

Sustainable Waste Management and Socio-Economic Development in Uyo Metropolis, Akwa Ibom State

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Abstract

The study examined sustainable waste management and socio-economic development in Uyo metropolis, Akwa Ibom State. Waste Management when executed sustainably has reverberating benefits to the present and future generations of an entity, especially in aspects of health and Life Expectancy (LE) improvement, natural resource conservation, urbanization, infrastructural development, etc. Hence, many countries of the world have developed measures for sustainable waste management. However, it was observed that sustainable waste management has not reached its full potential in Uyo metropolis owing to the focus on a part of waste management which is the collection, transfer and disposal of waste. Therefore, this paper was aimed at examining the state of sustainable waste management in Uyo metropolis, to establish whether it impacts the socio-economic development in the area. The qualitative research method was adopted for the study through the use of descriptive secondary data. The Zero Waste theory was adopted for the study. It was discovered that waste management in the Uyo metropolis as coordinated by the Akwa Ibom State Environmental Protection and Waste Management Agency (AKSEPWMA) is not sustainable owing to the absence of an organized framework for waste recycling and reuse, and the adoption of incineration as a waste management method. It was recommended that the Akwa Ibom State government should expedite the establishment of a formal waste recycling sector through public-private partnerships with both indigenous and non-indigenous waste recycling companies.

Keywords: Wastes, waste management, sustainable waste management, socio-economic development, recycling, incineration.

Introduction

The role of the state from the tenets of liberal democracy is expressed in terms of the protection and security of lives and properties, while also ensuring the equitable distribution of the state's resources for development. The process of ensuring the protection of lives and properties of citizens as well as the distribution of resources cannot be attained without the creation of a safe, healthy, and sustainable environment which would not only be beneficial to individual citizens but also, to the government, while working to ensure socio-economic stability within its clime (Amadi, 2020). One such strategy through which these functions are achieved is waste management which is particularly aimed at reducing the number of unusable materials by destroying, discarding, processing, recycling, reusing or controlling wastes to avert possible

and potential health and environmental hazards in a physical entity (Tuyahabwe, et al, 2022). The need for the management of waste is however traceable to the increase in global population which has resulted in a geometric demand for food, water, clothing, and other resources, hence, resulting in an increase in the amount/volume of waste generated. The increase in the generation of waste has also increased the levels of waste disposed which, if improperly done could result in environmental hazards, hence, the need for effective waste management systems (Ogara, 2022).

Different countries of the world have developed different methods of managing waste including recycling and reuse, biological treatment, incineration, minimization, and even prevention. For instance, recycling and reuse of wastes involve the recovery of useful materials such as glass, paper, plastics, wood, and metals from the waste stream to be incorporated into the fabrication of new products for use. This is exemplified by the recovery of green plant-based wastes for mulch or fertilizer application. Likewise, incineration which consists of waste combustion at very high temperatures is also a strategy which can be used to manage waste and convert it into useful end-products like electricity and biogas (Lumen-Candela, 2023). However, the aftermath of improper waste management systems and strategies calls for sustainable waste management which is aimed at processing and making use of waste products before disposal, to minimize the environmental and health effects of the disposal of such wastes. Hence, sustainable waste management does not just focus primarily on waste disposal, but also on the processes of reduction, recycling, reuse and recovery of wastes before disposal to prevent the extent of damage such wastes could cause to the environment (Ogara, 2022).

The relationship between sustainable waste management and socio-economic development is embedded in the manner through which the former leads to improvements in the indices of the latter as it concerns individuals and the government. For instance, in the health milieu, sustainable wastes management reduces the number of waste, while also regulating the methods of disposing of such waste, thereby, mitigating the health hazards such wastes could pose to the environment through the spread of diseases like cholera, malaria, diarrhoea, etc. (Rajadurai, et al, 2021; World Health Organization, 2010; Geng, et al, 2013).

In the mainstream economic aspect, sustainable waste management could benefit large economic organizations as well as small and medium-sized enterprises (SMEs) in terms of business location, attraction of customers, and ease of doing business. Hence, sustainable waste management can attract businesses into an environment thereby increasing economic activities in the area, and by extension, boosting revenue in the state where it is practised. In terms of raw material development for industries, sustainable waste management through recycling waste materials such as glass, paper, plastics, wood and metals can create new products, hence, reducing the need for natural resource exploitation for raw materials which can lead to natural resource depletion in the long run (Ekeuwei, et al, 2022).

