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ASSESSMENT OF TRADITIONAL LANDFILLS AND ITS IMPACTS ON THE RESIDENTS OF MUBI METROPOLIS, ADAMAWA STATE

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Abstract

Traditional landfills remain a predominant method for municipal solid waste (MSW) disposal worldwide. While cost-effective and simple to operate, they pose significant environmental, health, social, and economic risks - particularly when located near residential areas. This study focused on the environmental and public health impacts of traditional landfills on the residents of Mubi metropolis. The study identified two research questions and objectives respectively to guide the study. The study adopted descriptive research design type. The sample of the study was 200 respondents and the data collection instrument was a self-structured questionnaire titled 'Traditional Landfills Questionnaire (TLQ)'. The responses of the respondents were analyzed using chi square statistical formula. The study found out that there were numerous problems faced by the residents of Mubi metropolis as a result of traditional landfills which was due to the lack of enlightenment of 82.5% of the people towards proper waste disposal and management. More so, the study found that 75% of the residents of Mubi metropolis suffer various health and environmental challenges as a result of the impacts of traditional landfills. Based on the statistical analysis from the findings of the study; the chi square value indicates (x2) 9.270 with p-value of 0.010 which shows that there are numerous traditional landfills management problems. (x2) value of 9.432 with p-value of 0.009 indicates that there are health impacts of traditional landfills on the residents of Mubi metropolis. More so, (x2) value of 10.260 with p-value of 0.006 shows that there are various environmental impacts of traditional landfills on the residents of Mubi metropolis. Therefore, this study recommended that there should be enlightenment of the people on the proper means of solid waste disposal and enforcement of regulations guiding proper waste disposal systems by the local authorities.

Keywords: traditional landfills, Waste disposal, Environment, Health

Introduction

Traditional landfills - engineered pits or trenches where waste is deposited and compacted - continue to be widely used, especially in developing regions where alternative technologies (e.g., incineration, advanced biological treatment) may be cost-prohibitive. However, siting landfills near residential areas can create multiple adverse effects (Gupta & Singh, 2019). The daily generation of these wastes has become a significant challenge particularly on the environment and public health of the residents of Mubi metropolis. The increase in waste generation and improper disposal seems to come about as a result of population growth, lack of awareness on proper waste disposal and refusal to adhere to instructions by a seemingly stubborn population. Although Awosusi (2010) in Zoaka, Sali & Garba (2024), described wastes as substances and materials that are either disposed of or required to be disposed of in accordance with national laws, it is worrisome that many urban areas in Nigeria lack effective waste management systems, leading to haphazard dumping, burning, or burying of solid wastes. One little wonder then that the total global waste arising is around 20 billion tonnes in 2017. This corresponds to 2.63 tonnes of total waste per capita (cap) per year. The total global waste generated is expected to grow to 46 billion tonnes by 2050 under a business-as-usual scenario (Maalouf & Mavropoulos, 2022). Traditional landfills (also called sanitary landfills when basic controls are in place) typically consist of layers of compacted waste covered by daily soil cover. Key components include access roads, waste cells, final cover systems, leachate collection, and gas venting systems. However, in many regions, design and operational controls are minimal, leading to "dumpsites" with open waste, poor lining, and no gas control (Smith & Jones, 2018). These open dumpsites can create a number of adverse environmental impacts such as the generation of leachate, odour problems, eroding of surface vegetation and attraction of rodents (Amadi, Yisa, Okoye, & Okunlola, 2010).

