Abigail Z. K FAHNBULLEH

THE IMPACT OF SANITATION FACTORS ON WASTE MANAGEMENT (HUMAN EXCRETA)

M.Sc. THESIS

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NEAR EAST UNIVERSITY

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THE IMPACT OF SANITATION FACTORS ON WASTE MANAGEMENT (HUMAN EXCRETA): A CASE STUDY IN GIBI, MARGIBI, LIBERIA

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Approval

We certify that we have read the thesis submitted by Abigail Z K Fahnbulleh titled **"The Impact of Sanitation Factors on Waste Management (Human Excreta): Case Study Gibi, Margibi, Liberia"** and that in our combined opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Educational Sciences.

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Declaration

I hereby declare that all information, documents, analysis and results in this thesis have been collected and presented according to the academic rules and ethical guidelines of Institute of Graduate Studies, Near East University. I also declare that as required by these rules and conduct, I have fully cited and referenced information and data that are not original to this study.

Abigail Z. K Fahnbulleh

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Abigail Z. K Fahnbulleh

Abstract

The Impact of Sanitation Factors on Waste Management (Human Excreta): Case Study Gibi, Margibi, Liberia

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The failure to evaluate the health consequences of insufficient sanitation reporting in communities resulted in a large increase in the burden of illness from inadequate sanitation. So, based on this background, the inquiries aim to measure the impact of sanitation factors on waste management (human excreta), using the Gibi district of Margibi County, Liberia, as a case study. A quantitative research design was used with 384 respondents, including youth from ages 18 to 30 and adults. Data was collected through an open-ended, structured questionnaire via the Kobo app, while a Microsoft Excel sheet was used to analyze the data.

The findings show that 72% of the respondents lack knowledge on sanitation or waste management, 82% agree to promote the use and production of urine and feces for organic fertilizer, 47% of respondents generate waste but find it very difficult to properly dispose of it, 72% do not separate their waste due to a lack of knowledge, nearly 54% lack a sanitary and private toilet, 46% use the environment to ease themselves, and 88% also say that they believe that open defecation or waste in general have no health effect on them. 70% of the population stores waste in open containers to be eventually buried in the earth, and 76% of them said "yes." Waste in general has increased due to population growth. However, this study concludes that sanitation and waste management in Gibi District and Margibi County have a negative impact on people's health and the community at large. Additionally, the factors affecting sanitation and waste in Liberia and other underdeveloped countries have always been a rising issue. Therefore, it is recommending that more studies need to be done in the area of human excreta.

Key Words: human excreta, open defecation, sanitation waste management, waste

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List of Abbreviations

CLTS: Community Led Total sanitation

LDC: Lease Developed Countries

MNE: Ministry of National Education

OD: Open Dumping

ODF: Open Defecation Free

SWM: Solid Waste Management

TRNC: Turkish Republic of North Cyprus

CHAPTER I
Introduction

Solid waste generation happens to be one of the ultimate demanding concerns that creation has, both in countries that are classified as emerging; least established, and industrialized economies. Increment in solid waste generation has been thoroughly substantiated to be related to birth rates, higher industrial progress, and increased standards of living (Menikpura, 2012; Chi, 2015). Overgrowing solid waste cohort places a huge weight on the now exploited waste management systems (Medina, 2011; Troschinetz & Mihelcic, 2009), and if rubbishes are not managed, social conflicts with I got nothing to do with this attitude might probable surface and conquer.

In addition, solid trashes, if inadequately managed or untreated, it can lead to many severe environmental consequences, to name a few, accumulation of methane gas through anaerobic dreadful conditions of biological discarded mechanisms and its successive effects on climate change and universal heating, increasing prospect of energies, the creation of leachate causing groundwater contamination, and the beginning of vector causing diseases.

Waste generation is a natural by-product of life; we generate waste every time we buy, eat, sleep, exercise, go to the bathroom, or throw something away. Waste structure also refers to gathering or arranging of waste to be discarded, recycled, or reused (Dhokhikah & Trihadiningrum, 2012; Al-Khatib et al., 2007; Bai & Sutanto 2002; Troschinetz & Mihelcic 2009; Guerrero et al., 2013; Henry et al., 2006). While documents on developing countries are scarce in the collected works (Gurbrügg 2003; Glawe et al., 2005). Waste arrangement also rests on trade and industry growth, with other dynamics such as geographical setting, energy cradles, climate, and cultural norms also swaying the arrangement of the waste stream (World Bank 2012) that are very important to be taken into consideration.

Illegal dumping, unlawful discarding only because assemblages are insufficient, or inaccessible bins, are some of the factors influencing improper waste disposal (Badgie et al., 2009; NCON-PGR, 2009). Inadequate waste collection services in other least develop countries also engage in illegal dumping and burning (Dias et al., 2014; ADB 2014; Edjabou et al., 2012; Timor-Leste's State Secretariat for Environment 2014; Badgie et al., 2009; NCON-PGR 2009). Illegal waste

disposal can have grave ecological and wellbeing consequences due to the formation of leachate and methane (greenhouse) gases, as well as health consequences due to breathing vectors with the potential to cause diseases (Medina 2011; Lopes et al., 2010; The World Bank 2012; Karak et al., 2012; Ferrari et al., 2016).

Over the years, numerous procedures have been engaged for waste management (recycling, composting, anaerobic digestion; thermo-chemical waste-to-energy technologies such as incineration, gasification, and pyrolysis, and final waste disposal such as landfilling are all examples of waste-to-energy technologies) (Mukherjee et al., 2020). While some of the practices in developing countries are unsustainable and unfavourable, they do represent the most acceptable technique of management, as further reported in the waste management graph, waste dumping is the least desired option and is generally ordered as healthy landfilling and open dumping. Healthy landfilling is the dumping of unused products in a controlled environment (Diaz et al., 2005), whereas open dumping is the throwing away of unwanted things in an abandoned environment and the abandoned discarding of wastes in dumping sites without eco-friendly safety control, where the risks of fires or vectors, contamination of the underground water, and the blowout of vector tolerated illnesses are advanced (Medina 2011, Lopes et al., 2010, The World Bank 2012, Karak et al., 2012). This method of waste management is also widely used in other unindustrialized nations such as Ethiopia (Getahun et al., 2012; Sweepnet 2014; ADB, 2013; Bureau of Statistics, 2013).

Recycling refers to operations that reprocess waste into a product, material, or substance for the original or other purposes (Bundhoo, 2018). Recycling is practiced in most developing countries, but at a lower rate (Waste Management World, 2011). Composting is an aerobic decay of living things to yield an end artefact for soil conditioner or for agricultural purposes (Liang et al., 2003). As observed from Bundhoo (2018), the biological segment of solid wastes in countries that are not developed averages 52% and it is one of the utmost appropriate waste management results for developing countries because of the extraordinary organic segment of solid waste. despite its widespread use in many LDCs (ADB 2014; Dias et al., 2014; Barre 2014; Sinha, 2012; Twesigye 2011).

Anaerobic absorption is a natural dreadful condition of organism without oxygen to create biogas and digestion (Rahman et al. 2014) well matched for action gratified as fertilizer that can be used for agricultural purposes. Some other waste

treatment energy strategies for the warm air cure of solid wastes, in addition to anaerobic digestion, include incineration, gasification, and pyrolysis. It was comprehended that the deficiency or inadequate capital brutally hinders the consistency of rubbish assortment (Ferrari et al 2016; ADB 2014; Mizero et al, 2015). While waste is increasing at its peak, its collection remains to be a foremost issue in lots of underdeveloped countries (Isugi & Niu, 2016).

The absence of suitable structures, such as environmental sites and good road connectivity for collection and disposal, also hinders the route in several underdeveloped countries. Distance to community bins has also been reported as the most important factor in homes resulting in illegal dumping (Dias et al., 2014; Badgie et al, 2009; Forouhar, 2011). The lack of enforcing legislation is critical, as it leads to residents engaging in open burning and illegal dumping of waste at any given time, causing environmental pollution (Nnorom, & Osibanjo, 2008). Moreover, the deficiency of regulations means that ghettoization practices cannot be obligatory at the foundation and the absence of fees or taxation indicates that a significant source of funding has not been accumulated.

Due to a dearth or narrow courage of health awareness or education on the negative and positive adverse health and environmental consequences of prohibited dumping and not built up burning of waste, individuals existing in these countries frequently resort to these practices (Ferrari et al., 2016), and as a result, open dumping has given birth to so many diseases, and waste burning is also one of the major causes of carbon release into the atmosphere, causing an increase in the hotness of the earth.

According to a World Bank study conducted, waste in Liberia is classified into four types: radioactive, infectious, general, and hazardous waste (UNDP 2006; Szu-Chich & Chung-Min 2006; NSWMP 2011; Burton et al., 1993). Similarly, the United Nations Environment Programme (UNEP) discovered that waste is classified into three types: organic (food scraps, papers, cardboard, and wood), inorganic (plastics, cans, and bottles), and electronic waste (metals). In general, waste is composed and cared for to some extent in Liberia. Unsustainable solid waste management practices have resulted in disease causing vector breeding sites, land degradation, illnesses, and land valuation. Moreover, most Liberian cities have no waste separation growth or execution plan because storage and sorting systems are not in place. As a result, these provisions are composing, dangerous, recyclable, not

harmful, etc. and are always varied. So this state has led to the gathering of waste abandoned near rivers or river banks, street corners, swamps, and drainages, thus causing public health and environmental threats (David et al., 2019).

Waste transportation in Liberia is typically carried out by commercial creations, institutions, or households, and waste is collected and stored in steel drums, open spaces, plastic gears, and bins without cover at various street corners to be transported to dump sites or landfills (The World Bank Report 2019). Municipal solid waste transportation is handled by municipal establishments in urban areas, in collaboration with subcontracted individual companies. Transportation, lack of infrastructure or road networks, finance, taskforce, and education are some of the foremost challenges that confront the waste management system in this sector of the country, as they do in other developing countries, and these challenges include a lack of specific collection trucks, waste category, recyclables, distance to waste sites, collection time, route, insufficient stations, and other factors that have resulted into waste being improperly disposed of (David et al., 2019).

The practice of indecent withholding of human waste or open defecation (hereafter, OD) assists in carrying pathogens causing diarrheal diseases. 1.7 billion Diarrhea cases is been projected yearly, initiating about 800,000 passing amongst children age 5 and below inclusively (Ayalew et al., 2018). It is predicted that 15% of the global population, or 1.1 billion people, are still involved in OD (Galan et al., 2013). According to national surveys, a large proportion of OD practices involve humans emptying their bladders in other open spaces such as water bodies, bushes, forests, and fields. Despite an 11% decrease in folks defecating openly in Sub-Saharan Africa from 1990 to 2010, the outright sum of persons who committed OD was amplified by 33 million in the course of the same period because of a growing population (Galan et al., 2013).

Poor sanitation comprises a sewer system that could be a pour-flush or flush chamber pot that does not empty itself into a well-constructed septic tank system, or a pit latrine with no cover, a septic tank, hanging toilets, hanging latrines, bucket latrines, open defecation, and shared public facilities. Ending OD requires more than just the availability of sanitation facilities; it also requires widely implemented health educational and awareness programs and motivational factors such as reputation, situational goals, and knowledge of well-being (Kiraz, A., & Sıddık, H. (2018).

