Analysis of Knowledge and Attitude on Disposal of Polythene Bags in Damaturu Town, Yobe State

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Abstract

This study examines the knowledge and attitude on disposal of polyethylene bags among residents of Damaturu town, with a focus on its environmental impact. The objectives of the study are to; examine the factors influencing disposal practices of polythene bags among residents in the study area, to assess level of awareness among residents on the environmental impact of polythene bags and evaluate the attitudes and perceptions of residents towards proper disposal and recycling of polyethylene bags. The study utilizes a mixed-methods approach, as the research combines quantitative surveys and qualitative interviews to gain a comprehensive understanding of the issue. The survey, conducted with 150 respondents, reveals a high level of awareness about the environmental consequences of polyethylene bags, including land and water pollution, harm to wildlife, and drainage blockage. Despite this awareness, the majority of respondents still rely on general waste disposal methods. Key factors influencing disposal practices include convenience, lack of recycling facilities, and inadequate awareness. The study identifies a strong willingness among residents to engage in proper disposal and recycling practices, provided there are improvements in facilities and public education. The study recommended the enhancement of recycling infrastructure, increasing public awareness through comprehensive campaigns, and implementing government regulations to support better waste management practices. Addressing these issues could significantly reduce the environmental impact of polyethylene bags and improve overall waste management in the study area.

Keywords: *Perception, residence, indiscriminate, disposal, polythene bags*

Introduction

The widespread use of polyethylene bags, commonly known as Thermoplastic materials, has become a significant environmental issue globally, and Nigeria is no exception. Polyethylene bags are widely utilized due to their convenience, lightweight, and cost-effectiveness. In Damaturu Town, Yobe State, these bags are a common sight in markets, supermarkets, and retail stores, where they serve as the primary means of carrying purchased items. The extensive use of these bags can be attributed to the booming commercial activities and the lack of readily available alternatives, which further entrenches their use in daily life. The environmental impact of polyethylene bags is multifaceted and profound. When these bags are disposed of improperly, they can accumulate in the environment, causing aesthetic degradation and contributing to urban blight. This not only affects the visual appeal of public spaces but also has economic repercussions, as local governments often have to allocate substantial resources to clean up plastic waste. Furthermore, the degradation of these bags into micro plastics adds another layer of environmental complexity, as these tiny particles are difficult to remove and can persist in the ecosystem for centuries (Thompson et al., 2009).

Addressing the issue of polyethylene bag disposal requires a comprehensive understanding of the factors driving their use and the challenges associated with managing them. In many developing countries, including Nigeria, the lack of adequate waste management infrastructure and public awareness exacerbates the problem (Auta, Emenike, & Fauziah, 2017). Educational campaigns and policy interventions are crucial to altering public perception and behavior regarding polyethylene use and disposal. This study aims to delve into the perceptions and attitudes of residents in Damaturu Town regarding the disposal of polyethylene bags, to inform effective strategies for mitigating their environmental impact.

Literature Review

The production and consumption of polyethylene have surged dramatically over the past few decades. From a modest 1.5 million tons in 1950, global plastic production reached 368 million tons by 2019. This exponential increase is attributed to the versatility, durability, and cost-effectiveness of plastics, which are used extensively in packaging, construction, electronics, and numerous other industries (Geyer, Jambeck, & Law, 2017). The proliferation of plastics is driven by their essential role in modern life, despite the significant environmental challenges they pose (Ritchie & Roser, 2018). Despite their benefits, the improper disposal of plastics has led to widespread environmental issues, prompting urgent calls for sustainable management practices (Lebreton et al., 2018).

Environmental Consequences of Plastic Pollution

Thermoplastic materials have emerged as a critical environmental issue due to the long-lasting nature of plastic materials. These materials can take hundreds to thousands of years to decompose, leading to their accumulation in terrestrial and aquatic ecosystems (Kershaw et al., 2019). As plastics break down into micro plastics, they become more pervasive and difficult to manage, posing significant risks to wildlife and ecosystems (Law & Thompson, 2014). Micro plastics have been detected in nearly all environments, from the deepest ocean trenches to the highest mountain peaks, highlighting the extensive reach of plastic pollution (Bergmann et al., 2019). The pervasive nature of plastic waste necessitates comprehensive strategies to address its environmental impacts (Thompson et al., 2009).

