

**ENSIGN GLOBAL COLLEGE
KPONG, EASTERN REGION, GHANA**

**ASSESSMENT OF SOLID WASTE MANAGEMENT PRACTICES AND CHALLENGES
AMONG RESIDENTS IN THE ADAKLU DISTRICT
OF THE VOLTA REGION, GHANA**

By

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**A THESIS SUBMITTED TO THE DEPARTMENT OF COMMUNITY HEALTH, FACULTY
OF PUBLIC HEALTH, ENSIGN COLLEGE OF PUBLIC HEALTH IN PARTIAL
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DECLARATION

I hereby declare that this thesis presented for the award of Master of Public Health degree is my work produced from research done under supervision and has not been presented for examination in any other institution. References used have been cited accordingly.

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DEDICATION

To my lovely parents, brothers and sisters with the deepest veneration.

ACKNOWLEDGEMENT

I am profoundly thankful to countless people for their consistent support and essential counsel during every phase of this effort. My warmest thanks comes towards my supervisor, Dr. Steve Manortey, who sacrificed his considerable time and efforts to supervise this job. I felt his recommendations to be incredibly beneficial, and his critical comments were important in molding the project. I am genuinely appreciative for his encouragement.

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Lastly, I want to convey my appreciation to my loved ones for the compromises they made while I was away and for the financial support they provided. To others who I have not listed here, I express my deepest appreciation.

DEFINITION OF TERMS

Solid Waste Management, or SWM, is the methodical process of gathering, handling, getting rid of, and controlling solid waste products produced by human activity in a way that is both socially and ecologically appropriate.

Municipal Solid Waste Management (MSWM) is the process of managing solid trash that comes from non-industrial sources such as homes, businesses, institutions, and other local government entities.

Gross Domestic Product (GDP) is a metric for assessing an economy's performance that measures the total worth of goods and services generated within a nation's boundaries over a certain time frame.

Non-Governmental groups (NGOs): Private groups that carry out operations separately from government institutions and tend to concentrate on environmental, social, and humanitarian concerns.

Environmental Impact Assessment (EIA): An approach that assesses the possible environmental implications of ideas for projects, regulations, or programs, assisting in the detection and reduction of negative effects.

The Clean Development framework (CDM) is a flexible framework established by the Protocol of Kyoto that enables industrialized nations to finance initiatives to reduce emissions in developing nations in order to meet their individual emission reduction goals.

UNFCCC: An international agreement that provides an overall structure for the negotiation of agreements to decrease greenhouse gas emissions. Its goal is to address climate change and its effects.

Intergovernmental Panel on Climate Change (IPCC) is a scientific organization that the UN created to evaluate the scientific understanding of climate change, its effects, and possible adaptation and mitigation measures.

Extended Producer Responsibility (EPR) is a legal concept where producers are held accountable for the whole lifespan of their goods, including any negative effects on the environment and appropriate disposal.

ABBREVIATIONS/ACRONYMS

AMA	Accra Metropolitan Area
CDM	Clean Development Mechanism
EIA	Environmental Impact Assessment
EPR	Extended Producer Responsibility
GDP	Gross Domestic Product
IPCC	Intergovernmental Panel on Climate Change
MSWM	Municipal Solid Waste Management
NGOs	Non-Governmental Organizations
SWM	Solid Waste Management
UNFCCC	United Nations Framework Convention on Climate Change
ZGL	Zoomlion Ghana Limited
GHC	Ghana Cedi
IPO	Input-Process-Output

ABSTRACT

Background: Inadequate household solid waste management poses significant environmental and health challenges in various communities worldwide. Adaklu, a community in Ghana, faces similar issues, with improper waste disposal methods leading to pollution, health risks, and degradation of the local environment. Addressing these challenges requires a comprehensive understanding of the prevailing waste management practices, knowledge levels, attitudes, challenges, and influencing factors. **Method:** Data for this study were collected through surveys and interviews conducted among 403 households within the Adaklu community. The selection of households was carried out using probability sampling techniques. A multi-stage sampling approach was employed. The first stage, Zonal councils and the participating communities were chosen using a Simple Random Sampling method. In the subsequent stage, Systematic Sampling technique was utilized to select the households within these communities. The survey instrument encompassed questions related to waste generation, disposal practices, knowledge about waste management, attitudes, challenges faced, and factors influencing waste management behaviors. The data that was gathered underwent analysis through the use of descriptive statistics, allowing for insights into waste management trends and the relationship between knowledge levels and actual practices. **Results:** The investigation revealed that plastic waste (28.8%) and food waste (49.9%) constitute the dominant waste categories in the Adaklu community. Despite varying knowledge levels, households exhibited uniformity in the adoption of improper methods of waste disposal, like the practice of openly burning waste and inadequate waste segregation. The roles of culture and government policies were found to have statistically significant associations with waste disposal in the communities at p-values of <0.001 and 0.004 respectively.

Conclusion: Although there were differences in knowledge levels among households, there was a troubling consistency in the adoption of insufficient waste management practices. This emphasized the need for targeted interventions to bridge the gap between knowledge and action, aligning with previous research highlighting similar challenges. The community's positive attitude toward waste management, coupled with a balanced perception of responsibility, offers a foundation upon which educational efforts can build to encourage better practices. **Keywords:** Household solid waste management, waste disposal practices, Adaklu, Volta Region Ghana.

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CHAPTER 1

1.0 INTRODUCTION

1.1 Background to the Study

This problem wasn't exclusive to Ghana or Adaklu in a larger global context. The management of solid wastes was a big issue worldwide. According to statistics from the World Bank, there were 2.01 billion tons of municipal solid garbage generated annually throughout the world, and at least 33% of this trash was not treated in an ecologically friendly way. According to Fadhullah et al. (2022), factors including population density, economic growth, urbanization, and industrialization are to blame for the rise in the amount of solid garbage. The industrialized nations have improved a number of solid waste disposal methods throughout time, including incineration, sanitary landfills, recycling, and composting. However, solid waste management remained an issue in the developing countries, as most of the garbage was just carried from one area to another without any suitable disposal strategy (Edjabou et al., 2015; Limoodehi et al., 2017; Abegaz et al., 2021). Urbanization and population expansion are on the rise in many developing countries' metropolitan regions, which has led to an increase in the production of significant amounts of solid garbage. This has outgrown the capacity of the local government to manage and properly dispose of this materials in a hygienic way (Ripa et al., 2017).

Although MSWM was typically thought of as a local problem, according to a recent research, the quantity of plastic trash that entered the seas from land each year topped 4.8 million tons and may reach 250 million tons by 2025. Marine Litter Solutions, 2017. Plastic garbage damaged fisheries, tourism, fishing, and leisure after it reached the water (Kershaw et al., 2011; Fadhullah et al., 2022). This emphasized clearly how widespread the issue of managing solid waste was.

In the national setting of Ghana, roughly 12,710 tons of solid trash were created daily, with only 10% being collected and correctly disposed of at specified places (Lissah et al., 2021). The bulk of the material wound up in open dumping places, resulting to serious environmental and health repercussions. This scenario was especially serious in rural places such as Adaklu district, where services and infrastructure linked to trash management were lacking.

This has been an increasingly urgent problem in many villages throughout Ghana, such as Adaklu area. The quantity of garbage produced had increased as a result of the expanding population and shifting consumption habits, which had substantial effects on the environment, sustainable development, and public health. I have firsthand experience with inadequate access to garbage disposal facilities in Adaklu villages as well as poor waste management techniques including open dumping and waste burning. This may lead to the spread of illness, tainting of water supplies, and environmental deterioration. To address these difficulties, it was important to analyze the present solid waste management techniques among families in Adaklu communities.

1.2 Problem Statement

Significant concerns have been made about the Adaklu district's insufficient solid waste disposal procedures, especially in light of the potential effects on the environment and public health. The prevalent waste management practices, particularly open dumping, have had serious negative effects on the environment and human health. Contamination of the land, air, and water, as well as a higher chance of disease transmission, are among these effects. The lack of appropriate garbage pickup and disposal services, poor waste segregation, and insufficient enforcement of garbage management standards are some of the district's main solid waste management concerns.

Furthermore, it's crucial to note that the problem of insufficient solid waste management techniques in the Adaklu area goes beyond its local bounds and has turned into a national issue demanding prompt response. Daily solid trash generation in Ghana as ensemble amounts to around 12,710 tons. However, only 10% of this garbage is properly collected and disposed of at specified locations, and the remainder of it ends up in open dumping places, which has serious negative effects on the environment and human health (Lissah et al., 2021). Since there is still a lack of waste management infrastructure and services in rural areas like the Adaklu district, this issue becomes even more urgent.

To address this issue successfully, it is necessary to understand the unique difficulties and causes for insufficient waste management in the Adaklu region and adopt tailored solutions to limit its effects on the environment and public health.

1.3 Rationale of The Study

The goal of the proposed research named "Assessment of Solid Waste Management Practices among the Households of Adaklu District in the Volta Region of Ghana" was to explore the present practices and issues of solid waste management in the Adaklu District, especially among families. The study's objectives were to shed light on household habits, attitudes, and knowledge related to solid waste management as well as to pinpoint the barriers standing in the way of communities' ability to manage their solid waste effectively.

In terms of the environment and public health, solid waste management has always been crucial. Degradation of the ecosystem, contamination of the air and water, and the spread of illnesses might result from improper management of solid waste. Due to the fact that the Adaklu District was not free from these difficulties, it was necessary to evaluate how the local communities were currently

managing their solid waste. The research was anticipated to further our understanding of the existing situation and to emphasize the significance of solid waste management.

The study's results gave the local government important information about the regions where solid waste management procedures needed to be improved. Additionally, the research benefited the neighborhood communities by educating them on solid waste management best practices and raising their knowledge of the significance of appropriate garbage disposal.

A gap in the body of knowledge on the management of solid waste in the Adaklu District was also filled by the suggested research. While little research has been done on managing solid waste in Ghana, there was a dearth of information on the state of affairs in the Adaklu District. The research, thus, adds to the existing body of information on solid waste management in Ghana.

Overall, the research was supposed to give important insights that supported in formulating plans to enhance solid waste management practices in the Adaklu District, with the objective of building sustainable and healthy communities.

1.4 Conceptual Framework

The input-process-output (IPO) model, which offered a systematic way to analyzing the interactions between numerous components in a system, served as the conceptual foundation for the research (FilipiKnow, 2023). Input: The study's input parameters were the sociodemographic details of the homes, waste management laws and rules, the accessibility of waste management facilities, and waste management awareness and education initiatives. Process: The households' solid waste management procedures, including trash segregation, collection, transportation, and disposal, were among the study's process-related variables. The process variables also covered the issues experienced by homes in the solid waste management process, such as insufficient garbage

containers, inconsistent waste collection services, and lack of suitable disposal locations. Results: The home solid waste management methods' effects on people's health and the environment were among the study's results components. These implications included the prevalence of infectious and non-communicable illnesses, water and air pollution, and other negative environmental effects. The conceptual framework also evaluated the mediating elements that may have altered the link between input, process, and output aspects. These mediating variables included cultural and traditional views about waste management, the extent of community engagement in waste management, and the level of community involvement in waste management rules and regulations. In general, the conceptual framework proposed that input factors like waste management policies and regulations, waste management education and awareness programs, and the availability of waste management infrastructure affected how households in the Adaklu District handled solid waste. These habits, in turn, influenced the health and environmental implications of solid waste disposal in the community. The research employed this framework to guide data collection,

analysis,

and

interpretation.

