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PLASTIC AND IRON WASTE RECYCLING POLLUTION IN LAGOS STATE, NIGERIA

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Abstract
Lagos State had experienced adverse pollution as a result of lack of proper waste management and diverse industrial activities within its environs. The repercussion of this has consequently led to the deplorable state of the environment as well as the low quality of health amongst residents. Waste management has become a huge and intricate problem due to geometric population growth, urbanisation, industrialisation and the rising standard of living. This study investigated Plastic and Iron Waste Recycling Pollution in Lagos State, Nigeria. This study concluded that hazards of Plastic and Iron Waste Recycling Pollution in Lagos State; the drainage systems habitually blocked causing yearly flooding which usually lasted throughout the rainy seasons from April to October and displaced millions of residents. The clogged sewage systems became the perfect breeding environment for mosquitoes and flooding washed away footpaths caused people to move around in dirty water from overflowed gutters and polluted major sources of drinking water which led to the spread of cholera and typhoid fever. Also, higher levels of toxic heavy metals were observed among residents at close proximity to recycling iron factories. For environmental sustainability in Lagos State plastic and iron waste recycling pollution must be seriously cautioned in following; environmental impact assessment is necessary for any development in Lagos State, recycling programmes and waste to energy facilities can be reawaken with modernised and ecological friendly technologies.
Keywords: Iron waste, Plastic waste, Pollution, Waste recycling, Waste management.

1.0 Introduction

Throughout history, the environment and natural resources have been vital in shaping the social, political and economic transformations of nations globally. In Africa, these factors have also been at the heart of the narrative surrounding the continent's environmental crisis. The environment has borne the brunt of human excesses in their struggle for survival. It is a complex network of physical, chemical and biological factors that interact and affect all living things and their surroundings. As a life-supporting system, the environment is essential for human existence and survival while also providing the resources necessary for

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socio-economic progress. Environment is the source of global economy that must be protected and sustainably managed.

Many of the generally acknowledged global environmental problems (greenhouse warming, ozone depletion, soil erosion, chemical management, acidic rain and water pollution, among others) were directly or indirectly caused by the creation, operation, or disposal of the built environment undertaken by man. It was believed that many of the environmental challenges were caused by human activities which called for social action on environmental sustainability. Before the objectives of environmental sustainability can be achieved, there must be someone at the helm of authority who has historical and sociological knowledge of what is and what ought to be (Oyefara, 2013). Some residents of Lagos State polluted environment as if it has no implications on their community health and social welfare. Inadequate management of wastes posed severe environmental health risk on human populations also capable of inflicting permanent damage on the ecological systems. Considering the magnitude of waste generated daily and bearing in mind the fact that there appears to be no effective structured programme for the efficient management and disposal of these wastes, in spite of their environmental effects on human health there is need for an understanding of the dynamics that are essential for the explanation of the trends and emerging disease epidemics on the human environment. People need to be aware of the implications of their actions on the environment, most especially as it affects their health. Thousands of lives were lost every year to environment-related diseases such as cholera, diarrhea, malaria fever, typhoid fever, blindness and so on (Akande, 2018). Waste includes all items that people no longer have any use for, which they either intend to get rid of or have already discarded. Additionally, wastes are such items which people are required discarding. Many items can be considered as wastes e.g., household rubbish, sewage, sludge, wastes from manufacturing activities, packaging items, discarded cars, old televisions, garden waste and old paint containers (European Environment Agency, 2013). However, this work investigated Plastic and Iron Waste Recycling Pollution in Lagos State.

2.0 Theoretical Framework

Structural functionalism theory was originated from Emile Durkheim's work and others like Herbert Spencer, Talcott Parsons, Robert Merton, as founding thinkers of sociology. Durkheim's work focused on maintaining social order and stability in the society. The functionalist perspective operated on the macro-theoretical level, viewing society as consensual frame analogous to a biological unit whose subsystems are inseparably inter-related and interdependent. This theory helped us to see the environment as made up of several sub-units which must be maintained as a whole for the benefit of human health. Any malfunction in any component of the environment will result in environmental damage, with implications on human health. According to the Structural functionalist theory, institutions must survive by adapting to changing circumstances by means of interdependence on its various branches or partners. The actors and agencies in environmental health and waste management adapted to this theory if viewed the various actors as functional parts of a social phenomenon like pollution. Here, the agents or actors (Ministry of Environment and Water Resources, Ministry of Physical Planning, Ministry of Health, LASEPA, LAWMA, Private Sector Paticipation (PSP) and Residents) must be seen as interdependent organs of a larger

organisation or society (Lagos State). While each having its specialised functions working as a whole towards the common goal of delivering effective service and carrying out responsibilities in ensuring a functioning healthy environment in Lagos State.