In Akwa Ibom State, formal waste management is conspicuous in the Uyo metropolis through the activities of the Akwa Ibom State Environmental Protection and Waste Management Agency (AKSEPWMA) which was reformed and revived in 2018 and charged with the responsibility of maintaining a clean and safe environment in the State (Idemokon, 2021). However, it is observed that waste management in the metropolis takes the form of waste collection, transfer and disposal with aspects of sustainable waste management like recycling and reuse receiving little or no attention. Waste management in the Uyo metropolis has not reached attained the full potential of socio-economic development, especially as measures of sustainable waste management like recycling, which would reduce dependence on natural raw materials, have not been fully optimized. This has limited the extent of socio-economic benefits to the state through job creation and even revenue generation from industrialization. Aside from this, sustainable waste management in the metropolis is also bedevilled by both institutional and anthropogenic challenges which have impeded the extent

of its contributions to socio-economic development in the metropolis. Therefore, this paper is undertaken to examine the impact of waste management on the socio-economic development of Uyo metropolis, while also addressing the challenges therein.

Conceptual Framework

Concept of Waste

To holistically understand the concept of sustainable waste management, it is expedient that the terms 'waste' and 'sustainable waste management' are explained. Generally, wastes are materials, substances, or by-products discarded as no longer useful or required after primary use or after the completion of a process (Oxford Languages, 2023). In essence, they are unwanted or unusable materials which are meant to be discarded. However, the definition of waste in the environmental purview is largely subjective, because a substance can only be regarded as a waste when the owner labels it as such (United Nations Statistics Division, 2016). In this environmental parlance, Sridhar, et al (2017) define waste as any matter which has no further use, based on the composition, and which can be domestic, non-hazardous, hazardous or infectious. For them, a matter is considered a waste when its value is lost which further renders it unusable. For Cheremisnoff (2003), wastes are products which may still be of further use but are discarded as a result of the inability of individuals to recycle and reuse them for other purposes. Therefore, wastes are beneficial in diverse forms and areas which are relatively subjective. The deficiency of the definitions above is the concentration on the value of the object, which does not independently determine whether such an object should be disposed of or not. In particular, the concentration on the value of the object termed a waste negates the fact that such is something that the holder intends to get rid of or has gotten rid of whether such is still valuable to the holder or not.

Consequently, the definition offered by the United Nations Statistics Division is more apt and detailed. According to the department, wastes are materials that are not prime products (that is, products produced for the market) for which the generator has no further use in terms of his or her purpose of production, transformation, or consumption and which he or she wants to dispose of (United Nations Statistics Division, 2016). Going forward, the definition of waste is not compulsorily tied to the presence or absence of value of such object, but also the desire and need to discard such object at the generator's discretion. Accordingly, an object becomes a waste once it is intentionally discarded by the holder or generator after such is identified as unusable. These wastes are classified according to origin (activities generating the wastes, e.g., packaging wastes, medical wastes, etc.), composition (what the waste is made of, e.g., organic wastes, plastic wastes, e-wastes, etc.), toxicity (extent of danger, e.g., hazardous wastes, stabilized wastes, etc.), and management (how they are handled, e.g., municipal wastes, recycled wastes, etc.) (INTOSAI Working Group on Environmental Auditing, 2018).

Waste Management

Waste management is generally viewed as the integrated process involving the collection, transportation, processing, recycling or disposal, managing, and monitoring of waste materials, to reduce the effect of such on the health of individuals, the environment or aesthetics, or for the recovery of essential resources. However, scholars and institutions have developed specific definitions for the term. According to the United Nations Environmental Programme (2015), waste management is not only concerned with the collection, segregation, transportation and labelling, treatment, and disposal of wastes but also the practical supervision of how wastes are produced through policies and regulations. Hence, according to the sub-unit, waste management is the total supervision of waste production, handling, processing, storage, and transportation from its point of generation to its final acceptable disposal. However, this definition missed out on the benefit of waste management to man and the immediate

environment. Consequently, a more acceptable definition is provided by the United Nations Statistics Division (2016). According to the unit, waste management is not only limited to the practical or operational processes of managing waste, but also the processes involving the promulgation, implementation, and supervision of waste-related laws/policies as well as the technological and economic mechanisms which guide the waste management process. Hence, it defines waste management as the processes and actions required to manage waste from its inception (generation) to its final disposal through the collection, transportation, treatment, and disposal of such wastes, together with the monitoring and regulation of the waste management processes and waste-related laws, technologies, and economic mechanisms (United Nations Statistics Division, 2016).