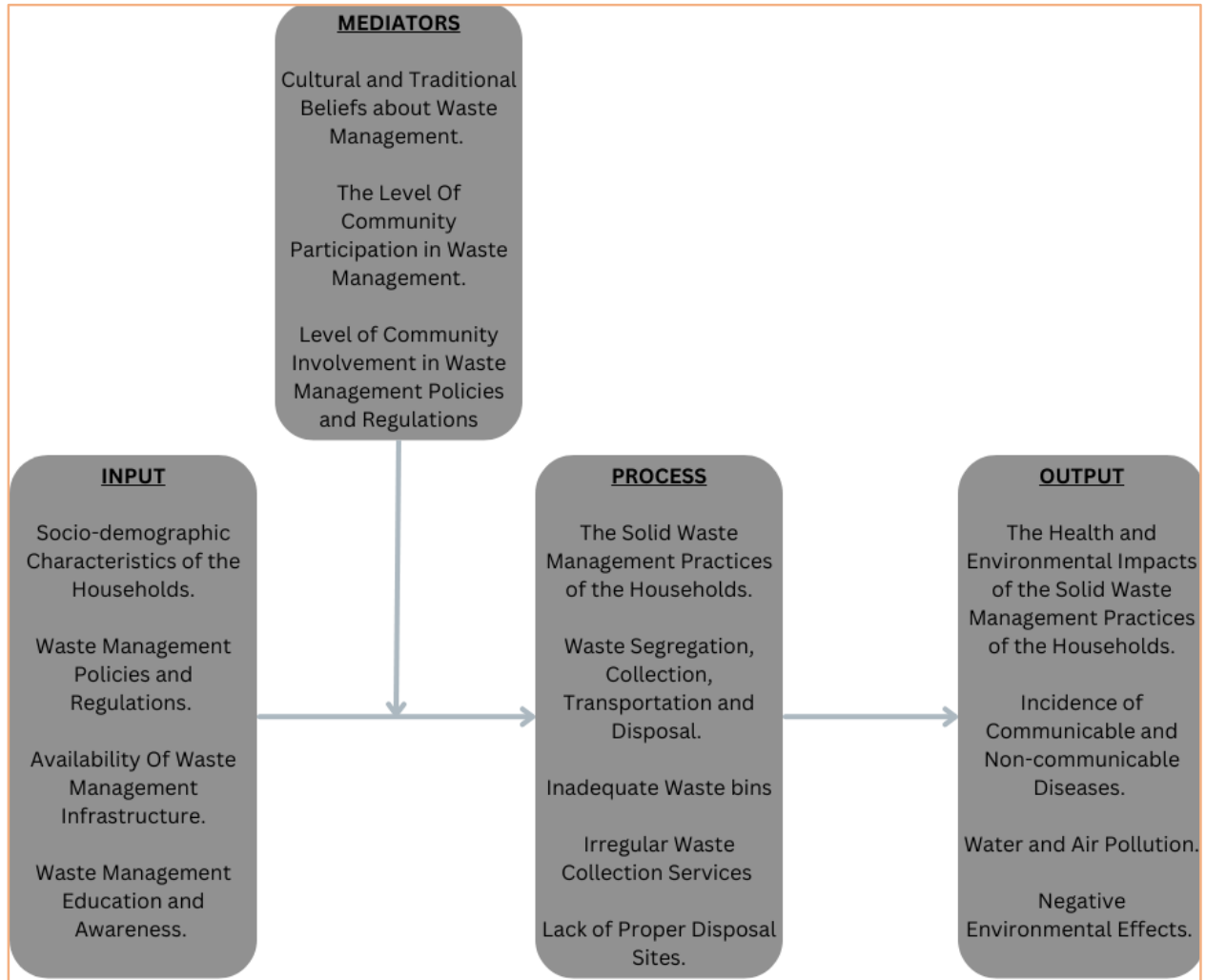


Figure 1 : Conceptual Framework

Source: Authors own construct

1.5 Research Questions

These research questions will guide the study in collecting and analyzing data to better understand the current state of solid waste management practices in Adaklu District and identify potential areas for improvement.

1. . What are the existing solid waste management methods among households within the Adaklu District?
2. What are the challenges faced by households in Adaklu District in the management of solid waste?
3. What is the level of knowledge, attitudes and perceptions of households in Adaklu District on the importance of proper solid waste management?

1.6 General Objectives

The general objective of the study is to evaluate solid waste management practices among residents of the Adaklu District in the Volta Region of Ghana.

1.6.1 Specific Objectives

1. To assess the current solid waste management practices among households in the Adaklu District.
2. To identify the elements that affect how the Adaklu District manages its home solid waste.
3. To assess the level of knowledge, attitudes and perceptions of households in the Adaklu District on proper solid waste management practices.

1.7 Profile of Study Area

The study was conducted in the Adaklu District, located in the Volta Region of Ghana. The district comprises several communities, such as Adaklu Waya and Adaklu Kpatove, and is predominantly rural. The communities are known for their agricultural activities, including the cultivation of crops such as yam, maize, cassava, and plantain. According to the Adaklu District Assembly (2020), the

projected population of the district in 2020 was about 45,325, comprising 22,304 males and 23,021 females, representing 49.21 and 50.79 percent, respectively. The annual growth rate for males was 2.5 percent, which is slightly higher than the regional figure of 2.4 percent. The sex ratio for the district was 95.7 males per 100 females. Christianity was the dominant religion in the district, with traditionalists and Muslims also present.

In terms of infrastructure, the district had a road network of about 123.1km, consisting of highways and feeder roads, most of which were not engineered. The district also had various educational institutions, including pre-school, primary, basic, secondary, and tertiary education. Mobile telecommunication networks such as Vodafone, MTN, Tigo, Expresso, and Airtel were available in the district. However, the quality of these network services was poor due to interference from Togocell and weak signals from the available networks.

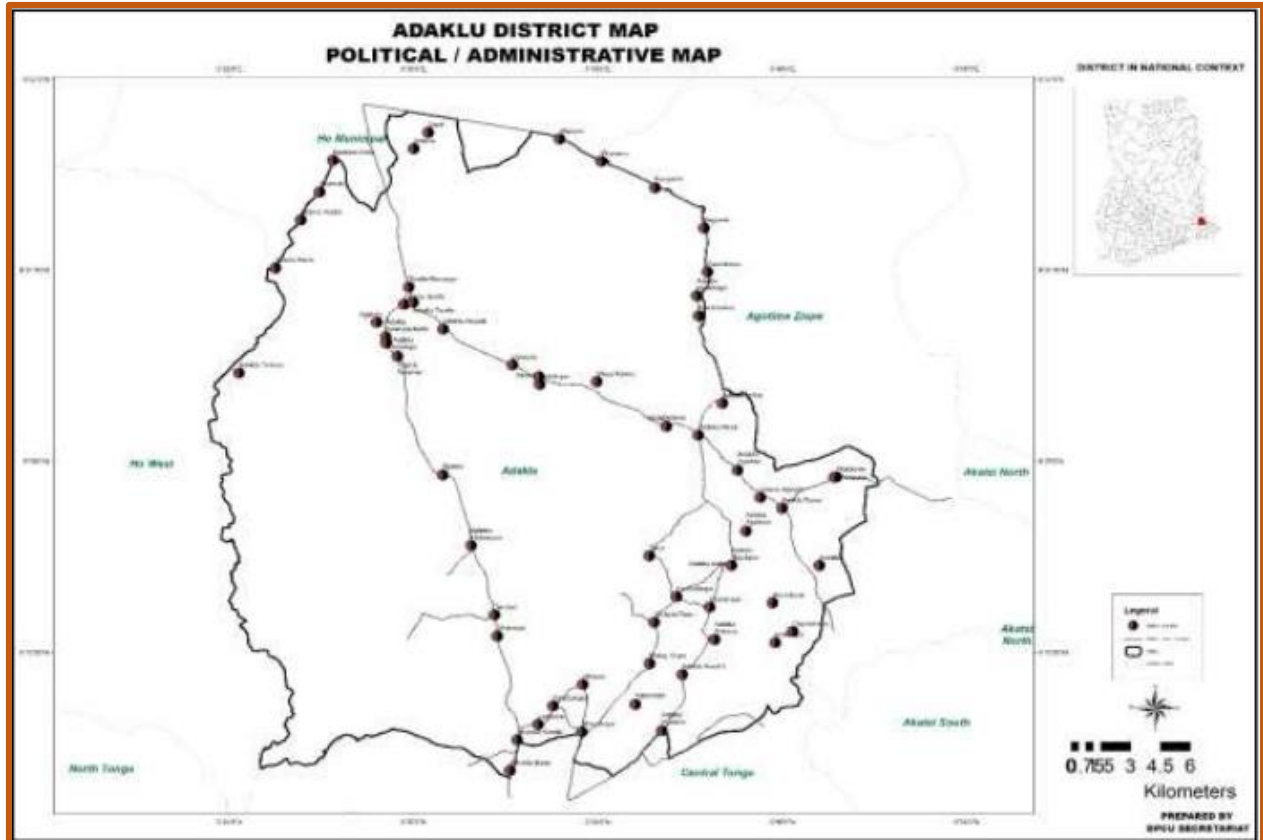


Figure 2: Map of Adaklu District

Source: Medium Term Development Plan 2018-2021

1.8 Scope of The Study

The scope of the study was limited to selected households in the Adaklu District. Specifically, the study focused on solid waste management practices, with emphasis on household waste. The study did not cover solid waste management practices related to industrial, commercial, construction, and demolition waste. Additionally, the study did not include liquid or gas waste management practices.

1.9 Organization of The Study

This research was structured into six main chapters, with each chapter serving a specific purpose. The following is a brief overview of the contents of each chapter: Chapter One provided an

introduction to the research and presented the statement of the problem under consideration. It also outlined the objectives of the study, research questions, and highlighted the significance of the research. Additionally, the chapter included information on the organization of the thesis and definitions of key terms used throughout the study.

Chapter Two focused on a comprehensive review of various studies and related literature that dealt with the evaluation of Municipal Solid Waste Management. This section aimed to provide a solid theoretical foundation for the research and highlight the existing knowledge and gaps in the field.

Chapter Three employed in conducting the study were detailed. It included information on the study area, research design, data sources, sample size, and sampling procedures. Additionally, the chapter described the methods of data collection, the instruments used for data collection, data collection procedures, and data analysis methods.

Chapter Four presented the results obtained from the data analysis and interpretation. This section focused solely on reporting the findings without any discussion or interpretation.

Chapter Five was dedicated to the discussion of the research findings. It allowed for a more extensive and critical analysis of the results, their implications, and their alignment with the research questions and objectives. This chapter facilitated a deeper understanding of the research outcomes.

Chapter Six summarized the entire study, including the key findings from Chapter Four and the discussion from Chapter Five. Based on these findings, this chapter presented the conclusions drawn from the research. Additionally, Chapter Six included practical recommendations based on the study's outcomes, aiming to offer guidance for improving Municipal Solid Waste Management practices.

CHAPTER 2

2.0 LITERATURE REVIEW

2.0 Introduction

Solid waste management continues to be a critical concern in numerous developing nations, Ghana included, primarily due to the rapid pace of urbanization and population growth. Negligent waste management practices can result in severe repercussions for both public health and the environment, encompassing issues like disease transmission, air and water pollution, and degradation of ecosystems.

2.1 Recent Research in Ghana

Recent research has delved into the contemporary state of solid waste management in Ghana. For instance, a study by Karikari *et al.*, (2018) underscored the significant challenge of insufficient waste segregation and disposal practices in effectively managing solid waste, in Kumasi Metropolis. Another study by Annan *et al.*, (2020) identified inadequate waste collection and transportation services as a prominent issue for households in the Cape Coast Metropolis. Educational and awareness initiatives aimed at promoting waste segregation and proper disposal have yielded success in certain Ghanaian communities. Notably, Agyei-Mensah *et al.*, (2019) discovered that involving communities in waste management through education and awareness programs led to notable enhancements in waste management practices in the Ashaiman Municipality.

