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ENVIRONMENTAL SANITATION INTERVENTIONS ACROSS DIVERSE PROFESSIONAL SPACES IN GHANA: EVIDENCE FROM BIRIM CENTRAL MUNICIPALITY

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Abstract:
The study assessed the effectiveness of environmental sanitation interventions in the face of contemporary environmental sanitation practices across various professional lines in Ghana. It employed a descriptive research procedure to explore specifically the status of sanitation in the area, as well as the environmental sanitation practices of residents. A qualitative-dominated multiple case study design was adopted to explore the phenomena from the diverse subjective perspectives of residents living in the municipality. Interviews and field observations were the main data collection techniques used to obtain responses from twenty-two (22) participants who were purposively sampled. The data gathered were thematically analysed. The study identified eight indicators that summed up environmental sanitation intervention effectiveness. This paper recommends the provision of solid waste containers (private and public), by-laws and punishment, collaboration, monitoring, education (personal hygiene, sanitation management), dump site demarcations, drainage and sewage interventions and community commitment. Finally, regular waste collection by public and private waste managers, such as the Zoom Lion Company Ghana Limited.

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1. Introduction

The efficient management of our environment and its resources determines mostly the sustainability of mankind (Abubakr, 2017). Nevertheless, contemporary environmental challenges are linked to how people live in particular areas and to the activities they engage in regarding the environment. These activities are known to stem from socioeconomic, sociocultural, industrial, and technological characteristics of individuals. A report by the United Nations indicates that about five billion people, approximately two-thirds of the world's population (8.2 billion), thrive in harsh livelihood conditions (UN, 2025). These conditions typically hover around poverty and sanitation, which apparently taint human decency. Interestingly, it turns out that these conditions, especially those relating to sanitation, not only affect the very lives of children but also expose adults to all sorts of health risks. Children remain vulnerable as far as poor environmental sanitation practices are concerned. According to UNDP (2019), poor environmental sanitation contributes to infant mortality each day. Studies show that about five thousand children aged below 5 years lose their lives every day to poor environmental sanitation (UNDP, 2019; Setty, 2019). Poor sanitation tends to stifle the economy since its health implication is likely to lower productivity (Otchere, 2023). Mohd et al (2017) further indicated the dangers that poor sanitation poses to the ecosystem. Such practices endanger nature as they mostly contaminate water bodies and flat lands.

People worldwide are worried about the state of the environment in which they live. There have been several international conferences, workshops, and seminars on the effects of environmental degradation on people and the necessity of promoting environmental values (Brundtland, 1987). UNICEF expressed sadness that developing nations are lagging in achieving sanitation targets, despite making progress in expanding access to clean water (Abubakar, 2017). In 2004, the World Health Organisation and the United Nations International Children's Education Fund at one of its summits, jointly reported that about 2.4 billion people will likely face the risk of needless diseases and death by the year 2016 because of bad environmental sanitation, decaying or non-existent sewage systems, and toilet which fuel the spread of diseases (WHO, 2017).

Developing countries and cities, especially those in the third world, continue to struggle with the fundamental issue of waste accumulation, treatment, and disposal, while towns and cities in developed nations such as the United States of America and Europe have largely overcome this problem and are now struggling to find suitable methods of treating and disposing of their waste (UNDP, 2019). According to Browning et al. (2019), the primary waste management and treatment issues that developing-nation cities face are related to the collection of waste from the urban or town surroundings. In third-world countries, between one-third and half of all waste produced in cities or towns goes uncollected (Browning et al., 2019). The cities and towns of many of these

developing countries struggle with inadequate waste collection and other environmental services.

Recent research conducted in sub-Saharan Africa shows that waste management has become an unsolvable problem, which could jeopardise the efforts of most nations and local governments (UNDP, 2019). According to Daramola et al. (2016), most urban and town environments in developing nations are typified by mountains of trash, overflowing trash cans, clogged drains, obstructed streams, and foul-smelling gutters. The urban environment in the Third World is therefore lethal and likely one of the most hazardous to human health and life (UNICEF, 2016).

District and municipal authorities across third-world countries focus their waste collection efforts on wealthy and planned areas as well as government officials (Musoke et al., 2016). They added that although waste collection operations are typically financed by public funds, residents of impoverished areas receive little to no assistance with waste removal. This is because providing sufficient trash cans, designated locations, and other associated environmental services across the entire jurisdiction becomes very challenging (Musoke et al., 2016). Geere et al. (2020) add that waste disposal facilities—which are typically in poor condition—are commonly found in the neighbourhoods of the poor and vulnerable, suggesting that our society's poor people are no longer receiving adequate sanitation.

Despite the initiatives taken by developed nations to address issues related to waste accumulation and management, they continue to face challenges with the swift rise of waste-related problems (Mensah, 2020). In the past, waste disposal was mainly viewed as a challenge associated with the overpopulation of countries, but now, urban waste issues, along with broader concerns of environmental sanitation, present significant challenges for many African nations. As stated by Martinez (2016), around ninety percent of African cities are dealing with serious waste disposal issues. The consumption of environmental resources and the resulting increase in waste production have led to an urgent need for effective waste management strategies. This is particularly important because our environment acts as a dumping ground for waste. Environmental challenges not only pose serious threats to human health but can also have detrimental effects on the local ecological systems. The decay of waste materials by bacteria produces foul odors that can lead to health issues or even fatalities, as evidenced by the incident in La Côte d'Ivoire where waste discharged by a French company near the coast reportedly resulted in numerous deaths (Martinez, 2016).

Dadson et al. (2013) observed a similar pattern of waste challenges in Ghana, particularly in terms of waste production and management. They discovered that significant waste-related issues facing urban areas in Ghana include the disposal of solid waste. Additional studies and reports regarding sanitation have highlighted the concerns this situation poses for city officials in Ghana (Mensah, 2020). This issue appears to be deeply entrenched, resembling a 'monster' confronting city authority, while they appear powerless. Mensah (2019) describes it as "a nightmare," suggesting that many of the Sustainable Development Goals (SDGs) are unlikely to be met by the 2030 deadline. The

UNDP Sustainable Development Goal 6, which focuses on clean water and sanitation, along with Goal 3 that emphasizes good health and well-being, clearly states that in 2015, 71% of the global population—or 5.2 billion people—had access to safely managed drinking water, yet 844 million people still did not have even basic drinking water. In 2015, 39% of the global population—approximately 2.9 billion people—had safe sanitation, but 2.3 billion people still lacked basic sanitation, and 892 million individuals engaged in open defecation. Furthermore, 80% of wastewater was discharged into waterways without sufficient treatment (UN, 2019) (Sustainable Development Goal Report). The Sustainable Development Goals (SDGs) acknowledge that environmental sustainability plays a crucial role in overall global economic and social well-being. However, accomplishing goal three (good health and well-being), the seventh goal (affordable and clean energy), and part of the sixth goal (to stop and begin reversing malaria incidents and other significant diseases by 2030) among the Sustainable Development Goals (SDGs) is heavily reliant on the nation's commitment to fostering a clean and healthy environment. Unsafe drinking water and inadequate sanitation contribute to numerous fatalities among children, and countless diseases such as diarrhoea, dysentery, malaria, and other parasitic infections. Insufficient sanitation facilitates the spread of these diseases. Prioritizing the achievement of the SDGs and the eradication of poverty remains at the forefront of the Ghanaian government's agenda.