Sustainable Waste Management

The concept of sustainable waste management arose as a result of the alarm by environmental scientists over increasing waste production and management process which was unsegregated at source, hence, resulting in increased pollution, contamination of non-renewable resources, depletion of the environment, and inflating the cost of waste processing and management in general (Lagos Business School Sustainability Centre, 2023). This led to the need for a more efficient, sustainable and cost-effective model of waste management which would also benefit the society in turn. First, the term sustainability has been defined by the World Commission on Environment and Development (WCED) as the act or process of meeting the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environmental Development, 1987). A sustainable environment therefore requires attention to optimization and recovery of resources (WCED, 1987). Sustainable waste management has therefore been defined by the Kenya Sustainable Waste Management Act (2022) as the process of using...

“material resources efficiently as prioritized by waste hierarchy, circular economy and clean production in order to reduce the amount of waste that is generated, deposited or discarded in the environment including the management of materials that would otherwise have been dumped or wasted in a way that contributes to environmental, social, and economic goals of sustainable development. (Kenyan Sustainable Waste Management Act, 2022:639).

According to Ifokwe (2021), sustainable waste management is the collection, transportation, recovery and disposal of various types of waste in a way that does not threaten the environment, human health or future generations, and which aims to lessen the amount of natural resources depleted by reusing the substances for the society. More expressly, Ingenium Group (2023) notes that sustainable waste management is the transition from the traditional make-use-dispose model of production to a more circular economy which entails that wastes are returned into the production cycle either as new raw materials, energy, or a new product which would benefit the society and reduce depletion or dependence on natural raw materials, reduce global warming and reduce the amount of solid wastes produced annually. According to the organization, this is however achievable through a hierarchical system with six (6) procedures, including prevention, reduction, reuse, recycling, recovery, and disposal.

From the definitions above, it is observed that sustainable waste management is centred on three necessities: the reduction of dependency on natural raw materials, the provision of new products to society and the maintenance of environmental hygiene for human safety.

Concept of Socio-Economic Development

The concept of socio-economic development cannot be understood exclusively by the term development. Hence, it is veritable to define what development is especially in the milieu of social sciences. Development is defined in both the liberal and Marxist perspectives. The liberal

perspective represents development as a factor of financial and capital accumulation, which only represents it as a measure of GDP without actual impacts on the lives of the populace (Ekeuwei et al, 2022). Since the concept of development is multi-faceted, a more holistic and encompassing explanation of the term has been provided by Marxist scholars, which do not only explain the financial/economic perspective of development but also the societal/human-based connotation of the term (Udoms, Atakpa & Ekanem, 2017). Popular among the definitions is one by Rodney (1972) who noted that the term development in the human and individual sense connotes increasing skills and capacity, greater freedom, creativity, self-discipline, responsibility and material well-being. Hence, for him, development is such that it does not only lead to an increase in the economic or financial reserve of a country or individual, but also the addition of value to the individuals in terms of knowledge (measured by the level of education and mean years of schooling in a country), the standard of living (GDP per capita), life expectancy (health system), and infrastructural build-up.

From the foregoing, socio-economic development emphasizes progress in terms of both economic (liberal) and social (Marxist) factors within a geographic entity. Economic development is the process of raising the level of prosperity through increased production, distribution and consumption of goods and services. Social development, on the other hand, focuses on the concerns of the people as objectives of development and people-centred, participatory approaches to development measured through multidimensional poverty levels, employment, security, education, health, etc. (Fritz, 2018). Thus, socio-economic development can be generally defined as the process, changes, or improvement in the social and economic conditions that affect an individual or a society. These social and economic factors include income (GDP /Per Capita Income), health, levels of education, employment level, infrastructure, and environmental sustainability (United Nations Development Programme, 2023).

Relationship between sustainable waste management and socio-economic development

The relationship between sustainable waste management and socio-economic development is positive. A positive relationship between them entails that an increase in sustainable waste management indiscriminately increases socio-economic development. Similarly, a decrease or reduction in sustainable waste management would result in a decrease or reduction in socio-economic development in a given entity (McLeod, 2023).

