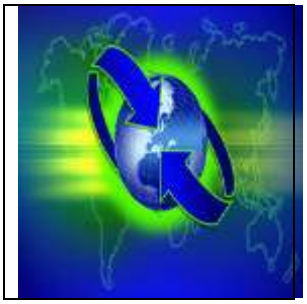

Perceived Effectiveness of Solid Waste Management Policies and Strategies Adopted in Some Selected States in the Niger Delta Region of Nigeria

Udom, Imo Cosmas, Addo, Doris Elemi and Oyamo, Vincent Ita
Department of geography and Natural Resources Management, University of Uyo. +234703-920-1841; imoudom2020@gmail.com
Department of Environmental Education, University of Calabar, Calabar, Nigeria, +234806-353-3925; elemidoris@gmail.com
+234803-247-8854; comradeoyamo@yahoo.com
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Abstracts

The study aimed at assessing the perceived effectiveness of solid waste management policies and strategies adopted in some selected cities in the Niger Delta Region of Nigeria. The specific objectives were to assess the effectiveness of solid waste management policies, determine the effectiveness of solid waste management strategies, and determine the barriers to the effectiveness of solid waste management strategies. Research questions were answered in line with the objectives of the study. Survey design was adopted and the sample size for the study was 1081 from the population of 5,156,000 of three major cities (Uyo, Calabar and Port Harcourt). Systematic sampling technique was adopted to select three major cities where Uyo, Calabar and Port Harcourt were selected from the Niger Delta region. Questionnaire and participatory observations were used to gather primary data from primary sources of information, while the secondary sources comprised reviews of the earlier works by scholars and journal articles. Data was analyzed using descriptive statistics and charts. The findings of the study revealed that the enforcement of waste management policies and strategies are very weak at all levels. Based on the findings of this study, it was recommended that there is the urgent need to review, strengthen and update periodically existing national and regional laws and regulations for the environmentally sound management of solid waste.

Keywords: Perceived effectiveness, Solid Waste Management, Policies and Strategies.

Introduction

Generally, solid waste management is one of the main responsibilities of both urban and rural communities and the fundamental objective of solid waste management programmes is to minimize the pollution of the environment as well as utilizing “waste” as a “resource”. Even though the per capita waste generation rates in the Niger Delta Region and other developing countries is less than in higher-income countries, the capacity of the responsible local authorities to manage waste from collection, to recycling or reuse and disposal, is limited (Ubouh, Nwawuike & Ikwa, 2020). Targets can be achieved using methods that can be afforded by the

community over the long term and with less risk to the persons involved. An input of universally valid skills or techniques, or a set of similar culture neutral attitudes defines management itself, while management of waste requires particular kind of intellectual insight, which would be expected to yield value specific solutions to local problems (Kapoor, 2019).

Until last two decades, solid waste management policies and programs in most African cities including the Niger Delta region were formulated and implemented by government agencies without significant public participation. The wind of political and social changes observed by the continent in the early 90s led to the growth of NGOs which have fostered an increase in awareness of environmental issues among the public (Palczynski, 2018). Most Urban and local populations are more concerned with issues surrounding Solid Waste Management (SW) than before (UNEP, 2005). The task of local governments throughout the world especially in urban areas of the Niger Delta Region and the developing countries as a whole is to ensure the provision of healthy and stimulating environment for their inhabitants. This global consensus is due to the fact that the local government is the sphere of government closest to the people and responsible for the delivery of municipal services to all its citizens (Ohimain & Izah, 2023).

The global focus on waste management has been on innovative energy generation, recycling technologies, disposal options such as incineration, and the controversies surrounding disposal site selection (landfills and incineration) in first world communities. However, cost reduction and environmental products are the primary issues (Uba, 2023). Increasing population, urbanization, industrialization, faced by developing countries such as Nigeria and other African countries are all increasing refuse further. Urbanization induces a consumer based society whereby an increase in concentration of people and industrial/commercial development implies an accumulation of waste which needs to be properly managed and safely disposed of. The genesis of the problem with the disposal of waste dates back to the time when humans first began to congregate in tribes, villages and communities and the accumulation of waste became a consequence of life. Thus the littering of food and other solid wastes in medieval towns led to the

breeding of rats and the outbreak of the plague epidemic which killed half of the Europeans in the 14th century and caused many subsequent epidemics and high death tolls (Weli & Adekunle, 2020).

The problem facing policy makers in the waste management sector is how to predict the amount and the composition of Solid Waste (SW) that is likely to be generated in the near future in order to devise the most appropriate treatment/disposal policy and strategy (Ndubuisi-Okolo, 2021). The problem of solid waste especially SW in the Niger Delta region, developing and industrialized countries has been the cause of growing concern in recent years, becoming one of the main areas of the environmental policy debate. More so, because of the growth in waste volumes, the environmental consequences of past disposal practices, there is raised concerns about the economic viability and environmental acceptability of the current waste-disposal methodologies. The present study will therefore seek to evaluate solid waste management policies in Niger Delta region and the perceived effectiveness of the management strategies adopted in the study area.

Statement of Problem

The problems associated with Solid Waste generation and its management has been the focus of considerable environmental attention during the last quarter of the twentieth century as communities all over the world have begun to recognize the hazards that its management entails (Mudiare, 2020). In recognition of the monumental challenges of SWM in the Niger Delta region, the government has attempted to tackle municipal waste management issues through several approaches such as the “task force” approach. This approach involves- the designation of solid waste collection centers on major and public markets, and the use of local contractors/ agencies to evacuate the waste generated.

However, this approach have been found to be counter-productive in the long run as it created more problem due to lack of coordination on the part of government and inadequate solid waste management knowledge of the responsible agencies. Solid waste dumped along roadsides

are usually left over a long time to decompose naturally (by micro-organisms), eaten by animals, picked by scavengers or washed away by the flood into larger creeks and rivers, thus affecting the surface water quality (Nweke, 2020).

Subsequently, other methods employed include the semi mechanical system, Contract system and house-to-house collection system. Until 2001, there exists the block collection system whereby the use of collection vehicles for disposal was employed. This system caused individuals to resume indiscriminate dumping of refuse at corners of streets, and road junctions while contractors are lined up with the authorities of collecting the refuse from these indiscriminate dumpsites.