The consequences of poor environmental sanitation in urban and rural areas jeopardize the realization of SDGs. SDG 6 (clean water and sanitation) is particularly focused on connecting environmental protection to poverty alleviation through sustainable development. Ghana's National Environmental Sanitation Policy 4 (MLGRD, 1999) outlines directives and empowers District Assemblies to create byelaws aimed at tackling environmental concerns in their regions to diminish environmental pollution. In considering the Millennium Development Goals (MDGs), some of which established the foundation for many African nations' initiatives toward environmental sanitation, the Sustainable Development Goals (2015 – 2030) become particularly relevant. The SDGs, introduced by the United Nations General Assembly in 2015, extend and continue the Millennium Development Goals (MDGs) (2000 – 2015), which reached their implementation target date. The SDGs comprise 17 Goals, with Goal 6 specifically advocating for clean water and sanitation for everyone. The formal wording for Goal 6 is "Ensuring availability and sustainable management of water and sanitation for all" (UNDP 2015. 1). Andersson et al. (2016) contend that SDG 6 is interlinked with other Sustainable Development Goals such as Goal 3, which pertains to "good health and wellbeing for everyone," Goal 7, which addresses "affordable and clean energy," and Goal 13, focusing on "climate change"/action, as well as Goals 14 and 15, which concern "life below water" and "life on land." All these goals further support the promotion of effective environmental sanitation. Furthermore, it empowers the Judiciary to set up and authorize Community Tribunals to prosecute those who violate sanitary byelaws and regulations; however, the enforcement of these environmental regulations to control residents' activities has largely been ineffective. As a result, certain communities continue

to struggle with inadequate environmental sanitation due to unsanitary habits, practices, and the ineffective implementation of sanitation protocols. Therefore, the declining quality of the environment in some areas necessitates solutions to mitigate its effects on the well-being of the inhabitants. Negative attitudes and poor hygiene, ongoing behavioral risks, insufficient basic sanitation, along with new and emerging diseases, are creating a dangerous combination that is altering the traditional image of healthy residents in Ghana.

1.1 Statement of the Problem

Widespread poor environmental sanitation, often attributed to human behaviors and attitudes (Kumah et al., 2020), has infiltrated numerous communities worldwide. While multiple studies have identified intentional human actions as a significant factor in this issue, an equally large body of research highlights the shortcomings of institutional frameworks in addressing the problem (Mensah et al., 2021). It seems that poor environmental sanitation remains a prevalent topic because researchers struggle to clearly identify the root causes of this issue. As mentioned previously, poor environmental sanitation has permeated nearly every community in Ghana, with the Birim Central municipality in the eastern region also affected. Currently, the municipality is facing alarming sanitation challenges. Significant sanitation issues in schools, marketplaces, bus stations, and other public spaces in the municipality are hard to overlook. Nevertheless, it appears that residents have largely ignored these problems. Observations reveal that both public and private areas are filled with trash, often obstructing drains and creating environments conducive to disease vectors, thus posing health risks to the community. Despite initiatives led by the Ministry of Health and Water and Sanitation to promote guidelines and improve sanitation in Birim Central Municipality, the area remains cluttered with water sachets, litter, and damaged furniture, among other waste. Although various measures, such as community clean-up efforts, public awareness campaigns, and collaboration with law enforcement agencies, have been implemented to lessen poor sanitation practices, the expected improvements still seem lacking. Mountains of refuse are carelessly discarded and mixed, containing both biodegradable and non-biodegradable materials, resulting in a nauseating odor and attracting pests like mosquitoes, rats, and cockroaches. Such scenes are disheartening for the municipality. Consequently, this study was undertaken in light of these sanitation issues, specifically to examine the effectiveness of poor environmental sanitation interventions in Birim Central Municipality.

2. Literature Review

2.1 Concept of Poor Sanitation

Sanitation in developing countries has taken centre stage in modern development discussions due to the poor situation concerning its management in those countries. Developing countries, in this context, are those in the low-income and lower-middle-

income brackets (Mensah, 2019). The United Nations (2019) has classified countries based on their level of development as measured by per capita Gross National Income. Due to this, countries with less than $995 GNI per capita as determined by the World Bank are classified by the UN as low-income countries, those with between $996 and $3895 as lower-middle-income countries, those with between $3896 and $12,055 as upper-middle-income countries, whereas countries with incomes of more than $12, 056 as high-income countries (UN, 2019). Besides the low-income feature, developing countries exhibit several characteristics, including poor environmental sanitation. While sanitation may refer to toilet or latrine management (Kumah et al., 2020), environmental sanitation services ensure privacy, dignity, accessibility, affordability, and safety, and are also socially and culturally acceptable (Smith-Asante, 2015). The importance of environmental sanitation is echoed not only in the United Nations' ratification of sanitation as a human right but also in its presence in the Sustainable Development Goals in 2015 (UN, 2019). Goal 6 of the SDGs charges global leaders to ensure universal access to adequate clean water, equitable sanitation and hygiene by 2030.

Yet, it has been realized that the environmental sanitation Goal of the SDGs cannot be achieved, particularly in developing countries, without recourse to a sound and practicable environmental sanitation management framework that can be translated into practice (Prüss-Ustün et al., 2019). This calls for a comprehensive framework that is sound and sufficient to support an all-inclusive appreciation of sanitation management practices, leading to a workable solution to the problem (Abubakar, 2017). One of the main reasons for the slow growth of improved water and sanitation coverage in developing countries is that some policymakers, practitioners in sanitation practices, and the public have not fully grasped the concept of environmental sanitation practices and the theories behind effective solutions to the threat. According to O'Neil (2015), sanitation can be classified based on some known indicators such as community, ecology and nature of site.

2.3 Community-led Total Sanitation

O'Neill (2015) opines that Community-Led Total Sanitation (CLTS) is an approach to attain behavior changes in mainly communities characterized by poor sanitation conditions through a process of sensitizing the community individuals, leading to natural and long-term rejection of open defecation practices. CLTS is a move toward community sanitation that works without hardware subsidies and that facilitates communities to recognize the problem of open defecation and take collective action to clean up and become "open defecation free".