Pragmatically, sustainable waste management directly affects many aspects of socioeconomic development including health, revenue generation through industrialization and manufacturing, urbanization, job creation, natural resource conservation, free and motorable road transportation network, etc. (Wan, et al, 2019). For instance, in the aspect of health development, sustainable waste management directly purges the environment from waste in public and private residential areas. These wastes are those which could contaminate soils and rivers, hence, causing harm to plants, aquatic and animal lives, and which could cause serious health concerns to the public, and may also lead to death. The effect would be reduced life expectancy and human capacity loss. In addition, healthcare and medical wastes such as body fluids, syringes, needles, ampoules, organs/body parts, disposable plastics, etc., when improperly disposed of or managed can prove to be dangerous by inducing infections within health facilities and among people working outside of health settings such as waste handlers, scavengers, and others. Hence, the sustainable waste management of such wastes would reduce the possibility of an outbreak or spread of certain infections and diseases, thereby reducing the risk of deaths and low life expectancy caused by unhealthy environmental conditions (Onyekwelu, et al, 2022).

Sustainable waste management techniques like reuse and recycling promote industrialization and manufacturing by making available cheap raw materials for the

manufacturing process without recourse to natural raw materials on which excessive dependence would result in resource depletion (Ekeuwei, et al, 2022). This reduces the cost of production and holistically, inflation in an entity. For instance, aluminum which is one of the fastest and easiest materials to recycle is used in numerous manufacturing industries which makes it and its by-products one of the cheapest minerals on earth (VLS Environmental Solutions, 2022; Neuman, 2019).

Also, owing to its profitability, sustainable waste management has attracted massive private and public investments which have enhanced the proliferation of industries, job creation, and increased revenue to respective countries. For instance, it is observed that Nigeria generates over 32 million tonnes of solid waste annually, with plastic waste constituting around 2.5 million. With a tonne of plastic waste averaging over \$150, many private organizations have ventured into waste management and recycling, hence, creating jobs and multiplying revenue through taxes to the government (Ezeobi, 2022). This has increased the number of industries involved in waste recycling, hence, boosting industrialization and income flow. For instance, the Lagos State Waste Management Authority (LAWMA) reported that the waste recycling industry alone generated over ₦18 billion in 2021 (Akingbolu, 2023).

Sustainable waste management can also boost urbanization and infrastructural development through the tourism and hospitality sectors. The inextricable link between them exists in the fact that proper waste management enhances the sustainability of a tourist area, the quality of the tourism experiences that the area offers, and the general image of the area both nationally and internationally. This would in the long run spark the influx of not only tourists but also organizations and individuals alike, which would further enrich economic activities and enhance the need for urban infrastructural development in the area (Koliotasi, et al, 2023). Additionally, sustainable waste management is also linked to natural resource conservation which is a factor of sustainable development. Furthermore, sustainable waste management could also ease road transportation networks and reduce congestion on public roads. Roads which are usually heaped with waste most times prove to be inaccessible, thus, restricting mobility by pedestrians. The application of sustainable waste management techniques eliminates such waste which could also affect small and medium-sized enterprises (SMEs) in those areas (Ifokwe, 2021).

Theoretical Framework: The Zero Waste Theory

The term ‘Zero Waste’ was first coined in 1973 by Paul Palmer, a chemist whose company, Zero Waste Systems, was established to reduce the amount of chemical waste in laboratories across the United States. Following the success of the assignment, the term which later became a practice rose into a movement in the late 1990s and has been adopted as a theory for explaining the process of sustainable waste management over the years (Walsh, 2017).

The theory posits that getting rid of or disposing of the waste is not the best form of waste management but rather, such waste is maximized through recycling and conserved through responsible production, consumption, reuse and recovery, packaging with burning them to prevent the risks of discharges to land, water, or air that threaten the environment or human health. The theory proposes a whole systems approach that aims for a massive change in the way materials flow through society, resulting in no or zero waste. This approach is the 5R approach which is defined as refuse, reduce, reuse, recycle, and rot (Vrachovska, 2022).

Extensively, the theory states that sustainable waste management does not only involve the recycling and reuse or proper disposal (which is also known as “rot” in the 5R) of waste but first, the refusal of wastes. The refusal of wastes here refers to the rejection of wastes or products that would constitute wastes from entering the household or an individual’s possession through certain preventive behaviours. For instance, carrying a refillable water bottle and hot drink cup to refuse plastic bottles and single-use cups is one of the strategies of

refusal. With this in place, other aspects of sustainable waste management like reduction, recycling and reuse, and rot would be easier, and would substantially reduce or eliminate the act of sending wastes to landfills, incinerators, oceans or other parts of the environment, thereby causing harm to individuals and affecting socio-economic development (Bell, 2020, Snow & Dickson, 2001; Vrachovska, 2022). The theory has however been criticized for focusing too much on sustainable living which is dependent on a privileged amount of disposable income and time (Matossian, 2023).

