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EVALUATION OF DOMESTIC AND INSTITUTIONAL PLASTIC WASTE GENERATION AND MANAGEMENT IN AWKA SOUTH LOCAL GOVERNMENT AREA OF ANAMBRA STATE

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Abstract

The research objectives were to evaluate the quantity and composition of plastic waste, identify its sources and causes, examine current management practices, evaluate environmental impacts, and propose sustainable strategies for improvement. Data were collected through structured questionnaires distributed to households, schools, and hospitals within Ifite, Okpuno, and Agu Awka (GRA) over six months (June–November 2024). The study found that both households and institutions generate significant amounts of plastic waste daily, with institutions (schools and hospitals) producing higher quantities (56.45%). Packaged food and beverage plastics (24.07%) were the most common waste category. Analysis of current waste management practices revealed that burning (49.39%), open dumping (41.66%), and burying (45.06%) were the predominant methods, highlighting ineffective waste management. The study concludes that ineffective plastic waste management contributes to environmental pollution and health hazards. Sustainable strategies, such as policy enforcement, incentives for waste reduction, private-sector collaboration, and investment in recycling technologies, are recommended to improve plastic waste management in Awka South LGA. These findings provide a framework for policymakers and stakeholders to implement effective plastic waste management solutions.

Keywords: Plastic waste, domestic waste, institutional waste, management practices.

Introduction

Plastic waste generation and management have become a critical environmental challenge in urban areas, necessitating the need for effective waste management. The increasing generation of plastic waste has become a significant environmental concern globally, particularly in several urban areas in Nigeria. Plastic waste poses a substantial threat to the environment, human health and the economy. The widespread use of plastics in various aspects of daily life, including packaging, consumer goods, textiles, construction materials, and automotive, aerospace, and medical industries, has led to a significant increase in plastic waste generation.

Plastic waste can be categorized into different types, including polyethylene terephthalate (PET), high –density Polyethylene (HDPE), Polyvinyl chloride (PVC), low-density polyethylene (LDPE), Polypropylene (PP), Polystyrene (PS), and Polycarbonate (PC), Polystyrene (PS) and Polycarbonate (PC).

The origin of plastic waste can be attributed to the rapid growth of the plastic industry, which has led to an increase in plastic production and consumption. (Chalmin, 2019). It is estimated that out of 27.3 million tonnes of municipal solid waste currently generated in Nigeria's urban cities per annum, about 11.2 million tonnes is collected, of which about 1.1 million tonnes is plastics (Ezeudu, Tenebe, & Ujah, 2024).. It is further projected that by 2040, about 40.5 million tonnes of municipal solid waste will be generated, and only about 1.6 million tonnes of the plastic component will be collected for disposal. (Ezeudu, Tenebe, & Ujah, 2024).

Nigeria's large consumption of primary plastics (resins) supports a robust plastic manufacturing sector. According to market reports, plastic production in Nigeria has grown rapidly at a rate of 13.9 percent annually, from 120kt in 2007 to 513kt in 2020 (Nzeadibe et.al, 2025). Nigeria is the largest producer of Olefin and polyolefin plastics in West Africa. Nigeria has over 3,000 plastic companies currently (Nzeadibe et al, 2025), these companies feed the massive plastic waste pollution challenge currently faced by many urban areas.

The problem of plastic waste management is particularly significant in urban areas, where the population density is high, and the infrastructure for waste management is often inadequate. Each type of plastic has its unique characteristics and uses, and the management of these plastics requires specific strategies. In terms of plastic waste recovery, studies reveal that less than 12 percent of

plastic waste is recycled in Nigeria, with over 80 percent of plastic products and their lifecycle in landfills and dumpsites. (Nzeadibe et al, 2025).