Review of Related Literature

According to Ralph, (2022) waste management simply connotes the collection, keeping, treatment and disposal of misuse items in such a way as to render it harmless to human and animal life, the ecology and the environment generally. This is imperative because the importance of waste management is to protect human lives in particular and the environment at large.

Vandana and Singh, (2020) defined waste as the sum total of all the materials thrown away from homes and commercial establishments and collected by local governments. It includes food wastes, household waste, containers, product packaging, dirt, demolition and construction wastes as well as other kinds of inorganic wastes from residential, commercial and institutional sources. Vandana and Singh, (2020) noted that the collection and disposal of the waste are performed by local authorities and may be in either solid or semi-solid form. Examples of this kind of waste are electronic appliances, newspapers, clothing, food scrapes, boxes, disposable table wares, office and classroom papers, furniture, wood, pallets, rubber tyres and restaurant wastes. According to Euan (2019), waste management has to do with the collection, transportation, storage, treatment, recovery and disposal of waste. Nonetheless, Oti and Odey (2020), also view waste management as the body of actions related to waste characterization and

classification, waste selection, storage and transportation, as well as its transfer, treatment and final disposal. Waste management is the collection, transportation, processing, managing, and monitoring of waste materials. These materials can be solid, liquid, or gaseous substances as the case may be.

Lalit and Subhojit (2022) opined that waste management strategies are not uniform among countries (developed and developing nations), regions (urban and rural areas), residential and industrial sectors can all take different method. An outsize portion of waste management practices deals with Solid Waste (SW) which is the bulk of the waste that is created by households, industries as well as commercial activities. Sha'Ato Aboho, Oketunde, Eneji, Unazi, and Agwa (2019) carried out a study of waste generation profile of Makurdi, in North-Central Nigeria. They reported that the bulk of the solid waste generated in the area originated from households than from commercial, institutional and industrial premises. These wastes, constituted majorly, various putrescible materials, ash, dust and sand. On the other hand, a study of solid medical waste showed that health outfits and hospitals in the Federal Capital Territory, Abuja, generate a sizeable amount of solid waste collected daily which poses serious harm to the environment and man (Bassey, Benka, Coker & Aluyi, 2018). The study stated that, of the total solid waste generated daily, 26.5% was hazardous in nature and waste segregation was found not to be practiced by any of the hospitals sampled.

Similarly, Fadipe, Oladepo, Jeje, and Ogedengbbe (2020), pointed out that medical wastes in Osun state are not being properly disposed of and as such, pathology wastes such as unclaimed dead bodies, placentas, umbilical cords are being dumped into unlined pits and other wastes in open dumps. A comparative analysis of solid waste (SW) composition in three local government areas in Rivers State revealed that waste generation rate was 0.45, 0.98 and 1.16 kg/capita/day for Emougha, Obio/Akpor and Port Harcourt, respectively (Babatunde, Vincent-Akpu, Woke, Atarhinyo, Aharanwa, Green & Joe 2020). Also, Sha'Ato (2018) noted that of the waste from households, a substantial proportion consists of various putrescible materials (36-

57%) and suggested composting as the best form of waste management. The rate of generation of plastics, cellophane materials and diapers has assumed an upward trend (Nnaji, 2019). Most food waste was found to constitute close to 50 percent of overall municipal solid waste in Nigerian cities (Nnaji, 2019). Due to the dysfunctional state of many municipal waste management authorities, many cities in Nigeria have been overrun by open dumps. There is need for both government and individuals to adopt holistic and sustainable waste management strategies in order to safeguard public/environmental health (Nnaji, 2019). Sustained cooperation could be developed among all key actors (government, waste managers, public health workers and inhabitants) to implement an economic, sustainable, and reliable management practices in Nigeria (Olukanni & Mnenga, 2021).

Similarly, Aliu, Adeyemi, and Adebayo, (2019) revealed several strategies that have been applied for efficient municipal solid waste management in developing economies adding that strong positive perception of public-private partnership as a waste collection policy framework to solve solid collection problems. Olukanni and Mnenga (2021) also notified that there is no investment presently made on the existing development plan to initiate a modern waste collection system thereby calling for innovative remedies to curb the problem. Other remedies to the underlining problems surrounding the collection and transportation of solid waste in Nigeria include; the integration and collaboration of all the stakeholders through broad-based sensitization and communication of effective and sustainable waste management (Hammed, Sridhar, & Wahab, 2023), as well as need for SWM cost-sharing between the government and the people, enforcement of sanitary laws and adequate fund allocation for all concerned agencies, the involvement of Private Sector Participation (PSP), and awareness campaigns (Oloruntade, Adeoye, & Alao, 2022). Although the collection of solid waste and transportation of solid waste may share the same setbacks, Ayantoyinbo and Adepoju (2018) identified a problem peculiar to solid waste transportation and logistics which is street traffic especially in urban areas affects

waste logistics. However, they noted the roles the government and the private sector could play for the effective management of solid waste.

According to Nnaji (2019), more than 50 percent of residents of Maiduguri in Northern Nigeria and Ughelli in Southern Nigeria dispose of their waste in open dumps. Although open dumpsites disposal method is a commonly adopted method of disposal in Nigeria and other developing countries, which involves people disposing of their waste on open grounds most often indiscriminately, they are generally unsanitary, unsightly and smelly, attracting rats, insects, snakes and flies (Udoh & Inyang, 2020). Onwughara, Nnorom, and Kanno, (2021) reported other non-obvious implications of open dumpsites such as landfill gases and leachate which contributes to global warming and urban ozone problem thereby harming both humans and the natural environment. Similarly, (Aluko, Sridhar, & Oluwande, 2018) reported that characteristics of leachates found at dumpsites at Ibadan, Nigeria and the serious problems they possess on contaminating the land and water around them. Dumpsites in the southern part of Nigeria are largely unsuitable owing to the highly waterlogged characteristics of the region (Leton & Omotosho, 2020). This calls for geological assessment of areas before designing dumpsites.

