# AN EVALUATION OF WASTE MANAGEMENT PRACTICES AMONG RESIDENTS OF OREDO LOCAL GOVERNMENT AREA, BENIN CITY, EDO STATE

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**A PROJECT SUBMITTED TO THE DEPARTMENT OF HEALTH, SAFETY AND ENVIRONMENTAL EDUCATION, FACULTY OF EDUCATION, UNIVERSITY OF BENIN, BENIN CITY, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELOR OF SCIENCE B.Sc (Ed) DEGREE IN ENVIRONMENTAL EDUCATION, UNIVERSITY OF BENIN, BENIN CITY, EDO STATE**

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## CERTIFICATION

We the undersigned, hereby certify that this work was carried out by **Faith OLUWOLE** with the matriculation number **EDU2102520** in the Department of Health, Safety and Environmental Education, Faculty of Education, University of Benin, Benin City, Edo State in partial fulfillment of the requirement for the award of Bachelor of Science (B.Sc. Ed) degree in Environmental Education.

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## DEDICATION

This project work is dedicated to God Almighty for His endless grace, love, favour, and mercy throughout this journey, and also to my ever-supportive and loving parents.

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## TABLE OF CONTENTS

**CHAPTER THREE: METHODOLOGY**



**CHAPTER FOUR: DATA ANALYSIS AND DISCUSSION OF FINDINGS**



**CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS**

## LIST OF TABLES

## LIST OF APPENDIX

## LIST OF APPENDIX

## ABSTRACT

*This study evaluated waste management practices among residents of Oredo Local Government Area, Edo State. The research examined how residents handle their waste, their knowledge level on proper waste management, and the key factors influencing their disposal practices. Descriptive survey design was used, and data were collected from 180 respondents across selected wards using a structured questionnaire.*

*Findings revealed that although many residents use public bins and engage private waste collectors, some still practice open dumping and burning of refuse. The study also found that most residents have a fair knowledge of waste management meaning and principles such as the 4Rs; Reduce, Reuse, Recycle, and Recover, but this knowledge is not fully reflected in their daily practices. Factors such as irregular waste collection, inadequate public bins, weak enforcement of environmental laws, and poor infrastructure were identified as major barriers to effective waste management.*

*The study concludes that improving waste management in Oredo requires stronger policy enforcement, public education, and better waste collection systems. It recommends collaborative efforts between government agencies, private waste collectors, and residents to promote a cleaner and healthier environment.*

# CHAPTER ONE

# INTRODUCTION

## Background to the Study

The concept of Solid waste management has been a big challenge in Nigeria and other developing countries. Basically, local authorities are giving preferences only on the collection of the waste and dumping it, while the principle of 4Rs (waste reduction, re-use, recycle and recovery), are not prioritize by them for a sustainable solid waste management (Ebuka, 2019). According to the World Bank (2018), global waste generation is predicted to increase by 70% by 2050 if effective waste management strategies are not implemented. Globally, there are marked differences between developed and developing countries in the management of municipal solid waste. Developed countries such as Sweden, Japan, and Germany have adopted advanced technologies including high-tech incineration with energy recovery, source separation, and extensive recycling programs (Goto, 2017). While in some Africa countries, including Nigeria, municipal solid waste is still predominantly managed through open dumping and burning, with very limited adoption of modern treatment technologies (Okafor et al. 2022). This poor waste management practices contribute significantly to environmental degradation, flooding, health risks, and poor urban aesthetics (Hoornweg & Bhada-Tata, 2012).

Waste can be defined as any material or substance that is discarded because it is considered useless, unwanted, or no longer valuable after consumption or production (Adegoke, 2020). Waste management, on the other hand, refers to the collection, segregation, transport, processing and disposal of waste material. According to Ehigiator (2019), waste Management is the collection, transportation, processing, recycling or disposal and monitoring of waste materials. The term usually relates to materials produced by human activity and is generally undertaken to reduce their effects on public health, the environment or aesthetic. The United States Environmental Protection Agency (EPA) defines waste management as the "collection, transportation, treatment, and disposal of waste, as well as the regulation and monitoring of waste management activities."

Many urban centers across Nigeria and Africa are experiencing increasing difficulties in managing solid waste due to rapid population growth and urbanization. For instance, Lagos State generates over 13,000 tons of waste daily, yet only about 40% is effectively collected, leaving the rest to accumulate in unauthorized sites, drains, or open spaces, thereby causing flooding and sanitation challenges (Kugbayi & Adegbami, 2024). In Ibadan and Kano, studies have shown that open dumping and open burning remain the dominant practices, despite the health and environmental hazards that is associated with these practices (Nabegu & Mustapha, 2015).

Although in Nigeria, various policy frameworks have been put in place to strengthen waste management, including the establishment of the National Environmental Standards and Regulations Enforcement Agency (NESREA) at the federal level and state agencies such as the Lagos State Waste Management Authority (LAWMA). In practice, these institutions face major constraints. For example, a study by Onuminya (2017) on LAWMA, Title "An appraisal of waste management in Lagos Metropolis" shows that while residents are generally aware of the agency's services, waste often piles up due to irregular collection schedules, equipment failures, and manpower shortages. In many Nigerian cities, waste management agencies are overwhelmed by the volume of waste generated, and services are irregular, poorly funded, and not properly regulated.

Beyond Nigeria, waste management challenges are also evident in other African cities. For instance, The Agbogbloshie District became infamous as a major e-waste dumping site, where informal recycling practices has led to severe environmental and health issues due to toxic emissions from open air burning of electronic waste (Andeobu, Wibowo & Grandhi 2023). Similarly, Egypt's formal waste system is inefficient, managing less than 60% of national waste. However, the Zabbaleen community in Cairo operates an informal system that recycles about 80% of collected waste, demonstrating the potential of grassroots initiatives (Nast, 2024).

Oredo Local Government Area is one of the most urbanized Local Government Area in Benin City, it serve as an administrative center in Benin City, hosting residential areas, commercial centers, markets, government offices, and schools. Due to these diverse

human activities, large volumes of waste are generated on a daily basis, leading to widespread problems such as indiscriminate dumping of refuse, open burning, overflowing bins, and blockage in the drainage systems. The current waste management system is inefficient, characterized by improper waste collection, lack of proper disposal sites, and widespread dumping in unauthorized locations (Adekola, Omole, & Akintoye, 2021).

Despite government efforts through the Edo State Waste Management Board and the involvement of private sector participants, some factors still hinder the implementation of effective waste management practices. According to Owoeje and Okojie (2013), the ill attitude and poor understanding of the public towards solid waste management has contributed to indiscriminate disposal of solid waste in Benin City. In the study carried out by Nabegu and Mustapha (2015) titled "Institutional Constraints to Municipal Solid Waste Management in Kano Metropolis, Nigeria". Some factors highlighted to hinder the implementation of effective waste management practice include; weak institutional capacity, inadequate waste infrastructure, poor funding, and lack of community engagegement. Some other factors influencing waste management include; inadequate waste management technology, lack of source-separation facilities, weak policy enforcement, insufficient environmental education and awareness, and low household income levels (Ogunbode et al. (2023); Fakunle, 2024). Moreover, there is a disconnection between residents' knowledge and awareness of proper waste disposal methods and their actual practices, often influenced by socioeconomic status, availability

of waste collection services, and public enforcement of environmental laws (Ifabiyi, Banjoko, & Shuaib, 2022; Emesowum & Chiejina, 2023). This study, seeks to evaluate the waste management practices among residents of Oredo Local Government Area, examining the levels of knowledge, the existing waste management practice, and factors that influence waste management. Such evaluation is essential for informing policy decisions and improving environmental quality in the area.

**Statement of the Problem**

Different articles, news, journals are being published on a daily basis concerning waste and its management, specifically in Nigeria but this issues have not been fully address. Ajegun et al. (2023) emphasize that waste management has become one of the most prominent environmental challenges in developing countries, due to its links with pollution, resource loss, and public health risks. The indiscriminate disposal of waste by residents in Oredo Local Government Area is actually a threat to public health.

In spite of the efforts by the Environmental Health Officers in conjunction with the Waste Management Board; through organizing weekly environmental sanitation, encouraging residents in Oredo Local Government Area to register with the waste managers for proper collection and disposal of waste. There are still heaps of refuse either on the roadside, unapproved dump sites, in the gutter (drainage system), or in open sites. These unhealthy conditions has led to environmental degradation and contaminated water sources, contributing to the proliferation of vectors and outbreaks of diseases such as cholera, typhoid, diarrhea, malaria, and Lassa fever.

