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FACTORS AFFECTING EFFECTIVE WASTE MANAGEMENT PRACTICES IN OWERRI WEST LOCAL GOVERNMENT AREA (L.G.A.) OF IMO STATE

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ABSTRACT

This study sets out to evaluate the factors affecting effective waste management practices in Owerri West L.G.A. of Imo State, with the intention of proffering better solutions to the problems. The objectives are; to identify the prevailing methods of waste management in Owerri West L.G.A., Imo State; to evaluate the effects of the prevailing waste management practices in Owerri West L.G.A., Imo State; to evaluate the factors affecting effective waste management practices in Owerri West L.G.A, Imo State and to examine effective waste management practices that can be useful in Owerri West L.G.A., Imo State. The study adopted a quantitative approach having explored the descriptive survey design using questionnaires to elicit answers from the population. 71 respondents returned their questionnaires and they were analysed. It was found that poor funding is a major impediment to effective waste management practice in Imo State. Out of 71 respondents who returned their questionnaires of the same number distributed, 26 (65%) noted that poor funding is the major issue with effective waste management practice in Imo State. What that implies is that engaging modern automated facilities will be very hard to come by. It recommended that public private partnership plan (PPPP) should be encouraged to boost the funding-base for waste management practices in Imo State.

Key words: Waste Management, Public Private Partnership, Effective Management

1.0 INTRODUCTION

1.1 Background to the Study

Generally, wastes are materials or substances which are regarded as useless by the producers or holders and therefore disposed of. Wastes occur in three different forms; solid, liquid and gaseous. The World Health Organization (WHO, 1994 cited in Nnadozie, 2022) defined solid waste as an unwanted and discarded material resulting from domestic, community, industrial commercial and agricultural operations with insufficient liquid content to be free flowing.

Waste generation is an on-going process and occurs in all places where life abounds. As an integral part of metabolism, living organisms produce different types of waste products which are released into the environment. Aside this, other activities of man such as agriculture, food processing, wood work, building and construction and others also release various forms of wastes into the environment. In the past, the wastes produced were mainly organic and sufficiently decayed by saprophytic microbes and therefore posed no harm to the quality of the environment and human health.

The era of technological advancement and industrialization has introduced various forms of equipment and facilities into government offices, residential homes, institutions, industries and commercial centres. The application of these gadgets has tremendously improved production and living standard of the people and consequently the economy of many countries. However, the introduction and use of these machines result in generation of more wastes, some of which are non-biodegradable and hazardous. Also the quantity and quality of organic wastes produced have become enormous and gone beyond the natural cleansing limit of microbes, resulting to the heaps of refuse found along the streets, roads, gutters, markets places and even in rivers in most cities of developing countries. Furthermore, urbanization brings about increased population in urban cities. Commenting on the alarming rate of urban population growth Imam, Mohammed, Wilson and Cheeseman (2007) reported that while Nigeria's population increased by about 2.8% per annum, the rate of urban growth is as high as 5.5% per annum. Increase in population means increase in waste generation which pollutes the environment and causes health hazards.

Waste management is one of the powerful drivers of human development that affects quality of life, it improves health and wealth of a country. It cuts across all sectors of the economy including

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those that concern health, environmental protection, improvement of human settlements and services, tourism and general economic productivity. In most rural areas of Nigeria such as Owerri West, L.G.A, there is gross environmental pollution or contamination due to poor sewage and refuse disposal, lack of safe and adequate water supply, poor food hygiene practices, poor housing etc. This ill condition has resulted to high death rates, infant mortality rate; morbidity rates and poor standard of health which are largely due to defective waste management. It accounted for reduced access to an improved source of drinking water and basic sanitation, which when compared to the baseline year for measuring the Millennium Development Goals (MDG's) was considerably low.

The problem of waste management has become one of the most serious problems facing many cities of the world more especially developing countries. Management of solid waste according to Buckle and Smith (2000) cited in Nnadozie (2022) encompasses all the activities that seek to minimize the health, environmental and aesthetic impacts of solid wastes. Many urban cities lack effective solid waste management systems and consequently the major part of generated wastes is indiscriminately released into the environment. Accumulation of solid waste creates health problems which include pollution, global warming and climate change due to release of green house gases, increased disease incidence such as malaria, cholera, diarrhoea, dysentery, respiratory tract infection and other filth –related diseases (Environment Canada, 2002, cited in Nnadozie, 2022; Nwankwo, 2008 cited in Nnadozie, 2022). Other problems associated with waste accumulation are blockage of roads and drainage systems, flooding, accidents and environmental degradation.