2.1 Review of Literature

Pollution is an unfavourable alteration in the physical, chemical or biological characteristics of air, water and land that will adversely affect human life, industrial life, industrial progress, living conditions and cultural assets Thus, it is a sort of negative stress exerted on the positive health of the ecosystem (Mbah, & Nzeadibe, 2017). The substance that causes the undesirable changes in the air, water and land are referred to as the pollutants. Pollutant is a substance (e.g., dust, smoke), chemicals or factor (like heat, noise etc.) that on release into the environment has an actual or potential adverse effect on human interests (Ayeyemi & Ayinla, 2019). According to Heinrich Boll Foundation (2020), pollutant has been defined as any solid, liquid or gaseous substance present in such concentration as may be or tend to be injurious to the environment. Various types of pollutants ranging from gaseous pollutants to radioactive wastes exist in nature. However, for convenience, the entire pollutant spectrum may be dived into two broad categories namely biodegradable and non-biodegradable pollutants.

3.0 Methodology

This study used secondary historical data (information from persons who do not witness the event e.g. textbooks, newspapers, journals etc.). Textual which is a secondary source of data was used to generate data on Plastic and Iron Waste Recycling Pollution in Lagos State.

Most of these secondary data were from different ministries, departments and agencies that are working in the areas of environment in the state. These include: Lagos Sate Ministry of the Environment and Water Resources, Ministry of Agriculture, Lagos State Water Corporation, Lagos Waste Management Authority (LAWMA) and Lagos State Wastewater Management Office (LASWMO). The primary data for the study was collected through direct oral interviews of 28 residents through random sampling technique.

4.0 Critical Analysis

Plastic Waste Pollution in Lagos State

About 20 million tons of primary plastics and plastic products were imported into Nigeria through Lagos ports between 1996 to 2017 (Heinrich Böll Foundation, 2020), a number that is expected to rise to over 40 million tons by 2030 according to the Plastic Atlas (2020), aggravating the already existing plastic pollution in Lagos Nigeria. According to the Food and Beverage Recycling Alliance (FBRA), Lagos State produced half of the estimated 150,000 annual metric ton of used plastic waste in Nigeria (Adewole, 2013). In other words, over 7,500 tons of plastic waste were created daily but only 2,500 tons can be recycled; the remainder ends up in the waterways and illegal dumpsites across the city (Ojewale, 2019).

Lagos being a coastal city, highly susceptible to the harmful effects of climate change induced impacts such as increased precipitation and intensity of floods. The vulnerability

of Lagos is consistently threatened by damaging storms and floods (Mackay, Webster and Kermeliotis, 2012). An illustration was the flooding of July 2011 where roads were converted to rivers, sewers burst, homes were destroyed, hundreds of people were displaced and the economy of Lagos was crippled. The low topography of Lagos coupled with poorly managed and insufficient infrastructure further exacerbated the city's vulnerabilities to climate change. Therefore, waste played a major role here because uncollected wastes from households and businesses in Lagos Metropolis clogged drains and caused flood. Rapid urbanisation, globalisation, and an exponentially increasing population have made waste management a complex problem in Lagos Nigeria (Mackay, Webster and Kermeliotis, 2012).

In 2012, Lagos Waste Management Authority (LAWMA), introduced waste banks and buy-back programme to improve waste management in the Lagos metropolis. The idea were two recycling initiatives called "waste to wealth" and "buy-back waste programme" for residents of the state to earn money from specific waste items on the streets as landfills could no longer take all the non-biodegradable materials (Mbah and Nzeadibe, 2017). In 2019, the state waste management board in its road map to a more resource-efficient Lagos announced its plans to optimise generated waste for a zero-waste economy. Among listed strategies were Private Sector Participation (PSP), waste sorting, recycling and public enlightenment on plastic waste management in the 20 local government areas of the state (Abolore, Oral Interview, 2023). Lack of adequate waste disposal infrastructures and the high cost of recycling have increased the reluctance to invest in recycling business in Lagos State which compounded the complexity and potential for recycling. While local initiatives like Wecyclers, Kaltani, Risley Bridge Company and Recycle Point collaborated with local scavengers picked specific types of plastic bottles, polyethylene bags and empty sachet water packs in exchange for money per kilograms, only a very little percentage were eventually recycled compared to overall plastic waste in Lagos (Abolore, Oral Interview, 2023).

