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THE IMPACTS OF COMMUNITY ENGAGEMENT ON SUSTAINABLE WASTE MANAGEMENT IN THE FDA COMMUNITY, WEIN-TOWN, PAYNESVILLE, LIBERIA

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ABSTRACT

Introduction: The involvement of communities in waste management is important for effectively sustaining waste management systems. The improper and ineffective waste management practices have led to environmental degradation, socio-economic factors, and fragile public health systems in Liberia.

Objective: The research aims to highlight the need for improved waste management practices in the community to support sustainable waste management.

Methodology: A cross-sectional survey was conducted using a sample size of 375 from a total population of 6,124. The sample size was calculated using the Taro Yamane frame with a confidence level of 95%. The data were collected over 15 days and analyzed using descriptive statistics in SPSS.

Findings: Malaria is one of the major health effects resulting from improper waste management, as indicated by 31.5% of respondents. Flooding is also a major environmental consequence experienced, as indicated by 34.1% of the respondents. The research shows that the leading cause of improper waste management is limited knowledge of regulating proper waste disposal. 32% of the respondents are willing to take the initiative in waste management, but there is limited accessibility to resources, and 44% align their participation with incentives.

Recommendation: We recommend that the Wein-town community initiate waste management programs that will improve the public health of the community and boost the community's pride.

Key Words: *Community, Engagement, Impact, Sustainable, Waste*

Introduction

The involvement of communities in waste management is important for effectively sustaining waste management systems. It focuses on building a shared responsibility for a healthier environment, which supports the Clean Air Act and the Health for All goal. When the community is engaged into waste management, it becomes more sustainable, efficient and equitable (Ramos, 2024).

The improper and ineffective waste management practices have led to environmental degradation, socioeconomic factors, and fragile public health systems in Liberia (Yusuf et al., 2025a). The direct costs of waste management in 2020, was estimated at USD 252 billion excluding the hidden costs associated with poor health, pollution and climate change accumulating USD 361 billion (UNEP, 2024).

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Sub-Saharan Africa faces lots of challenges in waste management. The region produces nearly 174 million tonnes of municipal solid waste each year, with only around 44% recovered and 4% recycled (Adedara et al., 2023). The waste collection rate in Sub-Saharan Africa is 44%, compared to 90% in Europe and Central Asia (Godfrey et al., 2019). Absence of effective waste management systems worsens environmental and health problems in the region (Abubakar et al., 2022).

Liberia is one of the poorest Countries in Sub-Saharan Africa, and faces lots of problems in its healthcare delivery systems. The Country was just trying to recover from a 14-year civil crisis that destroyed most of the infrastructure when it was again hit by the deadly Ebola virus. From 2014 to the present, the country has been faced with three major outbreaks, including the Ebola outbreak of 2014, the coronavirus outbreak of 2021, and the Monkeypox outbreak of 2021. Except for the Monkeypox with a low fatality rate, many people lost their lives to Ebola and COVID-19 (Keys et al., 2015).

In Liberia, about 800 tons of solid domestic waste are collected from Monrovia households every day, and together account for about 45% of the total waste generated in the city. The other 55% is not collected or is not supplied by the solid waste collection system (FPA, 2025). However, indiscriminate burning, open dumping, and burial of waste are routinely accepted practices and a significant threat to individuals and communities. Community engagement is perceived as an essential element to addressing these issues. Research has found that involving local communities

in waste reduction programs increases participation, awareness, and ownership (Anokye et al., 2024).

The Forestry Development Authority (FDA) community in Wein Town, Paynesville, Liberia, has had to contend with environmental and public health problems arising from poor waste management. Poorly managed landfills in the area have contaminated the local water supply, spread diseases, and altered living conditions. There is an expected rise of Municipal solid wastes from 2.1 billion tonnes estimated in 2023 to 3.8 billion tonnes by 2050, as stated by the United Nations Environment Program (UNEP).

For example, Ghana has a community-based recycling program that is significantly helping the waste collection and recycling processes. This program has been sustained over the years with similar system in Nairobi, Kenya where the focus is on plastic waste.

These case studies show the potential for community involvement in waste management and make a strong case for investigating such strategies in the Forestry Development Authority (FDA) community. The study will contribute to recognizing the need for improved waste management practices in Wein Town and similar localities by investigating the community's role in sustainable waste management.

Methodology

A cross-sectional survey was conducted in the study area to collect data on a specific population/sample. The research targeted community members including heads of households in four blocks of the

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FDA community and member of the leadership.