Awopetu, Coker, Awopetu, Awopetu, Booth, Fullen, Hammond, and Tannahill, (2019) revealed the perception of the public at Makurdi, North Central Nigeria, on the waste minimisation strategy option, which consists of waste reduction, reuse and recycling, of which, more than 80% of the sampled population were in support of this strategy and indicated interest as a more sustainable approach to managing waste as compared to other traditional strategies. As willing as the respondents were towards this strategy, Awopetu, Coker, Awopetu, Awopetu, Booth, Fullen, Hammond, and Tannahill, (2019) identified that the infrastructure and societal means needed to promote this strategy were limiting factors that prevented its actualization. Olukanni, and Mnenga, (2021) also, identified other major constraints in implementing this strategy, such as the cost of having a material recovery facility and technical expertise.

However, Olukanni, and Mnenga, (2021) established that the major key to a successful Waste Minimisation strategy was adequate waste characterization. Olanrewaju and Ilemobade (2020) revealed in their study the success of Ondo State Integrated Waste Recycling and Treatment Project (OSIWRTP) in transforming the waste generated in the state to valuable products using the concept of sustainability, environmental protection, and economic development, technical and technological improvement as a baseline. According to Olanrewaju and Ilemobade (2020), this waste recycling method eliminated the problems associated with open dumpsites which were unhygienic and inefficient posing a lot of harm to the people of Ondo state. Kofoworola (2019) acknowledged the informal recycling and recovery of waste in Lagos state which is yet to gain the support of the state government in charge and the waste authorities in place. To this end, only paper, metals, plastic and glass are recovered and recycled because of their high market value.

Similarly, Nzeadibe (2023) revealed the informal recycling existence of solid waste in Enugu state which consists of scavengers/waste pickers, artisans, middlemen who recover plastics, metals, soles and textiles from landfills and illegal dumps within the state. Rigasa *et al*. (2021) on the other hand, recommended the integration of 'Almajiri' into waste minimization strategy as they can serve as resource recovery agents in this strategy. Olukanni, Aipoh, and Kalabo, (2018) in their study, identified the benefits of minimization strategy to the economy through composting. The study which was carried out in six South-Western states in Nigeria, recommended composting of biodegradable in the region as a waste management strategy which will benefit the economy as well as agricultural production. Onwurah and Bello, (2019) also, conducted another study at the South Eastern region of Nigeria, where the benefits of Minimization Strategy also included the bioconversion of biodegradable waste to compost and biogas which will involve communities, industries and Small and Medium-scale Enterprise (SMEs) that have the capacity of integrated environmental technologies.

Agunwamba (2021), noted that "the poor state of waste management is attributable to an inadequately formulated and poorly implemented environmental policy, neglect of the economic, social, psychological, political and cultural life of Nigerians in the formulation and implementation of waste management programs. Also, Ogwueleka (2019) also identified inefficient collection methods, insufficient coverage of collection system and improper disposal as factors contributing to poor waste management in Nigeria. Iyanda and Bello (2020) opined, in Nigeria and other developing countries, policy implementation often turns out to be the graveyard of many policies. Large amount of energy and resources are spent on designing and preparing plans of all kinds with little or no thought given to the complex chains of reciprocal interactions and variables required and this can be seen usually in the wide gap between intentions and results.

Malik and Shah, (2019) noted that due to bad governance which has also affected waste management agencies, little regard is shown to the well-being of the citizens; so the government would not provide infrastructures and services to keep the cities clean, healthy and safe, especially in developing countries. Hunter and Peckham, (2019) argued that faulty policy design can stem from many causes: a poor understanding of the problem; insufficient knowledge of the implementation context; unclear and even contradictory goals; poor quality evidence; and an absence of political backing. The earlier studies conducted by Palczynski and Scotia (2018) as well as Ogwa (2020), observed that the legislation on waste management is usually fragmented and has several acts relating to public health, local government and environmental protection acts; including clauses related to solid waste management; thereby, making it possible for such regulation to be enforced by different agencies with duplication of responsibilities and gaps in the regulatory provision which constrains the development of effective solid waste management system.

Alabi, Kasim and Lasisi, (2020) reported that enforcement of environmental laws remains an issue of concern, control, and management of environmental legislation that has achieved very

little success. Some of the enforcement challenges in Nigeria have socio-political and economic nuances. In other to make sustainable waste management, appropriate policy and proper planning, in addition to enforcement of waste management legislation, must be implemented (Ezeudu and Ezeudu, 2019). Also, Ezeudu and Ezeudu (2021) was of the opinion that the poor state of waste management system in the study area is a reflection of its laws and policies. Most government policies on waste management that are in place lack strategies for actualization. Despite some good policies that are in place, proper implementation remains a significant challenge; for instance, a comprehensive environmental impact assessment is meant to be submitted during project planning before approval. However, this critical regulation is frequently overlooked.

Also, Ziraba, Haregu, and Mberu, (2023) reported that sorting of waste is hardly practiced in most developing countries of the world. Waste that by law is supposed to be managed in a stringent manner finds its way on dumping sites for general waste. Industrial effluents often discharge into rivers while medical waste is often mixed with household waste as well as electronic waste. Petroleum products including paints laden with lead are discharged in open spaces or water channels. While some of the chemicals discharged might have short-term effects on animal and plant life, others are carried through the food chain where they accumulate and have deleterious effects much later. Heavy metals such as lead, arsenic and mercury are of particularly high public health importance yet no clear measures are enforced to control their disposal and help limit environmental contamination (Ziraba *et al*., 2023).

With increasing population and industrialization, Nigeria is faced with the challenge of adequately handling the increasing quantum of solid waste generated from anthropogenic activities. The challenges facing the sector can be capped under the following major issues such as uncoordinated institutional functions and overlapping functions of existing institutions, inadequate funding and inappropriate technologies for sustainable and effective solid waste management, inadequate solid waste infrastructure in the country, and lack of incentives for

private sector participation in service delivery of solid waste management - in terms of loans, and availability of jobs to be undertaken by private sector participants (Giusti, 2020).