In Awka urban, the lack of effective waste management infrastructure, inadequate funding, and lack of public awareness have contributed to the proliferation of plastic waste (Onuoha 2023). According to Babayemi, Ogundiran, and Osibanjo (2018), improper disposal of plastic waste has led to environmental pollution, health-related complications, and economic losses. Also, improper plastic waste disposal has led to blockage of drainage systems, flooding, and degradation of natural habitats. It is against this background that this paper assesses domestic and institutional plastic waste generation and management in Awka South Local Government Area (LGA) in Anambra State. the specific objectives of this study include: to assess the quantity and composition of plastic waste generated from domestic and institutional activities in Awka South L.G.A; to identify the sources and causes of plastic waste generated from domestic and institutional activities in Awka South L.G.A; to examine the environmental and health impacts of plastic waste generated from domestic and institutional activities, and finally to examine the current plastic waste management practices of plastic waste generated from domestic and institutional activities in Awka South L.G.A.

Study Area and Methods

Awka South L.G.A is located approximately between latitudes $5^{0}55^{1}$N and $6^{0}15^{1}$N and longitudes $7^{0}5^{1}$E and longitude $7^{0}05^{1}$E and $7^{0}15^{1}$E. The LGA covers an area of approximately 144 sq km. Awka South L.G.A to the North, Njikoka L.G.A to the east, Dunukofia L.G.A to the west, and Idemili South L.G.A to the south. (fig 1.1).

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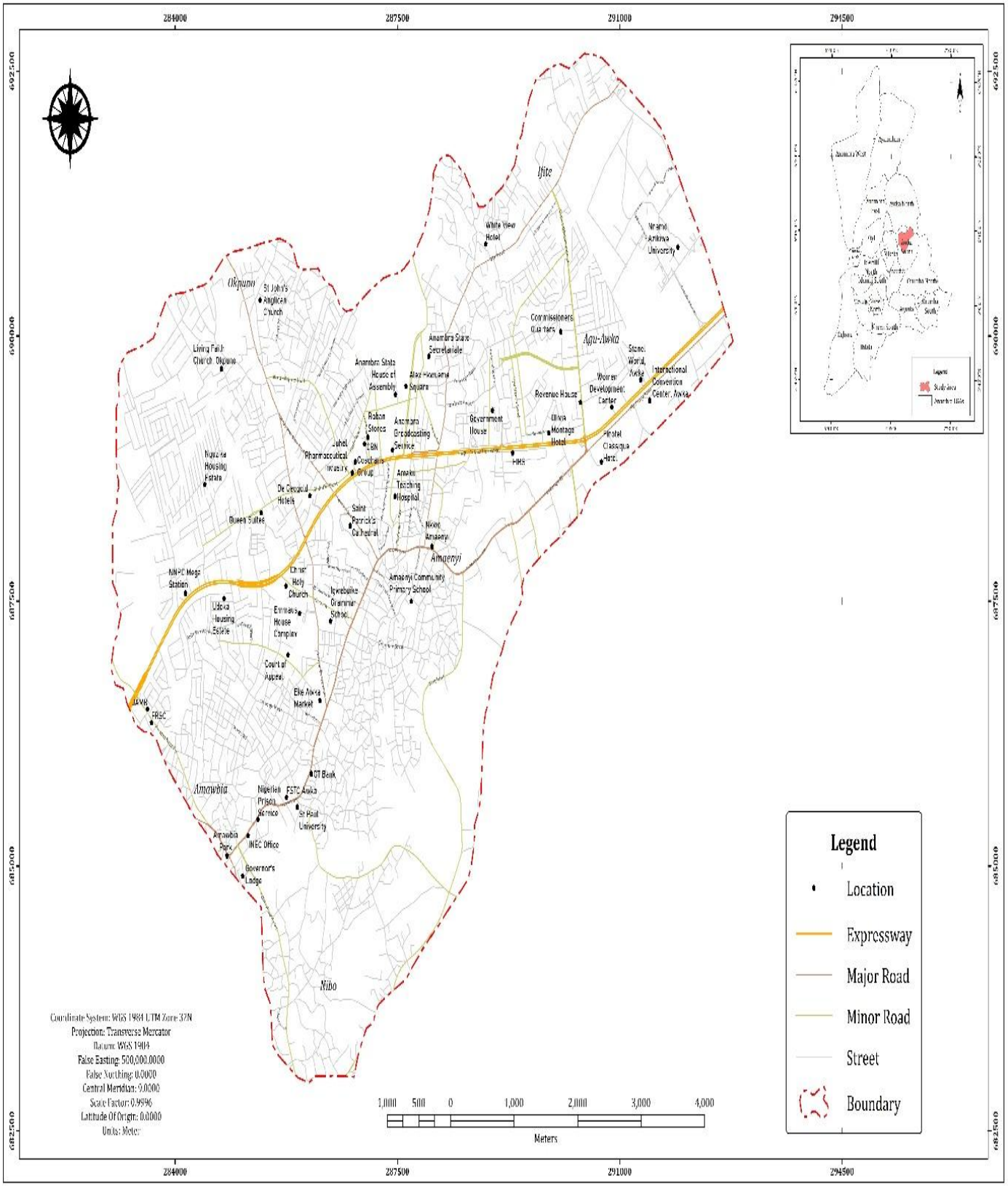
284000
287500
291000
294500
692500
690000
687500
685000
682500
Ifite
Okpuno
Agu-Awka
Amaenyi
Amawbia
Nibo
White View Hotel
Nnamdi Azikiwe University
St John's Anglican Church
Living Faith Church, Okpuno
Commissioners Quarters
Anambra State Secretariate
Anambra State House of Assembly
Alex Ekwueme Square
Stanel World, Awka
International Convention Center, Awka
Women Development Center
Revenue House
Government House
Olivia Montage Hotel
Hotel Classique Hotel
Robon Stores
LBN
Anambra Broadcasting Service
Juhel Pharmaceutical Industry
Coscharis Group
Nguzika Housing Estate
De Geogold Hotels
Queen Suites
Amaku Teaching Hospital
Saint Patrick's Cathedral
Nkwo Amaenyi
Amaenyi Community Primary School
NNPC Mega Station
Christ Holy Church
Igwebuike Grammar School
Udoka Housing Estate
Emmaus House Complex
Court of Appeal
Elke Awka Market
JAMB
FRSC
DT Bank
Nigerian Prison Service
FSTC Awka
St Paul University
Amawbia Park
INEC Office
Governor's Lodge
Legend
Location
Expressway
Major Road
Minor Road
Street
Boundary
Coordinate System: WGS 1984 UTM Zone 32N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: 9.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter
1,000 500 0 1,000 2,000 3,000 4,000
Meters