2.4 Ecological Sanitation

According to Smith-Asante (2015), ecological sanitation deals with an approach, rather than a technology or a device, which is characterized by a desire to "close the loop" (mainly for the nutrients and organic matter) between sanitation and agriculture in a safe manner. Ecological sanitation systems carefully recycle excreta materials (plant nutrients

and organic matter) for crop production in such a way that the use of non-renewable resources is minimized (McGranahan, 2015). Okurut et al. (2015) similarly assert that when appropriately designed and operated, eco-systems provide a hygienically safe, economic, and closed-loop system to convert human excreta into nutrients to be returned to the soil, and water to be returned to the land. Ecosan is also called resource-oriented sanitation. Sanitation encompasses the control of environmental factors that are connected to disease transmission. Subsets of this category are solid waste management, water and wastewater treatment, industrial waste treatment and noise and pollution control (Okurut et al., 2015).

2.5 On-site Sanitation

Tilley et al. (2014) describe on-site sanitation as decentralized sanitation. To them, it is a system where the treatment of excreta or sewage takes place at the same location where it is generated. Examples are pit latrines, septic tanks, and Imhoff tanks. A septic tank and drained field combination is the oldest and most common type of on-site sewage facility, although newer aerobic and bio-filter units exist, which represent scaled-down versions of municipal sewage treatment plants.

2.6 Environmental Management System

The United Nations Environmental Programme defines environmental management as the control of all human activities that significantly impact the environment (UN, 2019). Environmental management refers to decisions and actions concerning policy and practices regarding how resources and the environment are appraised, protected, developed, used, rehabilitated, remediated and restored, monitored and evaluated. To be efficient in managing the environment, institutions must have a good Environmental Management System (EMS) to provide a framework for managing environmental responsibilities in a way that is integrated into overall operations. Environmental Management System (EMS) pertains to the management of an organisation's environmental programmes in a comprehensive, systematic, planned and documented manner. It involves the organisational structure, planning and resource allocation for developing, implementing and maintaining policy for environmental protection.

There is equally the need to have a National Policy/Institutional Framework for Interventions for Environmental Sanitation Management. Over the period, governments have taken steps to initiate practical solutions to nationwide sanitation controversies. Their commitment has been seen in the number of offices and organizations that have been formed in the past years to tackle certain perceived sanitation problems. The formation of ministries such as the Inner-City and Zongo Development and the Tourism and Modernisation of the Capital City was a sign of the government of Ghana's commitment to combating this canker. Consequently, in Ghana, safe and sound environmental protocols are left in the care of these agencies and other environmental management bodies to regulate.

Sound environmental sanitation management systems ensure that appropriate intervention is introduced and implemented to promote behaviour change. Poor environmental sanitation or hygiene also has tremendous economic costs. The health impact of inadequate environmental sanitation leads to several financial and economic costs, including direct medical costs associated with treating sanitation-related illnesses and lost income through reduced or lost productivity and the government costs of providing health services (McGranahan, 2015). Additionally, poor sanitation also leads to reduced income from tourism (due to the high risk of contamination and disease) and cleanup costs. A World Bank country environmental analysis conducted in Ghana has shown that health costs resulting from poor water, sanitation and hygiene are equivalent to 2.1% of the Annual Gross Domestic Product (GDP) (WHO, 2017). The significant economic benefits of good environmental sanitation are not well known; the media often emphasise health benefits, but the time savings and opportunity costs are equally important stories.

Environmental sanitation management ensures that there is a prudent allocation of limited resources tailored to the needs of the people to ensure economic sustainability. On the one hand, healthy people produce more and miss fewer days, and on the other hand, a healthy community is often a more lucrative market for goods, services and investment. Every dollar spent on improving sanitation generates economic benefits (about nine times) that far exceed the required sanitation investments (Kumah et al., 2020). The cost of inaction is enormous. Achieving MDG for sanitation would amount to $66 billion gained through time, productivity, averted illness and death (UNDP, 2015). The record has it that a 10-year 18 rise in average life expectancy at birth translates into a rise of 0.3-0.4 percent in economic growth per year (WHO, 2017). Poor environmental sanitation practices also affect the environment in diverse ways.

2.7 Environmental Protection Agency (EPA)

The Environmental Protection Agency is the leading public body responsible for protecting and improving the environment in Ghana. Its job is to make sure that air, land and water are looked after by everyone today so that tomorrow's generations inherit a cleaner and healthier world. The Environmental Protection Agency (EPA) seeks to ensure environmentally sound and efficient use of both renewable and non-renewable resources, to prevent, reduce, and, as far as possible, eliminate pollution and actions that lower the quality of life; and to apply the legal processes in a fair, equitable manner to ensure responsible environmental behaviour in the country. According to O'Neill (2015), the Environmental Protection Agency is very collaboration-oriented, which weakens its regulatory abilities. There is also a need to update enforcement procedures for sanitation byelaws; for example, some fines are "ridiculously low" and still listed in British currency.

2.8 Ministry of Sanitation and Water Resources

The Ministry of Sanitation and Water Resources is the leading statutory government body responsible for the development and promotion of good sanitation all over the country (MLGRD, 2004). The main goal of the ministry is to contribute to the development of the living standard of Ghanaians through increased access to and use of safe water, sanitation and hygienic practices and sustainable management of water resources.

2.9 Ministry of Local Government and Rural Development (MLGRD)

The Ministry of Local Government and Rural Development is the leading agency in the sanitation sector. It is responsible for creating and coordinating sanitation policy, issuing guidelines on sanitation services and their management, and supervising the National Environmental Sanitation Policy Coordinating Council (MLGRD, 2004). In the model, institutional responsibilities for sanitation are clear, with the Ministry of Local Government and Rural Development (MLGRD) having overall responsibility for formulating environmental sanitation policies.

2.10 Ministry of Environment, Science, Technology and Innovation (MESTI)

The Ministry of Environment, Science, Technology and Innovation exists to establish a strong national scientific and technological base for accelerated sustainable development of the country to enhance the quality of life for all. The overall objective of MEST is to ensure accelerated 24 socio-economic development of the nation through the formulation of sound policies and a regulatory framework to promote the use of appropriate, environmentally friendly, scientific and technological practices and techniques and the intensification of the application of safe and sound environmental practices (MLGRD, 2004).

2.11 Environmental Sanitation Attitudes and behaviour

Defining an attitude is problematic, and there is still no consensus on a definition for it. Also, attitudes are often associated with multiple and even contradictory values (Akintunde, 2017). The concept has therefore been defined in various ways by various researchers, usually depending on their specific theoretical review and the constructs they investigated. Santaboni et al. (2018), for example, perceive attitude as a relatively stable, predominantly learned disposition of an individual towards a specific object (for example, people, things, or ideas). Setty (2019) has also referred to attitude as a way of feeling, learning, thinking, and behaviour to sustain the thought that enforced cleanliness. However, the concept of environmental attitude has been defined in various ways by several researchers based on their specific theoretical reviews and the construct each of them investigated. From the perspective of Levinson et al. (2017), environmental attitude is ultimately about how people view environmental issues, their perspective, beliefs and level of support, including their feelings towards specific people, issues and objects involved. They see environmental attitudes as thoughts and feelings that

encourage us to act as if we dislike or like a person, an object and issues. They further argue that the relationship between human beings and the environment is thus a function of culture. Liu et al. (2020) consider environmental attitude as an interest in a wider related concept, such as understanding human life, including protecting our physical environment.