There is a growing emphasis on motivating and educating folks to close OD, as demonstrated by the United Nations' new Sanitation determination.

The availability of the world standard for sanitation and water supplies is still very limited in both urban and rural Liberia (Ohwo, 2019 & The Poverty Reduction Strategy 2008) “one in every four Liberians has access to safe drinking water, one in every seven has contact with satisfactory sanitation conveniences such as toilets or some form of waste disposal, and only one in every twenty practices safe hygiene behaviour”. A census conducted in 2009 estimated that 2.6 million people in the country still lacking access to better-quality water streams, more than 3 million don’t have improved sanitation, and over 3.3 million don’t have hygiene knowledge or behaviours. According to reports that rank municipal significance first or second (Water Aid, 2008; UN Critical Humanitarian Gaps Study, 2008), the main concern agreed upon, sanitation, is also revealing of the societies' preparedness to engross themselves in community-led sanitation activities, and this approach is a methodology that was created by Dr. Karma Kar and Dr. Lester Chambers (2005). At the deficiencies of acceptable toilet conveniences, inhabitant use plastic bags and buckets or openly dispose it into water or drainage waterways as a handling instrument. The 2008 national population census indicates that 77% of family unit defecate the bush.

Statement of the Problem

Liberia EPA (2013), the proper disposal of waste in Liberia has been confronted with tasks categorized by; low public, poor ecological health education, lack of organisation and sharing tactic between implementing bodies and community dwellers (Pruss-Ustun et al, 2014; & Burnett, et al. 2014) attributed about 17,000 less deaths to inadequate water. Additionally; 2.3 billion folks do not have rudimentary sanitation station (Dickin, et al., 2020). Using new evidence, the methodologies for assessing exposure to both insufficient sanitation and inadequate hygiene practices have been changed. The failure to evaluate the health consequences of insufficient sanitation reportage in communities resulted to a large increase in illness burden from inadequate sanitation. Furthermore; poor sanitation or the improper disposal of human waste disposal is a nationwide issue that leads to death when not properly managed.

Besides, this issue is even more unique to Margibi, or Liberia as a nation, even though there are so many literatures on the subject, but there is still a great need to go digging for future action. In the line of these background, in this study it is aimed to indicate the impacts of sanitation factors on waste management (human excreta) in Gibi district, Margibi County Liberia.

Purpose of the Study

A desk enquiry showed by Water and Sanitation Program (World Bank) said Liberia loses $17.5 million yearly because of poor sanitation. This equates to US $4.9 per person each year in Liberia, or two point zero out of a hundred of the country's GDP. In a nutshell, over one point two million Liberians go to filthy or communal latrines, 1.7 million have no latrines, for this reason, they empty their bowels in the field and the poorest are nearly seven times more possible to use open places than for the richest to conduct open defecation. Liberia spends $11 million on open defecation, while to get rid of said practices they will only have to spend money on building three hundred and fifty, thousand latrines and use them properly. It is also time consuming in finding protected places to defecate and in calculating the lost time in money in time, it is US $1.9 million mismanage time per year. Each year, about $80,000 is lost owing to lost productivity while unwell or seeking healthcare; 1.7 million is consumed on health care; and 8.4 million is expended on education. Individuals who practice open defecation spend over 2.5 days per year looking for an isolated habitation to have a bowel movement, resulting insignificant financial losses and abuse, particularly for women who will have to look for a more private area to defecate. So, if sanitation facilities are provided and properly used individuals faced with said problems will have more to invest in that could be of profitable.

Liberia, a country in West Africa that is enclosed by Ivory Coast, Sierra Leon, the Atlantic Ocean and Guinea. In 2017 a monitoring programme led an investigation that says Liberia Sanitation is very poor, with more people in the rural part with absent of decent latrine and toilets, and has no options but to defecate in the open. So based upon these facts from other articles and this research data, the research aimed the measure the impact of sanitation factors on waste management thereby providing recommendation for implementation.

Research Questions

- How is the Sanitation (Human Excreta) Knowledge level of the local people in Margibi?
- How is the Waste Management Behaviour level of local people in Margibi?

Significance of the Study

Access to better-quality waste and sanitation management is as difficult for many underdeveloped countries as the discrimination and challenges that the government faces (Makaudze, & Gelles, 2015). The Millennium Development Goals tried to speed up admission to these niceties for the universal underprivileged, in part because progression and scarcity assuagement cannot occur in an infested setting and because these two elements are strongly linked to human wellbeing and outcomes (Laukkonen et al., 2009). Based upon this backdrop, this thesis wishes to discover the impact of sanitation factors on waste management in Gibi district, thereby taking into consideration the grades of local people's scales related to sanitation (human excreta).

Definition of Terms

Human excreta has to with waste excreted by human and it refer to as biodegradable and could be very useful other agricultural purposes.

Sanitation - according to the World Health Organization, is the provision of facilities and services for the safe management of human excreta from the toilet to containments, storage, and treatment onsite or transportation, and the final safe end-use or disposal. Sanitation, in a broader sense, refers to the proper disposal, treatment, and management of all types of waste.

Waste is the combination of assorted items that may not be useful to a person or a group of people but could be useful to someone else or a generation to come and it could be biodegradable and non-biodegradable.

Waste management is referring to the production, collection, recycle, reuse and disposal of every form of unwanted items.

CHAPTER II

Literature Review

Theoretical Framework

The increase of solid waste being generated and uncontrolledly managed by most underdeveloped countries is at the result of population growth, higher economic development and improved living standards. As municipalities develop, land turn out to be even more intricate, and the generation of waste increases in diversity and size (Omuta, 1987). As the earth continue to increase in its human populace the request for production will continue to rise to meet the pressing means of that number of individual being birthed, so as the demand is being produce there will always be wastage out of production (Fırat, Sepetcioğlu, Kiraz, 2012). With continuous monetary expansion and an upturn in active values, the call for belongings and amenities is growing speedily ending in the intensification per monetary cohort of solid waste. As the inhabitants increase, economy booms, with speedy growth and the upsurge in the standards of the civic have meaningfully amplified the community solid waste group frequency in emerging countries, mainly in China. The World Bank said that no country has ever qualified such a huge or rapid escalation in number as China (Yuan et al., 2006).

Over the years it has been proven that people worldwide have too many issues with sanitation, water and hygiene promotion services leaving 2.5 billion folks (Alagidede, & Alagidede, 2016) around the world that do not have contact to fundamental sanitation. For hand-washing services at homes 3 billion persons lack access. So, the regional discriminations are stark. Sanitation discusses the ideologies and practices that influence users, operators, and the environment when it comes to the assembly, deletion, or dumping of trash, and wastewater. Poor sanitation puts a population's health at jeopardy and facilitates disease transmission (Alegbeleye & Mohammed, 2020) resulting in insignificant illness and death around the world. According to the World Bank, a nonexistence of sanitation and water facilities, and the absence of hygiene education, are significant contributors to poverty reduction, emphasizing the importance of package transfer as a fundamental component of poverty alleviation measures (Cortinovis et al. 1993). Moreover, it is basically a major tragedy to Low and middle-income nations because most governments are not economically prepared to handle said needs. Additionally, the lack of advance

sanitation has been primarily the key factors and most serious health and environmental issues that are resulting in economic instability, an escalation in the death rate with kids of five to zero, undersized growth, and a continued outbreak of preventable diseases according to studies.

Human Excreta/Open Defecation Positive and Negative Effects

Diarrheal diseases are at the result of improper management of human excreta, for example, leading cause of sickness and death, particularly among kids in poor or middle republics, are linked to human excreta. Diarrhoea is the number two killer disease in rank (Peter & Umar, 2018 & Bern et al. 1992). 3,3 million deaths per year, but in 2019, approximately 370,000 kid five and below died from this condition (WHO, 2019). This means there has been a tremendous improvement made so far, but there is still a pressing need to limit the situation.

This primarily entails of announcing or enlarging the figure and usage of latrines to contain or dispose of faeces for the projected 2.6 billion that have no sanitation facility (Clasen et al., 2010) identified 13 studies linking over 33,400 people from 6 nations. This trial makes available some proof that interventions involving human excreta are active in avoiding diarrheal outbreak.

Every day, each fully functioning human being excretes waste that contains necessary chemical elements that could be converted to fertilizer for agriculture proposes (Heinonen-Tanski et al., 2005). A regular biogeochemical round that happens to be the only workable cradle of nourishment of the earth constantly circulates the chemical elements. According to Woolgast (1993), one person's yearly sum of human excreta is parallels to the volume of nourishment required to produce 250 kg of cereal. As known, Nitrogen and phosphorus are the most important nutrient elements for agriculture globally. The majority of Monrovia's 1.3 million residents lack satisfactory eco-friendly cleanliness and unwanted running services, posing a severe risk to residents. The present coverage is below 20%, and removal is unselective, unspool dumping. In 2003, the city experienced a series of cholera outbreaks, with 26,651 reported cases, many of whom died (Anthony Mensah 2006). The following were the general methodologies used for the assignment:

Desk research and evaluation of the obtainable Water and Environmental Sanitation (WES) reports as well as other important works, session with interested party, observation and collaborative work were used to solicit thoughts from a

number of national leaders involved with these mechanisms in order to get their understandings and aspirations. It likewise enclosed the gathering and scrutiny of existing statistics to aid in the preparation of plans and strategy of facilities.

The plan aimed to combine the municipal establishment's capacity with that of the private segment and NGOs/CBOs in order to answer the city's assorted package demands while handling accommodation and infrastructure situations, costs, and reclamation to confirm sustainability. It also identified funding sources and responsibilities for financing in order to facilitate effective plan implementation (FBT, 2021).

The tenacity of this research was to look into Ethiopia's solid waste management systems, identify gaps, and look for ways to improve them. To gather information, extensive literature searches of periodical qualifications, certified information, and a perilous journal of decrees and dogmas were conducted. Nevertheless, waste generation is increasing by 5% per year. Organic biodegradables dominate the waste, accounting for 67.4%. Common practices include rudimentary uncluttered discarding without pre-treatment and old-style uncluttered burning of waste that is unhealthy. Waste recycled that is unsafe is only 5% or in an unregulated manner. The recent rubbish management scheme is characterized by three I's: irregular, inefficient collection, and inadequate, squat handling, practical flaws, and a lack of law enforcement, respectively. As a result, putting the novel method projected in this study into action ought to be a top priority. To guarantee maintainable waste management, governmental will, established improvement, investment, and, most essentially, behavioural change is required.

Managing garbage in Liberia is becoming progressively more challenging, with more than 70% of homes abandoning their waste in unauthorized locations. The need for an effective waste management system in Liberia will be exacerbated by urbanization and population growth. This study surveyed 240 households in Paynesville, Liberia, to learn about occupants' waste disposal habits and the satisfaction that comes with the service collection. The assessment outcomes indicate areas for upgrading and unhappiness with current domestic services. Waste was commonly burned or buried, and few households separated or recycled waste. High-quality experimentation was used in the study to assess households' assessments of detailed waste collection service attributes. According to estimates from a diverse logistical ideal, households' importance in ensuring that waste is collected at home

and been separated. These outcomes highlight the prospective for enlightening Liberia's solid waste management by constructing steadfast facilities everywhere domestic collection is done (Almazán-Casali, S et al., 2019).