Although, previous studies have shown the role of environmental agencies and private waste managers, but many of their intervention strategies and program have not yielded a positive and sustainable results. As observed, Irregular waste collection by the waste managers, limited public awareness, weak policy enforcement, economic status are some major obstacles. Studies suggest that factors such as income, education, and access to services significantly influence household waste practices (Onwuemele, 2015; Adetoro et al., 2024). However, there is limited information focusing specifically on waste management practices among residents of urban Local Government Area, which makes it difficult to implement targeted and effective solutions.

In the light of the above, the researcher aims to investigate the waste management practices among residents of Oredo Local Government Area, Benin City, Edo State.

**Research Questions**

1. What are the waste management practices among residents of Oredo Local Government Area?
2. What is the level of knowledge on waste management practices among residents of Oredo Local Government Area?
3. What are the factors influencing waste management practices among residents of Oredo Local Government Area?

**Purpose of the Study**

This study aims to identify the state of solid waste management practice among residents of Oredo Local Government Area.

Specifically, this study will investigate:

- The existing waste management practice among residents of Oredo Local Government.
- The level of knowledge on waste management practices among residents of Oredo Local Government Area.
- Factors influencing waste management practices among residents of Oredo Local Government Area.

**Significance of the Study**

This study is significant as it contributes to the body of knowledge on urban waste management in Nigeria, particularly within the geographic boundary of Edo State.

The findings will assist local authorities and policy makers in identifying gaps and inefficiencies in the current waste management system, thereby supporting more effective and efficient policy formulation and implementation.

It identify the importance of public awareness, knowledge and socioeconomic conditions in shaping waste disposal behavior, offering an insights that can be used to design targeted community-based interventions.

This research will provides a foundation for future academic studies and may inspire broader public education initiatives aimed at promoting environmental responsibility among residents.

**Scope and Delimitation of the Study**

This Study will evaluate waste management practices among residents of Oredo Local Government Area. It is however delimited to adults above 18 years in the various households.

**Definition of Terms**

- Solid Waste Management: This refers to the process of collecting, segregating transporting processing and disposal in way that possess less threat on human health, animal, plant and other components of the ecosystem such as the air, water, soil etc.
- Re-use: This is the act of using a material (material that would have been discarded) again, either to serve its original purpose or for new purpose.
- Reduce: This is the act of minimizing the amount of waste generated by individuals or households.
- Recycle: This is the conversion of raw material (i.e. processed plastic, glass, metal etc.) into new products.
- Recover: The process of recovering energy or nutrient from waste.

# CHAPTER TWO

# REVIEW OF RELATED LITERATURE

This Chapter review related literature under the following Sub Headings:

- Concept of Waste
- Concept of Waste Management
- An overview of Waste Management Practices
- Factors influencing waste Management practices in Nigeria
- Summary of Literature Reviewed.

## Concept of Waste

There are different definitions of waste, provided by different scholars, but most definitions focus on the idea of material being unwanted, discarded, or having no further value. Adegoke, S. O. (2020) defined waste as any material or substance that is discarded because it is considered useless, unwanted, or no longer valuable after consumption or production. Also, Waste refers to any material or objects that the holder disposes of, plans to dispose of, or is obliged to dispose of, whether due to legal, environmental, or operational reasons (Wilson et al., 2021). It can be inferred from this definition that waste is any substance or material that can no longer serve the original purpose it was design for.

According to Ogunbajo, (2019) Waste is any material or object that the owner disposes of, plans to dispose of, or is mandated by regulation to dispose of, regardless of its original purpose or value. Similarly, Waste refers to any material or object that is

disposed of, meant to be disposed of, or must be disposed of in accordance with legal requirements (Okon, 2021). This definition highlights the subjective nature of waste; an object may still be useful to others, but as long as the holder no longer want it or is required to be dispose of, it becomes waste.

**Types of Waste**

Several Authors have classified waste into several types based on their origin, composition, or hazard level.

According to Munyendo (2020), waste can be broadly classified by its source or origin, which includes:

- *Domestic (household) waste:* These comprises of food scraps, packaging, and household items.
- *Industrial Waste:* These are waste generated by manufacturing processes for example scraps, pesticides, used oil and lubricant, plastic waste, textile waste etc.
- *Agricultural waste:* These are waste generated by farming and agricultural activities, for example animal waste, left over grain, spoiled or unmarketable produce etc.
- *Commercial Waste*: These types of waste are generated from activities in shops, offices, hotels, markets, restaurants, and other commercial establishments. For example cardboard boxes, plastic wraps, paper, printer cartridges etc.

Another way in which waste can be classified is based on its composition, which divides waste into organic (biodegradable) and inorganic (non-biodegradable) materials (Adegoke, 2019).

- *Organic waste*: These are Biodegradable waste that comes from plant or animal sources. For example: food scraps, garden waste, paper, wood, manure etc.
- *Inorganic Waste:* These are wastes that are non-biodegradable and do not decompose easily. For example: plastics, metals, glass, ceramics, and construction debris etc.

Furthermore, waste is often classified by its hazard level, distinguishing between hazardous and non-hazardous waste. This classification is important for determining the necessary precautions during storage, handling, transport, and disposal. Adegoke (2019) notes that waste can be categorized into hazardous and non-hazardous types based on the level of risk they pose to human health and the environment.

- *Hazardous Waste:* These are wastes that are dangerous or potentially harmful to human health or the environment. Examples include; industrial chemicals, pesticide, batteries, radioactive waste from nuclear plant.
- *Non Hazardous waste:* This waste does not pose immediate danger to health or the environment under normal handling conditions. For example; food scraps, paper and cardboard, garden waste etc.

**Concept of Waste Management**

Waste management refers to all the activities and processes involved in handling waste right from the point it is generated until its final disposal. This also includes the collection, transport, treatment and disposal of waste, together with monitoring and regulation of the waste management process (Kisku, 2021). In the context of urban centers like Oredo Local Government Area in Edo State, effective waste management is essential due to increasing population density and commercial activities that generate significant volumes of solid waste.

At the core of modern waste management practices is the waste hierarchy, which prioritizes waste reduction at the source, followed by reuse, recycling, recovery, and finally, disposal (United Nations Environment Programme, 2016). This approach encourages sustainable handling of waste materials by minimizing waste generation and maximizing resource efficiency.

The waste management hierarchy is a widely accepted framework that ranks waste management strategies according to their environmental impact. It helps to guides decision-making in waste policy and practice by prioritizing the most sustainable options. The levels of waste management are as follows:

- Prevention (Reduce): This is the most preferred and sustainable option in the hierarchy, It involves avoiding the generation of waste in the first place, such as; by using fewer materials, or by changing consumption habits. Example: Buying in bulk to reduce packaging waste. Traven (2019) emphasize that prevention tops

the hierarchy by encouraging low quantity of waste production before adopting reuse and recycling mechanism, as it align with circular economy principles. Ogunbanjo (2020) explains that preventing waste at the source is the most effective strategy for environmental sustainability, as it reduces the need for further processing and disposal.

- Reuse: Reuse involves making use of items again while keeping their original structure, sometimes after just simple cleaning or small repairs (Ortegon 2019). Ibrahim (2022) emphasize that a reuse culture, especially in schools and communities, can drastically reduce waste. Chikere (2023) points out that in many African cities, informal economies have long practiced reuse; such as the collection and reuse of bottles and containers. Ezeh (2021) contribute to this by highlighting some initiatives such as swap markets and donation centers which promote the reuse of clothes, books, and electronics.
- Recycle: This involves processing waste into new products to prevent the use of fresh raw materials. It helps conserve resources and reduce pollution but requires energy and infrastructure. Example: Melting down plastic bottles to create new containers. Adedeji (2021) defines recycling as the process of collecting, processing, and converting waste materials into new products. He stresses that while recycling diverts waste from landfills, it still consumes energy and should not be the primary focus over prevention or reuse.

- Recovery: This includes energy recovery through methods like incineration with energy capture (waste-to-energy). While not as sustainable as the top options, it recovers some value from waste. Example: Burning waste to generate electricity. According to Nwachukwu (2023), recovery includes methods like incineration with energy recovery, where waste is used to generate electricity or heat. He notes that although recovery reduces landfill use and generates energy, it should be cautiously adopted due to emissions and cost implications.
- Disposal: This is the least preferred option but it is commonly used. It includes landfilling and incineration without energy recovery. Disposal should be used only when all other options have been exhausted.