In the absence of proper sustainable recycling mechanisms, large quantities of empty plastic bottles and plastic bags collected ended up accumulated in warehouses. The buy-back programme launched in 2012 by the Lagos State Government to curb plastic waste pollution and recycling initiatives in the state has failed to deliver on the promise of cutting down plastic waste (Adefarati, Oral Interview, 2023).

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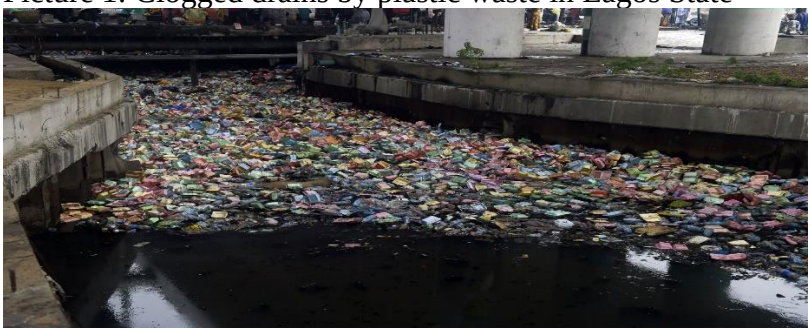
Source: The Researcher's Photograph 1st April, 2023
Picture 1: Clogged drains by plastic waste in Lagos State



Source: The Researcher's Photograph 1st April, 2023
Picture 2: Plastic pollution in Lagos State

Iron Waste Recycling Pollution

Rapid industrialisation and unorganised urbanisation have contributed to the elevated levels of heavy metals in the urban environment in developing countries (Wong et al., 2002). Many important metals have been recovered and recycled including iron and steel, copper, brass and aluminium (Norgate, Jahanshahi and Rankin, 2006; Onwughara, Nnorom and Charles, 2010). Scrap metal recycling industries are among a number of industries that contributed to the increasing amount of heavy metals in the environment in Lagos State (Sanyaolu, et al 2018).

However, improper recycling activities ranging from poor storage facilities to improper disposal of waste generated or accumulated during and after recycling activities led to heavy metal pollution of the environment. Heavy metal exposure occurred significantly by occupational exposure as workers of the mining, production and processing of these metals have been so exposed (Ogwuegbu and Muhanga, 2005). Also, inhabitants around industrial sites were exposed through air by suspended particulate matters (Ogwuegbu and Muhanga, 2005). Heavy metal entres into the body through ingestion and inhalation (Onwughara, Nnorom and Charles, 2010). Heavy metal residues have been reported in drinking water, cultivated soil and edible vegetables around Ikorodu-Shagamu axis of Lagos State

(Mabadeje and Uzo, Oral Interview, 2023). And this occurred as a direct consequence of improper and poorly regulated recycling activities of these iron recycling factories. Also, higher levels of toxic heavy metals were observed among residents at close proximity to recycling metal factories (Abolore, Oral Interview, 2023).

According to Vahter et al. (2007) and Akinola et al. (2014) uptake of heavy metals occurred through ingestion and inhalation, although percentage uptake is higher for inhaled metals than for ingested metals. Routes of exposure in Ikorodu – Shagamu axis area were probably through inhalation of contaminated smoke laden air usually common around the factories and through intake of contaminated food and water (Abolore, Oral Interview, 2023). Earlier reports had shown that hair levels of metals correlate positively with body burden, past or chronic ingestion of the elements and highly with pathological disorders (Longe, 2013). This further suggested that people living at heavy metal zone areas may suffer some health risk of lead toxicity. Low levels of lead in blood have been associated with increase blood pressure, decreased creatinine clearance, subtle decrements in cognitive performance and iron deficiency (Onwughara, et al., 2010).