Fig 1.1: Map of Awka south Local Government Area.
Source: Department of Surveying and Geo-informatics Nnamdi Azikiwe University Awka.

The areal coverage of the study includes the settlement area in Ifite, Okpuno, and Agu Awka (GRA). For the scope, this study assessed the domestic and institutional plastic waste generated. In the case of domestic plastic waste generated, households comprised the study unit, while in the case of institutional waste generated, the study unit comprised of schools and hospitals. The parameters studied included quantities and composition of plastic waste generated, sources of plastic waste, waste management practices, and health effects of plastic waste generated. The study was carried out for six months, from June to November 2024. Three settlement areas were selected for the study using a purposive sampling technique. The research design of the study included a survey design and an experimental design. The survey involved the use of a questionnaire. Data was solicited from primary and secondary sources. The population projection for Awka South Local Government Area is approximately 285,738 people, based on the 2022 population projection of 270,300 people and an annual population growth rate of 2.10% (National Population Commission, 2022; National Bureau of Statistics, 2022). The sample size for this study is 399, and in determining this sample size for the questionnaire survey, Taro Yamane's formula was used. A total of 399 questionnaires were distributed to the respondents across households, schools and hospitals for domestic and institutional wastes, respectively. The percentage rate of return on the whole was 81.2%. For the households in the three settlement areas, 190 questionnaires were distributed in thirteen (13) streets using systematic sampling of every 4th house. Also, 209 questionnaires were distributed in the chosen schools and hospitals.