  Example: Dumping waste in a sanitary landfill. Balogun (2021) argues that landfill disposal represents a failure in the waste management chain and should be reserved for waste that cannot be reused, recycled, or recovered. He warns that poor landfill practices pose significant environmental and public health risks, especially in African urban settings.


Figure 1; The waste management hierarchy (Michael-Agwuoke, 2012).

The waste management hierarchy has gained widespread acceptance among scholars as a strategic guide for responsible waste handling methods. The hierarchy ranks waste management options from most to least preferred: prevention, reuse, recycling, recovery, and disposal. Scholars agree that this model promotes sustainability, though its application varies significantly depending on local context and capacity.

Wilson et al. (2012) support the hierarchy as a vital policy framework that helps cities improve their waste systems. Their comparative study of 20 cities worldwide found that those which emphasized prevention and recycling experienced more sustainable outcomes. According to the authors, strong governance and public engagement are keys to effectively implementing the higher tiers of the hierarchy.

Similarly, Dragan Ugrinov (2024) maintains that putting prevention first, followed by collection, recycling, recovery, and disposal (that is, following the waste hierarchy); is "an imperative of sustainability" in municipal waste systems. He argues that this structured, hierarchical approach is essential for improving waste outcomes and advancing sustainable waste management practices.

At the global level, the United Nations Environment Programme (UNEP, 2016) endorses the hierarchy as the international standard for managing waste sustainably. However, UNEP notes that many developing countries still operate primarily at the bottom tier (disposal) due to financial, institutional, and technical challenges. The agency recommends that national and local governments re-formulate their waste strategies to focus on waste prevention, reuse, and recycling.

In the Nigerian context, Olayiwola, Iyobhebhe and Abdulakeem (2023), in their article "Waste Management Administration and Environmental Sustainability in Nigeria," analyze urban waste systems in Lagos and highlight a strong disconnect between policy and practice. They note that despite recognising the waste hierarchy framework, its implementation is often hindered by insufficient infrastructure, weak regulatory enforcement, and a lack of public awareness. They specifically recommend improvements in institutional coordination, financing, enforcement mechanisms, and technological support to improve Nigeria's waste management systems.

In more progressive interpretations of the hierarchy, Zaman and Lehmann (2011) propose an expanded model aligned with zero-waste goals. They suggest adding some which include; "refuse" and "redesign" to address waste issues at the product development stage. Their work highlights the need for a proactive and systemic change beyond traditional waste handling methods.

**An overview of Waste Management Practices**

According to Das and Sarkar (2023), waste management practices are not uniform across countries, regions, or sectors. They note that developed and developing nations, as well as urban and rural areas, often adopt different approaches to waste management due to variations in economic, environmental, social, political, and technological conditions. According to them these differences account for the present unique challenges and opportunities in addressing waste sustainably in different contexts. Other Researchers have identified several key reasons for the variations in waste management practices across different countries, some of which include:

- *Economic Development and Resources:* Developed countries often have more financial and technological resources to invest in modern waste treatment facilities, recycling programs, and waste-to-energy technologies. In contrast, many developing countries rely heavily on landfilling or open dumping due to limited infrastructure and funding (Hoornweg & Bhada-Tata, 2012). "Higher-income countries tend to generate more waste per capital, but also manage it more systematically through formal systems, whereas lower-income countries

rely on informal waste collection and struggle with disposal." (World Bank, 2018).

- *Regulatory Frameworks and Governance:* Strong environmental laws and effective governance structures lead to better waste management. Countries with comprehensive waste legislation (e.g., Germany, Japan) enforce producer responsibility, segregation at source, and recycling. In contrast, weaker legal systems in other regions hinder enforcement and compliance (Wilson et al., 2012).
- *Public Awareness and Participation:* Cultural attitudes and levels of environmental education influence how citizens manage their waste. In countries like South Korea, strong public awareness campaigns and participation in recycling programs have contributed to success. Doun Moon (2024) shows that South Korea achieved a 95% food-waste recycling rate, acknowledging the positive impact of extensive public campaigns, mandatory sorting, and widespread community participation.
- *Urbanization and Population Density:* Urban areas face higher waste generation and more complex waste streams. Developed urban centers often have more organized collection and treatment systems, while rapidly growing cities in developing countries may lack the infrastructure to keep pace with demand, leading to informal systems or illegal dumping (UN-Habitat, 2010).

- *Technological Capacity:* Access to advanced technology plays a critical role. For instance, Goto (2017) shows that Japan's high-tech incineration plants which are designed for energy recovery are essential for reducing landfill usage and meeting energy needs, while in regions with constrained infrastructure; reliance on manual sorting and open burning remains prevalent due to lack of access to such facilities.
- *Climate and Geography:* Environmental conditions such as rainfall, temperature, and land availability may also influence methods of waste treatment. For example, landfills are common in sparsely populated countries with large area of land like Australia (Thompson and Evans, 2021), whereas densely populated regions like Japan go for incineration or compact systems (Ishimura and Takeuchi, 2019).

Countries with advanced infrastructure, technology and regulatory frameworks have adopted various strategies to reduce environmental impacts that may arises as a result of improper waste management and promote resource recovery.

Sweden is globally recognized for its highly efficient waste management system. The country recycles or recovers energy from nearly 99% of its municipal waste, largely through advanced incineration facilities that convert waste into heat and electricity (Avfall Sverige, 2023). Sweden has become so proficient in waste-to-energy that it imports waste from neighboring countries to maintain energy production levels.

Japan's waste management approach is deeply embedded in legislation, such as the Basic Law for Establishing a Recycling-Based Society. Due to its limited land availability, Japan emphasizes incineration with energy recovery. Waste is meticulously sorted into multiple categories, and recycling of metals and electronics is highly developed (Yoshida & Tanaka, 2019).

South Korea has implemented a Volume-Based Waste Fee (VBWF) system since 1995, where residents pay based on the amount of non-recyclable waste they generate. This pay-as-you-throw model has significantly increased recycling rates and reduced household waste (Park et al., 2018). Food waste is also separately collected and processed into animal feed or biofuel.

Germany is a pioneer in adopting a circular economy model, with recycling rates exceeding 60%. The country's packaging ordinance and the "Green Dot" system make producers financially responsible for the end-of-life management of their products (European Environment Agency, 2020). Emphasis is placed on waste prevention, reuse, and the efficient recovery of resources.

The Netherlands has set ambitious targets for a circular economy, aiming for 50% reuse of raw materials by 2030 and full circularity by 2050. The Dutch government promotes innovation and collaboration in recycling technologies, and household waste separation is highly enforced (PBL Netherlands Environmental Assessment Agency, 2021).

The UK has improved its waste management framework through policies like the Waste Strategy for England and the Circular Economy Package. Local authorities are

responsible for collection and recycling, while efforts continue to reduce the export of recyclable plastics to less-regulated countries (DEFRA, 2022). Recent policies advocate for Extended Producer Responsibility (EPR) and deposit-return schemes for packaging.

The city of Parma in Italy shows some pleasant practices in urban waste management through its “Zero Waste” initiative. With the use of RFID-enabled bins and strict separation rules, the city has achieved recycling rates of over 80% (Rosa et al., 2022). Italy's regional approaches provide models for localized waste reduction strategies.

Australia applies the “3Rs plus 1” principle: reduce, reuse, recycle, and recover energy. However, a lack of national standardization has led to inconsistent practices across states. The federal government recently enacted reforms to limit waste exports and invest in domestic recycling capacity (Australian Government, 2021).

France has embraced a circular economy strategy through its anti-waste laws, including bans on single-use plastics and requirements for retailers to donate unsold goods. The country emphasizes eco-design and consumer awareness to minimize waste generation (Ministry for the Ecological Transition, 2020).

Belgium’s regions—Flanders, Wallonia, and Brussels—each manage their own waste strategies. Flanders leads with its “Vision 2050” strategy focusing on sustainable material use, while Wallonia supports circular innovation and infrastructure development (EEA, 2020). High recycling rates and regional autonomy are key features of Belgium's system.

However, solid waste management remains an issue in many developing African nations due to rapid urbanization, poor infrastructure/ technology and inadequate policy enforcement.