Solid waste management procedures and regulatory regime dynamic simulation aid policy development by explaining systems and recommending techniques for operative board (David et al., 2020). Building a workable system, on the other hand, entails money and high-tech proficiency, educated manpower, mechanical, communal, and store reprocessing, informative mindfulness drivers, and dynamic civic involvement, and this examination was to acme existing discarded management events in Liberia and provides readers with information about the challenges now and the future for sustainability.

An Overview of Sanitation and Waste Management Through Literature

Waste management is becoming a critical zone for maintainable improvement in South Africa, with potentials for increasing reserves in carbon offsets aimed at reducing the emissions of methane from landfills and moving resources in relative to green waste management equipment. Previously, the sector was controlled by the secretive subdivision, which conducted discriminatory actions in what made business sense, such as recycling of marketable products. Paper and hard plastic were two of the most commonly recycled materials (Karani & Jewasikiewitz 2007).

The leather organization or company deals with materials from proteins skin for the transformation of leather, which produces a large amount of dense and liquefied waste, resulting in pollution that must be addressed by acquaint with viable cleaner expertise. This study discussed the various environmentally friendly challenges as well as significant achievements in the reduction of pollution in the leather processing industry. The segment discusses countless environmentally sociable technological methods for preserving raw hides/skins, un-haring, tanning, and dyeing operations (Kanagaraj et al., 2015).

Indonesia is dealing with an amount of self-sufficiently managed waste management challenges, including waste, processing (composting, recycling), transportation, collection, and landfill reliance an intrusion is required to convey interested party to address garbage issues. The goals are to examine ultimate issues and prospects, as well as to create a viable and keen national system (Fatimah et al., 2020).

Solid waste management is an indispensable component of any conservational organization's program. Based on the recycle, reuse, and reduce (3R) principles, SWM tactics have been reformed into an extra applied and operative opportunity for launching a lasting effect. This examination provides a summary of a variety of the current SWM stratagems and their subsequent strategic intentions (Das et al., 2019). This document gives a broad idea on the arrangement of public solid discarded management by indigenous establishments in Kenya situation schoolwork of an unindustrialized country that has a low income. Approaches to potential solutions for improving urban waste services are conversed. In 1993 economic growth was at 1.1%, meaning very poor leading to an upturn in poverty, which now stands at 56% (Henry et al., 2006).

This tonnage includes a number of papers that address perilous issues in solid waste management from African and Caribbean perspectives. It is projected to function as an initial theme for dialog amid the varied self-restraints and zones involved, as well as to suggest forthcoming labour in the academic and applied magnitudes of the trial that emerging nations have to face (Azevedo et al., 2021).

Substandard freshwater resources, hygiene, and sanitation in semi-public settings like learning institutions, workplaces and health care facilities has a hurtful effect on population health, education, welfare, and productivity, particularly in low and middle-income countries. International and national standards were reviewed and intensive care was taken to fill the void; while the first non-household setting typology was developed to assess the possibility (Cronk, et al., 2015). UNICEF and WHO team up on an intercontinental monitoring on sanitation and water program through their Joint Monitoring Programme (JMP), with the Millennium Development Goals (MDGs) era coming to an end in 2015, the JMP has suggested an after-2015 agenda for cohesive intensive care of sanitation and water targets included in SDG no. 6. This piece argues how a human can understand individual division of the recommended matching pointers and sanitation mark (Giné-Garriga, et al., 2017). As a matter of fact, the drills of deprived washing of face and overall individual hygiene. There have been reports of europepmc.org being unavailable. Healthy water for consumption, sanitation, and hygiene are vital to raising residents' values of living. WASH standards include, to some extent, the WHO 2018-2025 water, sanitation, and hygiene strategies (Tagoh, 2018).

The World Health Organization's (WHO) 13th General Programme of Work (GPW) 2019-2023 describes three billion folk's health benefits: one billion "getting increasingly in good health" through multi-sectoral arrangements looking at ecological threat and healthy factors; one billion profiting from upgraded crisis awareness and reaction; and one billion receiving universal health coverage (UHC). On these platforms, a small number of important outline impact categories have been formed (World Health Organization 2018). Currently, approximately two point four billion individuals in cities and bucolic areas lack contact to a complete sanitation amenity. By the next 20 years, an estimation of 2 billion folks is expected to live in cities, primarily in countries that are not developed, necessitating cleanliness. Above ninety percent of dirt in emerging nations remains untreated, poisoning lakes, rivers, and seaside areas. Traditional public health theories based on water washing expertise and flush toilets are neither cost-effective nor environmentally friendly in both developed and developing countries (Langergraber, & Muellegger 2005).

Extract One out of every three hand pumps in rural Sub-Saharan Africa is unworkable at any agreed interval. Although there is some scientific proof explaining variables associated with faulty water systems, there is little evidence describing the common types of water scheme collapses. Inadequate water availability due to decomposed schemes may push people to use poorly maintained sources of water, undermining the health advantages of an enhanced supply (Klug et al., 2018). The optimistic Sustainable Development Goal drinking water goal of obtaining general and unbiased admission to affordable and safe consumption of water has been set for all by 2030. The way pointers for this goal are spelled out and observed critical in confirming that funds are deployed to support those who at this time lack the contact. This work argues the tasks and opportunities linked with the projected indicators (Thomson & Koehler, 2016).

WASH (Water-Sanitation-Hygiene) is still critical for the 2030 for the Sustainable Development agenda, the reason being that several nations have not localized the 17 Sustainable Development Goals (SDGs), specifically SDG 6, which concentrates on guaranteeing the convenience and maintainability of sanitation and water for all. Many communities in some leading African economies, like South Africa, continue to use the container system for sanitation (Nhamo et al., 2019). In the incident of upgraded water source, to urban supply and sanitation facilities

service providers also intends to investigate the established perspective of sanitation and water resource (Dominguez Torresm, 2012).

The urban population of Sub-Saharan Africa (SSA) is projected to rise from 414 million to over 1.2 billion by 2050. This increase will almost certainly make it more difficult for municipalities to make available entree to water and sanitation (WS&S). The purpose of this research is to illustrate drifts in admission to WS&S in SSA capitals and to categorize the dynamics influencing the drifts. This investigation of 31 capitals in the SSA used DHS statistics gathered between 2000 and 2012. Using demographic data, four sets of family contacts for WS&S were investigated (Hopewell & Graham 2014). Hygiene, water and sanitation are perilous components of a higher standard of all living beings. In 2015, 91% of households had better drinking sources of water, and 68% had better sanitation. In terms of wealth, rural residents, shanty towns, and disadvantaged communities delay dramatically behind. Just before contemplating the new water and sanitation marks under the Sustainable Development Goals (SDGs), which aim for a higher level of safety, care provided is lesser (Hutton & Chase, 2016).

Despite the fact that sanitation schemes are critical for sustainable development and the health of humans, tiny consideration has been given to influence the mitigation and adaptation of the temperature. Climate variation endangers current structures and created struggles to expand services to the 2.3 billion folks lack straightforward sanitation. Moreover, the wastewater divisions also directly produce discharges allied with organic matter failure (Dickin et al., 2020). Independently, this article investigates Millennium Development Goal 7c (MDG 7c), which has as its objective improved sanitation and access to water for 6 countries in West Africa: Sierra Leone, Nigeria, Togo, Niger, Mauritania, and Chad. The item discusses some of the potential reasons for the slow growth toward MDG 7c, the public health consequences of failing to meet the marks, and graphic representation routes for policymakers to cooperate in conveying these targets to satisfactory heights (Alagidede & Alagidede, 2016).

Restricted availability to sanitation and water endangers one's ability to work, health, and dignity. The tenacity of this object is to argue the historical and current aspects impelling admission to sanitation and water in remote part of South Africa; and to examine the industrial repercussions of the availability of water, mainly people disable and older in rural South Africa. Texts review was accompanied by

examining Scopus, the JSTOR, and MEDLINE cataloes and deducing the reclaimed official papers using framework analysis (Wrisdale et al., 2017).

Water-related diseases and enterococcus infection are especially common during periods of absolute abundance of water, particularly in areas with high rainfall patterns. Though it is unknown how periodic alterations in groundwater resources and drinking water influence enteric poisons in children, this study looked at periodic alterations in the uptake of water and the primary drinking water source by pathogen occurrence in toilet samples from 404 children under the age of five in Limpopo's rural communities (Nguyen et al., 2021). It has been demonstrated that enhancing the health of the public has an important impression on resident's wellbeing and the economy. Progress toward the Millennium Development Goals (MDGs) of splitting people with no simple sanitation and safe drinking water by 2015 has slowed. One reason for the slow progress is that policymakers and the overall public have not totally grasped the significance of upgraded sanitation results (Van Minh & Hung 2011).

Alarmist's impacts of human's settlements in Africa are initiated by a diversity of average temperature related factors, comprising rise in the sea level, thrilling weather actions, water resource impacts, food security, temperature-related morbidity in urban areas, and increased health risks from vector-borne diseases. Some African river deltas and coastlines that are heavily inhabited sunken areas that would be exaggerated by sea-level rise. Other coastal communities will face increase erosion in the coastal region (Magadza, 2000). In several places in Africa, access to adequate sanitation remains elusive. While sanitation universally has improved significantly, the issue with sanitation in Africa remains appalling, with nearly 20% of the folks in Sub-Saharan Africa still practicing open defecation. The systems of poor sanitation have a wide range of consequences, from deleteriously impacting natural resource quality of water to posing risk to the population's health. Clearly, the present-day sanitation structures have breaks and can only do so much to help the situation (Nansubuga, et al., 2016).

Despite recent progress, absence of entree to safe drinking water and acceptable sanitation remains a pressing public health issue of the 21st century. Almost a billion people worldwide do not have admittance to safe drinking water, and over 2 billion do not have suitable sanitation. The task is made supplementary difficult in Sub-Saharan Africa, where handling heights for both water and sanitation

linger disapprovingly little. The pressing requirement to handle the issue necessitates a thorough consideration of the socioeconomic factors involved (Adams et al., 2016)

To approximate the mortality and morbidity in China due to contaminated water and poor sanitation and hygiene, identify extraordinary burden groups, and notify enhancement actions (Carlton et al., 2012). A residential study of diarrhoea was conducted in two communities in Liberia communities to investigate food and water hygiene. The rate of contamination in drinking water kept in homes was expressively greater than sources of water. Standards in food hygiene were poor, mainly in urban slums where long-term boiled food storage resulted in high levels of bacterial multiplication. Kid meals were especially contaminated. It is established that when water resource programs are scheduled, the incidence of additional risks must be considered (Molbak et al.,1989).