LIGIS 2022 Census results indicates 6,124 household headcount. Using the Taro Yamane Sample frame, the calculated sample size was 375 with a confidence level of 95%. The community was divided into four Enumeration Areas (EAs) from Block A to Block D, according to a predetermined sampling frame. The size of each EA is determined by the number of households it includes, as recorded in the new 2022 Liberia Population and Household Census (LPHC) frame. We used structured questionnaire to collect the research data.

The researchers received approval by the Dean of the School of Health Sciences to approach the Forestry Development Authority (FDA) community chairman for permission to conduct the study at his facility. It took roughly 15 days to collect

data across the whole study. The data was analyzed using descriptive statistics in the SPSS. We used descriptive statistics to describe the demographics of the participant. We also used inferential statistics to determine the relationship between household income level and waste management practices.

Ethical Considerations

Training was conducted for the data enumerators to adhere to ethical principles. Even though the researcher did not get approval from the Country's ethic review Board, but it was done under the supervision of the Cuttington University graduate school research supervision and regulations. The rights of the participants were observed as the signed a consent form before partaking into the research. All the participants were labelled anonymous, hence, there is no identity.

Results

Table 1: Demography Data of Respondents

Age of The Respondents		
Age Range	Frequency	Percentage
18-22	36	9.6
23-27	39	10.4
28-32	42	11.2
33-37	47	12.5
38-42	84	22.4
43-47	44	11.7
48-50	45	12
51 >	38	10.1
Sex of Respondents		
Male	162	43.2
Female	213	56.8
Educational status of Respondents		

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No Formal education	43	11.4
Primary education	51	13.6
Secondary education	106	28.3
Tertiary education	61	16.3
Postgraduate education	45	12
vocational education	69	18.4
Occupation		
student	110	29.3
gainfully employed	54	14.4
self-employed	79	21.1
Not employed	69	18.4
Retired	63	16.8
Total Respondents/Sample size	375	

Source: Researcher Field data, 2025

Table 2: Research Outcomes

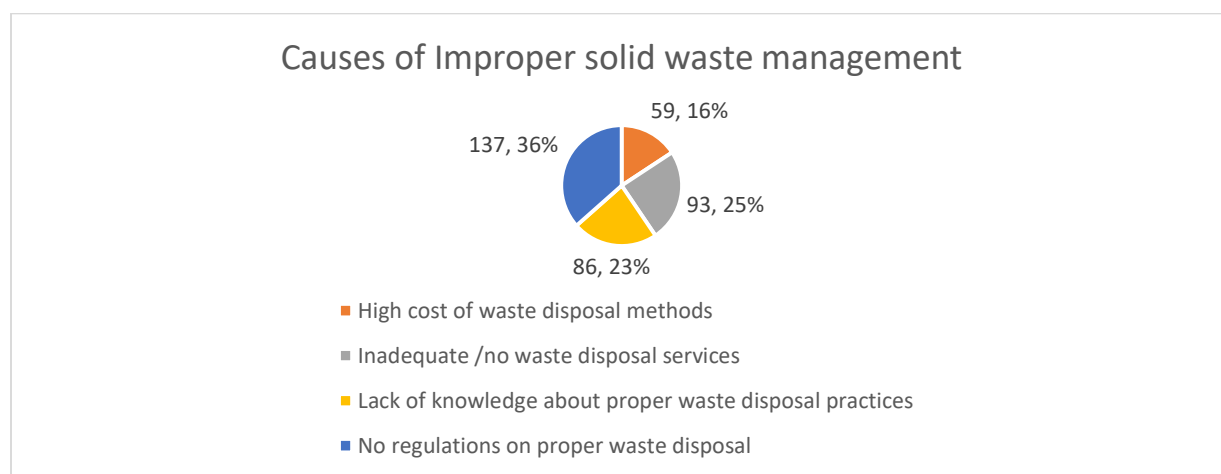
Regular participation in community waste management activities		
yes	96	25.6
No	279	74.4
Methods of solid waste disposal		
Burning	101	26.9
Burying	57	15.2
Dump in the drainage	41	10.9
Dump in the main street	127	33.9
Dump in the community Dirt bin	49	16.8
Frequency of household disposal of solid waste		
Daily	87	23.2
weekly	125	33.3
Monthly	212	56.5
Participation in the community cleanup exercise when announced		
Never	134	35.7
Sometimes	102	27.2
Always	26	6.9
Weekly	38	10.1
Monthly	76	20.3
Health effects experienced due to improper waste management		
Diarrhea	32	8.5
Cholera	43	11.5
malaria	104	27.7
Fever	118	31.5