The major cause of environmental pollution is the wrong dumping of refuse on the streets and into the waterways. This results in mass spillage of water from gutters into roads and an overall unkempt appearance. This also results in blocked drainages which inevitably breed mosquitoes and affect the health of the citizenry negatively. It is pertinent for adequate measures to be set in place to combat pollution especially environmental pollution. Citizens, home owners and businesses should be discouraged from dumping waste refuse on the roadsides and in the gutters. They should be sensitized on the negative effects of excess pollution on their health and the resultant climate change (Odesanya, 2024). According to a survey by World Health Organization (WHO) the dirtiest cities in the world are found in Nigeria. High levels of air pollution and land pollution are found within Nigeria and inevitably, this triggers a high mortality rate especially among infants (Odesanya, 2024). Moreover, solid waste disposal practices in Nigeria in the past have not been environmentally friendly (Adeyemi & Olowu, 2021). The majority of substances composing municipal solid waste include paper, vegetable matter, plastics, metals, textiles, rubber and glass. Proper waste management and efficient system of solid and fluid disposal techniques are lacking in most developing countries. Waste disposal techniques have created subtle and yet serious environmental pollution and ecological deterioration in many developing countries such as Nigeria. The manner in which municipal and industrial wastes generated are disposed in most urban areas in Nigeria is worrisome. The use of inadequate disposal system and lack of consideration of the topography,

geology and hydrogeology are the causes of pollution arising from waste disposal in many developing countries (Smith & Jones, 2018).

Statement of the Problem

Several agencies such as National Environmental Standards and Regulations Enforcement Agency, State Ministries of Environment amongst others have been set up to combat the pollution rate in Nigeria, however, the estimated pollution rate is still high (Odesanya, 2024) which indicates that there still exists a notable gap in implementing effective waste management and there is limited empirical research on the problem. Addressing this gap necessitates targeted empirical studies and policy measures focused on sustainable waste management strategies, public health initiatives, and community engagement. These efforts are crucial to mitigating the adverse impacts of escalating waste generation on both local communities and the global environment. Therefore, this research work focuses on the impacts of traditional landfills and associated problems in Mubi metropolis, Adamawa State, Nigeria.

Objectives of the study

The aim of this study was to assess traditional landfills and impacts on the residents of Mubi metropolis, Adamawa State, Nigeria.

Specific objectives are as follows;

- i. To assess the impacts of traditional landfills on the health of the residents of Mubi metropolis.
- ii. To assess the impacts of traditional landfills on the environment of Mubi metropolis.

Research Questions

- i. What are the impacts of traditional landfills on the health of the residents of Mubi metropolis?
- ii. What are the impacts of traditional landfills on the environment of Mubi metropolis?

Methodology

Study Area

Mubi metropolis as a geo-political area comprises of two Local Government Areas; Mubi North and Mubi South. According to Adebayo, (2004) in Peter & Tini (2011) the area is located between latitudes 10o30' and 10o05'N of the equator and between longitude 13o10'and 13o30'E of the Greenwich meridian. It occupies a land area of 192,307 Km and support a total population of 260,009 people (National Population Census 2006) in Peter & Tini (2011). Mubi and it's environs exhibits a tropical wet and dry type climate. The wet season runs from the months of April to October, while the dry season commences in November and ends in March. The annual average rainfall input at about 86.775mm with the highest occurrence in July and August. The temperature regime in Mubi is warm to hot throughout the year because of the radiation income which is usually relatively evenly distributed throughout the year (Peter & Tini, 2011).

Research Design

Descriptive survey research design was used to collect data to answer the research questions formulated for the study. Survey research design is a fundamental method in the field of research where the primary method of data collection is through surveys. This type of survey research allows researchers to collect structured data from individuals or groups to gain deeper insights into their thoughts, behaviors, or experiences related to a specific

topic (Mills, 2024). Consequently, the survey research method was used in this study since the research has a strong conviction of high participation from the respondents, hence will be able to predict causal relationship between the independent and dependent variables to be studied.

Population and Sample of the Study

The target population was 2,000 households in Mubi metropolis; it was categorized into three thus; category X (Mugulbu) closest to the landfill, category Y (Lokuwa) far from the landfill, category Z (Barama) far off from the landfill. Therefore, a representative sample of 200 respondents was selected for the study using purposive sampling technique.

Instrument for Data Collection

The research instrument used for the study was developed by the researchers. It was named ‘Traditional Landfill Questionnaire (TLQ)’.