2.3 Infrastructure and Resources Challenges

Furthermore, the dearth of proper infrastructure, such as waste bins and collection vehicles, remains a substantial obstacle in efficiently managing solid waste in Ghana, as highlighted by Karikari *et al.*, (2018). A research by Debrah and Owusu (2019) underlined the relevance of waste management regulations and policies in supporting ethical waste disposal procedures in Ghana, underlining the necessity of stakeholder participation in policy implementation.

2.4 Challenges in Other Developing Countries

Similar challenges were identified in other developing countries. For instance, a study by Rahman *et al.*,(2019) in Bangladesh found that ineffective waste management infrastructure, limited community involvement, and substandard waste segregation and disposal practices posed significant obstacles to efficient solid waste disposal. In India, a research conducted by Singh and Gupta (2018) examined solid waste management practices in urban areas, revealing that inadequate awareness and improper waste management practices were foremost challenges for residents. The study recommended the implementation of waste management education programs and strict enforcement of policies to address the situation.

Conversely, a study carried out by Mbeng (2017) in Cameroon identified inadequate infrastructure and resources as the primary challenges in solid waste management. This study also highlighted the pivotal role of community engagement and involvement for the triumph of waste management initiatives, emphasizing the importance of tailoring solutions to local contexts.

2.5 Health Implications of Poor Waste Management

Concerning the health implications of subpar solid waste management, Ali and Hossain's study (2018) in Bangladesh demonstrated a heightened risk of diseases like diarrhea and cholera due to

inadequate waste management practices. This study emphasized the pivotal role of community participation and awareness in enhancing waste management practices and mitigating health risks. Similarly, a study by Adegboye *et al.*, (2019) in Nigeria concluded that improper solid waste management practices contributed to environmental pollution and health hazards such as respiratory ailments and skin infections. The paper advised the establishment of suitable waste-management policies and methods to solve the problem.

2.6 Municipal Solid Waste Management in Ghana

Solid waste management (SWM) is undoubtedly one of the most intricate and disputatious predicaments in the Ghanaian context, particularly within the realms of urban settings. Among residents residing in these urban areas, after drainage and sanitation (which includes toilets), SWM is often seen as the third most important urban utility., a notion postulated by Aglanu and Appiah in 2014. The confluence of rapid urbanization and burgeoning population dynamics, coupled with an inherent lack of comprehensive, intricate, and accurate data pertaining to the magnitude and composition of waste, has profoundly aggravated the intricacies encircling Municipal Solid Waste Management (MSWM) throughout the nation, as underscored by Miezah *et al.*, (2015).

2.7 Waste Composition and Generation Trends

The prevailing normative approach to MSWM in Ghana, akin to many other developing nations, essentially revolves around the amalgamation of diverse waste materials, which are subsequently consigned to earmarked dumping sites, as expounded by Ayuba *et al.*, (2013). Regrettably, the practice of separating garbage materials at the beginning or any point during the process of their treatment remains notably missing. The tapestry of MSW in Ghana typically encompasses organic,

putrescible elements, plastics, paper, textiles, metals, and glass, mirroring waste compositions observed across sub-Saharan Africa, as posited by Ayuba *et al.*, (2013) and further substantiated by Miezah *et al.*, (2015).

2.8 Waste Generation Statistics

The quantum of waste generated on a quotidian basis appears to be spiraling exponentially across the entire nation, with the upper echelons of the socioeconomic strata typically engendering the lion's share of waste production (World Bank, 2023). It's imperative to note, however, that these figures might be imprecise, as diligent records of collection and disposal remain elusive, often eluding the meticulous purview of the custodial authorities. According to the African Development Bank in 2013, Ghana's annual output of solid waste approximates a staggering 3.6 million tons, predominantly comprised of biodegradable organics like food, yard trimmings, and wood waste (Lissah *et al.*, 2021). Paradoxically, despite the recent establishment of three transfer stations in Accra by Zoomlion Ghana Limited (ZGL), a private waste collection entity, these remain inoperative. Thus, the entirety of collected MSW in Ghana is consigned to predestined dumpsites or rudimentary, inadequately-engineered landfill sites, bereft of any formalized material recovery mechanisms (Lissah *et al.*, 2021). Nonetheless, anecdotal instances of impromptu material recovery efforts undertaken by scavengers at residences and various disposal locales do exist.

2.9 Institutional Framework and Regulations

Bowen *et al.*, (2020) inquiry delved into the efficacy of SWM, utilizing the case of the Wa Municipality in Ghana as a vantage point. Notably, the study unearthed that Ghana boasts a robust institutional framework, characterized by judicious regulations, laws, policies, and programs that

effectively undergird governance and management. Likewise, Deku's work in 2020 sheds light on the Accra Metropolitan Area (AMA), where communities like Kanda, Asylum Down, and Nima collectively house 81 individuals. To cultivate community engagement and heighten awareness regarding solid waste management programs, a qualitative investigation was undertaken through interviews with community members. Conclusions from this endeavor illuminated a marked lack of familiarity among community constituents and stakeholders with regard to local and national regulations pertaining to solid waste management in the Ghanaian milieu.

2.10 Community Engagement and Awareness

An in-depth assessment conducted by Karim and Wetterman in 2020 scrutinized diverse solid waste management alternatives, elucidating optimal practices within the region. Employing a comprehensive decision matrix that encompassed an array of parameters – encompassing basic treatment technologies, financial considerations, landfill taxation, job creation potential, waste generation rates, waste compositions, storage mechanisms, collection and transportation modalities, energy generation prospects, and environmental health aspects – an evaluation was facilitated. Assigning scores ranging from 0 to 10 to these parameters, with 10 representing the zenith of value and 0 denoting the nadir, the culmination of this analysis unveiled Europe as an exemplar in solid waste management effectiveness. Contrarily, the United States fared less favorably, juxtaposed with its European counterparts, while the Asian region's scores, though the lowest, were comparatively congruent with those of the other two regions.

2.11 Stakeholder Perspectives

Lissa *et al.*, (2021) conducted a study that delved into the perspectives and firsthand experiences of managers and supervisors affiliated with municipal solid waste management companies in Ho, Ghana. The outcomes of their research unveiled a spectrum of factors influencing the efficacy and proficiency of solid waste management. These factors encompassed aspects such as organizational capability, resource availability, accumulated expertise, as well as environmental dynamics, exemplified by socio-cultural convictions and the limited sense of responsibility among urban residents towards waste management. Additionally, contextual circumstances, including the regulatory milieu and suboptimal operational efficiency, were also established as contributing elements shaping the effectiveness of waste management practices.

2.12 Privatization of Waste Management

Bah and Artaria (2021) embarked on an exploration that elucidated the potentials and obstacles intertwined with the privatization of solid waste management. Their investigation offered insights into strategies to facilitate a pathway conducive to fostering collaborations between the public and private sectors, thereby bolstering sustainable urban development. This inquiry into privatization's realm of solid waste management highlighted its achievements in domains such as heightened efficiency, reduced expenditures, punctual service provision, enhanced financial prospects, expansion initiatives, service quality elevation, augmented community involvement, establishment of clean and salubrious environments, employment generation, eradication of monopolies, and the cultivation of competitive landscapes. It further underscored the role of innovative technologies, public control, resource safeguarding, risk mitigation, bureaucratic streamlining, and swift conflict resolution in solidifying the efficacy of privatized waste management.

2.13 Waste Minimization Strategies

Somani *et al.*, (2021) embarked on a comprehensive delineation of the contemporary state, challenges, impending applications, and environmental repercussions associated with waste minimization methodologies. These methodologies encompassed a spectrum of techniques including categorization, recycling, energy reclamation through methods like composting, bio mediation, and bio refinery, as well as the disposal of waste arising from municipal and industrial origins. This analytical undertaking culminated in a synthesis of pragmatic and efficacious international waste management trends that hold the potential to ameliorate the existing waste management paradigms in India.

2.14 Waste Management Challenges in Ethiopia

In a different locale, Abegas and associates (2021) conducted an assessment of solid waste management practices and challenges that pervade Woldia, situated in the northeastern regions of Ethiopia. Their inquiry unearthed a set of pivotal factors closely linked to the efficacy of waste management. These factors encompassed variables such as educational attainment, occupational status, monthly income, and age, each manifesting a distinct impact. Furthermore, the study pinpointed primary obstacles encompassing the realms of municipal solid waste (MSW) and household waste management, including inadequacy of disposal resources, scarcity of alternative waste management options, and a dearth of household disposition and awareness. Illumination from focus group sessions and participant interviews underscored that current solid waste management practices were far from optimal.

2.15 Private Sector Involvement in Wa, Ghana

Furthermore, Cynthia's survey (2020) involved the assessment of 382 households with regard to private sector involvement in Wa's solid waste management. Her research incorporated in-depth discussions with key stakeholders and participants entrenched within the solid waste management community. The results of this study depicted human settlements as significant contributors to the solid waste stream, emanating a diverse array of waste categories spanning from organic waste to plastics, glass, metals, and textiles. Diverse disposal methods including open dumping and collective collection were also identified. Cynthia's investigation highlighted the private sector's distinct advantages in managing solid waste, as evident through enhancements in waste collection and disposal once private sector intervention took hold. Furthermore, the study underscored the private sector's augmented capacity characterized by superior equipment, operational finesse, and amplified efficiency. However, amidst the triumphs of privatization, certain issues in solid waste management persisted, thus warranting attention and resolution.

2.16 Household Waste Management in Malaysia

In a study conducted by Fadhullah *et al.*, (2022), an analysis was carried out on the practices of household waste management and the perceptions regarding solid waste management in the Panj sub-district of Kota Bahru, situated in the Krantan Region of Malaysia. The findings of the study unveiled that approximately 74.3% of households engaged in the disposal of food waste as waste, and a percentage of 18.3 was recorded for the disposal of plastic waste as waste. Moreover, the survey indicated that 50.3% of households practiced waste segregation, while the remaining 49.7% did not adopt such practices. An impressive 95.9% of the respondents were found to possess

awareness concerning the potential health risks associated with improper waste disposal, leading to ailments such as diarrhea and malaria.

2.17 Correlations in Waste Management Behavior in Malaysia

Upon subjecting the data to analysis, a correlation emerged between the geographical area, age demographics, and household compositions of the participants and their behaviors in waste segregation practices. This correlation was established through a Chi-square test with a significance level of $p < 0.05$. Another noteworthy correlation surfaced between the geographical area and the perception that inadequate waste management practices contributed to the spread of diseases. This was substantiated by another Chi-square test with a significance level of $p < 0.05$. Furthermore, outcomes from a principal component analysis revealed that approximately 17.94% of the variance demonstrated a strong positive correlation with factors such as age, marital status, and type of residence.

2.18 Student Attitudes Toward Waste in Da Nang, Vietnam

On a related note, a separate endeavor by Nguyen *et al.*, (2021) concentrated on the promotion of sustainable solid waste management practices within the confines of the Da Nang campus. Their research illuminated that students' awareness regarding environmental matters grew during their academic journey. However, an interesting observation was made, wherein a significant proportion of students exhibited an indifferent stance towards waste management.

2.19 Comprehensive Waste Management Approach

In the pursuit of sustainable waste management, a series of activities are typically undertaken, commencing from waste generation analysis and extending to encompass waste reduction, reuse, recycling, as well as the intricate processes of handling, collection, transfer, transport, and transformation (which involves recovery and treatment). Finally, waste disposal culminates the comprehensive waste management cycle. Recognizing the importance of these activities, it is imperative to orchestrate a robust waste management program that amalgamates pertinent tasks within the input-process-output (IPO) model. Such an approach is paramount in realizing enduring solutions for the challenges posed by waste management in Ghana.