Primary data included the measurement of plastic waste generated by weighing the plastic waste from each household studied per day for domestic plastic waste. In the case of institutional plastic waste generated. Plastic waste from schools and hospitals was weighed, and then measurements were recorded. For the composition of plastic waste, domestic and institutional wastes were sorted, weighed, and recorded. Measurement of Plastic waste involved sorting of plastic waste from other wastes, cleaning of the plastic waste, and then categorization of plastic waste into PET, HDPE, PVC, LDPE, PP, and PS. This was done to achieve the composition of plastic waste.

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Result and Findings

Table 1: Plastic Waste Generation

The frequency of plastic waste generation was high, with 43.21% of respondents generating plastic waste daily. The quantity of plastic waste generated per day varied, with 31.17% of respondents generating between 1-2 kg of plastic waste daily. PET bottles and sachet water wrappers were the most common types of plastic waste, accounting for 22.84% and 21.30% of total plastic waste, respectively.

Items	Category	Households	Institutions	Total
Frequency of plastic waste generation	Daily	54 (43.55%)	86 (43.00%)	140 (43.21%)
	Weekly	40 (32.26%)	70 (35.00%)	110 (33.95%)
	Monthly	21 (16.94%)	31 (15.50%)	52 (16.05%)
	Occasionally	9 (7.26%)	13 (6.5%)	22 (6.79%)
	Total	**124**	**200**	**324**
Quantity of plastic generated per day	0-1 kg/day	27 (21.77%)	46 (23.00%)	73 (22.53%)
	1-2 kg/day	46 (37.10%)	55 (27.5%)	101 (31.17%)
	2-3 kg/day	30 (24.19%)	59 (29.5%)	89 (27.47%)
	Above 3kg/day	21 (16.94%)	40 (20.00%)	61 (18.83%)
	Total	**124**	**200**	**324**
Plastic waste type	PET Bottles (Drink Containers)	29 (23.39%)	45 (22.50%)	74 (22.84%)
	Sachet water (pure water) wrappers	27 (21.77%)	42 (21.00%)	69 (21.30%)
	Supermarket and shopping bags	22 (17.74%)	36 (18.00%)	58 (17.90%)
	Food Containers (Takeaway packs)	19 (15.32%)	34 (17.00%)	53 (16.36%)
	Disposable Cutlery (Plates, Spoons)	13 (10.48%)	21 (10.50%)	34 (10.49%)
	Electronics Casings (from e-waste)	6 (4.84%)	12 (6.00%)	18 (5.56%)
	Medical plastic waste (syringes, gloves)	8 (6.45%)	10 (5.00%)	18 (5.56%)
	Total	**124**	**200**	**324**

Table 2: Sources and Causes of Plastic Waste Generation

Packaged food and beverage containers were the primary source of plastic waste, accounting for 24.07% of total waste. The main causes of plastic waste generation were high consumption of plastic-packaged products (28.40%), inadequate waste collection systems (22.84%), and poor waste disposal habits (19.75%).