Characteristics of Polyethylene Bags

Polyethylene bags, specifically those made from high-density polyethylene (HDPE) and low-density polyethylene (LDPE), are highly valued for their lightweight, flexibility, and resistance to water and chemicals. These properties make them ideal for a wide range of applications, including packaging, carrying goods, and protecting items from moisture and contaminants. The durability and low production costs of polyethylene bags have cemented their status as a staple in both consumer and industrial markets (Hopewell, Dvorak, & Kosior, 2009). Despite their benefits, their environmental persistence poses significant disposal challenges (Gewert, Plassmann, & MacLeod, 2015).

Environmental Impact of Polyethylene Bags

The improper disposal of polyethylene bags significantly contributes to urban blight and visual pollution. Streets, parks, and water bodies are often littered with these bags, detracting from the aesthetic appeal of public spaces and potentially harming local tourism and property values (Jambeck et al., 2015). The visible accumulation of plastic waste in urban areas underscores the need for improved waste management practices and public awareness initiatives. Efforts to

mitigate this impact require coordinated actions among government, businesses, and communities (Schuyler et al., 2018).

Effects on Terrestrial Ecosystem

Polyethylene bags pose severe threats to both terrestrial and aquatic ecosystems. On land, they can obstruct drainage systems, leading to flooding and waterlogging, particularly in urban areas with inadequate waste management infrastructure (Liu et al., 2021). In aquatic environments, polythenes can be ingested by marine animals, causing physical harm, starvation, and death. Entanglement in plastic debris is another significant threat to marine life, disrupting natural behaviors and leading to injury or mortality (Gall & Thompson, 2015). The widespread presence of plastic debris in the environment necessitates robust mitigation strategies (Wilcox et al., 2016).

Socio-Economic Implications of Polyethylene

Managing plastic waste involves substantial financial burdens for local governments, including costs for collection, transportation, disposal, and environmental remediation (Mwanza & Mbohwa, 2017). These expenses can strain municipal budgets and divert resources from other essential public services. Effective plastic waste management requires significant investment in infrastructure and technology to minimize environmental impacts and ensure sustainable practices (Alam & Qiao, 2020). The economic burden of plastic waste underscores the need for efficient waste management systems.

Polyethylene waste can create breeding grounds for disease vectors, such as mosquitoes, which increase the risk of diseases like malaria and dengue fever. Additionally, chemicals leaching from plastics can contaminate soil and water, posing direct health risks to communities. The ingestion of micro plastics by humans through contaminated food and water is an emerging public health concern, with potential implications for long-term health outcomes. Addressing these health risks requires coordinated public health and environmental policies (Hale et al., 2020).

Factors Influencing Disposal Practices

The widespread availability and low cost of polyethylene bags make them a convenient choice for consumers and retailers. This accessibility contributes to their continued use and improper disposal, as many people prioritize convenience over environmental considerations (Eriksen et al., 2018). Addressing this issue requires interventions that make sustainable alternatives more accessible and economically viable for all stakeholders. Promoting reusable and biodegradable alternatives can help reduce reliance on polyethylene bags (Schnurr et al., 2018).

Waste Management Practices and Policies

Many developing countries face challenges with inadequate waste management infrastructure, including insufficient collection and disposal systems, which exacerbate plastic pollution issues. Effective waste management requires robust infrastructure, coordinated efforts at the local and national levels, and the integration of informal waste collection sectors into formal systems. Investments in waste management infrastructure can improve environmental outcomes (Medina, 2010).

Policy Interventions and Regulatory Frameworks Relared to Plastic Waste

Governments and international organizations have implemented various policies to address plastic pollution, such as bans on single-use plastics, recycling incentives, and extended producer responsibility schemes. These measures aim to reduce plastic waste generation, promote recycling, and encourage manufacturers to design more sustainable products and packaging. Effective regulatory frameworks are crucial for managing plastic waste (González-Torre & Adenso-Díaz, 2005). Policy enforcement and public compliance are key to successful outcomes.

Examples from different regions highlight successful strategies in plastic waste management. For instance, Rwanda's ban on polythenes and Kenya's stringent penalties for plastic pollution have significantly reduced plastic waste in these countries. In Europe, countries like Germany and Sweden have implemented comprehensive recycling programs and waste-to-energy systems that have minimized landfill use and improved resource recovery (Fehr, 2012). These case studies provide valuable insights into effective policies and practices that can be adapted and implemented in other regions facing similar challenges. Learning from these examples can guide local adaptations (Ellen MacArthur Foundation, 2017).