In this era of climate change which is associated with ozone layer depletion and global warming, proper solid waste management becomes necessary to reduce the emission of greenhouse gas, hazardous radiations, chemicals and gases. Achieving effective solid waste management has been identified by Burkart (2010) cited in Nnadozie (2022), as one of the six activity sectors essential for the meaningful operation of green economy. The target of green economy according to Iwuala (2012) cited in Nnadozie (2022), is sustainable development in a sanitary, healthy and supportive environment. Furthermore, parts of the Millennium Development Goals (MDGs) include combating HIV/AIDs, Malaria and other diseases as well as ensuring environmental sustainability. These goals can only be achieved through effective solid waste management which is a planned

system of effectively controlling the production, storage, collection, transportation, processing and disposal or utilization of wastes in a sanitary, aesthetically acceptable and economic manner. Effective solid waste management therefore keeps the environment free from harm, pollution, noise, odour, poisonous gases, fumes and other harmful substances (Nwankwo, 2008 cited in Nnadozie, 2022). This in turn promotes the operation of green economy which leads to sustainable development.

Poor waste management and disposal could lead to various diseases, infections and infestation and these include fly transmitted diseases like myiasis, diarrhoea, typhoid, cholera; rodent transmitted disease like lassa fever plague, leptospirosis, murine typhus; mosquito borne diseases such as malaria, yellow fever, filariasis, and dengue hemorrhagic fever. Also gases like methane, carbondioxide, hydrogen sulphide and mercury vapour emitted from land fill sites can constitute air contaminants and pollution. Another problem people face in proper waste management and disposal is the absence of storage facilities (waste bins with tight fitted covers) in some houses which lead to littering of refuse around the house, worsened by the absence of drainage systems in such houses. Even where the drains are available they are either constructed without a gradient or not properly maintained as they are clogged or blocked with sand or other debris thus preventing sewage drainage.

Against the background of these identified problems, this study is therefore aimed at evaluating the factors that affect effective waste management practices in the study area and proffer solutions to avert/prevent the emergence of these identified factors.

1.2 Statement of the Problem

In Nigeria, waste storage, treatment and disposal does not follow a sustainable approach due to poor supervisory guidelines which makes waste management practice a free-for-all activity. Furthermore, environmentalism in Nigeria is predominantly anthropocentric in terms of viewpoint. This has resulted to an informal approach to waste with pernicious environmental and health implications for all stakeholders in Nigeria. Similarly, there are serious challenges in terms of domesticating and applying sustainable waste management practices in Nigeria. Moreover, many individuals are not cognizant of the consequences of undiscerning environmental attitude on their health. In addition, health challenges from waste contamination in Nigeria generally stem from carcinogenic heavy metals, waterborne diseases, respiratory infections, skin diseases as well as

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spread of disease carrying pests. This is why this study is apt; the need to identify and evaluate the factors that affect effective waste management practices in the study area becomes more prompting.

1.3 Aim and Objectives of the Study

The major aim of this study is to evaluate the factors affecting effective waste management practices in Owerri West L.G.A., Imo State, with the view to mitigating the impact of these factors. The specific objectives of the study are:

i. to identify the prevailing methods of waste management in Owerri West L.G.A., Imo State,
ii. to evaluate the effects of the prevailing waste management practices in Owerri West L.G.A., Imo State,
iii. to evaluate the factors affecting effective waste management practices in Owerri West L.G.A., Imo State,
iv. to examine effective waste management practices that can be useful in Owerri West L.G.A., Imo State.

1.4 Research Questions

i. What are the prevailing methods of waste management in Owerri West L.G.A., Imo State?
ii. What are the effects of the prevailing waste management practices in Owerri West L.G.A., Imo State?
iii. What are factors affecting effective waste management practices in Owerri West L.G.A., Imo State?
iv. What are the effective waste management practices that can be useful in Owerri West L.G.A., Imo State?

1.6 Scope of the Study

The geographical scope of this study is Owerri West L.G.A., Imo State while the thematic scope of study is waste management practice.

