<u>Full Length Research Paper</u>
An Evaluation of Municipal Waste Disposal Management Policy in NTA Community, Montserrado County Liberia

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ARTICLE DETAILS	ABSTRACT
	This study evaluated municipal waste disposal management policy at NTA Community, Chicken Soup Factory, Montserrado County. The information generated by this study is a useful tool for International & national partners, the Government of Liberia through the Ministry of Health (MOH), the EPA, for policy making and designing appropriate interventions to improve waste management in Chicken Soup Factory Community and across the country. The descriptive survey design and random sampling technique were used to survey194 residents. Findings reveal that policy implementation on waste disposal was challenged by fewer inspectors (25%), lack of vehicle (23%) and lack of awareness (17%). Concerning monitoring of policy, 44% said EPA was the one responsible to monitor, while 17% said it was left with individuals. The government and other nongovernment organizations should develop programs that will educate community dwellers and funding that will strength the Environmental Protection Agency (EPA) so as to ensure that waste management policy is effectively implemented. The Inspectorate Department at EPA should perform its duties by conducting waste disposal inspections frequently as stipulated by the agency.

1. Introduction

Solid waste management is a critical issue affecting both urban and rural dwellers, with community dwellers contributing to hazardous waste. The problem is caused by various sectors, including domestic, commercial, and industrial activities, and many countries have attributed their waste management responsibility to government or administrative authorities. However, there is growing consensus among stakeholders, such as government, non-governmental agencies, and community dwellers, to work together to address the environmental and human health effects of solid waste. In Liberia, the rapid urbanization has led to increased pollution issues, such as municipal waste management policy and inadequate sanitation coverage. The UNDP report (2015) highlights the need for solutions to reduce waste volume in urban areas due to population growth, industry concentration, consumption, and inadequate facilities. Uncertainty problems in waste management systems can be addressed using fuzzy, stochastic, and interval programming techniques.

The efficiency of waste management systems can be maximized through proper use of these techniques. This paper discusses the application of fuzzy analysis approach and integrated waste management in dealing with uncertainty problems in urban

areas. In the European Union, waste generation is a critical issue globally, and countries should focus on promoting sustainable consumption and production. Attitudes towards personal waste generation significantly contribute to waste management behaviors, while attitudes towards general waste management negatively influence waste reduction and recycling behaviors. UNEP has been active in Liberia since 2003, providing capacity building assistance. The study aims to examine factors affecting effective municipal waste management policy on the Chicken Soup Factory Community.

Waste generation in both developing and developed countries is a chronic problem, impacting health and the environment. In Liberia, the alarming rate of waste generation has raised public concerns. A researcher reveals that municipal waste disposal policies in a chicken soup factory are not being implemented, leading to improper waste disposal. The researcher aims to investigate the factors responsible for effective policy implementation in this significant issue.

The research sought answers to the following questions:
1. *How is the municipal waste disposal management policy implemented?*
2. *What are the challenges faced in implementing the disposal policy?*
3. *What measures can be taken to adhere to the implementation of the policy?*

The research focused on the NTA Community in Chicken Soup Factory, a large population-dense community in Monrovia, Liberia. The study was conducted between December 2020 and January 2021, examining Monrovia's various districts, including Broad Street, Waterside, Sinkor, Old Road, and Paynesville. Sinkor, a bustling mid-town, hosts diplomatic missions, hotels, businesses, and informal communities. The Paynesville portion, where Neezoe falls, is a large area with numerous communities. The study aimed to provide insights into the city's diverse population and urban landscape. This study aims to provide insights into the implementation of Municipal waste disposal policies in Liberia's Chicken Soup Factory Community, with the aim of aiding policy-making, providing guidance to the community, and potentially influencing future research. The research faced limitations due to time constraints, financial constraints, political fear, and increased exchange rates. To address these, participants will be informed that participation is voluntary and will not negatively impact their jobs. Financial aid will be sought through family and friends.