The theory is relevant for the study in that it entrenches a systematic approach to sustainable waste management which reduces the impacts of waste on the environment, while also promoting the conversion of such wastes into new products which would be beneficial to society. In both facets, the reduction of impacts of waste on the environment means the attraction of socio-economic development through the reduction of health risks, promotion of job creation and revenue generation through industrialization and manufacturing, accelerating urbanization, and promoting ease of business for Small and Medium-Sized Enterprises (SMEs) in a particular entity.

Sustainable Waste Management in Uyo Metropolis, Akwa Ibom State

Akwa Ibom State which is one of the Niger Delta States in Nigeria has emerged as the cleanest state in Nigeria for five (5) consecutive years from 2018-2022. This has been attributed to the activities of the Akwa Ibom State Environmental Protection and Waste Management Agency (AKSEPWMA) which was reformed and revitalized in 2018 under the leadership of its current Chairman, Dr. Prince Ikim (Udonquak, 2021). Before the reformation of the agency in 2018 which led to the acquisition of new equipment such as compacting trucks and galvanizing receptacles, waste management in the Uyo metropolis was particularly bedevilled by dilapidated waste management equipment and the lackadaisical nature of waste workers. For instance, Okey et al., (2013) observed that most of the equipment like compactor trucks, tippers, pick-ups, side and rear loaders, and skip trucks used in the collection and transfer of waste were all in a state of disrepair and breakdown, which resulted to a low efficiency of waste collection with less than 50% of solid waste generated in Uyo conveyed to dump sites. This left major areas in the metropolis like Ikot Ebido Junction, Udo Udoma Road, Oron Road by Nyong Essien, etc., in immeasurable waste which also disrupted economic activities in these areas.

However, since 2018, the reform of the AKSEPWMA has changed the trajectory of waste management in the state which produces over 15,000 tonnes of municipal household waste daily (Udonquak, 2021). This was however achieved through the institution of waste management programmes such as the Greater Akwa Ibom Clean-Up Campaign, which was aimed at intensifying public awareness/sensitization towards proper waste management through environmental sanitation and the distribution of over 13,000 waste baskets and receptacles in the state. In addition, the agency was provided with 15 compacting trucks/tippers as against 3 before 2019, twenty (20) 5,000 litres of waste dumps, 50 galvanized roller waste bins, and an increment in personnel to ensure the evacuation of wastes from illegal waste dump areas to the Uyo village dumpsite which is the state's central dumpsite (Tom, 2022). As a result, there are over 215 authorized garbage dumps in Uyo alone of which 160 are high-volume dumping areas with 55 in low wastes designated areas. The metropolis is also segmented into 7 garbage evacuation zones, each of which is overseen by a resource person called a contractor. Each zone is formally allocated 4 evacuation trucks with 6 evacuators (conductors) each with a driver (Tom, 2022). The campaign also led to the reintroduction of the monthly environmental sanitation with improved levels of cleanliness and participation, acquisition of new equipment, augmentation of war against street dumping and trading in Uyo by arresting and prosecuting offenders, placement of waste receptacles/dumpsites at approved dump points,

maintenance of a clean and healthy environment through daily sweeping of roads, vegetation control, massive desilting of gutters, the employment of more than 4,000 personnel, decontamination of public places like hospitals and schools, and the collaboration with stakeholders for sustainable waste management in the metropolis (Tom, 2022). These practices have reduced the exposure of residents to health hazards, eased business activities among SMEs, and attracted tourism as well as infrastructural development in the metropolis.

The agency uses recycling as a method of managing waste. Recycling is the collection and reuse of everyday waste materials such as empty beverage containers, papers, plastics, metals, cloths, foods, and bottles. The preparatory stages of recycling are usually carried out by the agency. After the wastes have been collected by the different receptacles spread across the city, the waste trucks evacuate those receptacles and move them to the dumping site. The dumpsite is situated at Uyo village road near the government house, where all wastes in Uyo are collected and dumped. Afterwards, the process of recycling begins. First, the process of differentiation is carried out. This process involves the segregation of all wastes differently from another that is plastic to plastic, paper to paper, metals to metals, bottles to bottles, etc. After the sorting process is completed, trucks then move the sorted wastes to different recycling plants within the city (AKSEPWMA, 2023). However, the recycling of wastes in the Uyo metropolis has not received wide attention as such is coordinated by the informal sector with little or no organization and regulation from the government. Hence, the informal and uncoordinated manner in which such is executed in the metropolis makes it difficult to determine its contributions to socio-economic development. Though the concentration on waste collection and disposal, and the awareness created has augured well for the metropolis in terms of reducing exposure to health hazards, attraction of tourism, and boosting business operations amongst SMEs, these do not cover what sustainable waste management entails, hence, reducing its contributions to socio-economic development. Aspects of sustainable waste management like recycling, reuse and recovery would result in the preservation of natural resources for future generations, reduction in climate changes, and environmental degradation, which are the core of sustainable development (Ekeuwei et al, 2022).