Ijie (2021) argued that there are discrepancies in SWM policy formulation and implementation at different levels and organs of government. The author maintained that there are still indications that the Nigerian federal system will experience effective SWM policy formulation and implementation, assessment, communication and feedback mechanism. However, the author identified various challenges that confront SWM policy implementation in Nigeria. They include a multiplicity of agencies involved in SWM policy implementation, lack of coordination or communication, delay in implementation, and lack of political will. Other reasons why SWM policy fails in the federal system of government using Nigeria as a case include ambiguous SWM policy statement, overambitious SWM policy goals, lack of appropriate SWM technologies for implementation, problems of continuity and commitment to the SWM policy, and corruption. The author concluded that SWM policy formulation and implementation in the federal system of government requires effective communication to facilitate SWM service delivery.

Nwufo (2020) studied the legal and institutional frameworks in place in Nigeria to regulate and tackle the challenges of solid waste management in the country, and recommended wholesome reform of the institutional framework not only for solid waste management but the entire environmental sector. The scholar disclosed some environmental laws that exist at the federal level and these include the Environmental Impact Assessment Decree of 1992, the Harmful Waste (Special Criminal Provision, etc.) Act of 1988 and the Federal Environmental Protection Agency (FEPA) Act of 1988, among others. The later was the fulcrum upon which the moribund FEPA was established in 1988, the activities of which have been taken over by the Federal Ministry of Environment since 1999. In the view of Ebeku (2018), there is a synergy between a healthy environment and the right to life of the citizens.

The author explained the maintenance and protection of man's physical environment is the fundamental human rights of the citizens. According to Ebeku, (2018) tribunals have held that failure of government to preserve environmental quality was a violation of the fundamental right to life and that the right to life is not limited to the protection against arbitrary killing, but that the right to life is in many ways dependent on the preservation and protection of the citizen's environment. Worika and Etemire, (2020) states that other local government areas in the Niger Delta Region replicated effort by making bylaws and creating environmental task forces. Irrespective of numerous legislations, policies and programme, Worika and Etemire, (2020) therefore concluded that solid waste management in the region has continued to be a nagging problem.

Aim and Objectives of the Study

The research aimed at evaluating the perceived effectiveness of solid waste management policies and strategies adopted in the Niger Delta Region of Nigeria. The specific objectives were to;

i. assess the effectiveness of solid waste management policies in the study area
ii. determine the effectiveness of solid waste management strategies in the study area
iii. determine the barriers to the effectiveness of solid waste management policies and strategies

Research Questions

Base on the objectives of the study the following research questions are pose;

i. what is the effectiveness of solid waste management policies in the study area?
ii. what is the extent of the effectiveness of solid waste management strategies in the study area?
iii. what are the barriers to the effectiveness of solid waste management policies and strategies?

Materials and Methods

Study Area

Niger Delta is situated on the Gulf of Guinea in the southern part of Nigeria, it covers an area between latitude 3^{o} N and 6^{o} N and longitude 4^{o}E and 8^{o} E. The Niger Delta basin is bounded to east and west by the Calabar Flank and Benin , the Gulf of Guinea to the south and in the north by the Anambra Basin, Abakiliki uplift and Afikpo Syncline. A 2015 World Bank Technical Report gives the total land area of the Niger Delta as 20,000 sq. km. located in south eastern Nigeria. The broader Niger Delta region, which includes all oil-producing areas and others considered relevant for reasons of administrative convenience, political expedience and development objectives, extends the land area to 70,000 square kilometres.

It is the delta of the Niger River sitting directly on the Gulf of Guinea on the Atlantic Ocean in Nigeria. It is located within nine coastal southern Nigerian states, which include: all six states from the South South geopolitical zone, one state (Ondo) from South West geopolitical zone and two states (Abia and Imo) from South East geopolitical zone. The climate of the areas is characterized by two seasons: the rainy season and the dry season. The vegetation is characterized by thick-dense forest. According to Hutchful (2017), the Niger Delta consists of two distinct ecological zones: tropical rainforest in the northern reaches of the Delta, and to the south a coastal area of mangrove vegetation traversed by many rivers, tributaries and creeks. The freshwater forests cover 11,700 km of the Niger Delta, and lie within the hinterland away from the mangrove forest. It is located within the flood plains. The freshwater swamp forests are most extensive in the west and central delta; in the eastern delta, the freshwater forest band is much thinner because of higher elevations.

Research Design and methods

The research design adopted in this study is survey design. This involved the collection of data to accurately and objectively described existing phenomena. The choice of survey in this study was because it is cost effective in the sense that the study of the representative sample

would permit inferential generalization about the entire population that would have been too expensive for the study.

Study Population and Sample Size

The population of the study according 2006 population census as projected to 2024 is 5,156,000. In the breakdown, Uyo has a population of 1,393,000, with growth rate of 5.63%, Calabar has a population of 685,000 with growth rate of 4.30%, while Port Harcourt has 3,637,000 with growth rate of 4.86%. To draw a representative sample for the study, Krejcie & Morgan table (1970) was used for determining the sample size for a given population. The sample size will therefore become 1081.

Table 1: Sample Size Computation

Sampled City	Population	Sample size	Growth rate %)
Uyo	1,393,000	351	5.63
Calabar	685,000	346	4.30
Port Harcourt	3,637,000	384	4.86
Total	5,715,000	1081	

Source: Google Population Projection, 2024

Sampling Techniques

Systematic sampling techniques were used for this study. This is a probability sampling technique in which sample members from a larger population are selected according to a random starting point but in a fixed, periodic interval. In the first instance, the systematic sampling technique was adopted to select three major cities where Uyo, Calabar and Port Harcourt were selected from the Niger Delta region. List of areas in each of the selected city was made and selected using the systematic sampling approach.

The questionnaire entitled “perceived effectiveness of waste management policies and strategies: A study of selected cities in the Niger Delta region” was designed. The questionnaire consist of items that elicit respondent’s data on their perceived effectiveness of waste

management policies, strategies and barriers in the study area. The questionnaire was administered to respondents who are above 18 years at the interval of every 10th (tenth) household. The objectives of the study were assessed using frequency percentage and chart.