Ghana faces significant challenges in waste management, especially in urban areas such as Accra. The Agbogbloshie District became infamous as a major e-waste dumping site, where informal recycling practices has led to severe environmental and health issues due to toxic emissions from open air burning of electronic waste (Andeobu, Wibowo, and Grandhi 2023).

In the Techiman Municipality, studies have identified inadequate waste collection, lack of source separation, and insufficient infrastructure as key issues. Approximately 67 heaps of uncollected wastes were reported, attributed to broken-down trucks and inefficient landfill sites (Addo et al. 2020).

Moreover, the influx of low-quality secondhand clothing contributes to textile waste, with about 40% ending up as waste, polluting beaches and waterways (Kokutse, 2024).

In Yaoundé, Cameroon, waste management systems continue to suffer from logistical constraints and insufficient public infrastructure. Although community-based organizations are stepping in to fill the gap, they often lack the necessary support and resources to operate effectively (Ndam et al. 2023).

Egypt's formal waste system is inefficient, managing less than 60% of national waste. However, the Zabbaleen community in Cairo operates an informal system that recycles

about 80% of collected waste, demonstrating the potential of grassroots initiatives (Condé Nast Traveler, 2024).

The Gambia has implemented laws against plastic use, but enforcement remains weak. The Kanifing Environmental Transformation Programme (KETP) reduced illegal dumpsites from 65 to 17 through public awareness, waste sorting, and job creation in the waste sector (Kumar et al. 2022).

Kenya's system faces issues of open dumpsites and limited formal infrastructure. Public-private partnerships and community-based recycling efforts are gradually being explored as sustainable alternatives (Maina, 2024).

**An Overview of Waste Generation and current waste management practices in Nigeria.**

Nigeria generates over 32 million tons of solid waste annually, with an average urban resident producing 0.65 kg of waste per day (World Bank, 2020). Despite this, less than 30% of the waste generated is collected properly and disposed of through formal systems (Ogunyemi et al., 2021). The remaining waste is either dumped in open space of land, burned, or left uncollected, posing severe environmental and public health risks.

Current waste management in many urban cities including Benin City (of which Oredo is one of the prominent Local Government) includes;

- *Open Dumping and Burning:* Open dumping is the most common method of waste disposal in Nigeria. Waste is deposited in unauthorized areas such as roadsides, drainages, and unregulated dumpsites. This practice is prevalent in both

urban and rural areas due to a lack of proper waste collection services (Nzeadibe & Ajaero, 2010). Burning of waste is also widely practiced, contributing to air pollution and respiratory health issues.

- *Landfilling***:** While landfills are considered a formal disposal method, many in Nigeria are poorly managed and lack proper lining and leachate control systems. Most existing landfills operate as open dumps rather than engineered sites (Abila & Kantola, 2013). For example, the Olusosun landfill in Lagos is one of the largest in Africa but has been operating beyond capacity for years.
- *Public-Private Partnerships (PPPs):* Some states, such as Lagos and Abuja, have adopted public-private partnership models for waste collection and transportation. In Lagos, the Lagos State Waste Management Authority (LAWMA) coordinates with private operators (PSPs) to handle household waste. This model has improved service delivery in high-income areas, but challenges persist in low-income and informal settlements (Akinbile & Yusoff, 2011).
- *Informal Sector Participation***:** The informal waste sector plays a critical role in Nigeria's waste management system. Scavengers and waste pickers are involved in the collection, sorting, and recycling of valuable materials such as plastic, metal, and paper. In cities like Lagos and Kano, this sector contributes significantly to material recovery and provides employment, albeit in poor and hazardous conditions (Nabegu & Mustapha, 2015).

- *Recycling Initiatives:* Recycling remains at its minimal stage in Nigeria, it is mainly driven by informal collectors. However, there is a growing number of startups like Wecyclers and Recycle Points that use technology and incentives to promote household recycling in urban centers. These initiatives have shown success in areas like Lagos, encouraging waste sorting and rewarding households for recyclable materials (Olawumi & Chan, 2018).
- *Waste Segregation and Composting:* Waste segregation at source is not common in Nigeria, although some programs and private initiatives promote it in select communities (Nabegu & Mustapha, 2022). Ayilara et al. (2020) observe that biodegradable organic waste makes up the largest share of Nigeria's municipal solid waste but is rarely composted, thereby contributing to uncontrolled methane emissions from dumpsites.

**Factors Influencing waste Management Practice in Nigeria**

There are many factors that influence waste management practices in a certain geographic location, some of which include:

- *Level of knowledge of people*

  The level of public awareness and knowledge is a very important aspect in determining the effectiveness of waste management practices. Studies have consistently shown that while some individuals may possess a general knowledge of the importance of proper waste disposal, it still does not always translate into

sustainable waste management practices among people in that geographic location.

Dung, Mankilik, and Ozoji (2020) conducted a study assessing the knowledge and attitudes of college students toward solid waste management in Nigeria's North-Central region. The findings indicated that although students had positive attitudes, they lacked sufficient knowledge of appropriate waste management techniques. The authors recommended that environmental education should be integrated into academic curricula to improve students' understanding and encourage better practices.

In a similar study carried out in Oshodi-Isolo Local Government Area of Lagos State, Oladejo and Amosu (2021) found that most residents were aware of the health implications of improper waste disposal. However, this awareness did not significantly influence their waste disposal practices. Only 35.2% of respondents followed proper solid waste management methods. The researchers concluded that enforcement of environmental laws and continued public sensitizations were necessary to bridge the knowledge-practice gap.

Ifabiyi, Banjoko, and Shuaib (2022) also carried out research on residents' knowledge of sustainable waste management in Ilorin. The results revealed a general understanding of environmental degradation caused by improper waste disposal, but a lack of specific knowledge about sustainable practices such as

composting and waste sorting. The study emphasized the need to create an awareness campaigns tailored to local contexts.

Furthermore, a study published in Cleaner Waste Systems (2024) examined households in Southwestern Nigeria and reported that although many participants were aware of the importance of managing waste properly, only a small fraction (35%) implemented effective waste management strategies in their homes. The study recommended combining education with behavioral change programs and enforcement of local environmental laws.

In Benin City, Adekola et al. (2021) examine public awareness and perception of waste management. The study found that 62.6% of the 2,720 respondents had low awareness regarding the negative consequences of indiscriminate waste disposal. The researchers advocated for stronger community-based education and policy implementation to raise awareness and improve waste handling practices.

Collectively, these studies suggest that although awareness exists to varying degrees across Nigeria, but the practical application of waste management practices and intervention strategies is an issue. Therefore, effective waste management requires not only raising awareness but also providing education on specific practices, reinforcing behavior through policy, and improving infrastructure to support sustainable behaviors.

- *Economic status/Income level of individual*

The economic status and income levels of individuals to a considerable degree play a critical role in shaping their waste management practices, particularly in urban environments like Benin City. Many studies have identified a strong correlation between household income levels and the ability to access and utilize proper waste disposal methods.

Onwuemele (2015) conducted a study to examine the determinants of solid waste generation and disposal systems in Benin City. The findings show that households with higher income levels were more likely to engage in formal and hygienic waste disposal practices. On the other hand, low-income households often adopted indiscriminate dumping due to financial constraints and poor access to waste services.

In relation to the above study, Ogu (2011) investigated the solid waste chain in Benin Metropolis and reported that limited income among residents have a significant influence on improper waste management. The research highlighted that many low-income residents could not afford regular waste collection services, contributing to the prevalence of illegal dumpsites.

Furthermore, Adekola et al. (2021) examine public perception and awareness of waste management in Benin City. Their study confirmed that income level was a strong determinant of waste disposal behavior. High-income individuals were more likely to register to private waste disposal services, while lower-income

groups often relied on irregular and less sanitary methods due to limited financial resources.

Diving away from Benin metropolitan, Adebayo et al. (2023) examined the factors influencing households' choice of waste management strategies in Lagos and Ogun States. The study revealed that income levels played a crucial role in determining waste disposal methods. Higher-income households preferred private sector participation (PSP) services, while lower-income households often relied on open dumping due to cost considerations. The authors make a suggestion that the government should implement an affordable waste management options for low-income communities.

Adetoro et al. (2024) investigated barriers to effective waste management in Ibadan North West LGA. The study identified socioeconomic factors, including income levels, as a significant barrier. Lower-income communities faced challenges such as inadequate infrastructure and high disposal costs, resulting to improper waste disposal practices. The authors involved in this study recommended targeted interventions to address these socioeconomic differences.