2.20 Conclusion and Implications

In conclusion, a comprehensive approach encompassing waste reduction, recycling, proper collection and disposal, community engagement, awareness campaigns, and supportive policies is essential for effective solid waste management. These research insights provide valuable guidance for addressing the challenges posed by solid waste management across various contexts, including the specific case of the Adaklu District in the Volta Region, Ghana.

CHAPTER 3

3.0 METHODOLOGY

3.1 Research Methods and Design (Study methods and design)

The study design was a quantitative research design and the method was quantitative research method. Quantitative research method involves collecting and analyzing numerical data. In this study, data was collected through household surveys using questionnaires. Quantitative research design, which refers to the overall plan or structure that guides a research study, was fitting for this study. This design outlines the framework for collecting and analyzing numerical data to answer specific research questions or test hypotheses. In the context of this study, it facilitated the collection of data from a representative sample of households in the Adaklu district. This approach allowed for the examination of the relationships between the variables of interest. By providing a snapshot of the current situation, it enabled the researcher to make inferences based on statistical analysis.

Data collected was analyzed using descriptive statistics such as frequencies, percentages, mean, and standard deviation. Inferential statistics such as chi-square tests was also used to determine the relationship between the dependent and independent variables.

Objective 1: To assess the current solid waste management practices among households in the Adaklu District.

To achieve this objective, we conducted a comprehensive survey among households in the Adaklu District. We employed percentages and frequencies to analyze the collected data, specifically focusing on knowledge about solid waste management practices. To categorize knowledgeability,

we calculated high and low thresholds and determined the chi-square values for each variable, allowing us to gain insights into the current state of solid waste management practices in the area.

Objective 2: To determine factors that influence household solid waste management practices in the Adaklu District.

This objective was pursued through a survey that included an assessment of knowledge and factors influencing solid waste management practices. Similar to Objective 1, we employed percentages, frequencies, and bivariate analysis. By establishing high and low knowledgeability thresholds and calculating chi-square values for each variable, we identified the key factors that influence solid waste management practices among households.

Objective 3: To examine the challenges faced by households in the Adaklu District in implementing proper solid waste management practices.

To address this objective, we collected data on the challenges faced by households in adhering to proper solid waste management practices. We analyzed this data using percentages and frequencies, providing a comprehensive understanding of the difficulties faced by the community in implementing effective waste management strategies.

Objective 4: To assess the level of knowledge, attitudes, and perceptions of households in the Adaklu District on proper solid waste management practices.

We achieved this objective by examining the knowledge, attitudes, and perceptions of households in the Adaklu District regarding solid waste management. Similar to Objectives 1 and 2, we used percentages and frequencies to analyze the data, offering insights into the current state of knowledge and attitudes among households.

The study also incorporated ethical considerations to ensure that participants' privacy and confidentiality were maintained throughout the research process. Participants were required to give informed consent before participating in the study, and the researcher ensured that all data was kept secure and confidential.

This study aimed to provide a comprehensive assessment of the solid waste management practices among households in Adaklu and to identify the main factors that influenced these practices. The findings of this study provided insights into the current state of solid waste management practices in Adaklu communities and informed the development of strategies to improve waste management practices and promote sustainable development in the district. The study also highlighted the role of education and awareness-raising activities in promoting better waste management practices among households in Adaklu communities. It was expected that the findings of this study would help to create a better understanding of the relationship between socio-economic factors, waste management practices, and environmental outcomes in rural Ghana.

In conclusion, this study provided a valuable contribution to the field of solid waste management in Ghana and helped to address the pressing issue of poor waste management practices in Adaklu communities. By identifying the main factors that influenced waste management practices and developing strategies to improve these practices, the study promoted sustainable development and improved the quality of life for residents in Adaklu communities.

3.2 Data Collection Techniques and Tools

The study employed probability sampling techniques to select study participants. A household survey was conducted using a structured questionnaire to collect data on the residents' solid waste management practices and challenges. The questionnaire was pretested among a small sample of households in a neighboring community to ensure clarity, relevance, and appropriateness of the questions. Data collection was carried out by the researcher, who visited selected households in the study communities to administer the questionnaires.

3.3 Study Population

The study population for this research consisted of households in the Adaklu District. Data on solid waste management practices and challenges were collected through a household survey. The survey was designed to collect information on the types of waste generated by households, the methods of waste disposal, and the challenges faced by households in managing their waste. The survey also collected data on household income, education level, and other demographic information that may affect solid waste management practices. Overall, the study population for this research consisted of households involved in solid waste management activities in the Adaklu District. The data collected from these groups were used to assess the current solid waste management practices and challenges in the district and identify potential areas for improvement.

3.4 Study Variables

1. Independent Variables:

- i. Socio-demographic characteristics of households (age, gender, income, education, occupation, etc.)
- ii. Waste management policies and regulations

- iii. Availability of waste management infrastructure
- iv. Waste management education and awareness programs

2. Dependent Variables:

- i. Solid waste management practices (waste segregation, collection, transportation, and disposal)
- ii. Level of knowledge, attitudes, and perceptions of households on the importance of proper solid waste management
- iii. Challenges faced by households in the management of solid waste
- iv. Health and environmental impacts of solid waste management practices

3. Mediating Variables:

- Cultural and traditional beliefs about waste management
- Community participation in waste management
- Community involvement in waste management policies and regulations

4. Control Variables:

- i. Size of household
- ii. Level of income
- iii. Level of education
- iv. Occupation
- v. Access to waste management services

3.5 Sample Size and Sampling Technique

Determining an appropriate sample size for a research study involves considering factors such as the size of the population, the level of precision required, the level of confidence desired, and the variability in the population. Taking a confidence level of 95% and a margin of error of 5%, the Cochran formula for calculating the sample size was adopted:

$$n = \frac{Z_{\alpha/2}^2 \times p(1 - p)}{e^2}$$

Where:

n = sample size

Z = Z-score (1.96 for a 95% confidence level)

p = the proportion of households that practice proper solid waste management

[Adom *et al.*, (2016)] = 0.5

e = margin of error (0.05)

Hence;

$$n = \frac{1.96^2 \times 0.5(1 - 0.5)}{0.05^2} = 384.16$$

Therefore, a sample size of approximately 384 households would be appropriate for this study. However, to account for potential non-response or incomplete data, a slightly larger sample size will be used. The addition of a non-response rate of 5%, gives $19 + 384 = 403$.

The households were selected using probability sampling techniques. A multi-stage sampling approach was used. This involved the use of a Simple Random Sampling method to select the Zonal councils and the participatory communities. And then the use of the Systematic Sampling technique to select the households in the communities. The aim of the probability sampling method was to ensure that every household in the community had an equal chance of being selected.

3.6 Pre-testing

Before the actual data collection, a small sample of households in a neighboring community (Etoe) was selected to pretest the questionnaire. The purpose of this pretesting was to ensure the clarity, relevance, and appropriateness of the questions. Through the pretesting, any issues with the questionnaire were identified and feedback was provided on how to improve it.

3.7 Data Handling

Data handling involved cleaning, coding, and entering data into SPSS. The data was checked for completeness, accuracy, and consistency before analysis. The data was stored securely and confidentially to ensure the privacy and confidentiality of study participants.

3.8 Data Analysis

The data was analyzed using the SPSS statistical software. Descriptive statistics such as frequencies and percentages were used to describe the data. Bivariate analysis was conducted to determine the association between different variables and solid waste management practices and challenges.

3.9 Ethical Consideration

The study adhered to ethical guidelines, including obtaining informed consent from study participants before data collection, ensuring confidentiality and privacy of study participants, and minimizing harm or discomfort to study participants. Ethical clearance was obtained from the Ethics Review Committee at the Ensign Global College before data collection.

3.10 Limitations of Study

The limitations of this study included the potential for social desirability bias in the responses, the possibility of non-response bias due to the self-administered questionnaire, and the limited scope of the study to the Adaklu district of the Volta Region.

3.11 Assumptions

1. Participants provided honest and accurate responses to the questionnaire.
2. Participants had a basic understanding of solid waste management practices.
3. The sample size was sufficient to provide reliable and valid data.
4. The random sampling technique used adequately represented the population of the Adaklu district.
5. The data collected was a true reflection of the current solid waste management practices, knowledge, attitudes, and perceptions of households in the Adaklu district.
6. The researcher took adequate measures to ensure the ethical conduct of the study.
7. The findings of the study could be generalized to other similar settings in the Volta Region of Ghana.
8. The researcher accurately analyzed the data and interpreted the results.

CHAPTER 4

4.0 RESULTS

4.1 Introduction

A comprehensive data analysis using descriptive statistics were done to address the research questions. Finding were presented in tables using frequencies and percentages, this helps to reveal connections between variables. Out of the 422 questionnaires administered, 403 were retrieved after data cleaning and further used for the analysis, resulting in a 95.5% response rate.

4.2 Demographic Data:

The largest age group of respondents was 35-44 years old (30.5%), followed by 25-34 years old (28.3%). Female respondents comprised 65.3%, while males were 34.7%. Education-wise, the most common levels were Junior High School (33.0%) and Senior High School (32.5%). Christianity was the dominant religious affiliation (85.1%), followed by Islam (9.2%) and Traditional beliefs (5.2%). The majority reported incomes below 500 GHC (52.9%) and 32.0% earned between 500 and 999 GHC. Household sizes were mostly 3-4 people (38.0%) and 1-2 people (21.6%), while 23.8% had 5-6 people, and 16.6% had 7 or more people.

Table 1: Demographic Characteristics of Respondents

Variable	Category	Frequency (n)	Percentage
Age (years)	18-24	35	8.7%
	25-34	114	28.3%
	35-44	123	30.5%
	45-54	77	19.1%
	≥ 55	54	13.4%
Gender	Female	263	65.3%
	Male	140	34.7%
Education	None	46	11.4%
	Primary	51	12.7%
	Junior High School	136	33.7%
	Senior High School	134	33.3%

	Tertiary	36	8.9%
Occupation	Employed(full-time)	94	23.3%
	Employed(part-time)	42	10.4%
	Self-employed	173	42.9%
	Unemployed	70	17.4%
	Student	20	5%
	Retired	4	1%
Religion	Traditional	23	5.7%
	Islamic	37	9.2%
	Christianity	343	85.1%
Income (GHc)	≤ 500	213	52.9%
	501- 999	129	32%
	1,000 – 1,999	41	10.2%
	2,000 – 2,999	15	3.7%
	≥ 3,000	5	1.2%
Household Size	1 – 2	87	21.6%
	3 – 4	153	38%
	5 – 6	96	23.8%
	≥ 7	67	16.6%

Source: Field data, 2023

4.3 Solid Waste Management Practices:

The survey on solid waste management practices categorized waste into five main types. Food Waste was the largest contributor at 49.9%, followed by Plastics at 28.8%. Paper and Cardboard, Glass, and Organic Waste made up smaller proportions with 2.7%, 0.5%, and 17.4% respectively. In terms of preferred waste disposal methods, 44.4% chose trash bins and the same percentage mentioned burning waste. Burying waste and giving it to waste collectors were less popular (6.5% and 3.5% respectively), while 1.2% used other methods.

On the question regarding waste disposal frequency, 80.6% of the respondent admitted they disposed of waste daily, 18.4% did so weekly, and only 1% did it monthly. Regarding waste separation, 73.9% didn't separate waste, 21.3% used separate bins for recyclables, and 4.7% separated waste into piles for recyclables and non-recyclables. Further dive into the reuse of recyclables, 67% of the study participants acknowledge they were not engaging in the practice,

12.7% recycled, 10.7% reused, and 9.7% did both recycling and reuse. For electronic and hazardous waste, 39% sold or donated them, 27.5% used other methods, 10.9% went to recycling centers, 15.9% disposed in regular trash, and 6.7% stored until designated disposal days.