Accumulated lead in human is mostly sequestered in the bones and teeth and this leads to brittle bones and weakness in the wrists and fingers. This finally entres the blood stream during the periods of increased bone mineral recycling namely pregnancy, lactation, menopause, advancing age, etc. (Arikpo, Oral Inverview, 2023). Mobilised lead can be re-deposited in the soft tissues of the body and can cause musculoskeletal, renal, ocular, immunological, neurological, reproductive, and developmental effects. Kidney diseases including interstitial nephritis, tubular damage, hyperuricemia, decline in glomerular filtration rate and chronic renal failure have been observed in adults as a result of lead poison (Adefarati, Oral Interview, 2023).

Source: The Researcher's Photograph 3rd October 2023
Picture 3: Iron recycling factory pollution in Odogunyan, Lagos State

Source: The Researcher's Photograph 3rd October, 2023
Picture 4: Iron recycling factory pollution in Odogunyan, Lagos State

Source: The Researcher's Photograph 3rd October, 2023
Picture 5: Iron recycling factory pollution in Odogunyan, Lagos State

Health Risks

People need to be aware of the implications of their actions on the environment, most especially as it affects their health. The air which is an unavoidable source of life has been polluted with chemicals, smoke, pathogens or offensive odour. Seepage from refuse dumps (iron waste) often pollutes the underground and surface water. The environment is sick and

the sicknesses are less than natural but the effect of human activities. Similarly, National Planning Commission (NPC) and United Nation Children Education Fund (UNICEF,2001) asserted that in most cities, the methods of decomposing rubbish provided breeding grounds for rats, flies and mosquitoes contributed to the unhealthy living environment. Microorganisms can be spread in the air, water, food and contact with people. It can even be through disease vectors. These organisms cause diseases that may have deadly consequences.

It is a known fact that human health is contingent among other things, on the quality of air we breathe, the food we eat, the water we drink and the environment in which we live. Indiscriminate disposal of wastes is a threat to human health. Okebukola (2001) stated that inadequate disposal of wastes is a major factor in the spread of gastrointestinal and parasitic diseases primarily caused by vectors. He further asserted that diarrhea, cholera and typhoid fever are among the major killer diseases due to improper disposal of waste. Healthy people contribute greatly to the health and wealth of nation. The environment in which people live influences their health. A healthy environment remains one source of well-being. It is the responsibility of individuals, households, communities, organisations, and the government to promote healthy environment.

Analysing the health risk of exposure to smoke, a medical consultant said that individuals with cardiovascular or respiratory conditions (e.g., asthma), fetuses, infants, young children, and the elderly might be more vulnerable to the health effects of smoke exposure in communties. According to him, smoke released by any type of fire (forest, crop, structure, tyres, waste, wood burning or recycling) is a mixture of particles and chemicals produced by incomplete burning of carbon-containing materials. The type and amount of particles and chemicals in smoke varies depending on what is burning, how much oxygen is available, and the burning temperature. According to the consultant, studies have shown that some people exposed to heavy smoke have temporary changes in lung function, which makes breathing more difficult. He added that two of the major agents in smoke which could cause health effects were carbon monoxide gas and very small particles. If the smoke or air pollution continues, people may experience irritation of the eyes and throat; wheezing, coughing, chest tightness, and breathing difficulties; worsening of existing lung and heart problems such as asthma; increased risk of heart attack. Long exposure to air pollution can cause cancer and damage to the immune, neurological, reproductive and respiratory systems (Ayeyemi and Ayinla, 2019).

5.0 Conclusion

As indicated above, the high level of urbanisation and industrialisation in Lagos State with the inevitable generation and lack of management of pollution sources have led to undesirable impacts on human and environment.

5.1 Recommendations

Lagos State Government must prioritize maintaining a clean and hazard-free environment as a key component of sustainable development. Urgent action is needed to educate residents and industrialists on modern recycling and composting practices in order to curb

situation where winds carried poorly disposed plastic bags over long distance and they got entangled on trees and sometimes on electric cables. Regular environmental impact assessment for factories and projects in Lagos State are essential. Many factories operate without oversight from government agencies and posed serious effects on environment. Lagos State Government must enforce regular environmental impact assessments for all factories and projects within the state prior to implementation. These assessments should be conducted by competent personnel specialising on social and environmental research. The government should ensure that reports from these assessments are submitted several months before project commencement, allowing sufficient time for public feedback and complaints. It is imperative that the authenticity of these reports is verified and strict adherence to these procedures is maintained to promote sustainable environmental development. By implementing these measures, the government can effectively address the environmental concerns of the current generation while safeguarding resources for future generations.

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