WHO/EURO (2016) describes environmental attitude as a set of values and feelings of concern for the environment and motivation for actively participating in environmental improvement and protection. It is primarily the virtues that must work in the confinement of the natural surroundings. Environmental attitude is primarily concerned with enduring a combination of motivational, emotional, perceptual and cognitive processes concerning some aspects of our environment (Babaei et al., 2015). It is a characteristic acquired over a long period, and the individual will persist in environmental concern and eventually participate in environmental protection if they have that attitude (Santaboni, 2018). Tang et al (2022) envisaged that environmental attitude ought to be thought of as a relatively stable and predominantly learned disposition of an individual towards a specific object (people, things, ideas or the physical environment). Almazán-Casali et al (2019), on the other hand, explain environmental attitude as tendencies that are expressed by evaluating a particular entity (for example, the environment) with some degree of favour or disfavour.

It can be deduced from the scholarly positions that environmental attitude is a mental state of readiness formed by an individual towards an object or the physical environment and this can be either positive or negative. Nonetheless, this attitude should be directed towards the protection of the environment or improving the quality of the environment. The notion that environmental attitude is an enduring feeling is corroborated by Fishbein et al (1975), who noted that "*environmental attitude is a learned predisposition response in a consistently favourable or unfavourable manner concerning a given object, person or a situation*". Environmental attitude is, in a way, perceived as how to be in proper relationships with one's environment, that is, how an individual shows concern and acts friendly or favorably towards the environment (Musoke et al., 2018). Other authors argue that environmental attitude is the concern one shows towards the physical environment Dunlap et al., 2002). Muammar (2002) posits that environmental attitude is about the perception of values about a given environmental issue. Adams (2014) also views environmental attitude as a learned belief that develops from an individual's beliefs, knowledge and values about the environment and governs action to support or sustain the environment. This means environmental attitude does not deal with favourable or unfavourable feelings one has towards an object or issue alone, but also the nature of human beings and how they can preserve their surroundings. Drawing from the views expressed above, environmental attitudes may also refer to the collection of beliefs, affection and behavioural intentions a person holds regarding environmentally related activities or issues. This implies that environmental attitude has to do with the way a person relates to all the things and activities surrounding him or her.

2.12 Integrated Behavioural Model for Water, Sanitation, and Hygiene

The Integrated Behavioural Model for Water, Sanitation and Hygiene (IBM-WASH) focuses on the ability to promote and sustain behaviour change at the individual, household, community, and structural/institutional levels. The model relies on the contextual, psychosocial, and technological dimensions of WASH practices. The contextual dimension gives the characteristic of the setting, personal, or environment that is, in most cases, outside the range of influence of program activities, but they can affect acceptance of certain products and/or behaviours. The ability to obtain sanitation products, access to enabling resources (such as hand-washing water), socioeconomic, demographic and household features, and the physical environment are examples. The instances where behaviour takes place are dynamic and change throughout the day, as children start schooling, adults go to work, and household members go to the market. The final state of the contextual dimension explicitly addresses these by determining other opportunities or the lack of other opportunities to repeat and continue exhibiting improved behaviour. To understand hand-washing behaviours among school children at home, it must be understood within the context of hand-washing water, soap, and facilities accessible at various schools, workplaces and homes. The WASH framework introduces a simple, adaptable mechanism for understanding WASH behaviours and habit formation that is informed by existing theoretical insights at multiple levels and dimensions (Dreibelbis et al., 2013).

2.13 Psychosocial Dimension of WASH

The psychosocial dimension in this model consists of issues that can influence direct acceptance of introduced sanitation actions. These are taken as behavioural determinants. Disgust is an example that has been used as one of the psychosocial determinants in WASH to foster hand washing with soap and to halt open defecation. In Community-Led Total Sanitation (CLTS), elicitation of disgust at the community level is a key step in mobilizing support for sanitation improvements. Social norms and/or social desirability, and aspirations are extensively acknowledged to affect WASH practices as well as play a pivotal role in the Diffusion of Innovation Theory. Knowledge and the perceived threat of illness, particularly diarrhoeal/cholera diseases, are often relevant aspects of behaviour change promotion strategies. (Dreibelbis et al., 2013).

2.14 Technology Dimension of WASH

In this context, the issue of consideration is how the introduced technology can influence behavioural outcomes. Technology includes its placement because sometimes the location of the technology that was expected to facilitate good behaviour toward sanitation practices may inhibit, instead of enhancing, positive sanitation practices. Placing soap or water at a convenient location for hand washing was more relevant to improved hand washing practices following fecal contact (Dreibelbis et al., 2013).

2.15 Rational Decision-Making Model of WASH

This model, as it is known in organizational behaviour, is designed for making logically sound decisions. It is a multi-step model that logically begins with studies into the existing situation to identify the challenge and determine the solution. This is one of the models that can be used in determining sanitation problems in particular localities and trying to find out the desired solutions for such environmental problems.

2.16 Consumer Led Aspirational Sanitation Services (CLASS) model

This model considers people's aspirations as the major focus and proposes that these aspirations become the beginning point, rather than conventional pit latrine alternatives designed by experts being the starting point for sanitation services development. The model acknowledges many challenges associated with it. People's aspirations could be diverse and hence, the difficulty in tailoring them for a comprehensive sanitation development plan, on one hand, and sometimes the contrasting views between the expert thinking and the local people's thinking regarding sanitation planning processes. Of the models that can be used in determining sanitation problems in particular localities and trying to find the desired solutions for such problems, given the circumstances of the community in question.

2.17 WASH Map Model

This model uses social media and tools for mapping to gather data on water and sanitation. Important data on sanitation coverage and occurrences of open defecation are collected and mapped. The collected information can then be used to instigate communities and /or decision-makers to engage in action, taking community-led total sanitation approaches as an inspiration. This is a model that can easily be used in urban areas but is exceedingly difficult to operationalise in rural areas.

2.18 Progress Linked Finance (PLF) model

The PLF model is designed to provide incentives and to give support to water, sanitation and hygiene (WASH) service providers to meet the needs of low-income consumers in a financially sustainable manner. In this model, multilateral financing institutions commit to providing concessional finance for a stated time set during agreement with urban WASH service providers. The urban WASH service provider would receive the agreed financial support after being able to demonstrate commercially viable service delivery to poor communities and having built its capacity to a level of readiness for scale-up of services to low-income consumers (WSUP, 2014).