2. Materials and Methods

2.1 Study area
The research focused on the NTA Community in Chicken Soup Factory, a large population-dense community in Monrovia, Liberia.

2.2 Research Design
Descriptive survey design was what the research used to collect the data. Such design was appropriate for this study because it explored relationships between variables (dependent and independent). Reviews of essential municipal waste disposal management policy were done.

2.3 Population
According to the Liberia Institute of Statistic and Geo-Information Services (2008), the population projection covering June 2014 for Chicken Soup Factory Community is 25,198. The research randomly selected residents of NTA Community, Chicken Soup Factory which population is 375 and is considered as the population of interest. The study focused on residents of NTA Community, located in Chicken Soup Factory.

2.4 Sample Size & Sampling Technique
Due to limited time factor to conduct this study, the researcher is unable to use the entire population. Therefore, a sample representing the entire population of interest is drawn for selection in the study. Below is Taro Yamane's Formula (1972) which is the statistical formula that will be used to calculate the sample size:

$$n = \frac{N}{1 + N(e)^2}$$

Where n= the sample size
N= Population
'e = standard error of the study
0.05 is used as Standard error to calculate the sample size of this research.

$$n = \frac{N}{1 + N(e)^2}$$

$n = \dfrac{375}{1+375(0.05)^2}$ $= \dfrac{375}{1 + 374\,(0.0025)}$ $= \dfrac{375}{1 + 0.19375}$.

$n = \dfrac{375}{1.9375}$.

n = 193.5
n = 194

The sample size of the research was three hundred seventy- five (375). e = (maximum allowable error – 5%). The study employed a random sampling survey to draw out 194 from the population of 375.

2.5 Data Collection Instruments
The data collection instruments used was structured questionnaires.

2.6 Data Collection Procedure
The data collection procedure began by getting an introductory letter from the Dean of the School of Health Sciences at the Cuttington University Graduate School and Professional Studies to the community chairman of the Chicken Soup Factory Community. On receipt and acceptance of the introductory letter from the school, the community leadership onward gave a letter of acceptance to the researcher. After receiving the acceptance letter from the community leader, the researcher and her assistants surveyed the respondents. Data collection lasted for 14 days.

2.7 Data Analysis Procedure
The data analysis started by data entering, coding and cleaning. Data entry into the computer was carried out using the EPI INFO version 6 then exported to Release 9.2 (Statistical Analysis Software). Description of frequencies, means, proportions, standard deviations - SDs and rates for each variable were derived. A total of 194 questionnaires were distributed and retrieved.

3. Results

Table 1: Gender of Respondents

Sex of Respondents	Frequency	Percentage
Female	109	56
Male	85	44
Total	194	100

Source: Researcher's Field Data, 2021

The result in table 1 indicates that of the 194 respondents interviewed, more than half (109; 56%) were females and 85 (44%) were males.

Table 2: Age of Respondents

Age of Respondents	Frequency	Percentage
30 - 39	83	43
18 – 29	68	35
40 & above	43	22
Total	194	100

Source: Researcher's Field Data, 2021

Table 2 shows the age range of respondents where 83 (43%) where in the age range 30-39yrs followed by 68(35%) who were in age group 18 – 29yrs. Respondents in the age bracket 40yrs and above constituted the least (22%).

Table 3: Occupation of respondents

Variable	Frequency	Percentage
Business	134	69
Student	27	14
Contractor	15	8
Teacher	10	5
Nurse Aid	8	4
Total	194	100

Source: Researcher's Field Data, 2021

The result in table 3 shows that out of the total of 194 respondents, 134 respondents which represents 69% of the population were business people; 27 respondents which represents 14% of the population are students; 15 respondents which represents 8% of the total population are Contractors; 10 respondents which represents 5% of the population are Teacher and 8 respondents which represents 4% of the total population are Nurse Aid.