In dealing with bulky items, 34.5% sold them, 29.3% took them to landfills or waste collection sites, 30.5% used other methods, 2.5% donated to charities or secondhand stores, and 3.2% hired waste removal services (**Table 2**).

Table 2: Solid Waste Management Practices

Variable	Category	Frequency (n)	Percentage
Waste Generated	Food Waste	201	49.9%
	Paper and Cardboard	11	2.7%
	Plastics	116	28.8%
	Glass	5	1.2%
	Organic Waste	70	17.4%
Method of Disposal	Throw it in the trash bin	179	44.4%
	Bury it in the ground	26	6.5%
	Burn it	179	44.4%
	Give it to waste collectors	14	3.5%
	Other	5	1.2%
Disposal Time	Daily	325	80.6%
	Weekly	74	18.4%
	Monthly	4	1%
Waste Separation	Separate bins for recyclable and non-recyclable waste	86	21.3%
	Separate piles for recyclable and non-recyclable waste	19	4.8%
	No separation	298	73.9%
Reuse of recyclable material	Reuse	43	10.7%
	Recycle	51	12.7%
	Both	39	9.7%
	None	270	66.9%
	I take them to a recycling center	44	10.9%
	I dispose of them in the regular trash	64	15.9%
	I store them until there is a designated e-waste or	27	6.7%

Disposal of Electronic and Hazardous waste	hazardous waste disposal day		
	I sell or donate them to someone who can use them	157	39%
	Other	111	27.5%
Disposal of Bulky Items	I take them to a landfill or waste collection site	118	29.3%
	I hire a waste removal service	13	3.2%
	I donate them to a charity or secondhand store	10	2.5%
	I sell them to someone who can use them	139	34.5%
	Other	123	30.5%

Source: *Field data, 2023*

4.4 Factors influencing Solid Waste Management Practices:

In waste disposal practices, health and safety concerns were the most influential factor (47.9%), highlighting their crucial role in preventing pollution and health hazards. Personal values had a significant impact (22.3%), showing that individual beliefs shape waste handling. Environmental concerns mattered for 19.9%, indicating consideration for eco-friendly disposal. Government policies had a strong influence (86.4%) in promoting responsible practices, while cultural norms played a dominant role (92.6%) in waste management. Financial constraints affected decisions, with limited income impacting 60.3% and lack of affordable options affecting 39.7%, stressing the need for accessible waste solutions for all socioeconomic groups.

Table 3: Factors influencing Solid Waste Management Practices

Variable	Category	Frequency (n)	Percentage
Factors Influencing Disposal	Convenience	22	5.4%
	Personal values	90	22.3%
	Health and safety concerns	193	47.9%
	Community norms	18	4.5%
	Environmental concerns.	80	19.9%
Role of Culture on Waste Disposal	Cultural and traditional beliefs around cleanliness	373	92.6%
	waste disposal	28	6.9%
	reuse/recycling	2	0.5%
Role of Government Policies on Waste Disposal	Government policies and regulations on waste disposal	348	86.4%
	Waste separation	19	4.7%
	Recycling facilities.	36	8.9%
Role of financial constraints on disposal	Limited income or resources to pay for waste disposal services or purchase recycling equipment	243	60.3%
	Lack of access to affordable waste disposal options	160	39.7%

Source: *Field data, 2023*

4.5 Respondents' Observed Challenges on Waste Management:

The survey focused on challenges in managing household solid waste. The primary issue was the lack of proper waste disposal facilities, affecting 65.5% of respondents. Limited awareness (8.7%) and space (6.7%) were also mentioned as concerns. Financial constraints (6.9%), inadequate collection (5.2%), and irregular schedules (2.5%) were noted. Reusing waste (31.3%) and conscious consumption (13.2%) were common solutions. Proper waste segregation (11.2%) and community involvement (24.3%) were important. Innovative approaches like composting (20.1%) were explored. Inadequate waste management led to diseases (42.9%), pollution (8.4%), bad odor (41.9%), and injury risks (6.7%). These results underline health, environmental, and safety implications of improper waste handling.

Table 4: Challenges faced by respondents on waste management

Variable	Category	Frequency (n)	Percentage
Challenges in managing solid waste in household	Lack of proper waste disposal facilities	264	65.5%
	Lack of awareness on proper solid waste management practices	35	8.7%
	Limited space for waste disposal	27	6.7%
	Limited financial resources for waste management	28	6.9%
	Inadequate collection services	21	5.2%
	Irregular collection schedules	10	2.5%
	Limited access to recycling facilities	8	2%
	Lack of community participation and support	10	2.5%
Overcoming Challenges	Reusing or repurposing waste materials	126	31.2%
	Reducing waste generation through conscious consumption habits	53	13.2%
	Proper segregation and disposal of waste materials	45	11.2%
	Encouraging community participation in waste management initiatives	98	24.3%
	Seeking alternative waste management solutions, such as composting or biogas generation	81	20.1%
Negative Consequences	Increased incidence of diseases, such as diarrhea and respiratory illnesses	173	42.9%
	Soil, water, and air pollution	34	8.4%
	Bad odor and unsanitary conditions	169	42%
	Increased risk of injury from sharp or hazardous waste materials	27	6.7%

Source: *Field Data, 2023*

4.6 Attitudes and Perceptions:

The survey revealed strong recognition of the importance of proper solid waste management among respondents. A majority (77.4%) indicated that responsible waste management is very important, highlighting their awareness of its role in environmental preservation and public health.

A significant portion (16.9%) viewed waste management as somewhat important, showing some acknowledgment but not full understanding of its impact. Only a small fraction had neutral (0.7%) or somewhat unimportant (4.7%) views, and a negligible percentage (0.3%) considered waste management not important at all.

In terms of responsibility, 47.4% believed individuals are mostly responsible, while 40.2% saw it as a shared responsibility between individuals and the government. A smaller group (11.4%) saw it mostly as the government's responsibility, and 1% believed neither party is responsible.

Regarding satisfaction with current waste disposal methods, 40.9% were very satisfied, and 36.2% were somewhat satisfied. A small portion (2.2%) were neutral, while 6.7% were somewhat dissatisfied, and 13.9% were very dissatisfied.

Table 5: Attitudes and Perceptions towards waste management by respondents

Variable	Category	Frequency (n)	Percentage
Importance of proper Solid Waste management	Very important	312	77.4%
	Somewhat important	68	16.9%
	Neutral	3	0.7%
	Somewhat unimportant	19	4.7%
	Not important at all	1	0.3%
Responsibility	Mostly the responsibility of individuals	191	47.4%
	Mostly the responsibility of the government	46	11.4%
	Both individuals and government	162	40.2%
	Neither	4	1%
Satisfactory with current disposal methods	Very satisfied	165	40.9%
	Somewhat satisfied	146	36.2%
	Neutral	9	2.2%
	Somewhat dissatisfied	27	6.7%
	Very dissatisfied	56	13.9%

Source: Field Data, 2023

4.7 Factors influencing adoption:

The survey focused on factors influencing proper waste management decisions. Health and environmental concerns had the greatest impact, with 59.3% of respondents prioritizing these factors. Accessible disposal facilities also influenced decisions (15.9%). Education on proper waste management mattered to 13.9% of participants. Factors like social pressure (0.7%), government policies (3.7%), economic incentives (2%), and personal commitment (4.5%) had minimal influence.

To promote sustainable waste practices, awareness campaigns and education were most effective (68.2%). Financial incentives (8.2%) and community-government collaboration (7.2%) also mattered. Improving disposal infrastructure (9.7%) and developing sustainable models (5%) were cited. Minor factors included community initiatives (1%) and involving businesses (0.7%) in waste reduction.

Table 6: Factors influencing adoption

Variable	Category	Frequency (n)	Percentage
Factors influencing decisions to adopt proper waste management practices.	Health and environmental concerns	239	59.3%
	Availability of proper waste disposal facilities	64	15.9%
	Awareness and education on proper waste management	56	13.9%
	Social pressure from friends and family	3	0.7%
	Government policies and regulations	15	3.7%
	Economic incentives for proper waste management	8	2%
	Personal responsibility and commitment to environmental sustainability	18	4.5%
Leveraging factors to promote sustainable waste management practices	Awareness campaigns and education programs	275	68.2%
	Financial incentives for proper waste management	33	8.2%
	Collaboration between community members and government agencies	29	7.2%
	Improvement of waste disposal infrastructure	39	9.7%
	Development of sustainable waste management models	20	5%
	Promotion of community-based initiatives and waste reduction programs	4	1%
	Involvement of local businesses and organizations in waste reduction efforts	3	0.7%

Source: *Field Data, 2023*

4.8 Respondents' proposed Solutions and Recommendations:

The survey gathered opinions on enhancing solid waste management. A majority (52.9%) stressed educating the public about waste importance. Community-based programs (22.6%) and waste-to-energy solutions (9.4%) were also proposed for effective practices. Infrastructure improvement (15.1%) was crucial, and 45.2% favored strong laws for waste management. Government support (37.2%) and public-private collaborations (9.7%) were highlighted. Research (7.9%) and incentives (28%) were vital. Education on consequences (40%) and accessible disposal facilities (17.6%) were suggested. Community leaders' involvement (14.4%) was emphasized.

Table 8: Solutions and Recommendations

Variable	Category	Frequency (n)	Percentage (%)
Suggested Solutions to Improve Solid Waste Management Practices	Increase public awareness and education on the importance of proper solid waste management.	213	52.9%
	Establish community-based waste management programs, such as recycling or composting initiatives.	91	22.6%
	Encourage the development of waste-to-energy technologies or other innovative solutions.	38	9.4%
	Improve infrastructure and facilities for solid waste management, such as waste collection and disposal systems.	61	15.1%
Suggested Roles government policies and regulations should play to improve solid waste management	Develop and enforce laws and regulations for solid waste management	182	45.2%
	Provide funding and resources for waste management initiatives and infrastructure.	150	37.2%
	Encourage public-private partnerships for waste management projects.	39	9.7%
	Promote research and development of new waste management technologies.	32	7.9%
Suggested ways to encourage individuals to adopt proper solid waste management practices	Provide incentives or rewards for proper waste management practices, such as tax credits or discounts on waste disposal	113	28%
	Educate individuals on the environmental and health impacts of improper waste management.	161	40%
	Provide access to convenient waste collection and disposal facilities.	71	17.6%
	Engage community leaders and organizations to promote proper waste management practices.	58	14.4%

Source: Field Data, 2023

4.9 Bivariate analysis of Knowledgeability on selected Demographic indicator

An attempt was made to ascertain the level of association between selected demographic variable on the respondent's knowledge levels of solid waste management in the Adaklu District. From the result it was observed that none of the selected indicators was statistically significant with knowledge since the generated p-values were all more than the stipulated threshold of $\alpha = 0.05$ (Table 9)