Table 2: Selected Areas for Sampling Using Systematic Sampling Technique

Selected Cities	Selected Areas	Respondents
Uyo	Anua Offot	88
	Itiam Etoi	88
	Afaha Oku	88
	Ikot Offiong	87
Calabar	Abang Asang	86
	Edim-Otop	86
	Essien Town	87
	Ediba	87
Port Harcourt	Elekohia	96
	Abuloma	96
	Rainbow	96
	Okuru	96
	Total	1081

Source: Researcher's Field Survey 2025

Result and Discussion

i. The Perceived Effectiveness Solid Waste Management Policies

Results of the analysis of solid waste management policies adopted in the study area are shown in Figure 1 below. It was revealed that highest number (335) representing 30.99 percent of the respondents indicated "fair" in contracting of waste evacuation activities while least number (53, 4.90%) indicated "satisfactory". Highest number (417, 38.58%) of respondents indicated "fair" in waste management monitoring while least number (50, 4.63%) indicated "very satisfactory". Similarly, highest number (470, 43.48%) of respondents indicated "fair" in waste management policy enforcement and sanctioning while least number (57, 5.27%) indicated "not sure". Highest number (449, 41.54%) of respondents indicated "fair" in regulation of waste generation, storage and other activities while least number (33, 3.05%) indicated "not sure". On the provision of efficient waste management services and facilities in the study area, most (455,

42.09%) respondents indicated "poor" while few (11, 1.02%) indicated "satisfactory". It was revealed that, most respondents (323, 29.88%) indicated "fair" for ensuring efficient waste management practices, while least number (75, 6.94%) indicated "satisfactory". Similarly, most respondents (328, 30.34%) indicated "fair" for encouraging private investments, while least number (56, 5.18%) indicated "not sure".

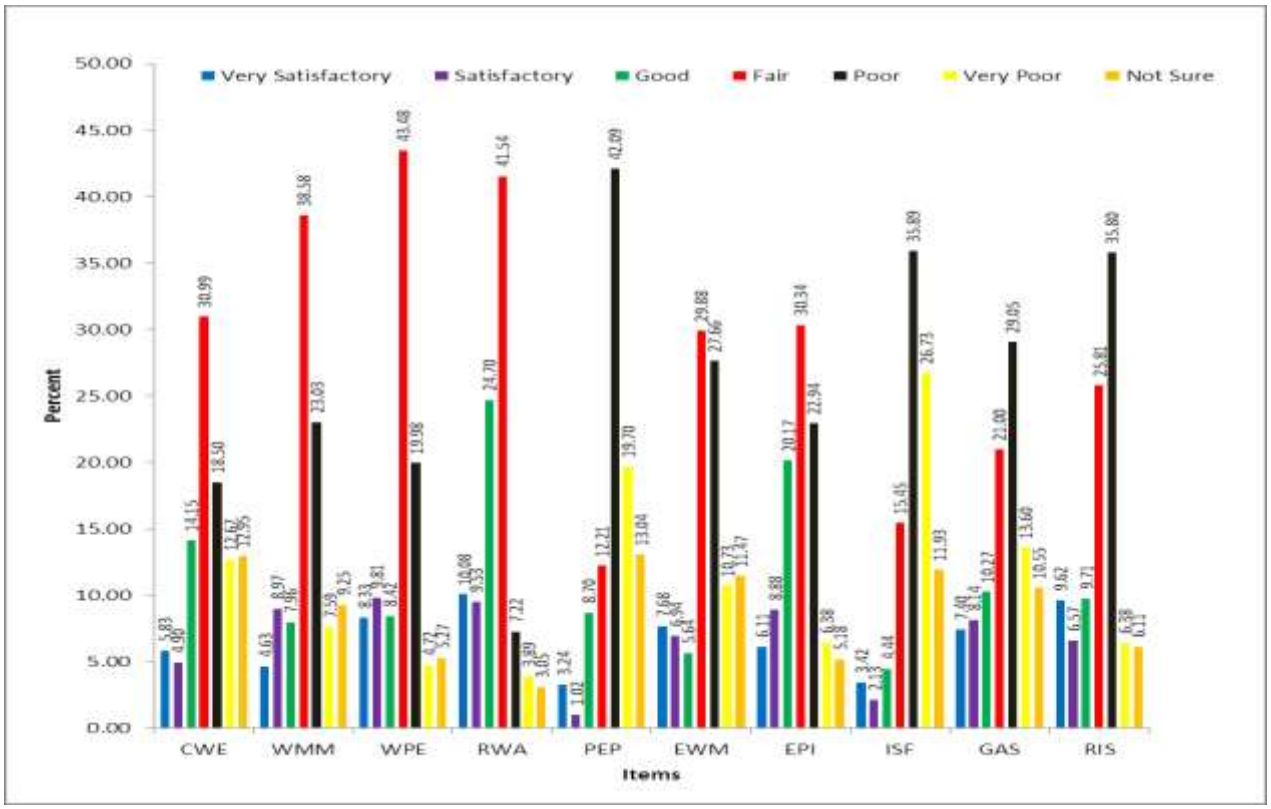

Figure 1: Perceived effectiveness of solid waste management policies in the Niger Delta region

WPE= Waste management policy enforcement, RWA= Regulation of waste generation, storage and other activities, PEP= Provision of efficient waste management services and facilities, EWM= Ensuring efficient waste management practices, EPI= Encouraging private investments, ISF= Introducing innovative services and facilities, GAS= Ensuring good access to waste management services, RIS= Protecting the rights and interests of stakeholders

For introducing innovative services and facilities in the area, most respondents (388, 35.89%) indicated "poor", while least number (23, 2.13%) indicated "satisfactory". The study also showed that most (314, 29.05%) respondents indicated "poor" while least (80, 7.40%) indicated "very satisfactory" for ensuring good access to waste management services. It was also

observed that most (387, 35.80%) respondents indicated "poor" for protecting the rights and interests of stakeholders, while least (66, 6.11%) indicated "not sure" (Figure 1).