2.0 LITERATURE REVIEW

2.1 Methods of Waste Management in Nigeria

In Nigeria various categories of wastes include, municipal wastes (Kaseva and Gupta, 1996) describe municipal waste as the waste collected by the city authorities which include refuse from household, non-hazardous from industrial, commercial, institutional and non-pathogenic hospital waste), construction wastes (waste which range from concrete, wood, metals, plastics, soils, glass among other materials), industrial wastes, agricultural wastes, commercial wastes e.t.c. (Nnadozie, 2022). The handling of Waste Management in Nigeria calls for immediate attention and the adoption of the best practicable environmental approach towards preserving the environment. In achieving a sustainable waste management strategy, all steps of the management process must be fully functional and effective. They include; waste generation and characterization, waste collection and transportation, and waste disposal/treatment (Federal Ministry of Environment, 2000). Researchers (Sha'Ato, Aboho, Oketunde, Eneji, Unazi and Agwa, 2007; Olanrewaju and Ilemobade, 2009; Uwadiegwu, 2013; Onuigbo and Bello, 2014 cited in Nnadozie, 2022) have reported a similar pattern of management at the different steps of waste management.

There are different waste management practices in Nigeria. Omole, Isiorbo and Ndambuki (2016) identified common waste disposal methods in Nigeria, such as burial, open-air burning, and open dumping. Meta AI (2024) discussed the following waste management methods in Nigeria:

i. Open dumping: this is the most common method in Nigeria

ii. Burning: open-air burning is another common method in Nigeria.

iii. Burial: some households bury their waste, especially in the southern region of the country.

iv. Reuse and recycling: there is an informal sector that has been active in collecting and recycling waste.

v. Donating: some individuals donate their used items to reduce waste.

vi. Waste-to-wealth: some individuals and organisations are exploring ways to convert waste to wealth through recycling and production of secondary raw materials.

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vii. Composting: composting is another method of managing waste, especially in the northern part of the country.

viii. Disposal at approved dumpsites: some households and organisations take their waste to approved dumpsites.

According to Adetolaju (2023), "there are several methods for handling domestic waste, which include:

i. Recycling: this involves separating and collecting recyclable materials such as paper, plastic, glass, and metal.

ii. Composting: composting involves the decomposition of an organic waste such as food scraps and yard waste into a nutrient-rich soil amendment.

iii. Landfills: landfills are designated areas for the disposal of waste.

iv. Incineration: incineration involves burning waste at high temperatures to convert it into ash and gas.

v. Waste to energy: this method involves converting waste into energy, typically through incineration or gasification

vi. Waste reduction: the best way to handle domestic waste is to reduce the amount of waste produced in the first place. This can be achieved through practices such as reducing consumption, revising items, and buying products with minimal packaging".

In the words of Adetolaju (2023), "in Nigeria, waste management is primarily carried out through two methods: open dumping and land filling. These methods are not only inefficient but also have negative environmental and health impact". Ogwueleka and Naveen (2021) noted that "the waste disposal option in Nigerian cities is principally open dumping followed closely by open burning…other disposal options are open dumping, open burning and composting". In a study by Dauda and Osita (2003), they noted that (…apart from dumping, waste disposal burning is predominant, representing more than 40%. Apathy of public towards waste management, inadequate funding are the major problems…"

2.2 Effects of Prevailing Waste Management Strategies in Nigeria

According to a Meta AI (2024) source, "the prevailing waste management strategies in Nigeria have several effects on the environment, public health, and the economy. Some of the effects include:

i. Environmental pollution: improper waste disposal leads to pollution of water bodies, soil, and air.

ii. Health risks: exposure to waste-related pollutants causes health problems like respiration diseases, cancer, and infectious diseases.

iii. Urban flooding: inadequate waste management causes drainage blockages, leading to flooding in urban areas.

iv. Economic losses: waste management inefficiencies lead to significant economic losses, including costs associated with health impacts and environment degradation.

v. Social implications: poor waste management affects the quality of life, livelihoods and community well-being.

vi. Climate change: the decomposition of organic waste on landfills produces methane, a potent green house gas contributing to climate change.

vii. Loss of resources: valuable resources like recyclable materials are wasted due to inadequate waste management practices.

viii. Aesthetic pollution: unmanaged waste affects the visual quality of urban environments, negatively impacting tourism and economic development.

ix. Community displacement: inadequate waste management can lead to the displacement of communities, especially in areas with severe environmental degradation.

x. Increased poverty: the effects of poor waste management can exacerbate poverty by reducing economic opportunities and increasing healthcare costs.

"Inadequate waste collection services, insufficient landfill capacity and lack of proper disposal facilities have exacerbated the problem, resulting in widespread environmental pollution, health hazards and social inequalities (Olamide, 2024). According to Environmental Services (2022)

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"when dumped into waterways, lakes or oceans or landfills, hazardous materials can release toxins into the environment, disrupting habitats and causing harm to wildlife and humans. Damage to watersheds, air pollution, and contamination of soil are only a few of the damagers of improper industrial waste management".