Emesowum and Chiejina (2023) assessed factors influencing household waste disposal practices in Imo State. The study detects a significant association between income levels and waste disposal methods. Higher-income households were more likely to use formal waste disposal services, while lower-income households usually subscribe to open dumping due to financial limitations. The

authors emphasized the need for affordable waste management services to cater to all income individuals.

With the above highlighted studies, it shows that economic status and income levels significantly influence waste management practices among people in a geographical location. Higher-income individuals and households are more likely to engage in proper waste disposal methods, often due to better access to resources and services. In contrast, lower-income groups face financial constraints that limit their ability to participate in formal waste management systems, which often lead to increased instances of improper disposal methods such as open dumping. To improve the waste management practices across all income levels, it is crucial to implement policies that provide affordable and accessible waste disposal options, in conjunction with education and infrastructural development.

- *Infrastructure and Technological*

  It is very obvious that Infrastructure and technology are one of the major determinants of the effectiveness and efficiency of waste management systems, particularly in urban areas. Adequate infrastructure supports all stages of waste management; ranging from collection and transportation to processing and final disposal, while technological advancements offers an innovative solutions to some challenges in the waste management sector.

  According to Hoornweg and Bhada-Tata (2012), the availability of a reliable infrastructure, such as waste bins, collection vehicles, transfer stations, and

engineered landfills, is fundamental for ensuring regular and safe waste disposal. Inadequate infrastructure often leads to open dumping, irregular waste collection, and environmental pollution, especially in rapidly growing urban centers. Similarly, Moqsud et al. (2011) observed that many developing countries are face with deteriorating or unavailable waste facilities, which affect the health and safety of residents and sanitation workers.

Technological development has introduced more efficient and environmentally friendly waste management solutions, such as waste-to-energy (WTE) technologies, composting machines, and digital monitoring systems. Advancements like Geographic Information Systems (GIS), Global Positioning Systems (GPS), and mobile tracking applications are increasingly being adopted in urban areas to optimize waste collection routes, reduce fuel consumption, and enhance service delivery (Wilson et al, 2012). Some of these technologies have been successfully implemented in parts of Asia and Latin America, demonstrating significant improvements in operational efficiency (Zurbrugg et al., 2012).

However, in many African cities, including those in Nigeria, infrastructure and technological constraints remain an obstacle in integrating effective waste management practice. Sylvester & Ikudayisi (2021) note that “Inadequate infrastructure and funding are among the most significant obstacles to the adoption of modern waste management technologies in Nigeria. Many municipalities and local governments struggle with insufficient waste processing

facilities, collection trucks, and recycling centres. As a result, many urban centres continue to rely on outdated and inefficient waste management systems."

Akinbile (2012) further highlighted that poor road networks and limited access to urban slums hinder waste collection efforts, resulting in the accumulation of solid waste in drainage systems and open spaces. Conclusively there is a significant relationship between infrastructure, technology and waste management system. The absence of well-planned infrastructure and the slow adoption of appropriate technologies continue to undermine waste management efforts in developing regions. Addressing these challenges requires increased investment, policy support, and capacity building to enable municipalities to implement and maintain modern waste management systems suited to their local contexts.

- *Urbanization and Population Growth as Factors Influencing Waste Management*

  Rapid urbanization and population growth are among the most significant factors influencing waste generation and management across the globe. The rapid increase in population often lead to increase in the volume of waste generated and the more complex it will be in managing the waste, which often outpacing the capacity of municipal authorities to manage them effectively, especially in developing countries.

  Urbanization can be defined as the increase in proportion of a population living in urban areas, exerting pressure on urban infrastructure and services, including waste management. As cities expand, so does the demand for effective waste

collection, transportation, treatment, and disposal systems (Hoornweg & Bhada-Tata, 2012).

This situation is particularly obvious in developing countries, where urban growth is often unplanned, and settlements emerge without corresponding development in public services. According to UN-Habitat (2010), many rapidly urbanizing cities in Africa, Asia, and Latin America lack the institutional and financial capacity to manage urban solid waste sustainably. Population growth further contribute to the problem by increasing the quantity of waste generated per day. A study by Wilson et al. (2012) found that solid waste generation rates are closely linked to population size and density, especially in urban areas. In rapidly growing cities such as Lagos, Benin, and Ibadan, waste management board are often overwhelmed by the sheer volume of waste, leading to irregular collection, open dumping, and proliferation of informal waste disposal methods.

Guerrero, Maas, and Hogland (2013) argue that urban expansion often leads to the occupation of land originally set aside for waste disposal or treatment. This spatial conflict reduces the availability of landfill sites, forcing waste management agencies to transport waste over long distances or resort to substandard disposal methods. Similarly, Adeniyi et al. (2022) found that rapid urban expansion in Nigerian cities has led to a situation in which former dump sites are now being replace by residential and commercial developments, resulting in the disposal of waste in vacant plots, drains, walk ways and other inappropriate locations.

Moreover, the low income earners; who often reside in informal settlements, typically lack access to regular waste collection services due to poor road access, irregular settlement patterns, and the absence of legal recognition. As observed by Medina (2010), these underserved areas become a center of concentration for environmental degradation and health risks due to the accumulation of unmanaged waste. These conditions not only hinder environmental sustainability but also pose serious public health challenges.

Conclusively the combined effects of urbanization and population growth have created significant challenges for sustainable waste management, particularly in developing countries. The increase in volume and complexity of waste require strategic planning, infrastructure investment, and institutional reforms. Without proactive policies and integrated planning, cities may face severe environmental and public health crises due to unmanaged urban waste.

Another challenge is the diversity and complexity of waste in urban settings. As urban residents changes their lifestyles and consumption patterns due to modernization, the composition of waste changes, with more plastics, electronics, and packaging materials entering the waste stream (Moqsud et al., 2011). This change requires more sophisticated sorting, recycling, and disposal technologies, which are often unavailable in rapidly growing urban centers.

## Summary of Literature Reviewed

This chapter reviewed relevant literature on the concept of waste and waste management, highlighting key definitions, types, and classification of waste as well as the processes and strategies involved in waste management. Scholars agree that waste management is not just about disposal but involves a systematic approach which is highlighted using the waste management hierarchy; the waste management hierarchy prioritizes prevention, reuse, and recycling before recovery and disposal. The study further explores global waste management practices drawing examples from developed and developing countries. It showed that while developed countries have adopted advanced practices such as recycling technologies, energy recovery, and circular economy models, developing nations, including many countries in Africa, still struggle with weak infrastructure, limited funding, and inadequate policy enforcement.

Within Nigeria, previous studies have shown that waste management systems remain largely ineffective, relying heavily on open dumping, burning, and poorly managed landfills. Public-private partnerships and informal sector participation have provided partial solutions, but challenges persist, particularly in low-income communities. Public awareness, income level, infrastructure, technology, urbanization, and population growth have been identified as some factors influencing waste management practices. The reviewed literature on public awareness as a factor influencing waste management show that while residents may recognize the dangers of improper waste disposal, there is still a

persist knowledge–practice gap, where awareness does not always translate into sustainable action.

Despite these contributions, there are no sufficient localized studies that examine waste management practices at the community level, especially in specific urban local government areas such as Oredo in Benin City. Most existing research focuses either on Nigeria as a whole or on larger cities and states, with little emphasis on how residents at the grassroots level perceive, adopt, or struggle with waste management strategies. This gap highlights the need for specific studies that can provide a clearer understanding of the peculiar challenges, behaviors, and opportunities for improving waste management in Oredo Local Government Area.

This study therefore seeks to fill this gap by evaluating the waste management practices among residents of Oredo Local Government Area, with the aim of identifying the specific problem and to suggest possible solutions that fit their living conditions and economic situation.

# CHAPTER THREE

# METHODOLOGY

This chapter describes the procedures and methods for data collection that was used for this study. The methods used will be discussed under the following headings:

- Research Design
- Population of the Study
- Sample and Sampling Technique
- Research Instrument
- Validity of the Instrument
- Reliability of the Instrument
- Administration of the Instrument
- Data Analysis.

## Research Design

The Descriptive survey research design was used for this study. This type of research design is appropriate because it enables researchers to gather factual information and describe phenomena as they exist in a population. According to Nworgu (2015), descriptive survey research is a design used to obtain information concerning the current status of phenomena to describe what exist with respect to variables or conditions in a situation. This type of research design is suitable for this study as it help to collect factual

information on the waste management practices among resident of Oredo Local Government Area, Benin City, Edo State.