Table 4: Educational status

Variable	Frequency		Percentage	
High School Diploma	91		47	
BSc	33		17	
High School Student	35		18	
University Student	25	13		
None	10	5		
Total	194	100		

Source: Researcher's Field Data, 2021

Table 4 shows the educational status of respondents were 91 (47%) had high school diploma, followed by 35 (18%) who were high school students. Those who have not been in high school and above represented the lowest (57%).

Table 5: Ethnic group of respondents

Ethnic Group	Frequency	Percentage
Kissi	68	35
Kru	43	22
Bassa	27	14
Grebo	27	14
Kpelleh	17	9
Gbandi	6	3
Lorma	6	3
Total	194	100

Source: Researcher's Field Data, 2021

The result in table 5 indicates that out of the total of 194 respondents, 68 respondents which represent 35% of the total population are from the Kissi tribe; 43 respondents which represent 22% of the total population are Kru; 27 respondents which represent 14% are from the Bassa; 6 respondents which represent 3% are Gbandi; 27 respondents which represents 14% of the population are from the Kpelleh tribe; 6 respondents which represents 3% of the population are from the Lorma speaking tribe.

Table 6: Is there policy for waste Disposal   ?

Variable	Frequency	Percentage
No	101	52
Yes	68	35
Don't know	25	13
Total	194	100

Source: Researcher's Field Data, 2021

Table 7: Is waste policy being implemented?

Variable	Frequency	Percentage
No	142	73
Yes	27	14
Don't know	25	13
Total	194	100

Source: Researcher's Field Data, 2021

Table 7 shows that majority (73%) of the respondents said they did not notice policy implementation on waste disposal while 14% admitted to some policy implementation on waste disposal.

Table 8: Who monitor the implementation of waste policy?

Variable	Frequency	Percentage
EPA	85	44
No one	34	17
Individual	33	17
Don't know	25	13
Marketer	17	9
Total	194	100

Source: Researcher's Field Data, 2021

Table 8 shows that out of the total of 194 respondents, 85 respondents which represents 44% of the total population said that EPA monitor the implementation of waste policy; 33 respondents which represents 17% said that individuals are responsible for monitoring waste policy implementation. While 17 respondents which represent 9% of the total population agree that waste policy is being monitor by Marketer.

Table 9: How can the policy be implemented effectively?

Variable	Frequency	Percentage
Thorough Awareness	194	100
Total	194	100

Source: Researcher's Field Data, 2021

The result of table 9 indicates that the entire population (194 respondents) makes up 100% said by educating people through awareness, the policy on waste can effectively be implemented.

Table 10: What should be done to those who refuse to adhere to waste policy??

What should be done to those who refuse to adhere to waste policy?	Frequency	Percentage
Punish them	177	91
Educate them	17	9
Total	194	100

Source: Researcher's Field Data, 2021

Table 10 shows that majority (177; 91%) of the respondents hold the view that violators of waste disposal policy should be punished while 17 (9%) said they should be educated.

Table 11: What are challenges faced by waste policy implementation?

Challenges faced by waste policy implementation	Frequency	Percentage
Fewer Inspectors	49	25
Lack of vehicle	45	18
Don't know	34	18
Lack of funds	33	17
Lack of awareness	33	17
Total	194	100

Source: Researcher's Field Data, 2021

Table 11 presents the challenges facing waste disposed policy implementation in the NTA Community. Accordingly, fewer inspectors (25%), lack of vehicle (23%), lack of awareness (17%) were majority impediments to effective policy implementation.

Based on the analysis and interpretation of both tables and figures, the research established the following findings. The result in table 1 indicates that of the 194 respondents interviewed, more than half (109; 56%) were females and 85 (44%) were males.

Table 2 shows the age range of respondents where 83 (43%) where in the age range 30-39yrs followed by 68(35%) who were in age group 18 – 29yrs. Respondents in the age bracket 40yrs and above constituted the least (22%).