(2) Perceived effectiveness of waste management strategies

Results of the analysis of effectiveness of waste management strategies are presented in Figure 2 below. The results revealed that highest number (315) representing 29.14 percent of the respondents indicated "poor" for waste minimization, while least number (33, 3.05%) indicated "very satisfactory". Highest number (409, 37.84%) of respondents indicated "not sure" for recycling, while least number (11, 1.02%) indicated "very satisfactory". For composting, highest number (457, 42.28%) of respondents indicated "fair", while least number (60, 5.55%) indicated "very satisfactory". Highest number (396, 36.63%) of respondents indicated "fair" for waste separation, while least number (87, 8.05%) indicated "very satisfactory".

For the availability and positioning of receptacle bins in the study area, most (389, 35.99%) respondents indicated "fair", while least number (82, 7.59%) of respondents indicated "good". It was also revealed that, most respondents (476, 44.03%) indicated "fair" for waste collection, while least number (57, 5.27%) indicated "very satisfactory". More so, most respondents (333, 30.80%) indicated "not sure" as an option waste treatment, while least number (36, 3.33%) indicated "very satisfactory". For waste evacuation, most respondents (341, 31.54%) indicated "very poor", while least number (50, 4.63%) indicated "very satisfactory". The study also revealed that most (273, 25.25%) respondents indicated "fair", while least (33, 3.05%) indicated "satisfactory" for energy generation. It was also observed that most (286, 26.46%) respondents indicated "poor" for landfilling, while least (68, 6.29%) indicated "satisfactory". For open dumping, most respondents (362, 33.49%) indicated "very poor", while least number (16, 1.48%) indicated "very satisfactory". The study also revealed that most (272, 25.16%) respondents indicated "very poor", while least (88, 8.14%) indicated "satisfactory" for compliance and monitoring.

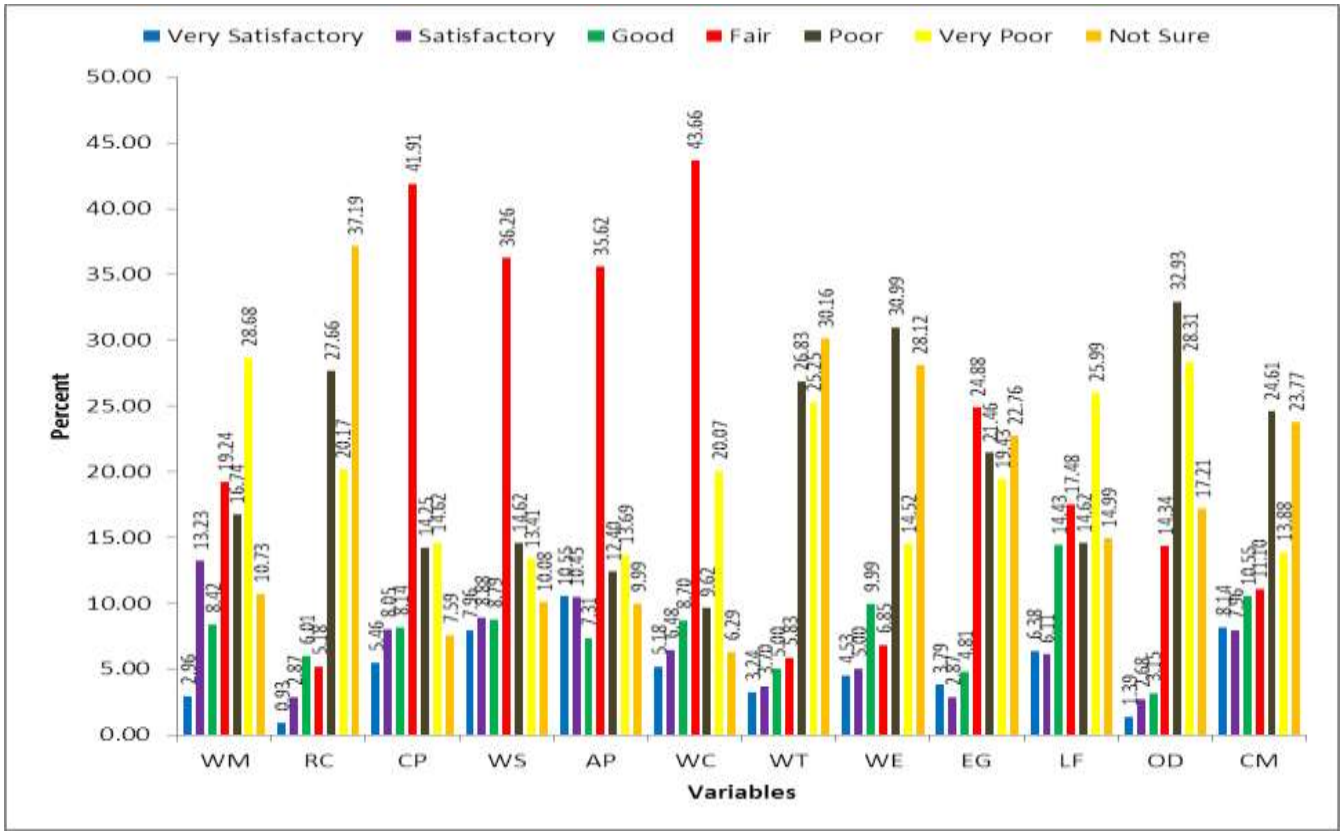

Figure 2: Perceived effectiveness level of waste management strategies.

WM=Waste minimization, RC=Recycling, CP=Composting, WS=Waste separation, AP= Availability and positioning of receptacle bins, WC=Waste collection, WT=Waste treatment, WE=Waste evacuation, EG=Energy generation, LF=Landfilling, OD= Open dumping, CM=Compliance and monitoring

(3) Perceived barriers to effective waste management policies

The results revealed that highest number (481) representing 44.50 percent of the respondents strongly agreed to the assertion that waste policies lack clear strategies for action, while least number (68, 6.29%) strongly disagreed. Highest number (474, 43.85%) of respondents strongly agreed that laws regulating waste management are inadequate, while least number (33, 3.05%) strongly disagreed. For weakness of waste management institution, highest number (480, 44.40%) of respondents strongly agreed, while least number (39, 3.61%) disagreed. Highest number (407, 37.65%) of respondents strongly agreed that unplanned aspects of the city make waste collection difficult, while least number (43, 3.98%) disagreed.