The PLF model proposes, among other models, the use of the Integrated Behavioural Model for Water, Sanitation, and Hygiene (WASH), which is built in the form of a matrix that has three dimensions (the contextual dimension, psychosocial dimension, and the technological dimension), which appears in the column. As the three dimensions work together, they reflect the notion of shared determinism in "Social Cognitive Theory", which defines reciprocated interfaces among the individual, the

behaviour, and the environment in which the behaviour is practiced (Dreibelbis et al., 2013). Also, five aggregate levels (rows) that are like levels in "multi-level models" are identified. These include: the societal/structural level that are general organisational, institutional, or cultural factors that influence behaviours in each of our three dimensions; the contextual, psychosocial, and technology dimensions; the community level includes the physical and social environment and the formal and informal institutions that form personal know-how; the interpersonal/household level shows relations among persons and other people they strongly associate with, such as household members, friends and neighbours; the Individual Level which describes socio-demographic factors such as age, sex, income and level of education; the final level in this model is the Habitual Level. This level is nested within the individual.

3. Methodology

The multiple case study design was adopted for the study because it tends to maneuver between cases, exploring and analyzing them based on diverse contexts for a better understanding of the phenomenon under investigation. To provide a more comprehensive understanding of sanitation-related issues across professional spaces, a qualitative research approach was employed. Furthermore, the approach was preferred because it supported the researchers' focus on drawing meaningful conclusions regarding the nature of environmental sanitation intervention in the Birim Central Municipality. The population of the Municipality according to the 2021 population and housing census stands at 76,302 with 36,474 (47.8%) males and 39,828 (52.2%) females (GSS, 2021). The target population for the study consisted of all residents above eighteen years old living in the Birim Central Municipality. The accessible population, however, comprised students, health professionals, teachers, sanitation officers, commercial drivers and traders residing in Birim Central Municipality. The study made use of two sampling techniques, namely convenience and purposive sampling techniques. The convenience sampling technique was used to select the Birim Central Municipality from the other districts (North and South) in the Birim vicinity. In other words, geographical proximity and availability of residents informed this technique choice. A purposive sampling technique was used in choosing twenty-two (22) participants who constituted the final sample for the study. Participants were purposively stratified. That is, they were placed in groups based on shared characteristics. Priority was given to participants' occupational status, geographical locations and educational status. Two primary data collection instruments were employed for the study: a semi-structured interview guide and an observation guide. The semi-structured interview guide was used to solicit views from sanitation officials (Environmental Protection Agency [EPA] representatives, Municipal Environmental Sanitation Officer), health professionals, traders, teachers and commercial drivers on the status of environmental sanitation intervention in the municipality. Their views were obtained exclusively in a face-to-face interview. The observation guide was, on the other hand, utilised in monitoring the nature and status of

environmental sanitation interventions with respect to their effectiveness in the municipality. This instrument was used during field and on-site visits to participants and some selected places in the study area. Responses obtained from the interviews were recorded and played back to participants to confirm their respective statements in the recordings. The Otter AI software was used to transcribe all views recorded. Transcripts retrieved were subjected to deductive, inductive, line-by-line and selective coding. Where patterns were identified, the codes were merged and categorized, and themes were generated afterwards.

4. Findings and Discussions

After seeking the views of sanitation officials, commercial drivers, health workers, teachers, students, assembly members and traders on the subject of sanitation intervention in the municipality, the following themes were generated from the responses: solid waste container, bye laws and punishment, sanitation management, collaboration, monitoring, personal hygiene, education, dump site demarcations, drainage and sewage interventions and community commitment. Sample expressions of participants in relation to sanitation interventions are captured under each of them.

Generally, during interaction, it was disclosed that the various environmental sanitation measures put in place to address the problem of poor sanitation were not yielding the desired results. Participants in their response claimed that the identified interventions have not been able to address poor environmental sanitation situations in the Birim Central municipality. There was an admission that there are indeed environmental sanitation interventions put in place in the municipality. It was found that the interventions were geared towards sanitation management. The position of those interviewed suggested that if residents religiously adhered to the interventions, it would go a long way in managing poor sanitation challenges in the municipality. To analyze the data collected, a graphically simplified thematic network is generated and displayed at the end of this research question analysis to represent all the themes to be discussed.

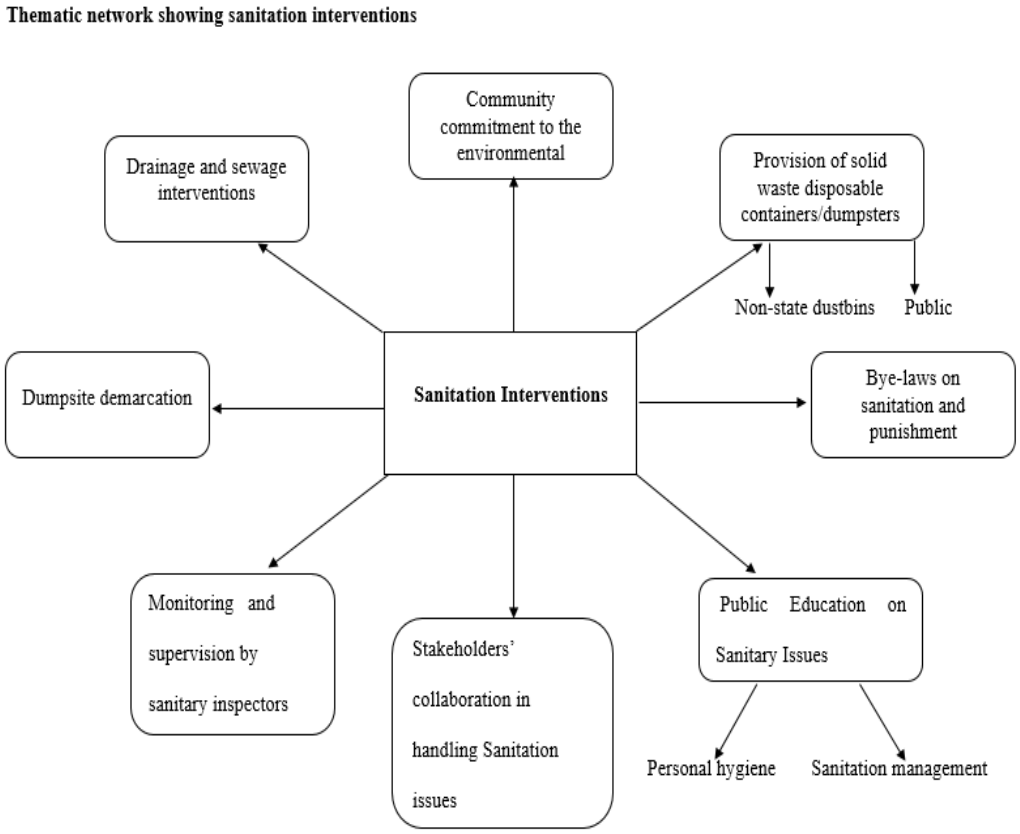

Figure 1: Thematic network showing the status of environmental sanitation interventions