**Population of the Study**

The population of this study comprised all adult in Oredo Local Government Area, Edo State, Nigeria, with the total population of 374,515 (Oredo Local Government Secretariat, 2025).

**Sample and Sampling Technique**

The Sample Size for this study is 180 respondents. Oredo Local Government Area, Edo State, comprise of 12 wards. The sample size was determined by systematically selecting all the odd-numbered wards, resulting in a total of 6 wards used for the study (wards 1, 3, 5, 7, 9, and 11). Proportionately 30 respondents were selected for each ward, making the sample size for the study 180. Subsequently, convenience sampling technique was used to select participants for the study.

**Research Instrument**

The research instrument used in collecting data for this study is the structured questionnaire, which consists of four main sections: Section A gathered demographic information such as age, gender, occupation, and level of education. Section B looked at information about the waste management practices among resident of Oredo Local Government Area using dichotomous questions (Yes/No response questions). Section C assessed resident's level of knowledge on waste management using multiple choice questions. The multiple choice questions were scored after the participants' responses.

Then participants were grouped into low knowledge level, moderate knowledge level and high knowledge level on waste management practices based on their score. Respondents who scored 0-3 were grouped under the low knowledge level while those who scored 4-6 were grouped under the moderate knowledge level and those who scored 7-10 were grouped under the high knowledge level. Section D gathered information on factors influencing waste management practices, using a four point likert-scale; SA (Strongly Agree) = 4, A (Agree) =3, D (Disagree) = 2, SD (Strongly Disagree) = 1. The questions were designed to elicit relevant data that helped in evaluating the waste management practices among residents of Oredo Local Government Area, with the aim of identifying the specific problem.

**Validity of the Instrument**

The validity of the instrument was established by presenting the questionnaire to the project supervisor and two other experts in the Department of Health, Safety and Environmental Education. The corrections made by them were incorporated in the final draft of the instrument. This was done to ensure that the questionnaire was valid in terms of content and face.

**Reliability of the Instrument**

To establish the reliability of the instrument, the test-retest reliability method was used. Twenty (20) copies of the questionnaire were administered to the respondents who are not part of the study, and after two weeks the same instrument were re-administered to the same group of respondents. After this the reliability of the research instrument was

determined using the Pearson Product Moment Correlation Coefficient (PPMC). A reliability coefficient of 0.79 was obtained and considered suitable for the study.

**Administration of the Instrument**

During the process of carrying out the research, the questionnaire was administered by the researcher and with the help of a research assistant, through face-to-face interaction. The questionnaire was collected immediately after they were filled. This is to ensure high rate of response and return.

**Data Analysis**

The data was analyzed using descriptive statistics comprising frequency counts, simple percentage and mean score and standard deviation.

## CHAPTER FOUR

## DATA ANALYSIS AND DISCUSSION OF FINDINGS

This Chapter presents the analysis of data collected and the discussion of results.

### Data Analysis

Research Question 1**:** What waste management practices do residents of Oredo Local Government Area engage in?

**Table 1: Waste Management Practices**

| S/N | Item | Yes (f) | (%) | No (f) | (%) |
|---|---|---|---|---|---|
| 1 | I dump my waste in a public bin. | 120 | 67 | 60 | 33 |
| 2 | I mostly engage in burning my household waste. | 80 | 44 | 100 | 56 |
| 3 | I dump waste in the gutter. | 30 | 17 | 150 | 83 |
| 4 | I dispose my waste by giving it to private waste collectors. | 90 | 50 | 90 | 50 |
| 5 | I use government-approved waste services. | 70 | 39 | 110 | 61 |
| 6 | I often separate my waste into types (e.g., plastics, organics). | 65 | 36 | 115 | 64 |
| 7 | I compost my food/organic waste. | 40 | 22 | 140 | 78 |
| 8 | I reuse containers, bottles, or other items instead of throwing them away. | 95 | 53 | 85 | 47 |

| | | | | | |
|---|---|---|---|---|---|
| 9 | I throw my waste in open spaces or illegal dumpsites. | 35 | 19 | 145 | 81 |
| 10 | I reduce my waste by buying products with minimal packaging. | 60 | 33 | 120 | 67 |

The analysis of respondents' waste disposal practices reveals varying levels of environmental responsibility among residents of Oredo Local Government Area. A significant majority (67%) reported disposing of their waste in public bins, indicating a fair level of adherence to acceptable waste management practices. However, 44% admitted to burning their household waste, while 56% denied this practice, suggesting that open burning remains a moderately common but declining disposal method. Only 17% confessed to dumping waste in gutters, while an overwhelming 83% refrained from this act, which reflects growing awareness of its negative environmental effects. Waste disposal through private waste collectors (50%) and the use of government-approved services (39%) show that formal waste management systems are moderately patronized, though there is still room for improvement. On waste segregation, only 36% of respondents reported separating their waste by type, and 22% practiced composting, indicating low adoption of sustainable waste management techniques. Meanwhile, 53% stated that they reuse items such as containers and bottles, showing some level of waste minimization consciousness. Despite this, 19% admitted to dumping waste in open spaces, while 33% actively reduce waste by purchasing products with minimal packaging.

Overall, the findings suggest that while a good proportion of residents engage in responsible disposal behaviors, unsustainable practices such as burning and inadequate waste separation remain prevalent, underscoring the need for intensified environmental education and enforcement of proper waste management regulations.

Research Question 2: What is the level of residents' knowledge on waste management?

**Table 2: Waste management knowledge level**

| Item | Question | Correct (%) | Wrong (%) |
|---|---|---|---|
| 1 | Which of these best define the concept of waste management? | 83 | 17 |
| 2 | Which of the following is a correct way to dispose of your waste? | 78 | 22 |
| 3 | What is the primary purpose of waste segregation? | 72 | 28 |
| 4 | Which of the following is a benefit of recycling? | 71 | 29 |
| 5 | The primary purpose of waste management hierarchy is? | 67 | 33 |
| 6 | Which of the following waste is considered hazardous? | 61 | 39 |
| 7 | Which of these waste management practices is most environmentally friendly? | 64 | 36 |
| 8 | Improper waste disposal is considered harmful to human health because? | 77 | 23 |
| 9 | Which of the following represents the "4Rs" of waste management? | 81 | 19 |
| 10 | The primary purpose of waste management hierarchy is? | 69 | 31 |

The analysis of respondents' knowledge of waste management practices indicates that a majority of the participants possess a good understanding of the key concepts and principles related to proper waste handling. Most respondents (83%) correctly identified the best definition of waste management, reflecting a strong foundational awareness of the subject. Similarly, 78% accurately recognized the correct disposal method, while 72% understood the primary purpose of waste segregation, showing that a considerable number are familiar with the essential steps of waste management. Knowledge about the benefits of recycling (71%) and the purpose of the waste hierarchy (67%) was also relatively high, suggesting that respondents appreciate the importance of sustainability and prioritization in waste reduction.

However, slightly fewer respondents (61%) correctly identified an example of hazardous waste, indicating a moderate knowledge gap in identifying potentially dangerous materials. Meanwhile, 64% demonstrated awareness of environmentally friendly practices, and 77% understood the harmful effects of improper disposal, underscoring a generally positive attitude toward environmental protection. Additionally, a large majority (81%) correctly identified the 4Rs—reduces, reuse, recycle, and recover—showing sound knowledge of key waste minimization principles.

Overall, the data reveal that residents of Oredo Local Government Area have a commendable level of knowledge regarding waste management, although targeted education and sensitization could further improve their understanding of hazardous waste and advanced waste reduction strategies.

**Table 3: Summary of Waste Management Knowledge Levels**

| Description | Details |
|---|---|
| High knowledge | 44% of respondents |
| Moderate knowledge | 39% of respondents |
| Low knowledge | 17% of respondents |

**Table 4: Knowledge Score Summary**

| Statistic | Value |
|---|---|
| Mean score (out of 10) | 6.8 |
| Standard deviation | 2.1 |

Item-level correct rates are generally high (most items 61–83% corrects). Overall, 44% of respondents scored in the high knowledge band, 39% moderate, and 17% low. The mean knowledge score was about 6.8/10 (SD = 2.1), indicating an overall moderate-to-high understanding among residents.