Items	Category	Households	Institutions	Total
Source of plastic waste	Packaged Food and Beverages	27 (21.77%)	51 (25.5%)	78 (24.07%)
	Supermarket and Shopping Bags	19 (15.32%)	32 (16.00%)	51 (15.74%)
	Disposable Items (Plates, Cups, Cutlery)	23 (18.55%)	35 (17.5%)	58 (17.90%)
	Sachets water (pure water) wrappers	25 (20.16%)	34 (17.00%)	59 (18.21%)
	Medical and laboratory plastic Waste	7 (5.65%)	15 (7.50%)	22 (6.79%)
	Plastic waste from schools and offices	15 (12.10%)	19 (9.50%)	34 (10.49%)
	Plastic waste from toiletries/cosmetics	8 (6.45%)	14 (7.00%)	22 (6.79%)
	Total	**124**	**200**	**324**
Cause of plastic waste	High Consumption of Plastic-packaged Products	39 (31.45%)	53 (26.50%)	92 (28.40%)
	Inadequate waste collection systems	27 (21.77%)	47 (23.50%)	74 (22.84%)
	Poor Waste Disposal Habits	28 (22.58%)	36 (18.00%)	64 (19.75%)
	Insufficient Recycling Facilities	16 (12.90%)	38 (19.00%)	54 (16.67%)
	Lack of Awareness on Plastic Waste effects	14 (11.29%)	26 (13.00%)	40 (12.35%)
	Total	**124**	**200**	**324**
Usage frequency of disposable plastics	Daily	49 (39.52%)	92 (46.00%)	141 (43.52%)
	Several times a week	40 (32.26%)	54 (27.00%)	94 (29.01%)
	Weekly	19 (15.32%)	31 (15.50%)	50 (15.43%)
	Rarely	13 (10.48%)	17 (8.50%)	30 (9.26%)
	Never	3 (2.42%)	6 (3.00%)	9 (2.78%)
	Total	**124**	**200**	**324**

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Table 3: Environmental and Health Impacts of Plastic Waste

The study revealed significant environmental and health impacts of plastic waste, including air pollution (22.22%), water pollution (20.06%), and soil pollution (19.44%). Respiratory issues (26.54%) and increased disease spread (22.53%) were the most common health impacts.

Items	Category	Households	Institutions	Total
Environmental impact	Water Pollution	28 (22.58%)	37 (18.50%)	65 (20.06%)
	Soil pollution	20 (16.13%)	43 (21.50%)	63 (19.44%)
	Air Pollution (due to the burning of plastic)	33 (26.61%)	39 (19.50%)	72 (22.22%)
	Blockage of Drainage Systems	26 (20.97%)	35 (17.50)	61 (18.83%)
	Land Degradation	9 (7.26%)	24 (12.00%)	33 (10.19%)
	Harm to Wildlife/Livestock	8 (6.45%)	22 (11.00%)	30 (9.26%)
	Total	**124**	**200**	**324**
Health impact	Respiratory Issues (due to the burning of waste)	37 (29.84%)	49 (24.50%)	86 (26.54%)
	Increased disease spread (stagnant waste)	30 (24.19%)	43 (21.50%)	73 (22.53%)
	Skin irritations/infections from contact	18 (14.52%)	37 (18.50%)	55 (16.98%)
	Increase in Disease Vectors (e.g., malaria)	22 (17.74%)	39 (19.50%)	61 (18.83%)
	Gastrointestinal Issues	17 (13.71%)	32 (16.00%)	49 (15.12%)
	Total	**124**	**200**	**324**
Severity of Environmental and Health Impacts	Very severe	33 (26.61%)	52 (26.00%)	85 (26.23%)
	Severe	42 (33.87%)	78 (39.00%)	120 (37.04%)
	Moderate	28 (22.58%)	42 (21.00%)	70 (21.60%)
	Mild	15 (12.10%)	20 (10.00%)	35 (10.80%)
	Not severe	6 (4.84%)	8 (4.00%)	14 (4.32%)
	Total	**124**	**200**	**324**
Community Awareness of Impacts	Very aware	40 (32.26%)	62 (31.00%)	102 (31.48%)
	Aware	34 (27.42%)	85 (42.50%)	119 (36.73%)
	Slightly aware	39 (31.45%)	30 (15.00%)	69 (21.30%)
	Not aware	11 (8.87%)	23 (11.50%)	34 (10.49%)
	Total	**124**	**200**	**324**

Table 4: Current Plastic Waste Management Practices

The most common disposal method was collection by waste management agencies (23.46%). However, burning plastic waste (21.30%) and open dumping (16.67%) were also prevalent. Recycling of plastic waste was low, with only 11.73% of respondents engaging in this practice. Weekly waste collection is the most common schedule, reported by 33.95% of respondents, with a stark contrast between households (54.84%) and institutions (21.00%). This suggests that household waste is more frequently collected more on a weekly basis.