The result in table 3 shows that out of the total of 194 respondents, 134 respondents which represents 69% of the population were business people; 27 respondents which represents 14% of the population are students; 15 respondents which represents 8% of the total population are Contractors; 10 respondents which represents 5% of the population are Teacher and 8 respondents which represents 4% of the total population are Nurse Aid.

Table 4 shows the educational status of respondents were 91 (47%) had high school diploma, followed by 35 (18%) who were high school students. Those who have not been in high school and above represented the lowest (57%).

The result in table 5 indicates that out of the total of 194 respondents, 68 respondents which represent 35% of the total population are from the Kissi tribe; 43 respondents which represent 22% of the total population are Kru; 27 respondents which represent 14% are from the Bassa; 6 respondents which represent 3% are Gbandi; 27 respondents which represents 14% of the population are from the Kpelleh tribe; 6 respondents which represents 3% of the population are from the Lorma speaking tribe.

The result of table 6 indicates respondents' view the existence of policy for waste disposal. More than half (52%) said they did not know of such policy while 35% answered in the affirmative.

Table 7 shows that majority (73%) of the respondents said they did not notice policy implementation on waste disposal while 14% admitted to some policy implementation on waste disposal.

Table 8 shows that out of the total of 194 respondents, 85 respondents which represents 44% of the total population said that EPA monitor the implementation of waste policy; 33 respondents which represents 17% said that individuals are responsible for monitoring waste policy implementation. While 17 respondents which represent 9% of the total population agree that waste policy is being monitor by Marketer.

The result of table 9 indicates that the entire population (194 respondents) makes up 100% said by educating people through awareness, the policy on waste can effectively be implemented.

Table 10 shows that majority (177; 91%) of the respondents hold the view that violators of waste disposal policy should be punished while 17 (9%) said they should be educated.

Table 11 presents the challenges facing waste disposed policy implementation in the NTA Community. Accordingly, fewer inspectors (25%), lack of vehicle (23%), lack of awareness (17%) were majority impediments to effective policy implementation.

4. Discussion

Findings of the study confirm that there is an existing policy on waste disposal. However, its implementation is being hindered by factors including fewer inspectors (25%), lack of vehicle (22%), and lack of awareness (17%). These results are in line with the report of the United Nations Environmental program on the challenges facing waste disposal (UNEP, 2007).

The current study indicated measures to be taken to effect waste disposal policy. Respondents overwhelmingly said community dwellers should be educated on safe waste disposal practices. Also, regarding what to be done to violators of the policy on waste disposal, majority (91%) of the population said they should be punished. The findings parallel to the Annual Report of MCC that provides for punishment of violators of waste disposal policy (MCC Annual Report, 2010).

As it relates to research question three (3): What measures can be taken to adhere to the implementation of the policy? The result of table 9 indicates that the entire population of 194 respondents which make up 100% of the population said that, by educating people through awareness, the policy on waste can effectively be implemented. Additionally, the result of table 10 indicates that out of the total population of 194 respondents, 17 respondents which make up 9% of the population said that, those who refuse to abide by the policy should be taught; while 177 respondents which represent 91% of the total population said that they should be punished.

5. Conclusion

There is an existing policy on waste disposal in the study area. However, its implementation strategy, challenged by lack of awareness, fewer inspectors and lack of logistics has made it somewhat ineffective. Addressing these impediments by the EPA will help make the policy on waste disposal more apparent and effective.

6. Recommendations

Base on the result of the study, the following are recommended:

1. The government should sensitize residence of NTA Community to abide by waste disposal policy since it is one of the reasons for which waste policy implementation is not effective.
2. The Inspectorate Department at EPA should perform its duties by conducting waste disposal inspections frequently as stipulated by the agency.
3. That the government, in collaboration with its partners should provide more vehicles or motorbikes and basic things required by an inspector.

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