Research Question 3: What factors influence waste management practices among residents?

**Table 5: Factors Influencing Waste Management**

| S/N | Item | Mean | Std. Deviation | Decision |
|---|---|---|---|---|
| 1 | Lack of public bins is a reason for improper waste disposal in my area. | 3.60 | 0.60 | Agree |
| 2 | Irregular waste collection contributes to improper waste disposal in my area. | 3.72 | 0.55 | Agree |
| 3 | Low level of awareness affects proper waste disposal. | 3.68 | 0.58 | Agree |
| 4 | The cost of waste disposal services is a concern for me. | 3.20 | 0.80 | Disagree |
| 5 | Improper waste disposal in my area is as a result of environmental laws not being well enforced. | 3.75 | 0.50 | Agree |
| 6 | Presence of illegal dumpsites encourages people to dispose of waste improperly. | 3.70 | 0.57 | Agree |
| 7 | Lack of recycling facilities in my area discourages waste separation. | 3.45 | 0.70 | Disagree |

| | | | | |
|---|---|---|---|---|
| 8 | Overpopulation contributes to poor waste management in my area. | 3.30 | 0.75 | Disagree |
| 9 | Poor road networks hinder timely collection of waste in my area. | 3.55 | 0.65 | Agree |
| 10 | It is my personal responsibility to manage household waste. | 3.10 | 0.90 | Disagree |
| | **Grand Mean** | **3.51** | **0.66** | **Agree** |

The results on factors influencing improper waste management among residents of Oredo Local Government Area reveal that several interrelated issues contribute to the persistence of poor waste disposal practices. With a grand mean of 3.51, respondents generally agreed that multiple infrastructural, administrative, and behavioral factors affect proper waste management in the area. The highest-rated item, "improper waste disposal in my area is as a result of environmental laws not being well enforced" (Mean = 3.75, SD = 0.50), underscores the critical role of weak policy enforcement in sustaining unsanitary practices. Similarly, "irregular waste collection" (Mean = 3.72) and the "presence of illegal dumpsites" (Mean = 3.70) were also identified as major challenges, suggesting that inefficiencies in waste collection systems and lack of regulated disposal sites are significant deterrents to proper waste handling. Respondents also strongly agreed that "low awareness" (Mean = 3.68) and "lack of public bins" (Mean = 3.60) contribute to improper disposal, highlighting gaps in environmental education and waste

infrastructure. Other notable concerns include the “lack of recycling facilities” (Mean = 3.45) and “poor road networks” (Mean = 3.55), which hinder effective waste segregation and collection, respectively. While “cost of waste disposal services” (Mean = 3.20) and “overpopulation” (Mean = 3.30) were moderately rated, they still reflect systemic pressures on waste management resources. Interestingly, respondents showed relatively lower agreement (Mean = 3.10) regarding personal responsibility for waste management, implying that many view the issue as a collective or governmental obligation rather than an individual one.

Overall, the findings suggest that improper waste disposal in Oredo Local Government Area is driven by a combination of infrastructural inadequacies, institutional lapses, and limited environmental awareness, necessitating both policy reform and community-based education initiatives to promote sustainable waste management.

**Discussion of Findings**

The findings of this study reveal a multifaceted understanding of waste management practices among residents of Oredo Local Government Area, Edo State. The demographic data show a fairly balanced gender composition, with females slightly outnumbering males. Most respondents were aged 26–35 years, placing them within the economically active population capable of adopting and influencing sustainable environmental practices. The majority had secondary and tertiary education, suggesting that the respondents were relatively literate and potentially aware of environmental issues. The occupational mix predominantly traders and civil servants represents both the

formal and informal sectors, whose activities collectively influence the volume and type of waste generated in the area.

The results on waste disposal practices show that while many residents use public bins and formal waste collection systems, a considerable proportion still engage in open dumping and burning of waste. This reflects partial compliance with recommended disposal methods and the persistence of environmentally harmful practices. Similar patterns were observed by Adama (2022) in his study of urban waste management in Ibadan, where over 60% of households still practiced open burning despite awareness campaigns. Likewise, Afon (2019) found that improper waste disposal in Nigerian cities persists mainly due to irregular collection and inadequate infrastructure. In agreement, Olanrewaju and Ilemobade (2021) reported that in Lagos State, limited access to collection facilities and poor road networks significantly affect waste disposal efficiency.

The study also found that respondents possess a good theoretical understanding of waste management concepts such as segregation, recycling, and the 4Rs (Reduce, Reuse, Recycle, and Recover). However, their ability to identify hazardous waste and apply the waste hierarchy in practice was comparatively weak. This indicates a knowledge practice gap, where residents know what should be done but face structural or behavioral obstacles to implementation. This aligns with Ogu (2020), who observed that awareness of proper waste management was high among residents in Benin City, but practical adoption remained low due to infrastructural challenges. Similarly, Ojo and Bello (2021) found that despite high knowledge levels among residents of Osogbo, poor waste

facilities hindered actual compliance. Kolawole et al. (2024) reinforced this by emphasizing that awareness alone does not guarantee sustainable behavior unless supported by adequate policy enforcement and service delivery.

Respondents strongly agreed that poor enforcement of environmental laws, irregular waste collection, and the presence of illegal dumpsites are the main causes of improper waste management in the area. These institutional weaknesses mirror findings by Adewumi and Ayodele (2022), who concluded that the effectiveness of municipal waste management systems in Nigeria largely depends on the strength of regulatory enforcement and government commitment. Okechukwu and Eze (2020) similarly reported that irregular waste collection and weak monitoring encourage indiscriminate dumping in Enugu State. In Edo State, Ighodaro (2023) found that insufficient waste trucks, lack of public bins, and poor coordination among waste management agencies contribute significantly to waste accumulation, consistent with the present study's results.

The findings further indicate that inadequate recycling facilities, poor road networks, and lack of public bins hinder effective waste management in Oredo. This agrees with Akinbami and Lawal (2021), who noted that limited access to recycling infrastructure in urban centers restricts residents' ability to separate and recycle waste. Similarly, Ogunleye (2020) found that poor road networks in Akure led to delayed waste collection and illegal dumping. Olanrewaju (2018) also reported that insufficient public bins and collection points in many Nigerian towns encourage residents to dispose of refuse

indiscriminately. These studies reinforce the argument that infrastructure is a major determinant of waste management effectiveness.

The relatively low mean score for personal responsibility found in this study suggests that many residents still perceive waste management as a government responsibility rather than a shared civic duty. This is consistent with Nabegu (2021), who observed similar attitudes in Kano, where residents believed environmental sanitation should be handled by the government. Eze and Okonkwo (2019) also noted that public participation in waste management remains low across Nigerian communities due to weak community mobilization and lack of ownership mindset. On the contrary, Ibrahim and Musa (2022) found that in parts of Abuja where community-based sanitation programs were implemented, residents demonstrated a higher sense of responsibility and compliance, implying that awareness and engagement programs can positively change attitudes.

The coexistence of high awareness and low compliance in Oredo aligns with the knowledge–behavioral gap theory, which posits that awareness does not always translate into action when enabling factors are absent. Studies by Adepoju (2023) and Chukwu (2020) both affirm that Nigerians often understand proper waste practices but fail to apply them due to logistical constraints, inadequate policy enforcement, and poor waste-collection systems. In contrast, Yakubu (2019) in Ghana found that strong community enforcement and adequate waste infrastructure significantly reduced open dumping, highlighting how institutional strength can bridge the knowledge–practice gap.

This study supports the consensus among African urban waste scholars that waste management is a shared challenge of awareness, infrastructure, and governance. The results are consistent with those of Afon (2019), Ogu (2020), and Adama (2022), who all emphasize that even with moderate public knowledge, sustainable waste management cannot be achieved without proper enforcement mechanisms, adequate facilities, and strong public participation. However, unlike Ibrahim and Musa (2022), who reported improved community engagement in some federal capital areas, this study found weaker civic involvement in Oredo Local Government Area, Benin City, underscoring the local variation in outcomes across Nigeria.

# CHAPTER FIVE

# SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter contains the summary, conclusion and recommendations based on the findings.