Waste segregation practices are largely absent, as the majority of respondents (64.51%) reported never segregating plastics from other waste. Institutions (61.00%) and households (70.16%) both show high levels of non-segregation, indicating a lack of formal policies or incentives to encourage this practice.

Items	Category	Households	Institutions	Total
Waste management practice	Burning plastic waste	29 (23.39%)	40 (20.00%)	69 (21.30%)
	Collection by waste management agency	31 (25.00%)	45 (22.50%)	76 (23.46%)
	Recycling of plastic waste	14 (11.29%)	24 (12.00%)	38 (11.73%)
	Reuse of Plastic Items	12 (9.68%)	21 (10.50%)	33 (10.19%)
	Separation of plastic waste from other waste	10 (8.06%)	15 (7.50%)	25 (7.72%)
	Open dumping	22 (17.74%)	32 (16.00%)	54 (16.67%)
	Burying plastic waste	6 (4.84%)	23 (11.5%)	29 (8.95%)
	Total	**124**	**200**	**324**
Frequency of waste collection	Daily	11 (8.87%)	29 (14.5%)	40 (12.35%)
	Weekly	68 (54.84%)	42 (21.00%)	110 (33.95%)
	Bi-weekly	41 (33.06%)	46 (23.00%)	87 (26.85%)
	Monthly	23 (18.55%)	30 (15.00%)	53 (16.36%)
	Rarely	27 (21.77%)	7 (3.50%)	34 (10.49%)
	Total	**124**	**200**	**324**
Waste segregation practices	Always segregate plastics	9 (7.26%)	16 (8.00%)	25 (7.72%)
	Occasionally segregate plastics	28 (22.58%)	62 (31.00%)	90 (27.78%)
	Never segregate plastics	87 (70.16%)	122 (61.00%)	209 (64.51%)
	Total	**124**	**200**	**324**

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Discussions

The study examined the generation and management of plastic waste from domestic and institutional activities in Awka South Local Government Area, Anambra state, providing insights into the composition, sources, environmental and health impacts, and management practices. From the analysis, it was found that there is high plastic waste generation from households and institutions which means that both domestic and institutions sources contribute significantly to plastic waste. Inadequate waste management practices, including burning and open dumping, are prevalent in the study area. Plastic waste leads to air, water, and soil pollution, as well as respiratory issues and disease spread. Finally, there is a low adoption of sustainable practices, such as recycling and waste segregation.

Conclusion

The study on the *Evaluation of Domestic and Institutional Plastic Waste Generation and Management in Awka South Local Government Area, Anambra State,* has provided critical insights into the challenges and opportunities associated with plastic waste management in the region. The findings reveal that plastic waste generation is a significant issue in both domestic and institutional settings, with high volumes of waste being produced daily. The study established that population density influences the quantity of plastic waste generated, and while the composition of plastic waste is similar across households and institutions, institutions tend to produce more plastic waste.

The current plastic waste management practices in Awka South LGA, including burning, open dumping, and burial, are largely ineffective in mitigating environmental pollution. These practices contribute to soil degradation, water contamination, air pollution, and various health risks, including respiratory diseases and the spread of infectious illnesses. Despite the presence of plastic waste collection services and recycling initiatives, their impact remains limited due to poor enforcement, low public awareness, and inadequate infrastructure.

To address these challenges, the study identified several sustainable strategies for improving plastic waste management, including public awareness campaigns, stricter enforcement of plastic

waste policies, incentives for plastic waste reduction, the establishment of recycling plants, and collaboration with private sector initiatives.

The study concludes that plastic waste generation and management in Awka South LGA require urgent intervention. A comprehensive and sustainable approach that integrates policy reforms, community engagement, technological innovations, and institutional collaborations is essential for reducing plastic waste generation and minimizing its environmental and health impacts. Implementing these measures will not only improve plastic waste management practices but also contribute to a cleaner and healthier environment for the residents of Awka South Local Government Area.

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