Data Analysis Technique

This study made use of descriptive statistics such as frequency counts and percentages for the analyses of the demographical data of the respondents while Statistical Package for Social Science (SPSS) version 22 (Chi-square) was used for the analysis of the research questions because it is more convenient, accurate and comfortable.

Presentation of Results

Table 1: The Impacts of Traditional Landfills on the residents of Mubi metropolis

Health impacts	Frequency	Percentage (%)
Fall sick frequently		
Yes	158	79
No	42	21
Total	200	100
Suffer typhoid caused by contaminated water		
Yes	164	82
No	36	18
Total	200	100
Suffer malaria caused by mosquito bite		
Yes	170	85
No	30	15
Total	200	100
Suffer cholera caused by contaminated water		
Yes	160	80
No	40	20
Total	200	100
Suffer catarrh due to air pollution		
Yes	150	75
No	50	25
Total	200	100

Source: fieldwork 2025

Table 1 shows the impacts of traditional landfills on the health of the residents of Mubi metropolis. Respondents that fall sick frequently constitutes 158 (79%) of the respondents while 42 (21%) disagreed. Those that suffer from typhoid fever caused by contaminated water were 164 (82%) while 36 (18%) disagreed, for suffer malaria caused by mosquito bite 170 (85%) agreed while 30 (15%) disagreed, for cholera caused by contaminated water 160 (80%) agreed while 40 (20%) disagreed and for catarrh caused by air pollution 150 (75%) of the respondents agreed while 50 (25%) of the respondents disagreed. This shows that there are numerous health impacts caused by traditional landfills on the residents of Mubi metropolis as the responses from the respondents revealed.

Table 2: Chi-square analysis on the impacts of traditional landfills on the health of the residents of Mubi metropolis

Location	Chi-square value (χ^2)	Df	p-value	Remark
Closest to landfills (Mugulbu)	9.432	2	0.009*	Highly affected
Far from the landfills (Lokuwa)	3.503	2	0.174	Less affected
Far-off from the landfills (Barama)	2.280	2	0.320	Not affected

Table 2 shows the chi-square analysis on the perceived impacts of landfills on the health of the residents of Mubi metropolis. In areas nearest to the landfills, the $\chi^2 = 9.432$ with p-value of $0.009 < 0.05$. It can therefore be stated that there are various health impacts on the residents and the people living in that area suffer various severe ailments such as typhoid, malaria fever, cholera, catarrh, dysentery and the location serve as a breeding grounds for mosquitoes. In area, far from the landfills the $\chi^2 = 3.503$ with p-value of $0.174 > 0.05$. This shows that there are no much health impacts of the landfills on the people living in the area. Furthermore, in areas far-off from the landfills, the $\chi^2 = 2.280$ with p-value of $0.320 > 0.05$. This indicates that there are little health problems on the people living in the area thereby making the people not to suffer much ailments due to the impacts of the landfills.

Table 3: Impacts of Traditional Landfills on the environment of Mubi metropolis

Impacts on Environment	Frequency	Percentage (%)
Blockage of drainages		
Yes	175	87.5
No	25	12.5
Total	200	100
flooding		

Yes	145	72.5
No	55	27.5
Total	200	100
Reduce the beauty of the environment		
Yes	160	80
No	40	20
Total	200	100
Damage of local roads		
Yes	181	90.5
No	19	9.5
Total	200	100
Numerous traditional landfills		
Yes	174	87
No	26	13
Total	200	100

Table 3 shows the impacts of traditional landfills on the environment of Mubi metropolis. The respondents reported as follows; for blockage of drainages 175 (87.5%) of the respondents agreed while 25 (12.5%) disagreed, for flooding 145 (72.5%) agreed while 55 (27.5%) disagreed, for reduction of beauty of the environment 160 (80%) agreed while 40 (20%) disagreed, damage of local roads 181 (90.5%) agreed while 19 (9.5%) disagreed and numerous littered round traditional landfills 174 (87%) of the respondents agreed while 26 (13%) of the respondents disagreed. These shows that there are numerous impacts of traditional landfills on the environment of Mubi metropolis as indicated from the responses of the respondents.