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	78	20.8
Environmental consequences experienced due to improper waste management		
Air pollution	102	27.2
Water pollution	48	12.8
Choked gutters	55	14.7
Flooding	128	34.1
Land degradation	39	10.4
Total Respondents/Sample size	375	

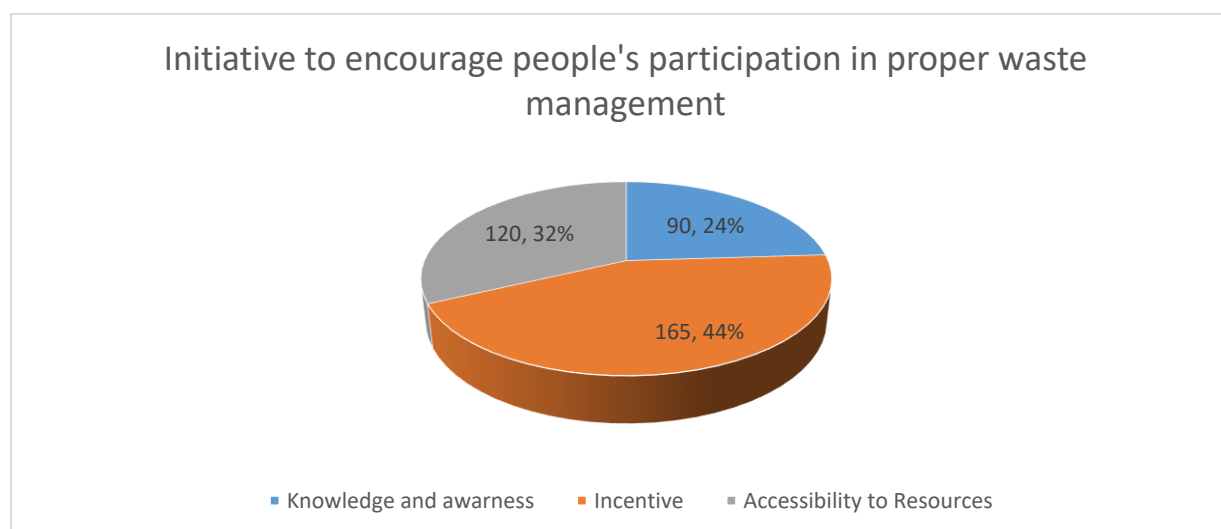
Source: Researcher Field data, 2025

Figure 1: Causes of Improper solid waste management



Source: Researcher Field data, 2025

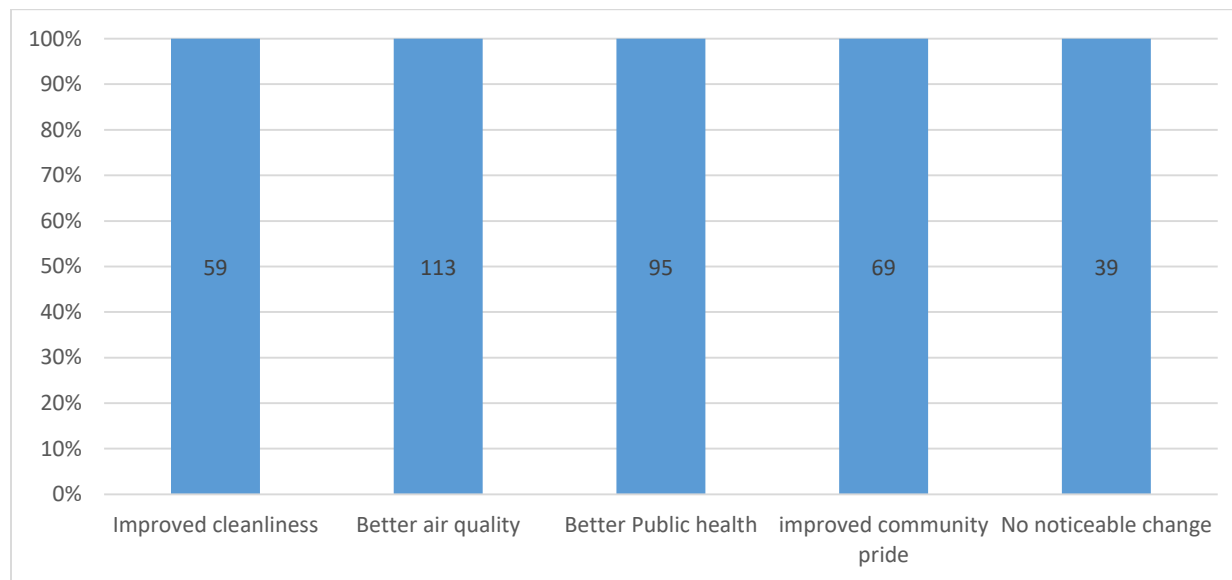
Figure 2: Initiative to Encourage People's in proper waste management