Adedibu (2008) cited in Odiana and Olorunfemi (2021), "humans have suffered in no small way from diseases associated with solid wastes and the contamination of the subsurface water by the leachate from solid wastes heavily laden with toxic chemicals and pathogenic organisms which contaminate the water and make it unfit for human consumption". In some parts of Nigeria, the odour emitted by waste renders those places uninhabitable. The dumpsites in Nigeria breed mosquitoes, resulting in a high incidence of malaria as well as a high risk of contracting cholera and other diseases (Esohe, 2023).

2.3 Factors Affecting Effective Waste Management Practices in Nigeria

Effective waste management has been a challenging issue in Nigeria. According to Ezeah and Roberts (2012), "the main drivers of the waste problem in Nigeria, for instance, are poverty, high population and urbanization growth rates, compounded by a weak and underfunded infrastructure". Esohe (2023) noted that "some of the key challenges (in effective waste management in Nigeria) include: inadequate infrastructure, lack of awareness, limited funding, weak regulatory framework, lack of collaboration (by stakeholders)"etc. Sujauddin, et al, 2008) cited in Abir, Datta and Saha (2023), opined that "the generation of waste is influenced by family size, education level, and monthly income, residential location and community status that is also included in the socio-economic factors where households have a significant role…Due to financial constraints, municipalities have been unable to manage solid waste". The significant financial outlay required to deliver the service" (Sharholy et al, 2008 cited in Abir et al, 2023) is also key. Basu (2009) argues that the processing of waste is a necessary step needed to safeguard public health.

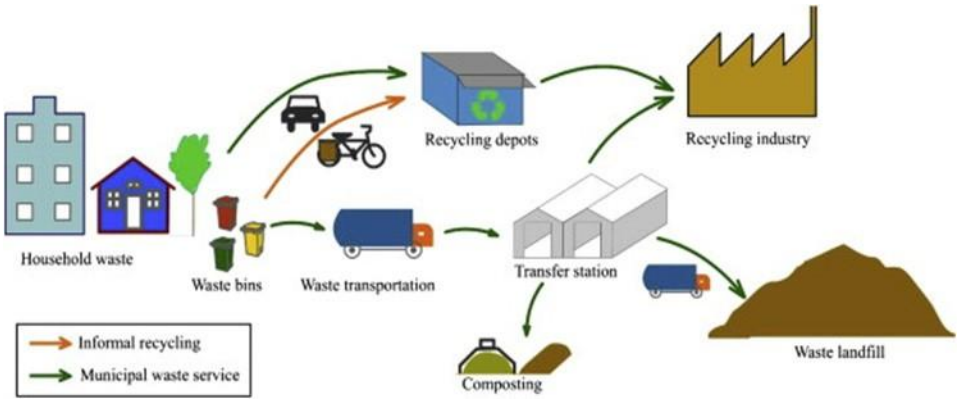

Figure 1: The Waste Management Cycle

Source: Zaman, 2014.

Demirbas (2011) describes waste management as a process by which wastes are gathered, transported and processed before disposal of any remaining residues.

2.4 Some Waste Management Practices that are Effective in other Countries

"Switzerland has 100% waste recovery…Switzerland stopped burying rubbish in landfills in 2020, and now they recover 53% of their waste through material recovery (i.e. recycling and composition), while the other 47% is incinerated for energy" (Open Access News, 2020). The source continued that "Sweden is also extremely close to fully recovering their waste at 99%. They are in the top five recyclers at 32%, with composting efforts at 16% of total waste. Denmark is also high at 99% putting two Nordic countries in the top…"

According to Igini (2022), "Germany has been celebrated as q world leader in recycling. Its waste management system and sorting policies have paved the way for other countries to implement greener practices when it comes to trash disposal and collection". According to Rethink Sustainability (2021), "Being has also introduced artificial intelligence (AI) in the waste management system. Facial recognition technology has been deployed in trash bins to encourage people to recycle more. The smart trash can pilot programme, ongoing since 2019, registers all participating residents and takes their pictures".