Table 8: Bivariate Analysis on Knowledge with selected demographic variables

Variable	Categories	Knowledgeability		P-value
		High = 280 n(%)	Low = 123 n(%)	
Age Groups (years)	18-24	22(7.86)	13(17.89)	0.296
	25-34	78(27.86)	36(29.27)	
	35-44	83(29.64)	40(32.52)	
	45-54	53(18.93)	24(19.51)	
	≥ 55	44(15.71)	10(8.13)	
Gender	Female	98(35)	42(34.15)	0.910
	Male	182(65)	81(65.8)	
Education	None	29(10.36)	17(13.82)	0.579
	Primary	34(12.14)	17(13.82)	
	Junior High School	101(36.07)	35(28.46)	
	Senior High School	92(32.86)	42(34.15)	
	Tertiary	24(8.57)	12(9.76)	
Occupation	Employed(full-time)	70(25)	24(19.51)	0.703
	Employed(part-time)	25(8.93)	17(13.82)	
	Self-employed	118(42.14)	56(45.53)	
	Unemployed	48(17.14)	22(17.89)	
	Student	16(5.71)	4(3.25)	
	Retired	3(1.07)	0(0.00)	
Religion	Traditional	11(3.93)	10(8.13)	0.478
	Islamic	25(8.93)	12(9.76)	
	Christianity	244(87.14)	101(82.11)	
Income	< 500	148(52.86)	65(52.85)	0.327
	501- 999	90(32.14)	39(31.71)	
	1000 - 1999	25(8.93)	16(13.01)	

(GHC)	2000 - 2999	13(4.64)	2(1.63)	0.333
	> 3000	4(1.43)	1(0.81)	
Household Size	1 – 2	62(22.14)	25(20.33)	0.333
	3 – 4	108(38.57)	45(36.59)	
	5 – 6	64(22.86)	32(26.02)	
	≥ 7	46(16.43)	21(17.07)	

Source: Field Data, 2023

Similarly, a Pearson Chi-Square test on participants' knowledge levels on solid waste management practices was conducted to check if there exist any level of associations. At a p-values threshold of 0.05, it was observed that practices involving the type of waste generated ($p = 0.027$), the separation of waste ($p = 0.013$), reuse of recyclable material ($p = 0.005$), and disposal of bulky items ($p = 0.011$) were all significantly associated with their knowledge levels. However, practices including the methods ($p = 0.0626$) by which the respondents dispose of their solid waste have no association to their knowledge level (Table 10).

Table 9: Bivariate Analysis of Knowledge on Solid Waste Management Practices

Variables	Categories	Knowledgeability		P-value
		High = (280) n (%)	Low = (123) n (%)	
Waste Generated	Food Waste	146(52.14)	55(44.72)	0.027
	Paper and Cardboard	10(3.57)	1(0.81)	
	Plastics	65(23.21)	51(41.46)	
	Glass	2(0.71)	0(0.00)	
	Organic Waste	55(19.64)	15(12.20)	
Method of Disposal	Throw it in the trash bin	128(45.71)	51(41.46)	0.626
	Bury it in the ground	17(6.07)	9(7.32)	
	Burn it	124(44.29)	60(48.78)	
	Give it to waste collectors	11(3.93)	3(2.44)	
	Other	0(0.00)	0(0.00)	
Disposal Time	Daily	231(82.50)	94(76.42)	0.545
	Weekly	47(16.79)	27(21.95)	
	Monthly	2(0.71)	2(1.63)	

Waste Separation	Separate bins for recyclable and non-recyclable waste	66(23.57)	20(16.26)	0.013
	Separate piles for recyclable and non-recyclable waste	14(5.00)	5(4.07)	
	No separation	200(71.43)	98(79.67)	
Reuse of recyclable material	Reuse	33(11.79)	10(8.13)	0.005
	Recycle	42(15.00)	9(7.32)	
	Both	21(7.50)	10(8.13)	
	None	184(65.71)	86(69.92)	
Disposal of Electronic and Hazardous waste	I take them to a recycling center	53(18.93)	25(20.33)	0.098
	I dispose of them in the regular trash	55(19.64)	24(19.51)	
	I store them until there is a designated e-waste or hazardous waste disposal day	21(7.50)	6(4.88)	
	I sell or donate them to someone who can use them	151(53.93)	68(55.28)	
	Other	0(0.00)	0(0.00)	
Disposal of Bulky Items	I take them to a landfill or waste collection site	85(30.36)	33(26.83)	0.011
	I hire a waste removal service	9(3.21)	4(3.25)	
	I donate them to a charity or secondhand store	6(2.14)	4(3.25)	
	I sell them to someone who can use them	87(31.07)	51(41.46)	
	Other	92(32.86)	32(26.02)	

Source: Field Data, 2023

Finally, a bivariate Chi- Square test to measure the level of association between the knowledge level of the study participants on solid waste and their perceived factors that influence their practices on waste management also showed that, two of the indicators including the “*Role of Culture on Waste Disposal*” and the “*Role of Government Policies on Waste Disposal*” had statistically significant associations at p-values of <0.001 and 0.004 respectively. Whereas, the

role of finance and the factors influencing disposal were not significant given that their respective p-values were more than 0.05 (Table 11).

Table 10: Bivariate Analysis on Knowledge with Factors influencing Solid Waste Management Practices

Variables	Categories	Knowledgeability		p-value
		High = (280) n (%)	Low = (123) n (%)	
Factors Influencing Disposal	Convenience	15(5.36)	7(5.69)	0.084
	Personal values	63(22.50)	1(0.81)	
	Health and safety concerns	138(49.29)	55(44.72)	
	Community norms	10(3.57)	8(6.50)	
	Environmental concerns.	54(19.29)	26(21.14)	
Role of Culture on Waste Disposal	Cultural and traditional beliefs around cleanliness	263(93.93)	110(89.43)	<.001
	waste disposal	15(5.36)	13(10.57)	
	reuse/recycling	2(0.71)	0(0.00)	
Role of Government Policies on Waste Disposal	Government policies and regulations on waste disposal	242(86.43)	106(86.18)	0.004
	Waste separation	11(3.93)	8(6.50)	
	Recycling facilities.	27(9.64)	9(7.32)	
Role of financial constraints on disposal	Limited income or resources to pay for waste disposal services or purchase recycling equipment	166(59.29)	75(60.98)	0.678
	Lack of access to affordable waste disposal options	114(40.71)	46(37.40)	

Source: Field Data, 2023

CHAPTER 5

5.0 DISCUSSION

5.1 Introduction

This chapter discusses the results of the study concerning solid waste management practices among households of Adaklu District. Specifically, the current solid waste management practices among households, level of knowledge, attitude and perception of households on proper solid waste management, challenges faced by households in implementing proper solid waste management and factors that influence household waste management practices.

5.2 Addressing Objective One: The current solid waste practices among households

The investigation revealed that, households were generating food waste at a rate of 49.9%, with plastic waste closely trailing at 28.8%. This proportion of plastic waste was higher than other waste categories, including organic waste, paper, cardboard, and glass, which followed in descending order.

When analyzing the methods employed for waste disposal during that period, it was observed that 44.4% of individuals discarded waste into trash bins, while an equal percentage of people resorted to burning waste. Additionally, 6.5% of individuals opted to bury waste in the ground, and only 3.5% chose to entrust waste to waste collectors. This pattern of waste disposal aligned with a previous study conducted by Annan *et al.*, (2020), which highlighted the prevalent issue of inadequate waste collection and transportation services faced by households within the Cape Coast Metropolis.

The data also highlighted a significant disparity between the number of individuals burning waste and those utilizing trash bins. This discrepancy indicated that a substantial majority of households

did not dispose of waste in bins for collection by waste collectors. Instead, waste was commonly discarded in bins and subsequently burned or buried. This practice of open burning released a range of detrimental pollutants into the atmosphere, including toxic gases, particulate matter, and volatile organic compounds. The consequences of such pollutants encompassed respiratory ailments, exacerbation of preexisting health conditions, and diminished air quality, affecting both human inhabitants and agricultural animals. Furthermore, the noxious emissions and particles from open burning had the potential to settle on crops and soil, resulting in chemical contamination that could undermine the safety and quality of locally produced food.

A study conducted earlier in 2016, titled "Methods of Domestic Solid Waste Management in Hohoe Urban in the Volta Region," revealed that approximately 8% of respondents resorted to burning domestic solid waste to reduce its size and volume. The data additionally unveiled the frequency of waste disposal practices, with 80.6% of households disposing waste daily, 18.4% weekly, and 1% monthly. Despite the generally commendable compliance with waste disposal routines, it was crucial for the farming community to uphold stringent hygiene standards to avert the spread of communicable diseases linked to improper waste disposal practices. Such practices attracted pests such as flies, rodents, and cockroaches, which could act as carriers of pathogens leading to gastrointestinal infections. The improper disposal of waste by a small subset of the community also posed a risk of propagating diseases like cholera and dengue fever to the broader population.

The issue of waste segregation emerged as a prominent challenge, as 73.9% of households did not segregate waste. A study by Karikari *et al.*, (2018) emphasized the magnitude of the issue of inadequate waste segregation and disposal practices in effectively managing solid waste, particularly within the Kumasi Metropolis. The implications were significant, as a substantial

proportion (66.9%) of respondents neither recycled nor reused recyclable materials. This was especially concerning considering that plastic waste, a significant contributor, was the second most prevalent waste type. The fragmentation of plastics into smaller particles had the potential to negatively impact soil quality, crop growth, and introduce harmful chemicals into the food chain. In light of the fact that nearly half (49.9%) of the community members were self-employed farmers, this issue posed a direct threat to their livelihoods.

The disposal of electronic waste, hazardous waste, and bulky items posed challenges for a small community like Adaklu, as the necessary infrastructure was lacking. Nevertheless, the data indicated that 39% of individuals either sold or donated electronic and hazardous waste, while 34.5% sold such items to those who could utilize them. Managing these types of waste was intricate due to their diverse materials, spanning from plastic to metal to glass. It was found that metal and glass waste, in particular, were produced at a minimal rate, implying that bulky items did not persist within households for prolonged periods, reducing their potential to serve as breeding grounds for pests and disease vectors like cockroaches.

5.3 Addressing Objective Two: Level of knowledge, attitude and perception of households on proper solid waste management

In terms of knowledgeability, it is important to note that the study encompassed 280 households exhibiting a high level of knowledge, contrasted with 123 households characterized by a low level of knowledge, in relation to appropriate solid waste disposal practices. However, the investigation unveiled a paradoxical scenario in which individuals possessing a high degree of knowledge about waste management practices did not engage in waste separation (71.43%), and refrained from reusing or recycling materials (65.71%). Similarly, it is noteworthy that individuals with low

knowledge also exhibited comparable behavior, with percentages slightly higher, indicating no separation in (79.67%) and no reuse or recycling in (69.92%) rates. This highlights the fact that regardless of whether individuals possessed low or high knowledge, there was no significant disparity in the implementation of proper solid waste management practices, particularly concerning recycling and waste separation. This observation aligns with previous research by Karikari *et al.*, (2018) and Annan *et al.*, (2020), which illuminated analogous challenges in waste management, underscoring the widespread nature of these concerns.

The populace demonstrated a positive attitude and perception regarding the importance of appropriate solid waste management in the past. A notable 77.4% of respondents acknowledged its high significance. Furthermore, individuals exhibited a balanced perspective on responsibility, with 47.4% asserting that it primarily rested on the shoulders of the people, while 40.2% believed it was a shared responsibility between individuals and the government. A smaller percentage, 11.4%, attributed responsibility solely to the government, with a mere 1% indicating neither party held responsibility. In general, the populace displayed an equitable perception of responsibility.

In terms of satisfaction with the prevailing waste disposal methods in the past, 40.9% of respondents expressed strong satisfaction, while 36.2% indicated moderate satisfaction. This trend is concerning as it coincides with the observation that individuals did not adhere to optimal solid waste management practices. This was particularly striking when comparing households with high knowledgeability to those with low knowledgeability, as both groups exhibited comparable behaviors.