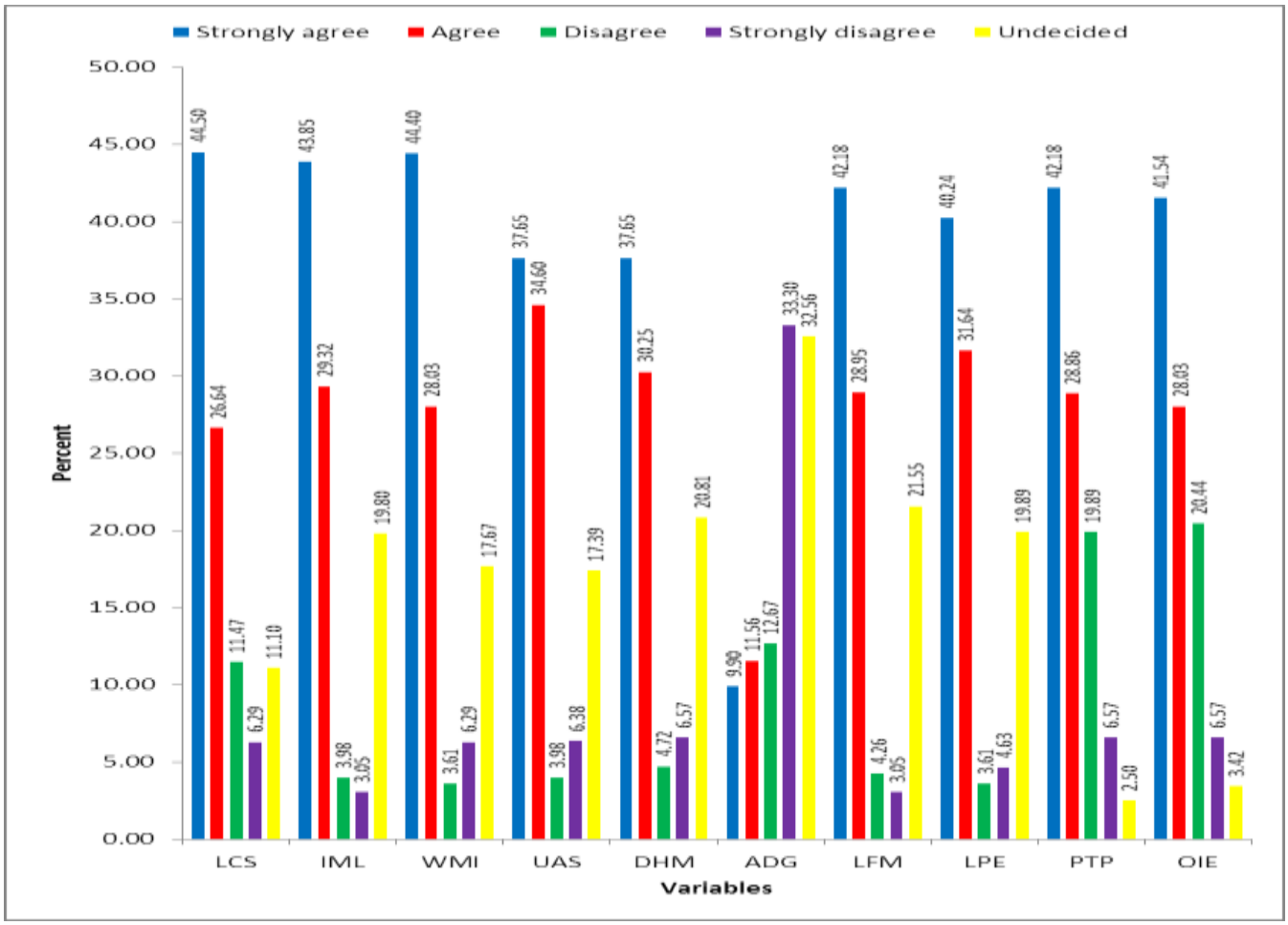

Figure 3: Perceived barriers to effective waste management policies

LCS= Waste policies lack clear strategies for action, IML= Laws regulating waste management are inadequate, WMI= Waste management institution are weak, UAS= Unplanned aspects of the city make waste collection difficult, DHM= Density and high moisture content make waste difficult to manage, ADG= Availability of dumping grounds discourages expensive investment in alternative disposal methods, LFM= Limited funds available are sometimes misused, LPE= Public education on waste management is low, PTP= Waste workers are poorly trained and poorly paid, OIE= Operational equipment are obsolete and insufficient.

Highest number (407, 37.65%) of respondents strongly agreed that density and high moisture content make waste difficult to manage, while least number (51, 4.72%) strongly disagreed. For the assertion that availability of dumping grounds discourages expensive investment in alternative disposal methods, highest number (360, 33.30%) of respondents strongly disagreed, while least number (107, 9.90%) strongly agreed. Highest number (456, 42.18%) of respondents strongly agreed that limited funds available for waste management are sometimes misused, while least number (33, 3.05%) strongly disagreed. Similarly, highest number (435, 40.24%) of respondents strongly agreed that public education on waste

management is low, while least number (50, 4.63%) strongly disagreed. For the contention that waste workers are poorly trained and poorly paid, highest number (456, 42.18%) of respondents strongly agreed, while least number (27, 2.50%) were undecided in their opinion. Highest number (449, 41.54%) of respondents strongly agreed that operational equipment are obsolete and insufficient, while least number (37, 3.42%) were undecided

Discussion of findings

The result on the perceived effectiveness of solid waste management policies in the selected cities of the Niger Delta region revealed that waste management policy enforcement, regulation of waste generation, storage and other activities, provision of efficient waste management services and facilities, efficient waste management practices, private investments, innovative services and facilities, good access to waste management services, as well as protecting the rights and interests of stakeholders as waste management policies are not effective in the study area. It also indicated that waste management policies in the selected cities of the Niger Delta Region needs urgent amendment as it is basically concentrating on waste collection from the point of generation to disposal without provision for regulating the modern waste management strategies such as waste recycling, reuse, reduction and recovery and this post conflicting management issues as scavengers unlawfully scattering waste disposal site in search for recycling materials.