Table 4: Chi-square analysis of the impacts of traditional landfills on the environment of Mubi metropolis

Location	Chi-square value (χ^2)	Df	p-value	Remark
Closest to landfills (Mugulbu)	10.260	2	0.006*	Highly affected
Far from the landfills (Lokuwa)	0.063	2	0.969	Less affected
Far-off from the landfills (Barama)	0.657	2	0.720	Not affected

Table 4 shows the chi-square test on the perceived impacts of traditional landfills on the environment of Mubi metropolis. In areas closest to the landfills, the $\chi^2 = 10.260$ with p-value $0.006 < 0.05$. This analysis reveals that the area is highly affected by the impacts of the landfills. In areas far from the landfills, the $\chi^2 = 0.063$ with p-value of $0.964 > 0.05$. The analysis shows that this area is less affected by the impacts of landfills. Furthermore, areas

far-off from the landfills, the $\chi^2 = 0.657$ with p-value of $0.720 > 0.05$. The analysis indicates that the areas are the least affected by the environmental impacts of landfills.

Discussion

The impacts of traditional landfills on the health of the residents of Mubi metropolis as reported by the respondents; fall sick frequently 158 (79%) of the respondents agreed while 42 (21%) disagreed, for suffer typhoid caused by contaminated water 164 (82%) agreed while 36 (18%) disagreed, suffer malaria caused by mosquito bite 170 (85%) agreed while 30 (15%) disagreed, for cholera caused by contaminated water 160 (80%) agreed while 40 (20%) disagreed and for catarrh due to air pollution 150 (75%) of the respondents agreed while 50 (25%) of the respondents disagreed. Various health impacts of landfills sites abound on the residents of Mubi metropolis as it relates to the distance of the households from the landfills. The study found out that constant exposure of the people to the landfill sites result into various diseases and ailments of family and friends as health impacts of the landfills. Some of the ailments suffered by the people due to the landfills include water borne diseases such as cholera, typhoid and dysentery which are caused by drinking polluted and contaminated water. The water bodies get contaminated as a result of infiltration of water from the landfills that are around the houses. Various health challenges abound from landfills as reported by Adeyemi & Oluwo (2021) and Smith & Jones (2018) who both expounded the health challenges such as typhoid fever and cholera as a resultant effect of landfills. Therefore, this study agrees with the assertion of the aforementioned scholars.

The impacts of traditional landfills on the environment of Mubi metropolis, revealed from this study included blockage of drainages (87.5%), flooding (72.5%), reduction of beauty of the environment and damaged roads (80% and 90.5% respectively). These are linked up as blocked drainage results to flooding and dirty environment and spoilt roads. This study is in consonance with the studies conducted by Odesanya (2024) and Maoulouf & Mavropoulos (2022) who all similarly reported that flooding is a major problem faced by residents whose localities are filled up with wastes in the gutters. More so, Gana and Ngoro, (2014) reported that solid wastes in major towns and cities in Nigeria are dumped in drainages thereby blocking the free flow of water and hence causing its contamination.

Conclusion

This study had discovered that traditional landfills are littered all over Ganye town which seriously poses threats on the people. The people suffer various ailments not knowing that they are caused by the traditional landfills they have created. Hence, Ganye town is suffering the impacts and other associated problems of traditional landfills.

Recommendations

Based on the findings of the study, the following recommendations are put forward:

- Since landfills cause various health challenges (which include typhoid, malaria, cholera and dysentery) on the people living in Ganye especially those who settle close to the landfills, it is recommended that there should be routine evacuation of the dumpsites to farms to serve as manure for crops. More so, there should be routine

immunization and provision of treated mosquito nets to curtail rampant ailments in the communities.

- ii. This study further recommends formation of environmental friendly clubs and societies in secondary schools which can be used to educate the younger generation on the impacts of the landfills and there resultant effects. More so, compulsory weekly environmental sanitation should be enforced by the local authorities.

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