Source: Researcher Field data, 2025

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Figure 3: Expected environmental outcomes from increased waste management Program



Source: Researcher Field data, 2025

Discussion

Table 1 displayed the demographics of the research respondents. The respondents' ages ranged from 18 to 51 years. However, the age group 38-42 was among the highest, with 84 persons, constituting 22.4% of the respondents. 56.8% of respondents were female, while 43.2% were male. The majority of respondents were students, accounting for 29.3% of the total respondents (375). The respondents included employed and non-employed students, self-employed individuals, and retirees. 21.1% of the respondents were self-employed. 28.3% of respondents had completed secondary education, and 18.4% had completed vocational education. 16.3% have completed tertiary education, while about 11.4% have no formal education.

Additionally, 128 (34.1%) of the respondents said that flooding is one of the major environmental consequences resulting from improper waste management. Most

communities in Montserrado County, particularly those in swampy areas, are affected by flooding. During the rainy seasons. The building of waterways and alleys has no biodegradable wastes, like the plastic wastes generated from the sachet water, which are not adequately recycled. These findings aligns with Bypolynext, (2025) article on “How plastic wastes fuels urban flooding”.

The data in Table 2 also indicate that 102 participants correlated air pollution with one of the environmental consequences resulting from improper waste management in the Wein-town community, constituting 27.2% of the total research respondents. The effects of air pollution cannot be overemphasized, as man's efforts to improve the environment are causing far more serious problems than expected. The Wein's-town community dumped site violates the Clean Air Act of 1990 in its entirety, which focuses on the attainment and maintenance of the

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National Ambient Air Quality Standards (US EPA, 2013). The effects of inhaling unclean air cannot be underestimated, as it encompasses adverse effects, including irritations of the respiratory tract, to the contraction of chronic diseases such as chronic obstructive pulmonary disease (COPD) that may lead to premature deaths when not given serious consideration the study is in line with Mkorombindo et al., (2022) article title “The Air We Breathe: Respiratory Impact of Indoor Air Quality In Chronic Obstructive Pulmonary Disease”.

Notwithstanding, the choking of gutters cannot be overlooked, as 14.7% of the respondents (55 persons) testified that the choking or clotting of gutters is among the numerous consequences of improper waste management in the studied community. We can give this serious attention, as it shows that when plastic and other non-biodegradable waste are not properly disposed of, they are left in the open environment, where erosion carries them into nearby waterways. When this happens, the drainage way becomes choked, preventing the water from flowing freely through it as it should. The water is released into the community, affecting dwellings and leaving residents homeless. According to Parker (2025), the planet is swimming in discarded plastic, harming humans and animals. Plastic pollution is dominant primarily in Asian and African Countries with poor garbage collection systems. This is the case with Liberia (Parker, 2025). Even though the focus of the study is on Wein-town community, it is a critical issue across various urban settings in Liberia. There are several factories producing plastic and

bottled water, yet there are limited services for collecting and recycling used and discarded plastics/bottles.

The data also presents other factors, including water pollution (12.8% as an environmental consequence) and land degradation (10.4%). We have considered all of these factors, as flooding is not associated with just one or two factors. However, land degradation has led to underproduction among inhabitants who rely on gardening for their income, as the foundations of houses can no longer stand as the soil erodes. We cannot overemphasize the issue of water pollution, as improper waste management is closely linked to it. Water travels from one point to another using the water vein and erosion.

In *Figure 1*, One hundred thirty-seven of the respondents, constituting 36.5% said that lack of regulations on proper waste disposal is a major cause of improper solid waste management, however. Ninety-three participants also referenced that inadequate waste disposal services led to improved solid waste disposal. Additionally, 86 and 59 participants believe that the lack of knowledge about proper waste disposal practices and the high costs of waste disposal methods, respectively, are responsible for improper waste management.