The agency also uses the method of incineration as a method of managing waste in Uyo City, which is not sustainable. Incineration is the process of combustion of waste materials. It is the conversion of waste materials into heat, gas, steam and ash. The process of incineration is usually carried out by the agency from different locations where the receptacles are positioned across the city. The waste trucks transport these wastes to the dumpsites located at Uyo Village Road after the process of selection has been completed. The unimportant wastes are then incinerated (AKSEPWMA, 2023). This method of waste management is unsustainable largely because gaseous emissions arising from it may include carbon dioxide (the most significant of greenhouse gases), sulphur dioxide and oxides of nitrogen, which contribute to acid rain. Others include highly toxic substances such as heavy metals and hydrocarbons such as dioxins. This may pollute air quality and result in climate change, while also posing health problems such as neoplasia, congenital anomalies, infant death, and even miscarriages. While the world is moving away from incineration as a measure of waste management owing to these effects, the concentration on this aspect increases the risks of environmental degradation especially in the long run (World & Washington, 2022). Hence, it is in place to aver that waste management in the Uyo metropolis as coordinated by AKSEPWMA is not sustainable.

Challenges of Sustainable Waste Management in Uyo Metropolis

The major challenge of sustainable waste management in the Uyo metropolis is the absence of formal recognition for waste recycling and reuse by the government. Recycling is one of the measures for sustainable waste management which not only offers economic benefits to the state but also ensures the provision of new products into the environment for use, as well as

clearing the environment of waste (Ayomide, 2021). However, recycling has not gained wide recognition in Uyo and Akwa Ibom state over the years owing to the absence of a policy framework towards that direction. Consequently, waste recycling is being done on a small scale through small companies in the informal sector. The absence of a formal, organized and well-regulated recycling framework has compressed the dumpsite along the Uyo village road which is close to the Uyo Local Government Secretariat, and which further places mobility along the area at risk (Sampson, 2023). However, in recent developments, the State through the AKSEPWMA has called for a private-public partnership for a large-scale and formal waste recycling industry in the state. This call which was made in July 2023, is powered by the “Refuse-to-Riches” initiative of the AKSEPWMA (eTender, 2023).

Conclusions

Waste management when made sustainable is instrumental for sustainable socio-economic development in an entity through natural resource conservation for future generations, provision of new products for use, and environmental hygiene for reduction of health risks amongst residents. However, it has been observed that waste management in the Uyo metropolis only covers the aspect of waste collection, transfer and disposal for environmental hygiene, with other aspects like recycling and reuse not formally operational. Hence, since sustainable waste management is not pervasive in the Uyo metropolis, the impacts thereof are not conspicuous. For aspects of socio-economic development like health safety, employment, tourism, revenue generation, etc., to be improved through waste management, such practices must adopt measures for sustainability as proffered by international provisions.

Recommendations

From the findings of the study, the following recommendations are made:

1. The Akwa Ibom State government should expedite the establishment of a formal waste recycling sector through public-private partnerships with both indigenous and non-indigenous waste recycling companies.
2. The AKSEPWMA should be critically supervised by the Ministry of Environment and Mineral Resources to evaluate the mannerism of execution of its plans and programmes.
3. Waste management equipment should be handled carefully and responsibly with repairs of failed equipment fast-tracked by the AKSEPWMA. However, the reason for such breakdowns should be reported and recorded to punish carelessness among the equipment handlers.
4. The AKSEPWMA should implement a whistle-blowing strategy on improper waste disposal methods in the metropolis. Reporters of improper waste disposal methods with evidence should be rewarded with cash awards with culprits punished accordingly.
5. The state government should impose an inclusive punitive measure for streets with illegal waste dumps and blocked sewage canals/gutters where all nearby residents of the area are to be punished in cases of violation. A resident can only be exonerated if he/she has reported any case or improper waste disposal in the area under consideration, or has evidence of such.
6. A morning and evening task force should be instituted to curb the menace of street trading in major areas and markets in the metropolis.

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