According to AUDA-NEPAD (2021) an African Development Agency, "several African countries are progressively adopting more sustainable modes of waste disposal and management technologies through leveraging emerging waste recycling technologies. These countries are also adopting digital technologies that can be utilized to decrease unsustainable waste disposal across

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the African continent". The source cited some remarkable progress recorded in countries like Ethiopia, Kenya, South Africa among others. It noted that "Ethiopia has predominantly utilized the Koshe dump site as the only landfill in Addis Ababa…However, in 2017; the Ethiopian government transformed this dumpsite into waste-to-energy plant. This effectively transformed, re-purposed and revolutionalized the dumpsite into incinerating approximately 1,400 tons of waste materials daily towards generating electricity…" it added that "…Kenya, through a company called Taka Taka, has actively managed waste collection, sorting, composting, plastic recycling, and purchasing waste from waste materials pickers". In South Africa, "waste disposal and management companies have invested in new technologies that can efficiently manage waste collection. For example, these companies leverage user-friendly Smartphone applications to facilitate prompt service, extra pickups, and bill payment through push notifications…"

2.5 Factors Affecting Effective Waste Management Practices in Nigeria

These factors vary from poor funding, poor legislation and implementation of policy, Limited infrastructures and professionals, level of awareness, poor recovery and recycling programme, and disposal technique (Nnaji, Onwurah and Bello, 2015).

i. Poor Funding

This is one of the major factors affecting the waste management sector. Incapability of purchasing new waste collection trucks, limited staff, poor vehicle maintenance, unsubsidized waste storage containers, inability to purchase equipments among others are all attributed to shortage of capital. Actualizing waste management projects require consistent funding to achieve answers to strategies yet to be implemented.

ii. Poor Legislation and Implementation of Policy

The constitutional strength of municipal waste management policy is weak and ineffective. Also implementation of this policy is not monitored. The policy is not well structured and definitely tends to be weak. There are instances in which due process is obstructed and sanctioned penalty are not expended on certain municipalities and individuals. Policies are yet to be aimed at the 3R's of waste management – reduce, reuse and recycle. Government policy on waste are not revisited, reaffirmed, restructured and upgraded in a comprehensive tune and form.

iii. Limited Infrastructures and Professionals

Limited solid waste infrastructures are one of the major contributing indices of poor waste management system in Nigeria. Nonetheless, experts to man these machineries are also not on ground. The environmental protection agencies and waste management personals are not experts and exposed to workshops and trainings that meet international standards on technology use, information management and knowledge management. Most of the state environmental protection agencies lack adequately trained personnel.

iv. Level of Awareness

In Nigeria, populace awareness on sustainable waste management is still very poor and effort by the agencies to increase awareness is still very low. Municipal members are not well informed on the adverse effects of indiscriminate and improper disposal of waste and also the benefits of such act.

v. Recovering and Recycling

Access to possible recyclable material possesses great difficulty due to poorly limited recycling programs. The informal recycling programs involve scavengers' effort search of recyclable items. Presently, the informal sector renders the service of retrieving and recycling of materials in Nigeria. The introduction of an advance formal recycling program presents positive and accelerating outcomes for municipal waste management sector.

vi. Disposal

The landfill disposal technique of waste materials with dearth of treatment processes and open dumping possesses increasing public health hazards to human lives, animals and plants. However, the evolutions of poisonous gases such as methane and carbon-dioxide causes alteration of weather, leading to climate change.

Abir, Datta and Saha (2023) discussed factors such as socio-economic factors (family size, education level, monthly income, residential location and community status),cultural factors (family attitude, community awareness, social indifference), physical and technical factors (strategic planning, public engagement and financial management, lack of technical skills, deficient infrastructure, poor roads and vehicles, insufficient technologies and dependable data), institutional factors (management shortcomings, lack of organizational capacities and professional

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knowledge), environmental factors (lack of environmental control mechanisms and appraisal of true consequences) as factors affecting effective waste management practices.

3.0 RESEARCH METHODOLOGY

The study adopts the descriptive survey design. The descriptive survey design seeks to answer questions as to "what"? Survey design is used to establish systematic relationships in the occurrence of a phenomenon. It is found appropriate in the evaluation of the factors affecting effective waste management practices in Owerri West Local Government Area of Imo State.