Every day, a quiet philanthropic disaster kills approximately 3900 children and stymies advancement concerning all Millennium Development Goals (MDGs), particularly in Asia and Africa. The truth is from every ten people there are four of them that don't have the availability to a pit latrine, and approximately two out of ten do not have contact to safe water for drinking. 1 in helping to end this heinous situation, the MDGs planted a specific goal (number 10) of divvy up the ratio of people living in scarcity by 2015 (Bartram, et al., 2005). Changing climate, thrilling climate actions, increased population, and lowly management have all strained the world's scarce freshwater resources in recent decades, resulting in major shortage of water in large areas of the earth. Water utilities respond to scarcity by presenting another water source, supplementing majority of the water in severe scarcity conditions and many families, store water in building (Salehi, 2022).

Within the next fifteen years, the resident of urban areas is likely to increase from three to four billion people or more, with the majority living in developing countries. This significant turn is having a vivid impression on our well-being and the atmosphere.... but not on the underprivileged. Accidental shantytowns deprived of simple services are not an unavoidable by-product of development, and purlieus cannot be clarified solely by insufficiency. Misguided policies and ineffective legal frameworks also contribute to urban misery (Tannerfeldt & Ljung 2012).

Context of Sanitation has a manageable impact on health, especially for young children. In Salvador, Northeast Brazil, the prevalence of diseases among residents with intestinal parasites is high. So the upgrading of sanitation activity

began in 1996 across the entire city with the goal of increasing septic tank handling from 26% to 80% of family units. With these intentions, the consequence of this interference on the frequency of lumbricoides, trichuria, Giardia impurities, Trichuris duodenalis, and Ascaris in infantile children was investigated. The appraisal consisted of two cross-sectional studies (Barreto et al., 2010).

The management of solid waste and its removal are worldwide issues. Despite speedy growth in recent years, approximately 47% of the world's population, or 3.31 billion people, and 31%, or 23.59 million Iranians, continue to live in undeveloped locations. In all nations, surveys have described that the amount and organization of family solid waste among rural people are uncommon. As a result, defining the class and composition (capacity) of rural communities' household solid waste is paramount (Taghipour et al., 2016). In addition to insufficient waste collection services and a lack of municipal solid waste (MSW) literature, age groups in emerging countries, particularly in places without basic services, have had a negative impact on how MSW is managed by occupants and the ruling classes. This has resulted in contamination and a reduction in the life span of residents. The purpose of this revision is to define the amount and category of waste creäte by families and community's perception of the MSW board in Guerrero and San Quintin (Taboada-González & Aguilar-Virgen, 2011).

The management of waste in remote regions have developed a serious hurdle for leaders in unindustrialized states. The truthfulness and steadfastness of facts on which judgments are based directly affect the achievement of waste management verdicts; many dynamics stimulate these data. We used field surveys and a review of previous literature to investigate the dynamics impelling internal garbage in poor nations. Population, education, and culture were among the social elements considered. There was a positive linear relationship (Han et al., 2018). Old-fashioned management choices in transitional economies around the world were based on waste disposal and mixed waste collection, which was frequently done on inappropriate locations. In countryside, the nonexistence of accurate waste assortment service station has encouraged backyard burning or open dumping. The paper examines the accomplishments and struggles of local governments (Mihai, 2018)

The outbreak of the Ebola virus disease (EVD) showed up in Liberia in February 2014 via Lofa County and extended to 2 health districts with the help of a non-profit group. Global Communities have been executing the community-led total

sanitation (CLTS) program since 2012. Before December 2014, Liberia had 928 confirmed Ebola cases and 648 deaths. And at that time, 155 communities were triggered prior to the epidemic, and 98 communities were licensed as Open Defecation Free (ODF) (Njiru & Vries 2017).

It is projected that two hundred and fifteen million individuals in Sub-Saharan Africa continue to defecate openly. The drill promotes the spread of diarrheal diseases, which are one of the primary reasons for death in kids below the age of five in Sub-Saharan Africa. The primary the tenacity of this investigation is to evaluate modifications in emptying the bowels in the open across Sub-Saharan African states between 2005 and 2010, to explore the link amongst national level catalogues and variations in the prevalence of excreting in the field, and to determine how many countries can achieve this goal (Galan, et al., 2013).

The significance of sanitation in shielding one's health is undeniable, has significant public health implications. It has been critical to health, security, and self-esteem. In spite of 15 years of concerted struggles beneath worldwide achievement strategies like the Millennium Development Goals (MDGs), two point three billion individuals lack admission to upgraded sanitation conveniences and just about 892 million people continue to practice open defecation (Saleem, et al., 2019). The global community is becoming more aware of the dangers of defecating in the field to human dignity and health, as well as the environment. Nigeria ranks third after India and China in terms of OD prevalence globally. The resolution of this education is to investigate the demographic, geographic, and socioeconomic issues that control and regulate the exercise of OD in Nigerian households, according to the Nigeria 2013 data (Abubakar et al., 2018).

In 2008, 3.1 million Liberians out of the entire citizen of about 3.5 million lacked admissions to sanitation convenience latrines. Individuals are required to practice excreting in the field, by far the riskiest sanitation practice, due to a shortage of toilets and the growing gravity on a limited and broken-down substructure. Self-esteem is jeopardized, and individuals are endangered. Diseases such as cholera, diarrhea, typhoid, and malaria that could be prevented but has come to be the primary reason of demise, and they are the result of poor sanitation or contaminated water (Sitali, 2010). Even in advanced nations where personal access to "cleanliness" and a public health power grid is widely available, diseases remain a problem. Least developed-country residents must be contending with insufficient municipal

wellbeing structure, a limited or no educational programs, and financial constraints in earning sanitization merchandises. As a result, developing countries carry a heavier responsibility of death and disability from contagious diseases (Aiello & Larson, 2002).

Children nutritional status is an important indicator of their development and a predictor of human well-being. Without nutritional well-being, it is impossible to achieve sustainable development. Open defecation is one of the issues disturbing dietary prominence in emerging countries. Every year, about 90% OD cases are in South Asia is from India. Open defecation allows faecal micro-organism to be absorbed, resulting in intestinal worms, diarrhoea, and conservation enteric failure (Rahman, et al., 2020). The accretion of substantial metals in the food supply chain is a global alarm because it ultimately poisons people via polluted water, soils, crops, and animals (Armah, & Quansah 2014).

Related Research

Multi-state outbreaks of acute gastroenteritis traced to fecal-contaminated oysters harvested in Louisiana (Berg et al., 2000): Walk in viruses, or comparatively tiny rotund arranged vector that is known to trigger chronic gastroenteritis in people who eat contaminated shellfish. In Louisiana from 1993 to 1996, three seaweed foodborne illness epidemics caused by NLV occurred. Thorough detectable and ecologic studies found that haywire wastewater reuse by oyster collectors.

Impact of waste disposal on health of a poor urban community in Zimbambwe (Makoni et al., 2004): Objective: To investigate the bodily excretions and sewage treatment facilities required in Epworth, a casual municipality in Harare's suburbs, and their implications for sanitation-related diseases. The survey was designed as a descriptive cross-sectional survey. The site was an ethnographic education of Epworth's natural environment. 308 families were cross-examined as themes. Contributing households were chosen at random from Epworth's three communities. Local secondary medical archival statistics on diarrheal disease occurrence was gathered.

Human excreta for plant production, Bio-resource technology (Heinonen-Tanski & Wijk-Sijbesma, 2005): Human excrement is a renewable element that is abundant in all civilizations. Regrettably, their significance in modern farming and horticulture, which includes several humid rising republics, is vastly

underappreciated. Human urine, in particular, is high in nitrogen. Along with faeces could be stimulated with wood ash and kitchen and garden waste in many cases to meet plant potassium and phosphorus needs and improve soil.

Sources of pathogenic microorganisms and their fate during land application of wastes (Gerba, & Smith, 2005): Organisms in all waste have been accepted as a threat. Knowledge of the bases, attentions, and subtraction by procedures that may be recycled to handle wastes; survival in the environment; and exposure to vulnerable populations are all required for risk management. The primary fonts are animal serving acts, municipal-wastewater handling plant runoffs, bio solids, and onsite treatment systems. Untreated interventions to improve human excreta disposal and prevent diarrhoea may contain more than 150 known enteric pathogens.

World Urbanization Prospects: an alternative to the UN model of projection compatible with the mobility transition theory (Bocquier, 2005): The tenacity of this document is to seriously evaluate the United Nations' predictions on urbanization. The guesses of the current drifts based on a nation databased, as well as the projection method, are both evaluated. The concept of movement shift is castoff as an alternate assumption. Predictions based on a polynomial ideal are proposed and matched to UN prognostications grounded on a true model. The decision is that UN prognoses for 2030 may overvalue the city residents by nearly one billion people, or 19% in relative terms.

The sanitation environment in urban slums: implications for child health (Buttenheim, 2008): Investigate the impact of improved child health from the sanitation perspective in Bangladeshi cities in order to figure out household neighbourhood characteristics versus their relative importance, as well as the harmless care of children's faeces versus the usage of adult latrines. By means of stable effects lapse, determine the alteration Weight-for-height differences were observed in 153 kids as a consequence of shifts in toilet facility utilization in the nearby communities. Because data is collected, children can act as their own controls, which is not possible in many other sanitation evaluation studies that use cross-sectional data.

Slums, climate change and human health in sub-Saharan Africa (Ramin, 2009): Sub-Saharan Africa has the world's lowest population density. Cities are home to about 39.1% of the world’s inhabitants. The region's urban population, on the other hand, is expected to double by 2030. The speed of development makes

management extremely difficult. According to a latest broadside published in the New England Journal of Medicine, modernization is a "health risk for convinced helpless inhabitants, and this demographic modification creeps up to produce a philanthropic tragedy." Poverty is associated to African urbanization, universally.

Human faeces-associated extended-spectrum β-lactamase-producing Escherichia coli discharge into sanitation systems in 2015 and 2030: a global (Berendes, et al., 2020): Background Improving sanitation waste management and treatment, the evolution and stretched of antimicrobial-resistant organisms could be slowed, but the extent of the consequences has yet to be determined. ESBL-producing Escherichia coli are indeed a primary factor of antimicrobial-resistant illnesses and are readily observed in faecal industrial effluents, making them simulate indicators of the allocation of antimicrobial-resistant organisms conveyed via the faecal-oral route.

CHAPTER III
Methodology

Research Design

This investigation gathered statistics from primary data; the primary data was obtained through a quantitative approach. This research is a survey design that employs the quantitative approach; it involved collecting, analysing, and interpreting data. It also gathered comprehensive understandings of difficulties and crafted new thoughts for this study, thus employing the descriptive statistics.

It employs to collect the data in the form of surveys, discussions, documents, analysis, and secondary investigation to collect statistics for a large scale and in-depth understanding and validation using the Gibi District of Margibi County as a base. Therefore, the quantitative approach was selected because it aims to provide a broad understanding of behaviour and other occurrences across separate settings and populations, and they are frequently fast, focused, scientific (Lazer, et al., 2021) and relatable, allowing researchers to forecasts and make a broad view to a larger populace apart from the sample being tested.