4.1 Community commitment to environmental sanitation

A municipal sanitation officer and an assembly member admitted that there are measures in place to control sanitation practices in the municipality. They mentioned that the assembly is doing its best through a series of initiatives to shape the attitudes and behaviours of people living in the municipality on environmental issues. The officer had this to say:

> R2: "*I can say that we are doing our best to see to it that people exhibit the desired sanitation habits. The assembly has a lot of measures in place to help fight environmental sanitation problems in this area. The problem, however, has to do with the willpower of the surrounding communities to also assist in maintaining a clean, safe and good environment.*" (Sanitation officer 2)

The assembly member reiterated in this manner:

> R17: "*The assembly is trying, but we as people in this neighbourhood are not helping them at all. Although the existing initiatives by the officers are not enough, the readiness of residents to help in ensuring that we abide by sanitation rules and regulations is not reflected at its best.*" (Assembly member 1)

Meanwhile, a second-hand cloth dealer lamented over the inadequacies of these measures. She expressed deep concerns for residents' commitment to assisting in clamping down on undesired sanitation practices in the area. She further cited that the level of commitment in certain communities is not enough to augment the effort of the assembly in addressing the poor environmental sanitation issue in the municipality. The degree of commitment among communities to ensuring proper environmental sanitation was found to differ. The second-hand cloth dealer gave an intriguing revelation about community members' attitudes. She claimed that commitment levels are highly unrelated across communities, especially when it comes to the dealings of sanitation. She said this:

> R11: "*In some places, they are serious about keeping their surroundings clean. This is not so in other places I know. There are areas like Joduro, Nkwantanum, and Jamaica where filth is not entertained no matter who you are. But there are also places that, of course, you know that I cannot name them. They just do not care what you put out there. You can leave carcasses of animals; no one dares to talk! It is a free zone!"* (Trader 3)

The responses obtained indicate that community members lack a sense of commitment to addressing poor environmental sanitation issues in the municipality. It was realized that the extent to which some communities tend to be on a look-out on sanitation problems is apparently not the same as that of other communities. The findings seem to suggest that community commitment to tackling poor environmental sanitation practices does not adequately reflect the assembly's urge to combine same phenomenon through its proposed and existing interventions. It can therefore be inferred from the findings that the lack of commitment among members of communities in the Birim Central Municipality renders sanitation interventions highly ineffective, thereby piling up sanitation problems in the area. These findings align with those of Lawrence et al (2016), who report that it requires whole communities to stop defecation in the open and hygienically contain all fecal matter.

4.2 Provision of Solid Waste Disposal Containers/ Dumpsters

Another intervention cited was the provision of solid waste containers by the assembly. Participants disclosed that the assembly ensures that there are waste containers mounted at various points in the municipality. It was stated that the assembly not only ensures that solid waste containers are provided to residents, but it also sees to it that residents make available trash bins at home and at various places of work. The direction of participants' responses paved the way for two sub-themes to be generated: public and private.

4.2.1 Public

A food vendor revealed that the assembly has been rendering public services by distributing solid waste containers at vital areas such as the market squares, roadsides,

public institutions, offices, among other places. She cited that the assembly executes these services through private companies. The food vendor disclosed this:

> R10: "*That container over there is for the assembly. There are equally big waste containers in other areas. You will see some of them on the main streets, from Attafuah School Junction to Old Town and around the Government hospital. Although there are not many, at least some have been made available for some of us trading in this market.*" (Trader 2)

Nonetheless, a phone dealer showed a certain level of dissatisfaction regarding how waste bins are distributed and mounted at corners in the municipality. He registered his displeasure over the allocation and distribution of solid containers in this manner:

> R12: "*I wish I knew the criteria they use in allocating and mounting the dustbins. Where the containers are in dire need, you will not see any but areas where the containers seem surplus to requirement, that is, where you see them scattered all over.*" (Trader 4)

4.2.2 Private

Apart from the assembly's commitment to providing waste bins to households and the public through private companies, the sanitation officers disclosed that the Assembly also entreats households and a section of the public who do not benefit from such distributions for some reasons to make available their own waste collection containers to deal with their own waste. The officers mentioned that, upon routine checks on household sanitation, shops, marketplaces, lorry parks, schools, churches, and corporate establishments, among others, they recommend that community members utilize other sanitation services rendered by people other than the assembly. Nonetheless, some officers were not at peace with the quantity of waste containers provided and stationed at home and other places by residents, as well as the rate at which they utilize the services of private waste collectors. One officer had this to say:

> RO2: "*It is always sad, especially when you get to a house where there are no waste containers. I can tell you for sure that several houses in this municipality do not have enough waste bins. You visit a house with a comparatively large occupancy rate, but sadly, the number of dustbins there is nothing to write home about. You can clearly see that they do not have people taking care of their waste. It is very unfortunate. What can you do about it? We only asked them to try and get some dustbins.*" (Sanitation Officer 2)

The responses gathered suggest that the provision of solid waste containers is a core component of the Assembly's intervention to ensure proper environmental sanitation in the Birim Central Municipality. The findings indicate that aside from the distribution role played by the Assembly, it also offers advice and recommendations on how and why residents should secure their personal waste containers without relying on the Assembly. While residents were not very enthused with the distribution role of the

Assembly, especially at certain crucial places, sanitation front-liners likewise expressed displeasure in residents' reluctance to assist by providing their own waste containers to manage waste generated. The responses obtained, therefore, tend to indicate that solid waste containers provided by the Assembly appear highly inadequate considering the occupancy levels of households in the municipality. This, according to the findings, has compelled residents to either seek the services of private waste managers or acquire solid waste containers of their own to augment this distribution role of the Assembly. Based on the findings, it can be inferred that the provision of solid waste containers as a sanitation intervention by the Assembly tends to be comparatively ineffective in the Birim Central Municipality since residents will have to augment the distribution role of the Assembly. These findings conform to Seah's and Addo-Fordwuor's (2022) study, who report that municipal and metropolitan assemblies assume the provision of domestic solid waste containers and communal refuse containers as a priority in the management of municipal and metropolitan solid wastes.

