the study that there are many illegal waste dumps within residential areas as very few people take their waste to the designated dump sites. Inadequate water supply and poor sanitation facilities also predispose the population to water related diseases. Thus, efforts must be made to get rid of waste dumps as quickly as possible for a healthy environment. It is important to promote proper child fecal disposal through a sustainable sensitization medium that could transcend generations. It is also imperative to focus on sanitation facility improvements, hygiene and sanitation behavioural change strategies rather than just on safe waste disposal methods.

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