The approach is typically used to assess a problem or answer the "what" or "how many" of a research question. And its goal is to apprehend the link amongst an independent and one or few other dependent variables in a population (Johnson, B, 2001). Furthermore, this study is focused; its goals and design are determined from the start, and they serve to test the initial theory and determine whether it is true or false. It also provides control and simplicity; and use to design, test theories about why or how certain situations arise by locating confirmation that uphold or refutes the theories. It is also popularly used by specialists in social scientific disciplines such as sociology, psychology, public health, and politics. It is also widely used in education, economics, marketing, and medicine (Rapley, M. 2003) so will bring out the full potential of my findings that could be use in the future.

Population and Sample

The data was gathered from the field through surveys, interviews using the Google forms, and kobo application through (cell phones & one-on-one) documents and or articles. Data was conducted in communities targeting 384 persons, including adult males and females, and youth from age 18 to 30 to dig out the right information

and these process was done through a random sampling survey in the district, with a population of 7359 (LIGIS, 2008) Margibi County, Republic of Liberia. The process of drawing small group as characteristic of the entire process is referring to as sampling method (Devi, 1998). Moreover, a sample size is an element of interest that reflects the entire population. In accordance with (Rody & Archaryulu 2009), in a research work or study, the sum elements are called population while the sets of elements are called sample. Therefore, the sample was described as unknown universe. This sample was used because it reflects the interest of the entire population of Gibi District.

The unknown universal sampling approach is used to randomly select a specific sample of interest from any population. In deriving sample size of this research, the Z-score statistics is applied to the sample frame 7359 thus realizing the sample size of 384 participants. This method is used in scientific research in order to select a determined sample of interest. By doing so the confidence level and the confidence intervals are the deciding factors, which predict the deviation from the mean population. Therefore, considering the confidence level of 95% and an error margin of 5% the below formula was ascribed to in deciding the 384 participants mentioned earlier (Edward, 1968).

$$n=\frac{Z^2 x\ P(1-p)}{E^2}$$

Where n

Z is the Z score

E is the margin of error

P is the population

Data Collection Tools

To achieve the study's goal, a cross-sectional survey research was developed and used via the google forms, and kobo application using (WhatsApp, Facebook messenger and in person interview) with a random sampling technique using balloting without replacement for 384 individuals in Gibi district, Margibi county, Liberia. In developing the tools for the survey, coordinated survey questionnaires were gathered from two researchers who conducted research on sanitation, rural

toilet facilities in china, and general waste management issues in Onitsha, Nigeria. The study in China was conducted by Prithvi Simha, Ph.D., a post-doctoral researcher from the Swedish University of agricultural sciences, Department of Energy and Eechnology, and his team, and the work was focused on “How poor awareness and attitudes toward sanitation servicing can impede China's rural toilet revolution: evidence from Western China” and this study was conducted to examine the nature of rural toilet, its trends, while the study in Nigeria was done by Agwunobi Uchechi Chiemezie, on Onitsha commercial city, a dissertation for the degree of master of science (MSc) in environmental management and sustainability that was submitted to the school of economics, business administration, and legal studies Thessaloniki, Greece November 2018 and these questionnaires were used to determine the factors that influence household waste disposal attitudes.

Due to the magnitude of this work, these question forms were requested and categorized into three (3) sections to be used for the investigation: Section one talked about age, level of education, and other socio-demographic variables that included gender, occupation, and family size; Section two (2) inspired information on individual knowledge of sanitation (human excreta); and Section three (3) took into consideration the inappropriate rubbish management of the population and, the knowledge of organic fertilizer by community dwellers. These sections required respondents to direct their level of understanding in answering questions with yes, no, I don't know, specify, or by selecting the correct answer, using Ashur's criterion for determining the level of knowledge employed, which provided results from questions drawn from Sections 1–3 as a criterion for determining the level of knowledge employed.

Data Analysis Procedures

The collected data during the field investigation was gathered and observed in order to process the composed statistics. An Excel™ software was used in analysing the information. The rate for each question was obtained by separating the total sum obtained in each question by the highest of possible points. As a value, the data acquired from this program was displayed in graphical form in order to explain the survey questionnaire findings (Ngoc and Schnitzer, 2009).

This research technique essentially gives a scientific, logical, and theoretical study of the processes used in any field to determine the research aim. In this chapter,

the analysis, sample size, and target population, as well as sampling methodologies, were examined, along with a variety of other criteria. Furthermore, this section discusses the purpose of the investigation likewise the tools used for information collection. This research lasted for a period of three months beginning October 2022.

Data analysis

The survey question form has three sections: the first interprets the social-economic and demographic components, and the last two sections provided a thorough understanding of waste management and sanitation, including human excreta, and some benefits of some waste. The social-economic and demography component of this research took into consideration gender, age, education level, occupational status, and family size. In analysing the data, it was discovered that 51% of the 384 people who participated in the study were male and 49% were female. Individuals between the ages of 31 and 40 had the highest of 39%, those between the ages of 41 and 50 had 22%, and those under 30 had 20%, while those between the ages of 51 and 60 had 14% and aged 61 and above were 5%, respectively.

CHAPTER IV
Findings

It is crucial to point out that the evidence generated during this research has limitations due to a shortage of cash, a scarcity of information, and specific characteristics of these sites (for example, information gathered from a floating population with a prevalent lower-middle socioeconomic status, to name a few), as well as the type of sampling obtained.

With this in mind, in measuring the findings generated, the data collected from individuals was taken into consideration to quantify the level of understanding, including ages. People aged 61 and up made up only 5% of the population, those aged 51 to 60 made up 14%, those aged 41 to 50 made up 22%, and those aged 30 or under made up 20%. People aged 31 to 40 made up the majority of those who contributed information during the survey, accounting for 39% of the total population.

The level of education was also taken into consideration to enable the team participating in the research to come to an understanding of the number of individuals that are affected by the issues of the research focus. During the study, it was certain that 10% of the population had a primary education, 12% were junior high school students or dropouts, 14% were not educated, 19% had undergraduate degrees or above, 22% were high school graduates, and the remaining 23% were individuals that were students in colleges.

The occupation of these individuals was also taken into consideration, and it was discovered that those that participated in the survey and were unemployed were: 15%, farmers 16%, workers 22%, businessmen and women 24%, students 15%, and those that were referred to as others. They made up 9% of the population.

The issue of waste management has always been major in Liberia. So the study's findings simply validated the findings of other researchers over the years. So, during the study, it was established that 72% of the respondents who participated in the research have no idea about waste separation, composition, or proper disposal; moreover, they lack knowledge on the effects of standard management of waste in general on a given population. Additionally, 82% of the respondents said that they would promote the use and production of urine and faeces or organic fertilizer even

though they have no idea or lack the technology to turn these wastes into agriculture products.

Findings for Research Question I: The Sanitation (Human Excreta) Knowledge Level of the Local People in Margibi

According to the study, the majority of the locals had a limited understanding of sanitation, which refers to the impact poor sanitation has on a group of people. Based upon the findings from the survey conducted, it was discovered that 47% of the people that participated in the study generated waste but found it very difficult to properly dispose of it; 72% of them do not separate their waste due to a lack of knowledge. Additionally, about 54% of the population does not have a sanitary and private toilet or latrine for his or her family, while 46% said their latrine is healthy but rather uses the environment to ease themselves, and 88% of them also said that they believe that open defecation, or improper disposal and waste in general have no health effect on them.

Table 1.

Survey question 1 (Do you think your waste generation level has increased over the years?)

	Frequency	%	Valid %	Cumulative%
Yes	293	24.00	24.00	24.00
No	91	76.00	76.00	76.00
Total	384	100.00	100.00	100.00

The table above indicates that 24 percent of the population said yes, and that the level of waste has increased over the years.

Table 2.

Survey question 2 (What could be the cause of this?)

	Frequency	%	Valid %	Cumulative%
Increase in packaged food	47	12.00	12.00	12.00
Increased income	73	19.00	19.00	19.00
Increased number of consumption	111	29.00	29.00	29.00
Population growth	153	40.00	40.00	40.00
Total	384	100.00	100.00	100.00

The table above indicates that 40% of the people who participated in the survey said that population growth is the reason for the increase in the amount of waste generated.

Table 3.

Survey question 3 (How should be the waste store or collect before disposal?)

	Frequency	%	Valid %	Cumulative%
In an open container	269	70.00	70.00	70.00
Direct disposal to dump	38	10.00	10.00	10.00
In a polythene bag/sack	68	18.00	18.00	18.00
Waste bins No storage	9	2.00	2.00	2.00
Total	384	100.00	100.00	100.00

Table 3 indicates that those who store their waste in open containers before disposing of it have the highest score in the study.

Table 4.

Survey question 4 (Where is the final destination of your family excreta?)

	Frequency	%	Valid %	Cumulative%
Use it as crop fertilizer directly after collection	19	5.00	5.00	5.00
After collecting through the septic tank, transport it by the suction truck, but don't know how the excrement disposed of after that	52	14.00	14.00	14.00
Collected in the sewer pipe, and then enters the sewage treatment plant	33	9.00	9.00	9.00
Seeps directly into the ground through the pit	36	8.00	8.00	8.00
Dumped in the environment	138	36.00	36.00	36.00
Don't know	92	24.00	24.00	24.00
Store for a period of time after collection, than use it as crop fertilizer	14	4.00	4.00	4.00
Total	384	100.00	100.00	100.00

According to table 4, the data indicate that family excrement dumped in the environment is the highest.

Table 5.

Survey question 5 (Would you like to produce human excreta-derived fertilizer?)

	Frequency	%	Valid %	Cumulative%
Yes	124	32.00	32.00	32.00
No	260	68.00	68.00	68.00
Total	384	100.00	100.00	100.00

Table 5 indicates that about 68 percent of the population disagreed to produce human excreta-derived fertilizer.

Table 6.

Survey question 6 (Would you promote the practice of producing human excreta-derived fertilizer?)

	Frequency	%	Valid %	Cumulative%
Yes	316	82.00	82.00	82.00
No	68	18.00	18.00	18.00
Total	384	100.00	100.00	100.00

Table 6 indicates that about 82 percent of the population agreed to promote the practice of producing human excreta-derived fertilizer.

Table 7.

Survey question 7 (What do you think are the barriers to reuse human excreta organic fertilizer?)

	Frequency	%	Valid %	Cumulative%
Little dosage, no need to reuse it	16	4.00	4.00	4.00
Operator health problems	39	11.00	11.00	11.00
The quality of excrement fertilizer	16	4.00	4.00	4.00
Unbearable odour	52	14.00	14.00	14.00
The cost	80	21.00	21.00	21.00
Insufficient technology	90	23.00	23.00	23.00
No barriers	24	6.00	6.00	6.00
Don't know	67	17.00	17.00	17.00
Total	384	100.00	100.00	100.00

Table 7 indicates that insufficient technology is the barrier to reuse human excreta organic fertilizer.

Table 8.

Survey question 8 (Do you think faeces and urine should be separated?)

	Frequency	%	Valid %	Cumulative%
Yes	122	32	32	32
Don't Know	151	39	39	39
No	111	29	29	29
Total	384	100.00	100.00	100.00

Table 8 indicates that people who said, "I don't know," have the highest number of individuals who agreed that feces and urine should be separated.

Table 9.

Survey question 9 (How should the source-separated urine be handled?)