Raising public awareness about the environmental impacts of polyethylene pollution is crucial for changing behaviors and promoting responsible waste disposal. Educational campaigns can inform and motivate communities to adopt more sustainable practices, emphasizing the long-term benefits of reducing plastic waste (Jakovcevic et al., 2020). Awareness initiatives can lead to increased public participation in recycling programs and support for policy measures.

Role of Community Engagement in Promoting Sustainable Practices

Engaging communities in waste management initiatives enhances their effectiveness by fostering ownership and participation. Community-led recycling programs, clean-up activities, and local policy advocacy can encourage sustainable practices and reduce plastic pollution. Such initiatives can also build social cohesion and a sense of collective responsibility for environmental stewardship. Empowering communities through education and involvement can lead to lasting behavioral change (Davis & Challenger, 2009).

Methodology

Location and Extent

The study area, Damaturu town, is located in Yobe State in the northeastern geopolitical zone of Nigeria. It serves as the capital city of Yobe State and headquarters of the Damaturu Local Government Area. Damaturu town covers a total land area of about 50 km2 (Etuonovbe, 2011). It is located between latitude $11^{0}34`11`N$ to $12^{0}03`00`N$, and longitude $12^{0}42`11`E$ to $12^{0}15`28`E$.

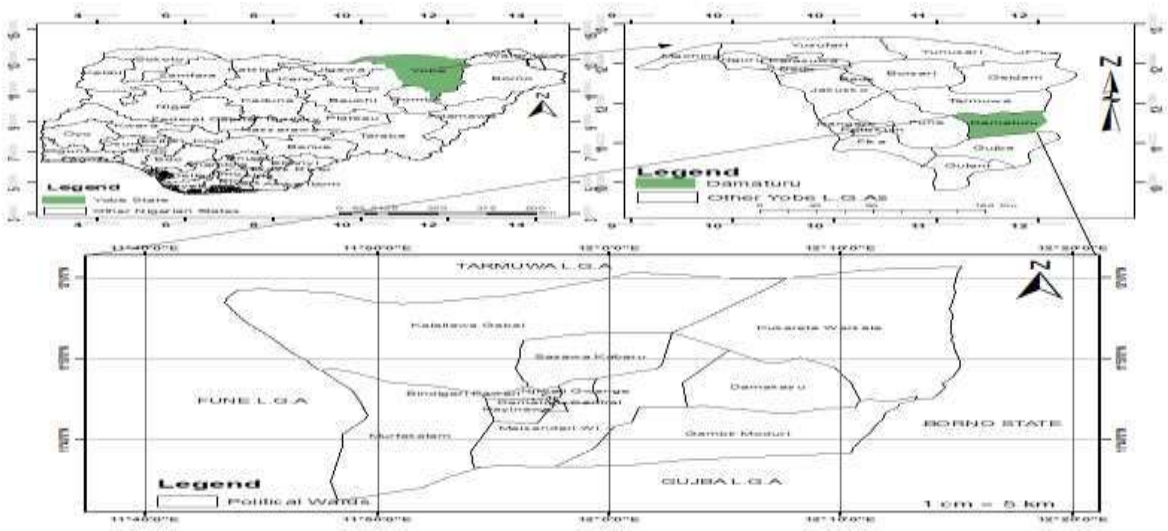

Fig 1: Map of the Study Area.

Source: GIS laboratory, YSU, 2023.

Method of Data Collection

A mixed methods research design combining quantitative and qualitative approaches was adopted for this study. This approach would enable gathering numerical data for statistical analysis as well as descriptive insights to fully address the research problem.

Research Design

The research design chosen for this study is a descriptive survey. This design is appropriate for obtaining detailed information about the residents' perceptions and attitudes toward polyethylene bag disposal. A mixed-methods approach was adopted, combining both quantitative and qualitative data collection methods to provide a holistic understanding of the issue. The quantitative component involves the use of structured questionnaires to gather measurable data, while the qualitative component involves semi-structured interviews to capture in-depth insights.

Sources of Data Collection

Data for this study was collected from primary and secondary data sources. Primary data was collected from field through questionnaire administration. A questionnaire is the basic instrument for collecting the data. Secondary data was sourced from existing works such as record from related institutions and organizations as well as journal, articles, and other research works.

Sampling Techniques

For the purpose of this study, random sampling technique was employed, were three wards were randomly selected to form the sample frame. The selected wards include; Gwange, Bindigari and Damaturu central wards respectively.