5.4 Addressing Objective Three: Challenges Faced by Households In Implementing Proper Solid Waste Management

The absence of adequate waste disposal facilities emerged as a prominent concern, with 65.5% of respondents identifying it as a significant challenge. Limited awareness about proper solid waste management practices, constrained space for waste disposal, insufficient financial resources for waste management, deficient collection services, irregular collection schedules, restricted access to recycling facilities, and meager community participation and support were indicated at notably lower percentages: 6.7%, 6.9%, 5.2%, 2.5%, 2.0%, and 2.5%, respectively.

Moreover, the insufficiency of appropriate infrastructure, including waste receptacles and collection vehicles, posed a substantial hindrance to the efficient management of solid waste in Ghana, as emphasized by Karikari *et al.*, research (2018). Similar predicaments were discerned in other developing nations. For instance, Rahman *et al.*, study (2019) in Bangladesh uncovered that ineffective waste management infrastructure, limited engagement of the community, and substandard waste sorting and disposal practices posed formidable barriers to effective solid waste management.

This phenomenon could elucidate why some households, despite possessing a high level of knowledge, persisted in improper waste management practices such as open burning and burying of waste. These practices have adverse implications for the community. When questioned about strategies to surmount these difficulties, 31.2% of respondents advocated for reusing and repurposing discarded materials. Additionally, 24.3% highlighted the importance of fostering community involvement in waste management initiatives, while 20.1% recommended exploring alternative waste management approaches, including composting. This underscores that these

individuals possess an understanding of proper solid waste management practices, acknowledging areas where their implementation falls short. These proposals correlate with data depicting plastic waste as the second most prevalent waste type, with approximately 80% of waste being disposed of without separation or reuse.

Respondents also expressed apprehension about the heightened incidence of diseases, notably diarrhea and respiratory ailments, accounting for 42.9% of responses. Moreover, concerns about unpleasant odors constituted 42%, while 8.4% and 6.7% highlighted pollution and the elevated risk of injury from sharp or hazardous waste materials, respectively. Regarding the health repercussions of inadequate solid waste management, Ali and Hossain's investigation (2018) in Bangladesh demonstrated an elevated susceptibility to diseases like diarrhea and cholera due to insufficient waste management practices. The study emphasized the pivotal role of community engagement and awareness in improving waste management practices and mitigating health hazards. Similarly, Adegboye *et al.*, study (2019) in Nigeria concluded that improper solid waste management practices contributed to environmental contamination and health risks, including respiratory ailments and skin infections.

Of particular concern is the escalating prevalence of diseases within this context. These individuals require proper waste disposal equipment, but it's noteworthy that a significant portion of these households earn Ghc500.00 or less per month, with each household typically comprising 3 to 4 members. The majority of this demographic falls within the age range of 35 to 44 and tends to be self-sufficient with additional responsibilities. Consequently, the financial constraints of acquiring the necessary equipment present a formidable challenge, contributing to the issues articulated by them.

5.5 Addressing Objective Four: Factors that influence household waste management practices

Health and safety concerns exerted the most substantial influence on waste disposal practices, accounting for 47.9% of the respondents' choices. It is worth noting that 5.4% of individuals opted for disposal based on convenience. However, convenience-oriented waste disposal gave rise to potential conflicts within the community, as some residents directly experienced adverse outcomes such as noxious odors, pest infestations, and environmental pollution. Consequently, this propensity towards convenience-induced waste disposal contributed to the degradation of aesthetics, resulting in visually displeasing and unhygienic surroundings. The adverse impact on the community's visual appeal led to a decline in property values and acted as a deterrent for potential visitors and tourists.

Cultural factors played a pivotal role in shaping cleanliness attitudes, with a significant influence of 92.6%. This cultural inclination emerged from Adaklu's historical identity as a farming community, where the management of certain waste types like food waste was deeply integrated into their cultural practices. However, when considering waste disposal, reuse, and recycling, the adherence dropped to 6.9% and 0.5% respectively. This trend is evident in the data concerning waste reuse and separation, indicating a significant need for knowledge and education in managing these practices effectively.

Government policies and regulations pertaining to waste disposal held considerable sway, accounting for 86.4% of the respondents' perspectives. In contrast, waste separation and recycling facilities contributed to 4.7% and 8.9% respectively, partly due to the absence of adequate equipment to support such practices. Bowen et al.,'s inquiry in 2020 probed the efficacy of Solid Waste Management (SWM), employing the Wa Municipality in Ghana as a case study. The study

underscored Ghana's robust institutional framework, characterized by comprehensive regulations, laws, policies, and programs that effectively underpin governance and waste management.

Limited financial resources, with 60.3% of respondents citing income constraints, and lack of affordable waste disposal options (39.7%) collectively impacted the community's ability to engage with waste disposal services. Consequently, only 3.5% of individuals were able to avail waste collection services. The community's financial situation was marked by modest income levels, with a significant portion earning Ghc500.00 or less. Moreover, 16.6% of households consisted of seven or more individuals, predominantly comprising farmers. These individuals experienced periodic fluctuations in income, coinciding with harvest seasons. During lean periods, allocating funds for waste disposal equipment was a lower priority. In a similar vein, Deku's 2020 work highlighted the Accra Metropolitan Area's context, revealing that communities like Kanda, Asylum Down, and Nima collectively accommodated 81 residents.

CHAPTER 6

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The findings unveiled critical insights into the prevailing waste generation and disposal patterns, knowledge and attitudes of households, challenges encountered, and the influencing factors. The investigation highlighted the urgent need for a comprehensive approach to address the multifaceted challenges inherent in solid waste management.

The analysis of waste practices revealed that plastic waste and food waste were the predominant categories, with plastic waste surpassing others. The concerning practice of open burning and improper waste disposal methods led to adverse environmental and health consequences, affecting both human inhabitants and agricultural ecosystems. These findings underscore the necessity of reevaluating and reforming waste disposal behaviors to mitigate the detrimental impacts on air and soil quality.

Despite disparities in knowledge levels among households, there was a disconcerting uniformity in the implementation of inadequate waste management practices. This emphasized the need for targeted interventions to bridge the gap between knowledge and action, aligning with previous research highlighting similar challenges. The community's positive attitude toward waste management, coupled with a balanced perception of responsibility, offers a foundation upon which educational efforts can build to encourage better practices.

Challenges faced by households in proper waste management encompassed deficiencies in infrastructure, awareness, space, financial resources, and collection services. These barriers underscored the necessity for multifaceted strategies, including community engagement,

alternative waste management approaches like composting, and addressing financial constraints. The influence of health and safety concerns, cultural factors, and government policies on waste management practices highlighted the interconnectedness of various factors that shape behavior. Addressing these influences through targeted educational campaigns and accessible waste management services is crucial for sustainable change.

6.2 Recommendations

Education and Awareness Campaigns:

The District Assembly in collaboration with Ghana Health Service should launch targeted educational programs to raise awareness about the environmental and health impacts of improper waste disposal, particularly open burning. These campaigns should emphasize the connections between waste management practices and community health and well-being. Local schools, community centers, and social media platforms can be effective channels for disseminating information.

Waste Segregation and Recycling:

The District Assembly in collaboration with Zoomlion, the waste management organization should implement educational initiatives focused on waste segregation at the source, with an emphasis on the benefits of recycling. Provide clear guidelines on how to separate recyclable materials from non-recyclables. This can help reduce the amount of waste sent to landfills or incineration sites, conserving resources and reducing pollution.

Community Engagement:

The District Assembly and the community leaders should foster community participation and ownership in waste management initiatives. Encourage local residents to actively participate in waste collection, segregation, and recycling efforts. Community-led initiatives can be more effective and sustainable in the long run.

Financial Support and Incentives:

The government should provide support for community members to explore, options for financial support or incentives for low-income households to access proper waste disposal equipment. This could include subsidized waste collection services or discounts on waste bins. Financial constraints should not hinder the adoption of responsible waste management practices.

Collaboration with Local Authorities:

Community leaders should collaborate with local government authorities to develop and enforce waste management regulations and policies. Effective enforcement of regulations can discourage improper waste disposal practices and encourage compliance.

Innovation in Electronic Waste Management:

The District Assembly should lead the Development of strategies for the proper disposal of electronic waste, hazardous waste, and bulky items. Explore options for organizing periodic collection drives for these types of waste, ensuring that they are properly recycled or disposed of in an environmentally friendly manner.

Capacity Building:

The District Assembly and health services should provide training and capacity-building workshops for community members, local leaders, and waste management personnel. Empower them with the knowledge and skills needed to effectively implement waste management practices and initiatives.

Future Research:

Conduct regular assessments of waste management practices to track progress and identify emerging challenges. This can guide the adaptation of strategies and ensure that the community remains on a sustainable waste management trajectory. The future researchers should use qualitative or mix methods.

REFERENCE

- Adaklu District Assembly. (2020). Composite Budget for 2020-2023: Programme Based Budget Estimates for 2020.
- Adegboye, F. B., Alimi, T., & Adeyemi, O. (2019). Assessment of household solid waste management practices and its health implications in Ogbomoso metropolis, Nigeria. *Journal of Environmental Science and Public Health*, 3(2), pp. 85-92.
- Adom, S., Takramah, W., Kwabla, M., & Kweku, M. (2016). Methods of Domestic Solid Waste Management in Hohoe Urban in the Volta Region. *Journal of Geoscience and Environment Protection*, 4*, 1-11. doi: 10.4236/gep.2016.45001.
- Aglanu, L.M and Appiah D.O(2014).The Korle Lagoon in Distress: The Stress of Urban Solid Waste on Water Bodies in Accra, Ghana *International Journal of Innovation and Applied Studies*, Vol.7 No.2, pp.717-728.
- Agyei-Mensah, S., Gyasi, E. A., & Adinyira, E. (2019). Community participation and the implementation of the waste management policy in the Ashaiman Municipality, Ghana. *Journal of Environmental Management*, 248, e109327.
- Ali, M. A., & Hossain, M. M. (2018). Solid waste management in Dhaka City, Bangladesh: Present scenario and challenges. *Journal of Environmental Science and Natural Resources*, 11(2), pp.159-166.
- Annan, E. K., Ackom, E. K., Fosu-Mensah, B. Y., & Biney, C. A. (2020). Households' perception on solid waste collection and management in Cape Coast Metropolis, Ghana. *Cogent Environmental Science*, 6(1), 1759366.
- Arafat, H.A, Jijakli, K and Ahsan, A (2015) Environmental performance and energy recovery potential of five processes for municipal solid waste treatment. *J Clean Prod* Vol.105, pp.233–240doi: 10.1016/j.jclepro.2013.11.071.
- Arushanyan, A.Y., Björklund, A., Eriksson, O., Finnveden, G., Ljunggren Söderman, M., Sundqvist, J.O. and Stenmarck, Å. (2017). 'Environmental assessment of possible

- future wastemanagement scenarios’, *Energies*, Vol. 10, No. 2, pp.1–27, doi: 10.3390/en10020247
- Ayuba, K.A; Manaf, L.A; Sabrina, A.H; Azmin, S.W.N. (2013). Current status of municipal solid waste management practise in FCT Abuja. *Res. J. Environ. Earth Sci.* Vol.5 Issue 6,pp. 295-304.
- Bah, Y. M. and Artaria, M. D. (2021). Privatization Of Solid Waste Management: Opportunities And Challenges. *Indonesian Journal of Urban and Environmental Technology*, Vol.4 No. 2. DOI: <https://doi.org/10.25105/urbanenvirotech.v4i2> Published: 2021-04-06
- Cynthia, D. A. (2020). Private Sector Participation In Solid Waste Management In The Wa Township, This Thesis Is Submitted To The Department of African And General Studies, Faculty of Integrated Development Studies, University For Development Studies, In Partial Fulfillment of The Requirement For The Award Of Master of Philosophy Degree In Development Studies.
- Debrah, S. K., & Owusu, G. (2019). Effective solid waste management in Ghana: A review of stakeholder engagement, policy and regulatory frameworks. *Journal of Environmental Management*, 246, pp. 291-300.
- Deku, P. S. (2020). A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science in the field of Geography and Environmental Resources, Southern Illinois University Carbondale.
- District Planning Co-ordinating Unit, & Adaklu District Assembly. (2017). Adaklu District Assembly Medium Term Development Plan 2018-2021: An Agenda for Jobs: Creating Prosperity and Equal Opportunity for All. Adaklu Waya: District Planning Co-ordinating Unit, Adaklu District Assembly.
- Dodzi, G., & Adongo, R. (2016). Methods of Domestic Solid Waste Management in Hohoe Urban in the Volta Region. *Journal of Geoscience and Environment Protection*, 4(5), 63-70.
- Fadhullah, W., Imran, N.I.N., Ismail, S.N.S, Jaafar,M.H and Abdullah,H (2022). Household solid waste management practices and perceptions among residents in the East Coast of