This is in line with study of Agunwamba (2021) who noted that "the poor state of waste management is attributable to an inadequately formulated and poorly implemented environmental policy, neglect of the economic, social, psychological, political and cultural life of Nigerians in the formulation and implementation of waste management programs". Also, Ogwueleka (2019) also identified "inefficient collection methods, insufficient coverage of collection system and improper disposal as factors contributing to poor waste management in Nigeria."

The study showed that laws involving waste management were mainly formulated and articulated. The Waste Management Agency's policy thrust is to make positive and considerable

change in the living conditions as well as declining diseases or health challenges emanating from poor sanitary condition in the Niger Delta region. However, from the present findings, there are several factors that indicated that this statutory obligation has not been fully met. The three major cities of the Niger Delta surveyed in this study are still experiencing abandonment or decomposed refuse at the dump site for days without evacuation by the waste contractors.

The modus operandi adopted for waste evacuation is faulty; in fact, waste dumping and evacuation usually last sometime beyond twenty four hours. Iyanda and Bello (2020) opined, in Nigeria and other developing countries, policy "implementation often turns out to be the graveyard of many policies. Large amount of energy and resources are spent on designing and preparing plans of all kinds with little or no thought given to the complex chains of reciprocal interactions and variables required and this can be seen usually in the wide gap between intentions and results."

Also, on the perceived effectiveness of waste management strategies, the result showed poor satisfaction among residents on waste minimization, recycling, composting, waste separation, availability and positioning of receptacle bins, waste collection, waste treatment, waste evacuation, and energy generation, landfilling, open dumping, compliance and monitoring in the study area. As observed by the researcher, the establishment of environmental protection agencies in each state of the Niger Delta is a mere nomenclature, this is because it has failed improve and strengthen the agency with waste management strategies to achieve greater sanitary condition. An evaluation of waste activities reveals poor implementation strategy in waste management. There is a consistent abandonment of refuse in the streets. Most times, these refuse stayed without evacuation. The residents who live close to where these refuse are dumped are exposed to various health challenges.

This finding supports that of Malik and Shah, (2019) who opined that due to bad governance which has also affected waste management agencies, little regard is shown to the well-being of the citizens; so the government would not provide infrastructures and services to

keep the cities clean, healthy and safe, especially in developing countries. From the present finding, the delay in waste evacuating breed offensive odours, flies, rats, ants, beetles, among others. This supports Hunter and Peckham (2019) who argued that "faulty policy design can stem from many causes: a poor understanding of the problem; insufficient knowledge of the implementation context; unclear and even contradictory goals; poor quality evidence; and an absence of political backing."

The result of the study agrees with earlier studies conducted by Palczynski and Scotia (2018) as well as Ogwa (2020), who observed that the legislation on waste management is usually fragmented and has several acts relating to public health, local government and environmental protection acts; including clauses related to solid waste management; thereby, making it possible for such regulation to be enforced by different agencies with duplication of responsibilities and gaps in the regulatory provision which constrains the development of effective solid waste management system.

Lastly, the result on perceived barriers to effective waste management policies strongly agreed that waste policies lack clear strategies for action, laws regulating waste management are inadequate, waste management institution are weak, unplanned aspects of the city make waste collection difficult, density high moisture content make waste difficult to manage, lack of availability of dumping grounds discourages expensive investment in alternative disposal methods, limited funds available are sometimes misused, public education on waste management is low, waste workers are poorly trained and poorly paid, and operational equipment are obsolete and insufficient making waste management ineffective. This is in line with the study of Alabi, Kasim and Lasisi, (2020) who reported that enforcement of environmental laws remains an issue of concern, control, and management of environmental legislation that has achieved very little success.

Some of the enforcement challenges in Nigeria have socio-political and economic nuances. In other to make sustainable waste management, appropriate policy and proper

planning, in addition to enforcement of waste management legislation, must be implemented (Ezeudu and Ezeudu, 2019). Also, Ezeudu and Ezeudu (2019) was of the opinion that the poor state of waste management system in the study area is a reflection of its laws and policies. Most government policies on waste management that are in place lack strategies for actualization. Despite some good policies that are in place, proper implementation remains a significant challenge; for instance, a comprehensive environmental impact assessment is meant to be submitted during project planning before approval. However, this critical regulation is frequently overlooked.

Conclusion

Waste management policies and strategies in the selected cities of the Niger Delta Region does not varies in contexts but on approaches and implementation. In recognition of the monumental challenges of solid waste management in the region, the government has attempted to tackle municipal waste management issues through several policies, approaches and strategies. However, some of these strategies have been found to be counter-productive as it created more problems due to lack of coordination on the part of government and inadequate solid waste management facilities and knowledge of the responsible agencies among others. Also, waste management across the selected cities of the Niger Delta Region has deteriorated significantly as the strategies used in tackling the waste problems have recorded very little success.

The study revealed that waste management policy enforcement, regulation of waste generation, storage and other activities, provision of efficient waste management services and facilities, efficient waste management practices, private investments, innovative services and facilities, good access to waste management services, as well as protecting the rights and interests of stakeholders as waste management policies are not effective in the study area.

Also, the study revealed the barriers to effective waste management policies and strategies to includes; lack clear strategies for action, inadequate laws and regulation, weak waste management institution, lack of availability of dumping grounds, limited funds available are

sometimes misused, low public education on waste management, waste workers are poorly trained and poorly paid, and operational equipment are obsolete and insufficient among others.

Recommendations

Based on the findings of this study, the following are recommended for policy action:

1. Embark on periodic evaluation of progress achieved in the implementation of the recommendations listed herein.
2. Review, strengthen and update periodically existing national and regional laws and regulations for the environmentally sound management of solid waste.
3. Encourage and mobilize all individuals to ensure wastes minimization, reuse, recycling and recovery strategies.
4. Develop an infrastructural capacity building process for sound municipal management of waste.
5. Ensure compliance with existing laws and regulations on waste management through effective monitoring and enforcement.

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