Waste management, mainly in a developing country like Liberia, is a significant concern (Yusuf et al., 2025b). When we look around the city of Monrovia, there are few waste bins on major streets, leading to the random disposal of waste as people find it challenging to hold waste in

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their hands for long walks. This leads to dumping or dropping it along the street side. More besides, it is still challenging to authenticate whether there is a law governing proper waste disposal.

However, the government, through the Public Health Law, has provided regulations for solid waste management, but implementation of said law /regulation is still a major concern, as awareness and acceptance are cardinal. The result indicates that there is more to do in terms of awareness. Health education needs more emphasis to change the mindset and perception. Community involvement is key in identifying strategic areas for waste bins. Waste management is not just the responsibility of an individual, but the implementation of said law/regulations is still a major concern, as awareness and acceptance are cardinal.

The result indicates that there is more to do in terms of awareness. Health education needs more emphasis to change the mindset and perception. Community involvement is key in identifying strategic areas for waste bins. Waste management is not just the responsibility of an individual, but the entire community through its collective and participatory effort (Zebua et al., 2025). The community-led total sanitation is one major strategy that could adequately help in the proper management of solid waste.

Figure 2 represents respondents' initiative to encourage people's participation in proper waste management. 165 people expect an incentive to participate in the initiatives. At the same time, 120 respondents align initiative with inaccessibility to

resources. 90 people feel that there is limited knowledge and awareness of proper waste management. Our activities on the earth to transform our environment are causing more harm around us than expected. While it is a known fact that we are striving to improve our knowledge and skills in technology, we are deeply forgetting the waste generated from these technological devices, how they are managed, the effects on the ecosystem, and even on our own lives. Knowledge is power; it is about time that we focus on properly managing the waste we produce. The data indicate a significant need to improve knowledge and raise awareness of proper solid waste management in the Wein-town community. The area has been contaminated with waste for decades, yet no protective measures have been put in place. It has become the new normal for citizens to build their dwellings in or near such unsanitary environments. This study shows that when more awareness is raised in the community on proper waste management. There will be a kind of protective factor, and people will consider taking waste management as a community initiative project. With this, advocacy can be done to divert the minds of policy and implementation partners to direct their resources to the community. When resources and incentives are provided to augment the efforts of the lead initiators of the community waste team, there will be a high expectation for sustainability.

Figure 3 presents the expected environmental outcomes from increased waste management programs. 30.1% of respondents believe that when waste

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management programs are initiated, air quality will improve. At the same time, 25.3% are expecting better public health outcomes. Waste tends to erode the community's pride. No one wants to identify with a waste-infested community, yet we also find it almost difficult to work collaboratively to make it waste-free. 18.4% trust that waste management programs will improve the community's pride, while 15.7% expect improvements in community cleanliness. As in all cases, 10.4% still do not trust that there will be any noticeable change.

Community waste management programs have worked in other African Countries, including Kenya, Rwanda, South Africa, Senegal, and Ghana. For example, the "Taka Taka Solution" in Kenya was a solution that bought waste from waste pickers in low-income areas (European Commission. Directorate General for Environment. et al., 2021). This solution raised recycling rates to 90%, thereby reducing waste across the community's streets. Similar initiatives can be implemented in the Wein-Town Community to reduce improper waste disposal to the greatest extent possible. To be able to achieve Sustainable Development Goal 6, which aims to ensure access to safe and affordable drinking water and sanitation for all (UN-SDG, 2023). These initiatives are better placed.

Conclusion

Improper waste management is a major concern in the Wein-town community. Limited knowledge and awareness, along with the lack of accessible resources,

continued to be a stumbling block to adequately managing the community's waste. Moreover, malaria and typhoid fever are among the endemic health conditions associated with improper waste management. The community continued to face environmental consequences, including flooding and air pollution.

Lack of regulations on proper waste disposal and knowledge on proper disposal practices, coupled with inadequate waste disposal services and high cost of waste disposal methods, are among the leading causes of improper solid waste management.

Recommendations

The findings of this research have led us to recommend the following:

1. The entity responsible for waste management should create more awareness in the community. This will enable them to develop self-initiated programs that will be effective and sustainable.
2. The Government should develop/adapt a regulatory framework for proper waste disposal. If available, ensure implementation effectiveness.
3. The Wein-town community should initiate waste management programs to improve public health and boost community pride.

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