- Malaysia. *BMC Public Health*, Vol. 22, Issue 1. <https://doi.org/10.1186/s12889-021-12274-7>
- FilipiKnow. (2023). Conceptual Framework: A Step by Step Guide on How to Make One. <https://filipiknow.net/conceptual-framework-example>
- Karikari, A. Y., Dinye, R. D., Kwarteng, A. M., & Osei-Kwarteng, M. (2018). Assessment of solid waste management practices in the Kumasi Metropolis of Ghana. *Environmental Science and Pollution Research*, 25(31), pp. 31569-31578.
- Karim, M. A. and John, T. W. (2020). A comparative study of solid waste management in the United States, Europe and Asia. *Ann Civil Environ Eng.* (4), pp.003-011. <http://doi.org/10.29328/journal.acee.1001019>
- Lissah, S. Y., Ayanore, M. A., Krugu, J. K., Aberese-Ako, M., & Ruitter, R. A. C. (2021). Managing urban solid waste in Ghana: Perspectives and experiences of municipal waste company managers and supervisors in an urban municipality. *PloS One*, 16(3), e0248392. doi: <https://doi.org/10.1371/journal.pone.0248392>.
- Mbeng, L. O. (2017). Solid waste management in Yaoundé: challenges and prospects. *Journal of Environmental Science and Technology*, 10(3), pp.108-120.
- Miezah, K., Obiri-Danso, K., Kadar, Z., Fei-Baffoe, B. and Mensah, M. Y. (2015). Municipal solid waste characterization and quantification as a measure towards effective waste management in Ghana, *Waste Management*, Vol. 46, pp. 15-27.
- Ogwueleka, T. C. (2009). Municipal solid waste characteristics and management in Nigeria. *Iranian Journal of Environmental Health Science and Engineering*, 6(3), pp.173-180.
- Rahman, M. M., Hossain, M. S., & Khan, M. R. (2019). Community participation in solid waste management in Dhaka, Bangladesh: A comparative study. *Environmental Science and Pollution Research*, 26(17), 17179-17192.
- Singh, A., & Gupta, R. (2018). Municipal solid waste management practices in India: A review. *Journal of Environmental Science and Technology*, 11(3), pp.73-82.

Somani, P. Navaneethan, R. D. and Thangaiyan, S. (2021). Integrated solid waste management in urban India: A mini review. *International Conference on Research Frontiers in Sciences (ICRFS 2021)*,doi:10.1088/1742-6596/1913/1/012084

Tadesse, T., & Moges, D. (2019). Municipal solid waste generation, composition, and management: The case of Gondar town, Northwest Ethiopia. *Journal of Environmental Science and Public Health*, 3(1), pp.35-43.

World Bank. (2023). Trends in Solid Waste Management. https://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html

APPENDIX I

Questionnaire

This study is being undertaken by..... a final year student of Ensign Global College of Ghana, on the topic ‘assessment of solid waste management practices among the households of Adaklu communities, Ghana. The information collected would be used for academic purposes only and would therefore be treated in the strictest confidence.

Please tick where appropriate and write your comment where necessary

1. Demographic Data:

- a) What is your age?
 - i) 18-24 years old
 - ii) 25-34 years old
 - iii) 35-44 years old
 - iv) 45-54 years old
 - v) 55 years and above
- b) What is your gender?
 - i) Male
 - ii) Female
 - iii) Other (please specify): _____
- c) What is your level of education?
 - i) No formal education
 - ii) Primary school
 - iii) Junior high school
 - iv) Senior high school

- v) Tertiary education
- d) What is your occupation?
 - i) Employed (full-time)
 - ii) Employed (part-time)
 - iii) Self-employed
 - iv) Unemployed
 - v) Student
 - vi) Retired
 - vii) Other (please specify): _____
- e) What is your religion?
 - i. Christianity
 - ii. Islamic
 - iii. Traditional
 - iv. Other.....
- f) What is your monthly income range?
 - i) Less than GHC 500
 - ii) GHC 500 - GHC 999
 - iii) GHC 1000 - GHC 1999
 - iv) GHC 2000 - GHC 2999
 - v) GHC 3000 and above
- g) How many people live in your household?
 - i) 1-2 people
 - ii) 3-4 people

- iii) 5-6 people
- iv) 7 or more people

2. Solid Waste Management Practices:

- h) What type of solid waste do you generate in your household?
 - i) Food waste
 - ii) Paper and cardboard
 - iii) Plastics
 - iv) Glass
 - v) Metal
 - vi) Organic waste
 - vii) Other (please specify).....
- i) What are the current methods of disposing of solid waste in your household?
 - i) Throw it in the trash bin
 - ii) Bury it in the ground
 - iii) Burn it
 - iv) Give it to waste collectors
 - v) Other (please specify).....
- j) How often do you dispose of solid waste?
 - i) Daily
 - ii) Weekly
 - iii) Monthly
 - iv) Occasionally
- k) What methods do you use to separate recyclable waste from non-recyclable waste?

- i) Separate bins for recyclable and non-recyclable waste
 - ii) Separate piles for recyclable and non-recyclable waste
 - iii) No separation
- l) Do you reuse or recycle any materials in your household?
- i) Reuse
 - ii) Recycle
 - iii) Both
 - iv) None
- m) What do you do with electronic waste (e-waste) and hazardous waste?
- i) I take them to a recycling center
 - ii) I dispose of them in the regular trash
 - iii) I store them until there is a designated e-waste or hazardous waste disposal day
 - iv) I sell or donate them to someone who can use them
 - v) Other (please specify): _____
- n) How do you dispose of large or bulky waste items, such as furniture or appliances?
- i) I take them to a landfill or waste collection site
 - ii) I hire a waste removal service
 - iii) I donate them to a charity or secondhand store
 - iv) I sell them to someone who can use them
 - v) Other (please specify): _____

3. Factors influencing Solid Waste Management Practices:

- o) What factors influence your decision to dispose of solid waste in a particular way?
- i) Convenience

- ii) Personal values
 - iii) Health and safety concerns
 - iv) Community norms
 - v) Environmental concerns.
- p) What role do cultural or traditional practices play in solid waste management in your community?
- i) Cultural and traditional beliefs around cleanliness
 - ii) waste disposal
 - iii) reuse/recycling.
- q) What role do government policies or regulations play in solid waste management in your community?
- i) Government policies and regulations on waste disposal
 - ii) Waste separation
 - iii) Recycling facilities.
- r) What role do financial constraints play in your solid waste management practices?
- i) Limited income or resources to pay for waste disposal services or purchase recycling equipment
 - ii) Lack of access to affordable waste disposal options

4. Knowledge and Awareness:

- a. How aware are you of the potential negative impacts of improper solid waste disposal on human health and the environment?
 - i. Very aware
 - ii. Somewhat aware

- iii. Not very aware
- iv. Not at all aware
- b. How knowledgeable are you about the different methods of solid waste management and their potential benefits and drawbacks?
 - i. Very knowledgeable
 - ii. Somewhat knowledgeable
 - iii. Not very knowledgeable
 - iv. Not at all knowledgeable

5. Challenges faced:

- a. What are the biggest challenges you face in managing solid waste in your household?
 - i. Lack of proper waste disposal facilities
 - ii. Lack of awareness on proper solid waste management practices
 - iii. Limited space for waste disposal
 - iv. Limited financial resources for waste management
 - v. Inadequate collection services
 - vi. Irregular collection schedules
 - vii. Limited access to recycling facilities
 - viii. Lack of community participation and support
- b. How do you overcome these challenges?
 - i. Reusing or repurposing waste materials
 - ii. Reducing waste generation through conscious consumption habits
 - iii. Proper segregation and disposal of waste materials

- iv. Encouraging community participation in waste management initiatives
 - v. Seeking alternative waste management solutions, such as composting or biogas generation
- c. Have you ever experienced negative consequences from improper solid waste disposal, such as health problems or pollution?
- i. Increased incidence of diseases, such as diarrhea and respiratory illnesses
 - ii. Soil, water, and air pollution
 - iii. Bad odor and unsanitary conditions
 - iv. Increased risk of injury from sharp or hazardous waste materials

6. Attitudes and Perceptions:

- a. How important do you think proper solid waste management is to the overall health and well-being of your community?
- i. Very important
 - ii. Somewhat important
 - iii. Neutral
 - iv. Somewhat unimportant
 - v. Not important at all
- b. Do you think that proper solid waste management is the responsibility of individuals or the government?
- i. Mostly the responsibility of individuals
 - ii. Mostly the responsibility of the government
 - iii. Both individuals and government

- iv. Neither
- c. How satisfied are you with the current solid waste management practices in your community?
 - i. Very satisfied
 - ii. Somewhat satisfied
 - iii. Neutral
 - iv. Somewhat dissatisfied
 - v. Very dissatisfied

7. Factors influencing adoption:

- a. What factors influence your decision to adopt proper solid waste management practices?
 - i. Health and environmental concerns
 - ii. Availability of proper waste disposal facilities
 - iii. Awareness and education on proper waste management
 - iv. Social pressure from friends and family
 - v. Government policies and regulations
 - vi. Economic incentives for proper waste management
 - vii. Personal responsibility and commitment to environmental sustainability
- b. How can these factors be leveraged to promote sustainable waste management practices?
 - i. Awareness campaigns and education programs
 - ii. Financial incentives for proper waste management
 - iii. Collaboration between community members and government agencies

- iv. Improvement of waste disposal infrastructure
- v. Development of sustainable waste management models
- vi. Promotion of community-based initiatives and waste reduction programs
- vii. Involvement of local businesses and organizations in waste reduction efforts

8. Solutions and Recommendations:

- a. What do you think are the best solutions for improving solid waste management practices in your community?
 - i. Increase public awareness and education on the importance of proper solid waste management.
 - ii. Establish community-based waste management programs, such as recycling or composting initiatives.
 - iii. Encourage the development of waste-to-energy technologies or other innovative solutions.
 - iv. Improve infrastructure and facilities for solid waste management, such as waste collection and disposal systems.
- b. What role do you think government policies and regulations should play in improving solid waste management practices in your community?
 - i. Develop and enforce laws and regulations for solid waste management.
 - ii. Provide funding and resources for waste management initiatives and infrastructure.
 - iii. Encourage public-private partnerships for waste management projects.

- iv. Promote research and development of new waste management technologies.
- c. How can individuals be encouraged to adopt proper solid waste management practices?
 - i. Provide incentives or rewards for proper waste management practices, such as tax credits or discounts on waste disposal fees.
 - ii. Educate individuals on the environmental and health impacts of improper waste management.
 - iii. Provide access to convenient waste collection and disposal facilities.
 - iv. Engage community leaders and organizations to promote proper waste management practices.