Sample Population

A population is defined as all elements (individuals, objects and events) that meet the sample criteria for inclusion in a study. A total of 150 households representing 5% each of the selected wards were interviewed across the three selected wards in the study area. The study area has a total of 3000 households. The selected wards include Gwange with 900 households, Bindigari with 1100, and Damaturu Central with1000 respectively (SPHCDA, 2023).

Data Analysis and Results

Demographic Characteristics of Respondents

Table 4.1: Gender, Age and Educational level of Respondents

Gender	**Frequency**	**Percentage (%)**
Male	70	41.4
Female	80	58.6
Total	150	100
Age Range		
15-24 years	30	20
25-34 years	50	33.3
35-44 years	40	26.7
45-54 years	20	13.3
Total	**150**	**100**
Education Level		
No Formal Education	10	6.7
Primary Education	30	20
Secondary Education	60	40
Tertiary Education	50	33.3
Total	**150**	**100**

Source: Field Survey, 2024.

This table presents the gender distribution of the respondents. Out of 150 respondents, 53.3% are male and 46.7% are female. This indicates a relatively balanced gender representation in the sample. The proportion of males slightly exceeds that of females, which may reflect the general demographic distribution in the study area. This demographic balance is crucial for ensuring that the findings are representative of the broader population.

The age distribution reveals that the largest group of respondents is between 25-34 years' old which represent 33.3%. The older age group of between 45-54 years constitute a smaller portion of the sample population. This distribution shows a predominance of younger to middle-aged individuals, which might influence the responses, particularly regarding awareness and attitudes towards polyethylene bag disposal.

The table also shows that 40% of respondents have had secondary education, while those with no formal education constitutes only 6.7%. The attainment of secondary level of education might correlate with greater awareness and different attitudes towards environmental issues. This educational distribution is essential for understanding the depth of knowledge and attitudes in the study area.

Table 4.2: Frequency of Polyethylene Bag Usage, Methods of Disposal and Factors Influencing Disposal

Frequency	**Frequency**	**Percentage (%)**
Always	60	40
Often	40	26.7
Sometimes	30	20
Rarely	10	6.7
Never	10	6.7
Total	150	100
Disposal Method		
General Waste	80	53.3
Recycle	30	20
Burn	20	13.3
Bury	10	6.7
Reuse	10	6.7
Total	150	100
Factor		
Convenience	70	46.7
Lack of Recycling Facilities	60	40
Lack of Awareness	50	33.3
Cultural Practices	20	13.3
Attitude Towards Envtal Issues	40	26.7
Other	10	6.7
Total	**150**	**100**

Source: Filed survey, 2024.

The majority of respondents which constitute 40% use polyethylene bags always, while smaller number of respondents which constitute 6.7% either rarely use polythene bags or have never use it. This distribution highlights the prevalence of polyethylene bag usage in the community and may reflect on the extent of disposal issues.

The results indicate that over half of the respondents that constitute 53.3% dispose of polyethylene bags in general waste sites. Recycling is the method for 20%, while burning is chosen by 13.3%. Burial and reuse are less common methods. This data highlights a need for better recycling facilities and awareness about the environmental impacts of improper disposal methods.

Convenience is the primary factor influencing disposal practices for 46.7% of respondents. Lack of recycling facilities and awareness are also significant factors. Cultural practices and attitudes towards environmental issues play a lesser role. These factors indicate areas where targeted interventions could improve disposal practices.

Table 4.3: Awareness, Sources of Awareness of Environmental Impacts, Specific Environmental Impacts, and Reducing Environmental Problems through Proper Disposal & Recycling

Awareness	**Frequency**	**Percentage (%)**
Yes	100	66.7
No	50	33.3
Total	150	100
Source		
Media (TV, Radio)	40	26.7
Social Media	30	20
Educational Institutions	20	13.3
Government Campaigns	10	6.7
Community Groups	20	13.3
Other	10	6.7
Total	150	100
Specific Impact		
Pollution of Land and Water	70	46.7
Harm to Wildlife	50	33.3
Blockage of Drainage Systems	20	13.3
Contribution to Climate Change	10	6.7
Other	10	6.7
Total	150	100
Belief in Environmental Problems through Proper Disposal and Recycling		
Strongly Agree	50	33.3
Agree	60	40
Neutral	20	13.3
Disagree	10	6.7
Strongly Disagree	10	6.7
Total	**150**	**100**

Source: Field survey, 2024.