4.3 Byelaws on Sanitation and Punishment

Another sanitation intervention mentioned during the interview hovered around the establishment and formulation of sanitation rules, regulations and bylaws. A phone dealer, recounting his experience, acknowledged that the Assembly has systematized measures that deal accordingly with environmental sanitation offenders. To him, these codes are simply a way of ensuring that even without the Assembly directly observing, individuals demonstrate environmentally appropriate behaviours and attitudes. He asserted that the assembly has varied environmental sanitation laws in addition to its bylaws in its books. The phone dealer shared this experience accordingly:

> R12: "*I won't lie to you, my brother. If you have not been caught, you are tempted to say that there is no law. I know what I'm saying. I have been charged before, sent to court by these inspectors for choking my own gutter. I thought it was a joke, but it was real. I found myself in the witness box right here in Oda. They have laws that punish people who do not keep their places clean. As I said, I have lived and experienced it.*" (Trader 4)

A student seemed not to be content with the consequences attached to sanitation offences. He lamented that fines given to those found culpable are not damaging enough to deter culprits and potential offenders from doing what needs to be done as far as good environmental sanitation practices are concerned. This is what the student said on sanitation intervention:

> R14: *Are we preventing the problem or encouraging people to continue doing it? Do you have any idea how much it costs to go for malaria and typhoid treatment? Hefty fines need to be imposed on them. This will deter them from repeating such actions.* (Student 2)

The responses obtained tend to portray that the Birim Central Municipal Assembly has established sanitation laws as a way of intervening in environmental sanitation practices in the municipality. The findings suggest that although there are myriad sanitation laws and aligned punishments, implementation of the laws remains a challenge in the municipality. Poor implementation of sanitation laws has been found to walk together with scarcity of sanitation inspectors vis-à-vis sanitation offences, as well as the nature of the judicial system. From the findings, it can be deduced that there is sanitation laws established to control sanitation practices and environmental behaviours and attitudes of residents in the Birim Central Municipality. These findings confirm the MLGRD (1999) report, which states that the sanitation policies entrust in the Assemblies the power to promulgate byelaws and regulations to help in their environmental sanitation management process.

4.4 Public Education on Sanitary Issues

Educating the public on environmental sanitation was noted as one of the important preventive measures designed by the Municipal Assembly in dealing with environmental sanitation practices among residents in the municipality. Officials from the EPA and the municipal assembly stated that the municipal assembly has been organizing conferences and seminars on safe sanitation practices. They added that they also make use of social media handles, radio services, flyers and mobile vans to sensitise the populace on good environmental sanitation behaviours, especially in personal hygiene and sanitation management. The officers had this to say:

> R1: "*We use the information mobile van to go around the market square and other areas to let people know the need to keep the body clean. You know, these vans have megaphones that go a bit far, so we use this to reach them. As you may be aware, charity, they say, begins at home. What this means is that self-cleanliness reflects a clean environment. Because of this, we prioritise the teaching of personal hygiene seriously.*" (Officer 2, [EPA])

> R2: "*As you may be aware, it is our duty to educate the public on sound environmental sanitation practices, such as how to dispose of safely generated refuse, keep good and healthy surroundings, among others. We do this very often. We visit residences, churches, mosques, schools, shops and market grounds to give this kind of education. We let them know the various appropriate ways to handle waste, be it liquid or solid waste.*" (Officer 2, [Assembly])

The responses gathered suggest that the municipal assembly devotes time to educating people in the municipality on proper sanitation management practices. The findings indicate that sanitation officials have avenues of meeting residents in the municipality with waste treatment and management (sanitation management) information, even though they (avenues) tend not to be overly exhaustive. It can be

deduced from the findings that the educative role of the Birim Central Municipal Assembly as a sanitation intervention appears comparatively effective and multi-dimensional since varied platforms are utilized to reach residents, and crucial angles of sanitation controversies about them are targeted. Hence, there is a corroboration between these findings and the position of Safo-Adu (2019), who maintains that the Assembly organizes regular visits to schools and radio stations in Metropolis, municipalities and districts to engage students and the public to rekindle their interest in proper waste management and other related sanitation practices.

4.5 Stakeholders' Collaboration in Handling Sanitation Issues

There was a consensus among the officers regarding the collaborative role of the Assembly with other stakeholders of sanitation and health in the municipality. They were positive about this role, citing instances where they joined forces with other institutions to promote proper sanitation and health practices in some areas in the municipality. Officers from both the Environmental Protection Agency (EPA) and the Municipal Environmental Sanitation Office disclosed that they have been working closely with households, key members of communities, the Health Directorate, schools, among others, to address sanitation challenges holistically. The EPA officers shared their experience appropriately, with one citing this:

> R3: "*Normally, when there is a problem, it is reported to us. Sometimes, the offenders or those with problems will visit us to launch their complaints. We do our investigation, and where there is a need to contact MHO, we do that. Last year, around August, there was a burst pipe at Attafuah Senior High School, and some households around there came to report. We made sure the problem was fixed, and it had been fixed. Occasionally, they come and report, and we collaborate with the MHO, and where there are difficulties, we put our heads together and solve them. There was this lady at SDA, she rears cattle, and her ranch was established behind somebody's building. This gave some foul smell, and there was a report by the community. We came together and made sure that the problem was solved. So, it is all about collaboration and education."* (Officer 2, [EPA]).

> Another officer had this to add:

> R4: "*Yes, that reminds me. I believe you know the municipal hospital. Last year, their wall broke down. Unfortunately, that wall was where the mortuary was situated. So it happened that there was an overflow from the mortuary into the adjoining streets, so the occupants there came and made a complaint. We were able to impress upon the Assembly and the hospital management to fix that problem. We made them fix the wall, and that prevented the overflow. This is among the few collaboratives works we do as an environmental health institution."* (Officer 1, [EPA])

The responses gathered indicate that beneath the many interventions to good sanitation practices in the Birim Central Municipality is collaboration. The findings suggest that collaborating or working together with stakeholders of environmental sanitation and health is a way the Assembly ensures proper environmental sanitation in the municipality. A cursory look at the findings further indicates that the collaborative role of the Birim Central Municipal Assembly as an environmental sanitation intervention tends to be effective. Hence, an inference can be made that collaboration as a sanitation intervention cannot be overlooked as far as good environmental sanitation practices in the Birim Central Municipality are concerned. These findings can be reaffirmed by Seah and Addo-Fordwuor (2022), who maintain that to ensure sustainability in solid waste management in urban areas, there must be collaboration between the government, private sector and residents.