This study focuses on Owerri West LGA of Imo State. Owerri West is a Local Government Area of Imo State, Nigeria. It is located within latitudes 5º 16'30"N and 5º 31'30"N, longitude 6º 51'00"E and 7º 5'00". Owerri West has its secretariat at Umuguma along Port Harcourt road; it is made up of ten political wards, which include: Avu or Oforola, Umuguma, Okuku, Okolochi or Emeabiam, Umuokpo or Olaku, Omusu, Eziobodo, Ihiagwa, Nekede, Obinze, Ubi or Ohii or Ndegwu, Irete or Orogwe (Media Nigeria, 2018). Other communities includes Umuguma, Avu, Okuku, Oforola,Obinze, Nekede, Ihiagwa, Eziobodo, Okolochi, Emeabiam, Irete, Orogwe, Amakaohia, Ndegwu, Ohii. The study area is densely populated and houses many institutions of learning including Federal Polytechnic Nekede and Federal University of Technology Owerri, churches, hospitals like general hospital Umuguma and clinics, markets and other commercial centers, recreational centers like hotels like the Concord Hotel and the Nekede zoo. It also has Nekede divisional police, state secretariat, World Bank Housing Estate Umuguma, Federal Housing Estate Umuguma, Imo State Housing Estate Umuguma. Owerri West has an area of 295 km^2 (114 sq mi) and a population of 99,265 at the 2006 census (Media Nigeria, 2018 cited in Nnadozie, 2022).

All these establishments, plus the various homes and other business outfits constitute sources of solid waste generation, which are been collected, disposed and recycled by the Imo Waste Management Agency (ISWAMA), an Imo state government agency with the sole responsibility for keeping Imo state at clean and recycling solid waste to something useful. Despite the several challenges faced by this agency, they work tirelessly to make sure that waste in Owerri west is properly managed and inappropriate waste disposal and its hazards are reduced to the barest minimum (iswama.com.ng, 2020 cited in Nnadozie, 2022)

Imo State Waste Management Agency has a population of 250 people including the management, administrative staff and field workers (Ezeobi, 2022). The sample size is representation of the total population. Taro Yamene formula was used to determine the sample size of this study. It is given by the formula,

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

Where n = sample size

N = population size

e = degree of error = 0.01

Therefore the sample size for this study is 71. The respondents were selected on the basis of random sampling that is the stratified random sampling from the selected staff at Imo State Waste Management Agency .The researcher has the knowledge that those individual would serve the purpose of the research as well as his presumption that these individuals may represent active quota of the population of the study. In the researcher's judgment the number chosen would adequately represent the whole population of the study. The questionnaire is a form that contains open ended questions related to the topic under study that allowed the respondents select their opinion of options available on the questionnaire. The researcher got all the information by going to Imo State Waste Management Agency (ISWAMA). The method of data analysis that was adopted in carrying out this research work is the percentage method and tables were used to analyze the data from the study through the use of questionnaire.

4.0 DATA PRESENTATION AND ANALYSIS

Table 1: Factors Affecting Effective Waste Management Practice in Owerri West LGA, Imo State

Responses	Frequency	Percentage
Poor funding of ISWAMA	26	36.62%
Poor legislation and policy implementation	09	12.68%
Limited infrastructure and professionals	12	16.90%
Inadequate provision for recovery and recycling materials	17	23.94%

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Poor awareness creation mechanism	07	9.86%
Total	71	100%

Table 1 shows that poor funding is a major impediment to effective waste management practice in Imo State. Out of 71 respondents who returned their questionnaires of the same number distributed, 26 (36.62%) noted that poor funding is the major issue with effective waste management practice in Imo State. What that implies is that engaging modern automated facilities will be very hard to come by. This is probably why 12.68% of the respondents also admitted that there is also the problem of inadequate provision for recovery and recycling materials. Obviously, the processes of recovery and recycling are best operated through automation than manual, for effective outcome. Hence 16.90% of the respondents pointed out that limited infrastructure and professionals were responsible for the lack of effective waste management practice in the State. Poor legislation and policy implementation which are germane for innovations were also identified as issues, as well as issues of poor awareness creation.

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

In summary, the factors affecting the effective waste management practice in Owerri West LGA, Imo State have been identified to include poor funding of the Imo State Waste Management (ISWAMA), inadequate provision of recovery and recycling materials, limited infrastructure and professionals to execute the practices effectively, poor legislation which is a requirement for technological innovation or automation programme and poor awareness or public enlightenment programmes.

5.2 Recommendations

i. The public private partnership plan (PPPP) should be encouraged to boost the funding-base for waste management practices in Imo State.

ii. Government should embark on a public private partnership plan (PPPP) to raise adequate funds for the implementation of modern waste management programmes.

iii. There is need for innovations in automation of the existing system to monitor the waste dump sites and ensure that they are carted away in good time.

iv. Policies and legislative enactments should be made pragmatic to ensure effective management of the waste; it will also boost the infrastructure base for waste management.

v. Training and re-training of staff in modern practices of waste management is germane.

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