The above table shows that two-third of the respondents representing 66.7% are aware of the environmental impacts of polyethylene bags, while the remaining 33.3% are not. This high level of awareness is encouraging, but the remaining percentage indicates a gap that needs to be addressed through further education and outreach efforts.

The media is the primary source of awareness for 26.7% of respondents, followed by social media constitutes 20%. Educational institutions and community groups also play significant roles. Government campaigns and other sources contribute less to awareness. These findings suggest that media and social platforms are key channels for spreading environmental information.

This table also shows that pollution of land and water is the most recognized impact, reported by 46.7% of respondents. Harm to wildlife is noted by 33.3% of the respondents, with fewer respondents aware of drainage blockage and climate change contributions. This variation in knowledge indicates different levels of understanding about the broader environmental issues related to polyethylene bags.

Most respondents believe that proper disposal and recycling can reduce environmental problems, with 40% agreeing and 6.7% strongly disagreeing. This positive attitude suggests that there is support for initiatives aimed at improving disposal practices.

Table 4.4: Willingness to Participate in Proper Disposal and Recycling Practices

Willingness	**Frequency**	**Percentage (%)**
Very Willing	50	33.3
Willing	60	40
Neutral	20	13.3
Unwilling	10	6.7
Very Unwilling	10	6.7
Total	150	100
Challenge		
Lack of Facilities	70	46.7
Lack of Information	30	20.0
Inconvenience	20	13.3
Cost	20	13.3
Other	10	6.7
Total	150	100
Strategy		
Increased Public Awareness Campaigns	60	40
Improved Recycling Facilities	50	33.3
Government Regulations and Policies	20	13.3
Community-Based Initiatives	10	6.7
Incentives for Recycling	10	6.7
Total	**150**	**100**
Suggestion		
Implement Stricter Regulations	40	26.7
Encourage Use of Eco-Friendly Bags	30	20
Establish More Recycling Centers	30	20
Organize Community Clean-Up Events	20	13.3
Provide Educational Programs	20	13.3
Others	10	6.7
Total	150	100

Source: Field Survey, 2024.

A significant proportion of respondents which constitute 33.3% are very willing to participate in proper disposal and recycling, while a paltry of 6.7% are unwilling. This indicates a strong readiness among residents to engage in better waste management practices if supported adequately.

The main challenge reported is the lack of facilities, affecting 46.7% of respondents. Lack of information and inconvenience are also significant challenges. Cost and other factors play a lesser role. Addressing these challenges can help improve participation in proper disposal and recycling practices.

Increased public awareness campaigns are viewed as the most effective strategy, with 40% of respondents supporting this approach. Improved recycling facilities are also a key strategy, supported by 33.3%. Government regulations, community initiatives, and incentives are seen as less impactful but still relevant.

The most commonly suggested strategies include implementing stricter regulations with 26.7% of the respondents supported that strategy. Those encouraging the use of eco-friendly bags

constitute 20% of the respondents. Establishing more recycling centers and organizing community clean-up events are also seen as important. Providing educational programs and other suggestions are considered valuable but less prioritized.

Conclusion

The high level of awareness about the environmental impacts of polyethylene bags among residents indicates a readiness to engage in better disposal practices. However, there is a disconnect between awareness and actual disposal behaviors, highlighting the need for more effective implementation of recycling and waste management strategies. Disposal Practices: The predominant use of general waste disposal methods for polyethylene bags reflects a gap in available recycling facilities and infrastructure. This suggests that improving recycling facilities and making them more accessible could significantly impact disposal practices. The major challenges faced by residents include lack of recycling facilities and information, as well as the inconvenience associated with proper disposal. Addressing these issues is crucial for enhancing community participation in waste management efforts.

The study identified several effective strategies for improving waste management practices, including increased public awareness campaigns, better recycling facilities, and enforcement of government regulations. These strategies align with the views of respondents and offer a practical approach to mitigating the environmental impact of polyethylene bags.

Recommendations

Government should encourage enterprising individuals and corporate organizations to venture into business of establishing recycling centers and improve existing facilities to make recycling more accessible and profitable. This should include providing adequate bins and collection services for polyethylene bags.

Government and Non-Governmental Organizations should intensify comprehensive public awareness campaigns to educate residents about the environmental impacts of polyethylene bags and the benefits of proper disposal and recycling. Utilize social media handles, and community groups to reach a broad audience.

Government should introduce and enforce regulations that mandate proper disposal practices and encourage the use of eco-friendly alternatives. Consider implementing fines for improper disposal to deter non-compliance.

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