## Summary

This study examined waste management practices among residents of Oredo Local Government Area in Edo State. The major aim was to understand the existing waste management practices among residents of Oredo Local Government, how knowledgeable they are about proper waste handling, and the factors influencing waste management practices among them. Three (3) research questions were raised to guide the researcher in the course of this study. Also, relevant literatures were reviewed and discussed in the study. The descriptive research design was used and a total of 180 participants, representing the total population of 374,515 of people residing in Oredo Local Government Area were used in the study. Data were collected through a structured questionnaire. The questionnaire was presented to the project supervisor and two other experts in the Department of Health, Safety and Environmental Education for corrections and suggestions; this helped to validate the test instrument. To establish the reliability of the instrument, the test-retest reliability method was used. A co-efficient of 0.79 was obtained and considered adequate for the study.

**Findings**

Based on the data collected and analyzed, the findings of the study show that:

1. Although many residents dispose of their waste through fairly acceptable methods, such as using public bins, engaging private waste collectors and use of government approved waste services, some still practice burning of refuse and dumping waste in gutters and open spaces.
2. The study also found out that most respondents had good level of knowledge about waste management; particularly the meaning, importance, and basic principles such as the 4Rs (Reduce, Reuse, Recycle, and Recover). However, knowledge on the adoption of sustainable waste practices like composting, recycling and waste sorting was still relatively low.
3. The study revealed key factors affecting proper waste management in Oredo Local Government Area. These include irregular waste collection, poor enforcement of environmental laws, lack of public bins, presence of illegal dumpsites, low awareness among residents, poor road networks, and inadequate recycling facilities. It was also evident that many residents feel that waste management is mainly the responsibility of the government rather than a shared duty.

## Conclusion

Based on the findings of this study, it can be concluded that waste management practices in Oredo Local Government Area are improving but still far from ideal. While a good number of residents know the right thing to do, many are not fully putting their knowledge into practice. This suggests that knowledge alone is not enough; there must also be strong enforcement, availability of infrastructure, and community motivation to encourage proper waste handling.

The study concludes that poor waste management in Oredo is the result of both human behaviour and systemic issues. Government agencies, private waste collectors and residents must all work together to make Oredo Local Government Area cleaner and healthier. Without adequate waste collection services, provision of facilities and proper environmental education, sustainable waste management will continue to face challenge in this local government area.

## Recommendations

Based on the findings of this research, the following recommendations were made by the researcher:

1. Government agencies such as the environmental health officers should reinforce environmental regulations to discourage illegal dumping and burning of waste. Penalties should be clearly communicated and enforced to ensure compliance.

2. Waste management authorities should ensure regular and timely waste collection across all wards. Collaboration with private collectors can help cover more households effectively.
3. There is a need for more public waste bins and designated dumpsites in residential areas, markets, schools, and major streets to make proper disposal easier for residents.
4. The government and private stakeholders should establish recycling centres and encourage households to sort their waste. Incentive-based recycling programs can motivate residents to participate.
5. Residents should be encouraged to take personal and collective responsibility for their environment. Community environmental clubs, sanitation days, and volunteer waste-cleaning exercises should be supported.

**Suggestions for Further Studies**

For complimentary and to bridge certain gaps identified in this study. The following suggestions were made for further research:

1. The effectiveness of waste management policies implemented by Edo State Government.
2. The effectiveness of waste management board services in Oredo Local Government Area.

3. A comparative study of waste management practices between urban and rural communities in Edo State.
4. The role of technology and innovation in improving waste management systems in Nigeria.

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## APPENDIX A

## DEPARTMENT OF HEALTH, SAFETY AND ENVIRONMENTAL EDUCATION

## FACULTY OF EDUCATION, UNIVERSITY OF BENIN, BENIN CITY

## QUESTIONNAIRE ON AN EVALUATION OF WASTE MANAGEMENT PRACTICES AMONG RESIDENTS OF OREDO LOCAL GOVERNMENT AREA, BENIN CITY, EDO STATE

Dear Participant,

I, OLUWOLE FAITH; a student of the above name department, is conducting a study on "Waste Management Practices among residents of Oredo Local Government Area, Edo State". I kindly request your participation for the success of this study. Your responses will be treated with strict confidentiality and used for academic purpose only.

Thanks for your cooperation.

Yours faithfully,

Researcher.

**Section A: Demographic Information**

**Instruction:** please tick √ appropriate option

1. Age:

☐ 18–25 ☐ 26–35 ☐ 36–45 ☐ 46–55 ☐ 56 and above

2. Gender:

☐ Male ☐ Female

3. Educational Level:

☐ No formal education ☐ Primary ☐ Secondary ☐ Tertiary

4. Occupation: _____

**Section B: Waste Management Practices among residents of Oredo Local Government Area.**

**Instruction:** Please indicate if you engage in any of the following waste management practices by ticking the option Yes and No if you do not.

| S/N | ITEM | Yes | No |
|---|---|---|---|
| 1 | I dump my waste in a public bin | | |
| 2 | I mostly engage in burning my household waste | | |
| 3 | I do dump waste in the gutter | | |
| 4 | I dispose my waste by giving it to private waste collectors | | |
| 5 | I do use government-approved waste services | | |
| 6 | I often separate my waste into types (e.g., plastics, organics) | | |

| | | | |
|---|---|---|---|
| 7 | I compost my food/organic waste | | |
| 8 | I reuse containers, bottles, or other items instead of throwing them away. | | |
| 9 | I throw my waste in open spaces or illegal dumpsites. | | |
| 10 | I reduce my waste by buying products with minimal packaging. | | |

**Section C: The Level of Knowledge on waste management practices.**

**Instruction: please tick the option that best fit your idea.**

1. Which of these best define the concept of waste management?

(a) It is the art of hiding unwanted items in creative spots around the house, with the hope that no one will notice them until they are discarded.

(b) It is the act of dumping waste in a landfill

(c) It refers to the process of collecting and transporting waste to dump site

(d) It is the collection, transport, treatment and disposal of waste, together with monitoring and regulation of the waste management process

2. Which of the following is a correct way to dispose of your waste?

(a) Put them in the waste bin and ensure it is collected by private or public waste collectors.

(b) Bury them in the ground

(c) Burn them

(d) Keep them at home indefinitely

3. What is the primary purpose of waste segregation?

(a) To reduce waste volume

(b) To facilitate recycling

(c) To increase landfill space

(d) To reduce waste collection frequency

4. Which of the following is a benefit of recycling?

a) Increases greenhouse gas emissions

b) Reduces the need for landfills

c) Increases energy consumption

d) Pollutes the environment

5. The primary purpose of waste management hierarchy is?

(a) To reduce waste generation

(b) To increase recycling rates

(c) To promote sustainable waste management practices

(d) All of the above

6. Which of the following waste is considered hazardous?

(a) Plastic bottles

(b) Used batteries

(c) Food leftovers

(d) Paper and cartons

7. Which of these waste management practices is most environmentally friendly?

(a) Open burning of waste

(b) Open dumping of waste

(c) Recycling and composting

(d) Indiscriminate disposal

8. Improper waste disposal is considered harmful to human health because?

(a) It makes the environment look dirty only

(b) It can cause the spread of diseases and pollution

(c) It attracts government attention

(d) It only affects wildlife, not humans

9. Which of the following represents the "4Rs" of waste management?

(a) Reduce, Reuse, Recycle, Recovery

(b) Replace, Remove, Refill, Reuse

(c) Replant, Restore, Rebuild, refill

(d) Report, Record, Retain, Reduce

10. The primary purpose of waste management hierarchy is:

(a) To reduce waste generation

(b) To increase recycling rates

(c) To promote sustainable waste management practices

(d) All of the above

**Section D: Factors Influencing Waste Management**

Indicate the extent to which you agree or disagree with the following statements.

Key: Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD)

| S/N | ITEMS | SA | A | D | SD |
|---|---|---|---|---|---|
| 1 | Lack of public bins is a reason for improper waste disposal in my area. | | | | |
| 2 | Irregular waste collection contribute to improper waste disposal in my area. | | | | |
| 3 | Low level of awareness affects proper waste disposal | | | | |
| 4 | The cost of waste disposal services is a concern for me | | | | |
| 5 | Improper waste disposal in my area is as a result of environmental laws not being well enforced | | | | |
| 6 | Presence of illegal dumpsites encourages people to dispose of waste improperly | | | | |
| 7 | Lack of recycling facilities in my area discourages waste separation | | | | |
| 8 | Overpopulation contribute to poor waste management in my area | | | | |
| 9 | Poor road networks hinder timely collection of waste in my area | | | | |
| 10 | It is my personal responsibility to manage household waste | | | | |