	Frequency	%	Valid %	Cumulative%
Used for power generation	59	15.00	15.00	15.00
Direct discharge into surface water sources (rivers, oceans)	45	12.00	12.00	12.00
Don't know	136	35.00	35.00	35.00
Make biogas with livestock excrement	39	10.00	10.00	10.00
Reuse as crop fertilizer	35	9.00	9.00	9.00
Treated by sewage system	33	9.00	9.00	9.00
Used as water for lawn/flower	37	10.00	10.00	10.00
Total	384	100.00	100.00	100.00

Table 9 indicated that "I don't know" had the highest number of people who said that urine should be source-separated.

Table 10.

Survey question 10 (How should the source-separated faeces be handled?)

	Frequency	%	Valid %	Cumulative%
Reuse as crop fertilizer	67	17.00	17.00	17.00
Make biogas with livestock excremen	13	3.00	3.00	3.00
Don't know	225	59.00	59.00	59.00
Treated by sewage system	79	21.00	2.00	2.00
Total	384	100.00	100.00	100.00

Table 10 indicated that "treated by sewage system" answer had the highest number of people related with the source-separated faeces.

Table 11.

Survey question 11 (Do you know the subsidy policy for organic fertilizer?)

	Frequency	%	Valid %	Cumulative%
Yes	118	31.00	31.00	31.00
No	266	69.00	69.00	69.00
Total	384	100.00	100.00	100.00

Table 11 shows that the participants have a negative idea on the subsidy policy for organic fertilizer.

Table 12.

Survey question 12 (Do you think improper disposal of general waste and open defecation have impact on the health of the people?)

	Frequency	%	Valid %	Cumulative%
Yes	47	12.00	12.00	12.00
No	337	88.00	88.00	88.00
Total	384	100.00	100.00	100.00

Table 12 indicates that 88% of the population said that improper disposal of general waste and open defecation has no impact on the health of the people.

Findings for Research Question II: The Waste Management Behaviour Level of Local People in Margibi

Because the population has limited education on the proper disposal and management of all types of waste, approximately 70% of the population would store their waste in open containers to be eventually buried in the environment, potentially causing ground water pollution, while the other 30% would burn, dispose of their waste in nearby bush, streams, on the streets, or in drainages to be washed away during rainy seasons. The study also discovered that the overall increase in all types of waste is due to the increase in inhabitants over time, and it has significantly led to so many factors, including population growth, increased consumption, and an increase in packaged food, and this situation has resulted into approximately 76% of people saying “yes” waste in general has increased due to population growth while the of 24% says “no”.

Table 13.

Survey question 13 (What sorts of waste are mostly generated around your area, in your household/place of work?)

	Frequency	%	Valid %	Cumulative%
Four or more kinds of waste	180	47.00	47.00	47.00
Three kinds of waste	62	16.00	16.00	16.00
Two kinds of waste	10	3.00	3.00	3.00
One kind of waste	132	34.00	34.00	34.00
Total	384	100.00	100.00	100.00

The table above indicates the amount of waste generated per house or workplace as four or more kinds of waste (food, plastic, paper, and aluminum (cans) or metal), which happens to be 47% of the total waste.

Table 14.

Survey question 14 (How do you store or collect your waste before disposal?)

	Frequency	%	Valid %	Cumulative%
One storage	161	42.00	42.00	42.00
Three or More Storage places	56	15.00	15.00	15.00
Two Storages	167	43.00	43.00	43.00
Total	384	100.00	100.00	100.00

According to the table above, the individuals who took part in this study stored their waste in two separate facilities, which was the highest.

Table 15.

Survey question 15 (Do you separate your solid waste before disposing?)

	Frequency	%	Valid %	Cumulative%
Yes	106	28.00	28.00	28.00
No	278	72.00	72.00	72.00
Total	384	100.00	100.00	100.00

This question in Table 15 shows that 72% of the population does not separate their waste before disposing of it.

Table 16.

Survey question 16 (Who collects the waste in your house?)

	Frequency	%	Valid %	Cumulative%
Collected by owner's contractor	62	16.00	16.00	16.00

Collected by the waste agency contractor	43	11.00	11.00	11.00
Collected by the waste management agency	33	9.00	9.00	9.00
No collection service (done by owner)	246	64.00	64.00	64.00
Total	384	100.00	100.00	100.00

Table 16 clarifies that waste collection by owner have the highest percentage.

Table 17.

Survey question 17 (Where do you empty / dispose your waste?)

	Frequency	%	Valid %	Cumulative%
Along the road/Street	27	7.00	7.00	7.00
Burn	26	8.00	8.00	8.00
Burry	97	25.00	25.00	25.00
Drainage channels like gutter	54	14.00	14.00	14.00
Dump stand	70	18.00	18.00	18.00
In the stream	20	5.00	5.00	5.00
Nearby bush	90	23.00	23.00	23.00
Total	384	100.00	100.00	100.00

According to Table 17, those who bury their waste percentage were the highest in the study.

Table 18.

Survey question 18 (Which kind of toilet do you have in your household currently?)

	Frequency	%	Valid %	Cumulative%
Dry latrine	94	25.00	25.00	25.00
Flushing toilet	74	19.00	19.00	19.00
Public or shared toilet	77	20.00	20.00	20.00
Other types	139	36.00	36.00	36.00
Total	384	100.00	100.00	100.00

According table 18, majority of the respondent use other types of toilet (open defecation).

Table 19.

Survey question 19 (How do you store your family excreta?)

	Frequency	%	Valid %	Cumulative%
Three-septic-tank type;	70	18.00	18.00	18.00
Double-vault funnel type;	15	5.00	5.00	5.00
Biogas-linked toilet;	13	3.00	3.00	3.00
Urine-feces division toilet;	16	4.00	4.00	4.00
Integrated flushing toilet;	43	11.00	11.00	11.00
Double pit alternate type;	18	5.00	5.00	5.00
Simple pit alternate	67	17.00	17.00	17.00
Public or shared toilet	59	15.00	15.00	15.00
Other toilets	83	22.00	22.00	22.00
Total	384	100.00	100.00	100.00

Table 19 says that those that use other types of toilet were the highest in the studies.

Table 20.

Survey question 20 (How do you transfer your family excreta?)

	Frequency	%	Valid %	Cumulative%
Transported by myself	89	23.00	23.00	23.00
Transported by sewage pipe	86	22.00	22.00	22.00
Transported by excrement suction truck	41	11.00	11.0	11.0
Don’t know	168	44.00	44.00	44.00
Total	384	100.00	100.00	100.00

Table 20 indicates that they don’t have any idea on where their toilet is being transfer, is the highest in the survey.

Table 21.

Survey question 21 (Do you think that the toilet is enough and sanitary for your family?)

	Frequency	%	Valid %	Cumulative%
Yes	176	46.00	46.00	46.00
No	208	54.00	54.00	54.00
Total	384	100.00	100.00	100.00

Table 21 states that 54% of the population said that their toilet is not enough and sanitary.

CHAPTER V

Discussion

The information gathered from related literature indicates that the impact of sanitation factors on waste in Liberia, like any other undeveloped country, has always been a rising issue due to the deficiency of effective management, no or limited execution of policies, a futile or no collection system, the nonexistence of sorting and separation of waste, inaccurate data about the magnitude and arrangement of waste produced, and inadequate measures to lessen pollution.

Moreover, these documents also state that the truancy of an incorporated waste management outline has led to incongruous waste disposal, poor separation tactics, fruitless cooperation between interested parties, the implementation of reconditioning platforms, and a dearth of motivation, which is emblematic for most developing countries.

Additionally, the progress of maintainable management is further hampered by a shortage of funds, technical, technological, and policy support, low public participation, a lack of educational awareness programs, and a failure to recognize the informal recycling sector. Furthermore, waste in general (David et al., 2020) stated that the relatively high organic component and toxicity remain in the environment for an extended period of time (Tchounwou et al., 2012). In rural areas, there are no designated sanitary landfills for hazardous waste disposal. The most common type of landfilling practiced is the unsustainable, uncluttered filling of swamps. Similarly, medical waste is occasionally disposed of in open areas due to a lack of satisfactory public mindfulness.

Moreover, a study on waste disposal in Liberia conducted by David Jr. et al. (2019) also shows that waste dumping in water bodies; along street corners, drainages, landfilling, and open burning are the order of the day. This is also explained the difference in solid waste fabrication per capita in rural and urban regions, as well as residents' attitudes toward environmental sanitation (David et al., 2020). Furthermore, the structure, solidity, and waste generation rates in rural communities are lower than in urban areas (Dladla & Shale 2016; Gu et al., 2017). Similar findings in most developing countries pose environmental risks (The World Bank 2018, IBRD-IDA Solid Waste Management).

For sanitation, according to Sitali (2010), in Liberia, access to sanitation facilities remains extremely limited. According to the PRS (2008), one out of every seven people has access to adequate sanitation. While the 2008 census in Liberia translates to an estimated 3 million people who do not have access to improved sanitation. Furthermore, flush and pit latrines were found to exist in only one out of every two households in an urban community in Monrovia (Samuel et al., 2022). That is, one out of every two households practiced open defecation. Therefore, with almost similar founding I will recommend more research is required to completely understand the factors that influence the amount of waste generated and managed in the country's urban and rural areas.

CHAPTER VI

Conclusion and Recommendations

Generally speaking, the proper management of garbage amid the pressing issues in most countries in sub-Saharan countries and Liberia is no exception. This study looked at the impact of sanitation factors on waste management in the Gibi district of Liberia's Margibi country. It discovered that tertiary education was not critical to household participation in environmental sanitation activities. It also came to the conclusion that household size had an impact on household participation in environmental sanitation. Furthermore, flush toilets and pit latrines were discovered to exist in only a few households, leaving the rest of the population to relieve themselves in shared latrines or the field.

This means that one in every four households used open defecation. Again, one out of every three households lacked adequate waste storage or disposal facilities on their property. It was revealed that at least one out of every four people was irregularly involved in environmental sanitation activities. More importantly, one out of every four respondents had no information on how organic waste is converted into biodegradable nourishment for agriculture.

This study looked at a Liberian district's sanitary, general, and technical knowledge of converting human waste into fertilizer. It has been habitual that the bulk of the households in the district participated in poor environmental sanitation, waste management activities, and human excreta. It can therefore be established that households' participation in waste management is poor. Although there were still some negative environmental practices like open defecation and the building of pit latrines close to the houses,

Recommendations

- Formal education on health-related issues should be introduced at all levels of the learning institutions and nonchalantly at homes, market places, and every populated area by the local authority, non-governmental institutions, religious or private groupings, and the national rule on the need for domestic waste disposal at various homes.
- The government should update and review current regulations with a focus on urban and rural planning, infrastructure, building standards, environmental

regulation, and infrastructure in order to make them more attainable, realistic, and relevant to indigenous communities.

Recommendations According to Findings

- Legislation should ensure that there is massive health education activity across the country on waste related issues.
- Leaders from all sectors could also lend their voices to putting a greater stress on family hygiene and environmental health, because many citizens belong to one of two groups and usually take their leaders' words seriously.
- Legislation, private institutions, and non-governmental institutions should invest in organic fertilizer production using urine, biodegradable waste, and human excreta.
- They should also incorporate strategies to reduce the safety and health risks allied with outdated waste dumping practices for both populations and the environment.