4.6 Monitoring and Supervision by Sanitary Inspectors

Among the myriads of sanitation interventions identified were monitoring and supervision. It was pointed out by the sanitation officers that the Assembly embarks on frequent visits to residents, workplaces, commercial centers, lorry stations, food joints, marketplaces, places of worship and schools to oversee sanitation practices and the status of environmental sanitation in these areas. A food vendor affirmed this in an experience she shared on how sanitation officials used to make follow-up routine checks on her sanitation behaviours and attitudes after she was fined for sanitation offenses. One of the officers said this:

> R1: *One of our core mandates is to monitor what people do. I mean, how they conduct themselves hygienically in and out of their homes. We usually go out there to see what people are doing to keep their homes, themselves and the outside environment clean. Officers from the Assembly go round the markets, taxi ranks and stations, schools, restaurants and other places to check sanitation conditions there.* (Officer 1, [Assembly])

The food vendor had this story to tell:

> R10: "*The Assembly people have been coming here from time to time, ooh. I can say that I see them here twice every week. You will see them today in this house and the other houses the next day. They are really having close checks on us. You know something? I was processed for court over certain sanitation offenses. I pleaded with them, and I was given a spot fine. Even after that, they were still coming to my place almost all the time to find out how I was comporting myself hygienically.*" (Trader 2)

Despite the food vendor and the officials admonishing monitoring and supervision as effective roles of the Assembly, some drivers operating at the Oda Main Station, on the contrary, believed that sanitary monitoring agencies, including the

Assembly and the Environmental Protection Agency (EPA), have been underutilizing this role. One of the drivers made this statement:

> R22: "*I really do not see sanitation inspectors as I used to. I admit that there are problems with this monitoring and supervision exercise. However, for me, I will blame the Assembly. They are too lenient with offenders. So, even take meagre bribes and let culprits. How do you expect sanitation issues to be tackled with such an attitude? Those people at the EPA, I don't even know what they do! You don't see them doing anything.* (Driver 2)

The responses gathered indicate that the municipal assembly is intervening in sanitation controversies through monitoring and supervision. The findings tend to suggest that even though the Assembly is doing its best to tackle environmental sanitation issues through its role as supervisors and monitors in the municipality, there is a need to intensify this exercise. Furthermore, it appears that officers are willing to execute their function effectively as sanitation inspectors, but due to the existence of certain unfavourable structures, execution of such tasks tends to be difficult. Based on the findings, a deduction can be made that monitoring and supervision of sanitation conditions in the Birim Central Municipality exist; however, they need to be intensified. These findings conform to the assertion that strict monitoring and enforcement remain a key strategy in managing sanitation properly in community level (Seidu, 2018).

4.7 Drainage and Sewage Interventions

Construction of drainage and sewage systems was identified among the roles the Assembly plays in ensuring environmental sanctity in the municipality. A teacher said that the government or the municipal assembly is not constructing new drainage and sewage systems, except for the few ones that were constructed during the construction of the main roads in a few areas in the municipality. He said this with emphasis:

> R16: "*There have not been any new gutters constructed. The only drainage or gutter here is the one that was constructed during the construction of the road. You know, it is the duty of the Assembly to ensure that proper gutters are dug in the communities to facilitate the free flow of liquid waste. Unfortunately, no new gutters have been constructed.*" (Teacher 2)

Meanwhile, the EPA officials revealed that certain areas in the municipality have new and standard drainage and sewage systems installed either by the Assembly or community members. Regarding this, there was an admission by an officer that there are levels of drainage and sewage systems installed in the municipality, even though, to him and others, this cannot be described as the best, especially in some areas in the municipality. One EPA officer had this to say:

> R3: "*Oda is a nice town, and the drainage system is perfect, especially in Community 6. It is well planned. You don't see open gutters around and because of the nature of the buildings there, each house has a septic tank that serves the people there. Oda has an old and a new town. Since the old towns had old planning, I don't think they have good drainage and sewage systems.* (Officer 1, [EPA])

It appears from the responses gathered that drainage and sewage systems in the Birim Municipality differ depending on geography. Regardless, the findings suggest that the Assembly's effort in constructing and installing drainage and sewage systems in the municipality has not been adequate since drainage and sewage systems remain poor because of facility structure, obsolete and residents' attitudes and behaviour. These findings align with Kyere et al. (2019), who iterate that most cities presently have drainage facilities, but the drainage lines are not in good condition.

4.8 Dumpsite Demarcation

Dumpsite allocation was featured among the plethora of measures put in place by the assembly to tackle sanitation in the municipality. Sanitation officials cited that the assembly does not have a dumping site for the municipality, despite acknowledging that it is part of their duty as an assembly to ensure that residents get a demarcated area to dump their trash. The officer cited that the municipal assembly relies on the neighbouring district's dumping site, which, before their separation to become a district, was part of the municipality. This is what a sanitation officer narrated:

> R2: "*If I may say, it's the Assembly's responsibility to ensure that waste is disposed of well. However, the Assembly is having some challenges and sometimes there are no places to dump the refuse because we don't have a sanitary site. Since there are no dumping sites, we are forced to place our big containers wherever we find available or assume convenient. Interestingly, people do not even drop their refuse inside them. Some people dump these dead animals into the containers, leaving a foul smell not only in the container but in the entire area…We have lost our disposable site to Manso, so currently we do not have a final disposable site."* (Officer 2 [Assembly]).

The sanitation officials stated further that the lack or absence of a dumping site for the entire municipality has left the municipal assembly with no other option than to withdraw most of their waste containers from essential spaces in the municipality, since they are not getting places to dump them when they are full. Nevertheless, an assembly member held a different view, claiming that some selected areas have dumping sites in the municipality. One of the sanitation officers had this to say:

> R1: "*Yes, there is no place here in Oda to dump large rubbish. Where we used to dump refuse is no longer within our jurisdiction. So technically, we don't have a dumping site now. Perhaps the reason why we do not have any dumping site of our own has to do with*

the money involved in constructing one. Besides, this place has developed remarkably; therefore, locating a big piece of land to serve such a purpose is extremely difficult. There is no land!" (Officer 1, [Assembly] male)

With emphasis, the assembly member expressed this diverse view:

R18: "*We have about three places at Aboabo where we normally dump refuse.*" (Assembly member)

The officers' positions regarding the provision of a dumping site as an environmental sanitation intervention seem to have towed separate lanes. Considering the responses, however, it appears that dumping sites for residents in the Birim Central Municipality tend to be inadequate, especially if the population of residents together with the wastes they generate are carefully considered. Based on the findings obtained, a deduction can be made that the Birim Central Municipality is encountering challenges relating to dumping sites, thereby rendering the Assembly's effort to intervene in this regard futile. These findings align with the assertion of Kyere et al. (2019), who maintain that constructing new landfills may be difficult due to the scarcity of land, an increase in land price and demand for a better disposal system.

5. Recommendations

1) The Birim Central Health Management Team should consider organizing periodic sanitation health education at social gatherings, schools, marketplaces and community durbars on the need to live in a healthy environment and practice proper methods of waste disposal.
2) All media houses located within the Birim Central Municipality should be encouraged by the Municipal Assembly, the EPA, the Health Directorate, and opinion leaders such as sub-chiefs, pastors, imams, and community front liners, among others, to advocate and broadcast programs geared towards the needs and importance of residents keeping their environment clean.
3) Sanitary inspectors in the Birim Central Municipality should be empowered by the Municipal Assembly through the Ministry of Environmental, Science and Technology and the Ministry of Local Government and Rural Development with logistics to help them discharge their duties of educating, arresting and enforcing the laws to keep/improve the environment clean. Again, a considerable quota must be allocated to the recruitment of sanitation inspectors.

Conflict of Interest Statement
The authors declare no conflicts of interest.

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