Recommendations for Further Research

- Forthcoming inquiries ought to concentrate on determining prices for services that are reasonable for families. Municipal based packages that engage residents directly and provide job opportunities may alleviate concerns about free riding actions and increase participation.
- Researchers should also look into ways to reduce the burden of waste, possibly by tying this performance to secondary profitable assistance from the sale of treasured waste torrents. Municipal buy in, service pricing, and waste stream optimization strategies are essential for executing resourceful and viable waste programs.

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Appendices

Appendix A

Ethical Approval

NAER EAST UNIVERSITY

SCIENTIFIC RESEARCH ETHICS COMMITTEE

04.11.2022

Dear Abigail Z K Fahnbulleh

Your application titled **"Waste Management With Emphesis On Santation (Human Excreta)"** with the application number NEU/ES/2022/892 has been evaluated by the Scientific Research Ethics Committee and granted approval. You can start your research on the condition that you will abide by the information provided in your application form.

Prof. Dr. Aşkın KİRAZ

The Coordinator of the Scientific Research Ethics Committee

Appendix B

Consent Form

Consent Form

GRADUATE THESIS: WASTE MANAGEMENT WITH EMPHESIS ON SANTATION (human Excreta)

I _____agree to participate in the research project WASTE MANAGEMENT WITH EMPHESIS ON SANTATION (human Excreta), conducted by **Abigail Z K Fahnbulleh**, a Graduate Student of the Department of **DEPARTMENT OF ENVIRONMENTAL EDUCATION AND MANAGEMENT MASTER PROGRAM of Near East University** who has discussed the research project with me.

I have received, read and kept a copy of the information letter/plain language statement. I have had the opportunity to ask questions about this research and I have received satisfactory answers. I understand the general purposes, risks and methods of this research.

I consent to participate in the research project and the following has been explained to me:

1. the research may not be of direct benefit to me
2. my participation is completely voluntary
3. my right to withdraw from the study at any time without any implications to me
4. the risks including any possible inconvenience, discomfort as a consequence of my participation in the research project
5. the steps that have been taken to minimise any possible risks
6. public liability insurance arrangements
7. what I am expected and required to do
8. whom I should contact for any complaints with the research or the conduct of the research

In addition, I consent to:

audio-visual recording of any part of or all research activities (if applicable)
publication of results from this study on the condition that my identify will not be revealed.

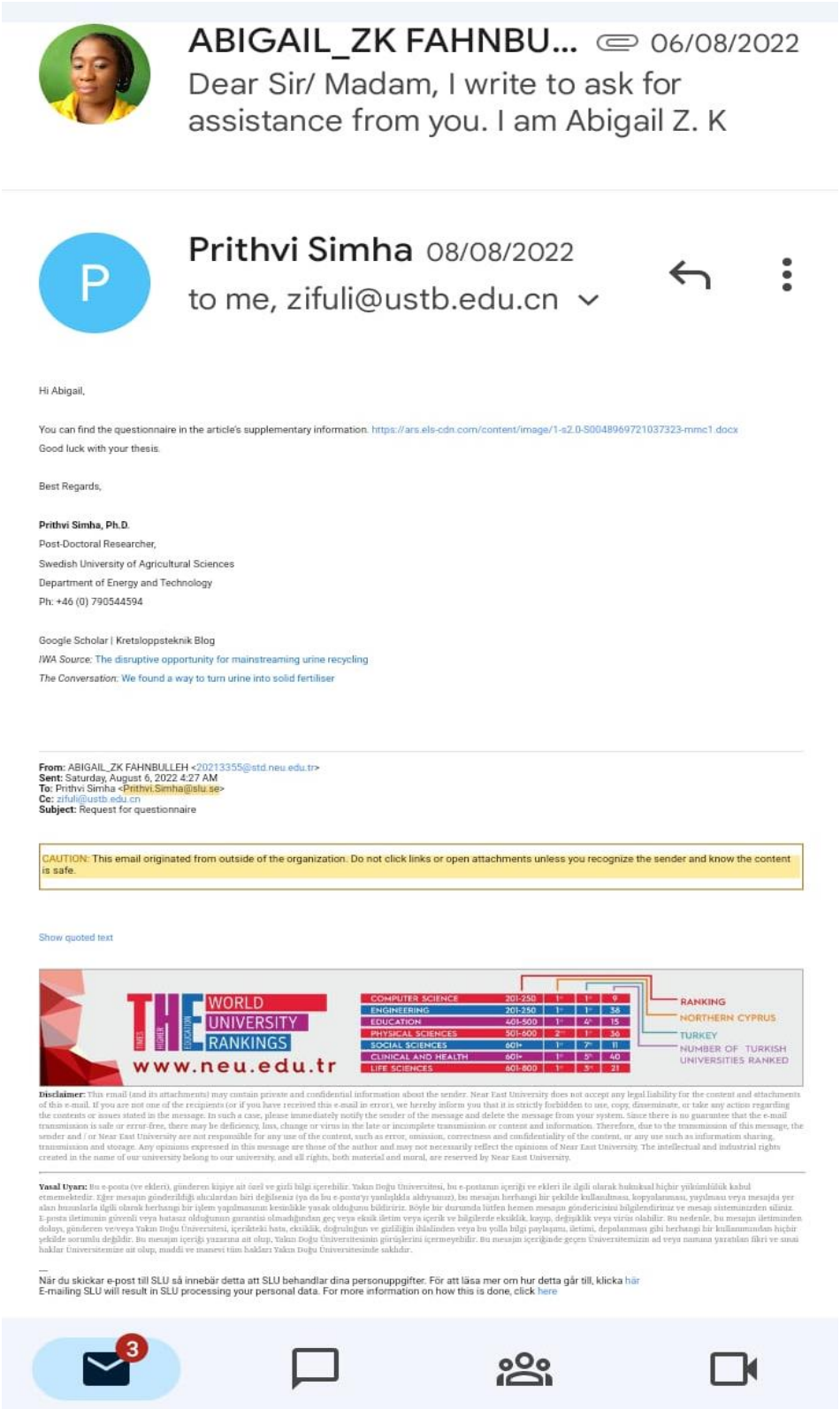
Name: _____ (please print)

Signature: _____

Date: _____

Appendix C

Permission for Data Collection Tools



ABIGAIL_ZK FAHNBU... 06/08/2022

Dear Sir/ Madam, I write to ask for assistance from you. I am Abigail Z. K

Prithvi Simha 08/08/2022

to me, zifuli@ustb.edu.cn

Hi Abigail,

You can find the questionnaire in the article's supplementary information. https://ars.els-cdn.com/content/image/1-s2.0-S0048969721037323-mmc1.docx

Good luck with your thesis.

Best Regards,

Prithvi Simha, Ph.D.

Post-Doctoral Researcher,

Swedish University of Agricultural Sciences

Department of Energy and Technology

Ph: +46 (0) 790544594

Google Scholar | Kretsloppsteknik Blog

IWA Source: The disruptive opportunity for mainstreaming urine recycling

The Conversation: We found a way to turn urine into solid fertiliser

From: ABIGAIL_ZK FAHNBULLEH <20213355@std.neu.edu.tr>
Sent: Saturday, August 6, 2022 4:27 AM
To: Prithvi Simha <Prithvi.Simha@slu.se>
Cc: zifuli@ustb.edu.cn
Subject: Request for questionnaire

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Show quoted text

Appendix D

Question Forms (Samples)

Section I. Demographic Information

Q1. Gender

A. Female B. Male

Q2. Age

A. ≤30
B. 31~40
C. 41~50
D. 51~60
E. ≥60

Q3. Education

A. None
B. Primary school
C. Junior high school
D. High school
E. College
F. Undergraduate college and above

Q4. Occupation

A. Unemployed
B. Farmer
C. Worker
D. Businessman
E. Students
F. Other

Section II. Sanitation (Human Excreta) Knowledge Form

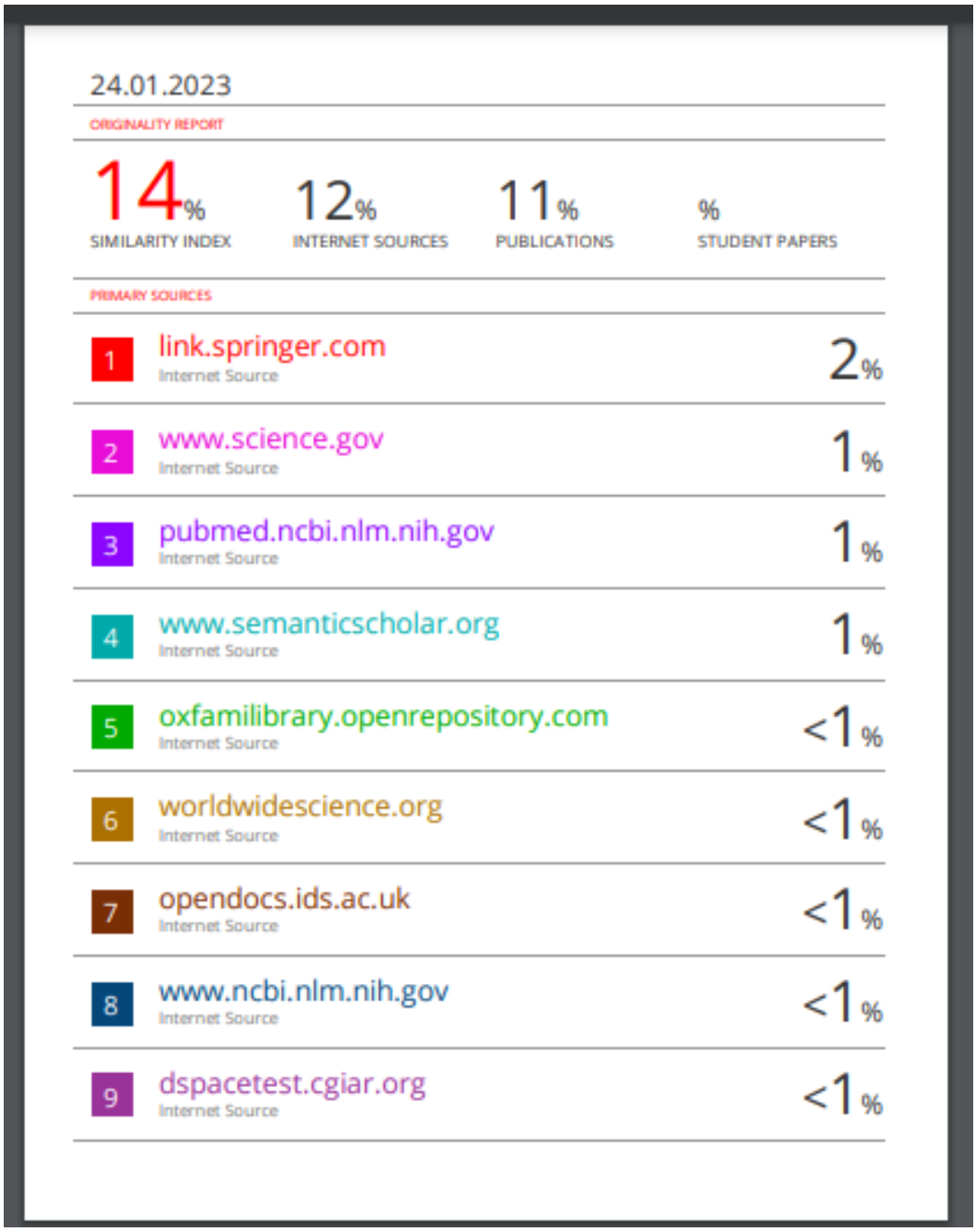
Q1. Do you think your waste generation level has increased over the years?
Q3. How should be the waste store or collect before disposal?
Q10. How should the source-separated faeces be handled?

Section III. Waste Management Behaviour Form

Q14. How do you store or collect your waste before disposal?
Q19. How do you store your family excreta?
Q20. How do you transfer your family excreta?

Appendix E

Turnitin Similarity Report



24.01.2023

ORIGINALITY REPORT

14%	12%	11%	%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	link.springer.com Internet Source	2%
2	www.science.gov Internet Source	1%
3	pubmed.ncbi.nlm.nih.gov Internet Source	1%
4	www.semanticscholar.org Internet Source	1%
5	oxfamilibrary.openrepository.com Internet Source	<1%
6	worldwidescience.org Internet Source	<1%
7	opendocs.ids.ac.uk Internet Source	<1%
8	www.ncbi.nlm.nih.gov Internet Source	<1%
9	dspacetest.cgiar.org Internet Source	<1%

Curriculum Vitae

A dedicated public health professional with over ten (10) years of education and experience in community development work, including monitoring and reporting on gender-based issues and child development, as well as carrying out community engagement activities to promote the sustainability of water sanitation and hygiene (WASH) project facilities and community development using the Community Led Total Sanitation (CLTS), Participatory Hygiene and Sanitation Transformation (PHAST), and SARA approaches. a bachelor's degree holder, an advanced diploma holder, and a master's candidate in environmental education & management.

EDUCATIONAL BACKGROUND

Bachelor of Science Degree, General Agriculture 2012 - 2018
Williams R. Tolbert Jr. College of General Agriculture & Forestry, University of Liberia
Capitol Hill, Monrovia, Liberia

Advance Diploma, Environmental Health 2005-2008
Tubman National Institute of Medical Arts (TNIMA)
John F. Kennedy Medical Center Compound
21st Street, Sinkor-Monrovia, Liberia

Certificate, Computer Training 2005
Ms Word, Ms Excel, Ms PowerPoint & Ms Outlook
REAP Training Institute, Isaac A. David Compound
ELWA Junction, Paynesville, Liberia

TRAININGS

Participatory Hygiene and Sanitation Transformation (PHAST) methodology 2008
Tearfund
Greenville, Sinoe County, Liberia

Certificate2009
Trainer of Trainers (TOT)

Community Health Ambassador Training Methodology including Malaria
Equip Liberia

Participated in the National Strategy and Policy Making 2010
Approach for Community Health Services in Liberia

Participated in community Led Total Sanitation approach facilitated by 2012
UNICEF for health care services provider
Fish Town, River Gee County, Liberia

EMPLOYMENT HISTORY

Building Resources Across Communities (BRAC) 2019 March- August 31, 2021
Branch Coordinator
Ultra-Poor Graduation Program
Old Road, Sinkor, Monrovia, Liberia

Duties & Responsibilities

- Worked with 251 ultra-poor women in lower Margibi County, ensuring that they participate in the program so as to enable them graduate from poverty within the next two years of the project implementation in Liberia through agriculture programs;
- Supervised and implemented the community wealth ranking process, participatory rural appraisal strategy and mapping;
- Monitoring six program assistants implementing the Ultra-poor beneficiary (target group of 251 women).
- Supervised field activities precisely, staff, assets, and project beneficiaries;
- Travels to operational areas to provide field support and coaching sessions, participate in strategic meetings and events as well as maintain close working relationships with field teams, beneficiaries and their families;
- Working to improve and update operational systems, processes and policies;
- Working closely with communities, districts and country level teams in general to develop improved policies in order to implement better emergency plans and incident responses;

- Strategically map-out, plan, and implement projects thereby contributing to the innovation of new ideas in Monitoring & Reporting;
- Contribute to the timely achievement of the project objectives and measure of successes;
- Communicates effectively with colleagues, project beneficiaries and families including management to execute institution processes.

Margibi County Health Team 2017 June-2018 December
Supervisor, Community Led Total Sanitation (CLTS)
Kakata, Margibi County, Liberia

Duties & Responsibilities

- Ensured best quality implementation of the projects are met in pre-triggered, triggered and open defecation communities (ODF);
- Designed and follow innovative and community-friendly approaches to ensure full participation of community members in the projects so that it yields the desire results in these communities;
- Ensured that children, youth groups, women groups and the local community members are fully engaged in the implementation of projects related activities where their voices are heard and respected.
- Collaborated with different entities including local children and youth groups, women groups and governance and traditional, local and international organizational structures to raise awareness on and ensure commitment to project sustainability;
- Organized and coordinated awareness raising, trainings, survey and livelihood activities;
- Monitored community projects, ensuring that sanitation facilities are sustained after project implementation;
- Monitored and Evaluated projects objectives, so that they are reported in a timely manner and results are shared with different stakeholders on a monthly basis.

Living Water International- Liberia
Acting Team leader, Hygiene & Sanitation 2015 January-2017June
Towel Hill, Lower Margibi County, Liberia

Duties & Responsibilities

- Monitored and encouraged community dwellers to ensure the functionality of water points and other WASH indicators (scaling up) in community;
- Conducted coaching sessions in meetings with water users during the installation of water points and discuss the cash box system for projects sustainability after LWI intervention;
- Provided technical and effective support in coordinating and supervising training of target group members (Community WASH Committees & Natural Leaders);
- Designed visual aids and other project training materials for communities used;
- Closely work with the local and national government ministries (Ministry of Health & Public Works).
- Conducted baseline survey on the knowledge, aptitude and practice of community members and water beneficiary in regards to urban and per urban WASH projects;
- Facilitated community WASH committee groups training for sustainability;
- Facilitated the development of materials on Ebola and sanitation awareness with health promoters at the community level;
- Designed projects work plans and develop projects progress and reported to the operations manager;
- Facilitated and pre-trigger communities using the community Led Total Sanitation approach;
- Trained, map and trigger communities in collaboration with the County, District Steering committees and the National Technical Coordinating Units in the implementation of the Community Led Total Sanitation (CLTS) Approach;
- Supervised, monitored and verified triggered communities along with the County, district Steering committees and the National Technical Coordinating

Unit in communities to obtain Open Defecation free status with in its project time frame;

- Supported other partners and WASH actors in CLTS training, community entry, community mobilization, SHEP activities, etc.
- Built the capacity of district and community-level CLTS facilitators e.g. EHTs, NLs, and supervised EHTs on post-triggering activities.

Living Water International in Liberia 2013 January- June 2015
Hygiene promoter
Towel Hill, Lower Margibi County, Liberia

Duties & Responsibilities

- Mobilized local communities and inform them about the project activities;
- Provided effective support in training needs identification of target group members;
- Created awareness and ensure communities participate fully from problem identifying stages through implementation and the management stage.
- Organized and facilitates Information Education and Communication (IEC) sessions with community members.
- Closely worked with the ministry counterparts (The County Health Team) and link the activities of the community with relevant bodies;
- Integrated WASH and Christian Witness activities with other extension work, like health, education, institutional capacity building, and other developmental activities to strengthen the holistic approach of community dwellers for a better achievement;
- Facilitated the distribution of disinfectants materials to Ebola affected communities, clinics and health facilities;
- Facilitated and conducted health club training and interactive forum in District # 4, Montserrado County.

Welthungerlife/ECHO Project-Liberia 2011 November-2012 October
Team leader, Hygiene Promoter
Grand Gedeh & River Gee Counties, Liberia

Duties & Responsibilities

- Worked with hygiene promoters to support community health volunteer efforts to disseminate WASH messages after training on sustainability of project facilities in Grand Gedeh and River Gee Counties in collaboration with the Ministry of Health teams in the various communities who were covered by the ECHO project;
- Assisted in the development of materials for training community health volunteers and additional topics to support WASH beneficiaries;
- Planned and facilitated trainings for community health volunteers on health-related issues.
- Interacted with community health volunteers, the County Health Team, and others well appropriate groups to support health education through community health volunteers;
- Monitored and measured project implementation, impact, standards, and operational compliances;
- Developed and implemented work plans and collected reports on a weekly and monthly basis.
- Facilitated and conducted health education training, monitored and supervised health activities in project communities in collaboration with the County Health Team.

Equip Liberia 2009 February-2011 September
Supervisor, Regional Public Health Team
Greenville, Sinoe County-Liberia

Duties & Responsibilities

- Conducted baseline and end line Survey on the president's malaria Initiate project (PMI);
- Implemented the president's malaria initiate program to reduce the incidence and death rate of children under 5 years and pregnant women;
- Organized and trained community dwellers on the proper used of treated mosquitos' bed nets;

- Identified Children under the age of 5 years with fever and refer them to the nearest clinic or Health facility within 24 hours for treatment;
- Supervised community Health Ambassadors, conduct survey in community on the incident rate of malaria;
- Mobilized and sensitized communities on project activities and implementation;
- Assisted in evaluating the knowledge of Public Health issues in project communities;
- Supported community to take actions to prevent diseases and promote healthy behavior in communities;
- Created awareness on HIV and AIDS in the project communities; and
- Monitored and evaluated projects activities through pre and post Knowledge Attitude and Practices (KAP) surveys during project implementation.

Sinoe County Health Team 2008 February- 2009 September
Supervisor, Public Health System
Greenville, Sinoe County, Liberia

Duties & Responsibilities

- Monitored INGOs/ NGOs projects, at clinics and communities on public health related issues;
- Monitored communities on hygiene and sanitation activities;
- Created awareness on the media on scheduled environmental risk and hazards;
- Facilitated and conducted Public Health trainings with INGOs and LNGOs in the county and
- Planned and conducted water quality testing and treatment in the county.

AREAS OF EXPERTISE & UNDERTAKINGS

- Sensitization and mobilization of communities for project implementation and sustainability;
- Capacity building of community health volunteers, students, teachers and local leaders;

- Skills in Behavior Change Communication (BCC) and/or Information Education Communication (IEC) message production;
- Facilitate drama Documentary of Projects.
- Skills in applying the following methodologies and or strategies:
    - Participatory Rural Appraisal (PRA).
    - Participatory Hygiene and Sanitation Transformation (PHAST).
    - Community Led Total Sanitation(CLTS)
- Excellent motorbike riding skills;
- Project impact stories writing skills;
- Excellent organizational, planning and financial management skills;
- Experience in working with rural communities;
- Experience in conducting training and other development activities in multi-cultural settings;
- Very good at presentation and facilitation skills;
- Excellent verbal and written communication skills with ability to produce professional reports in English; and
- A team player who is also culturally sensitive.