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THE IMPACT OF IMPROPER SOLID WASTE DISPOSAL IN SOME SELECTED AREAS OF LOKOJA, KOGI STATE, NIGERIA

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ABSTRACT

The issue of waste management is gradually becoming a concern in cities today especially in developing nations like Nigeria with rapidly increasing population. Improper disposal of waste in cities tend to deface the cities and also expose the inhabitants to health hazards and diseases such as malarial, typhoid fever and cholera among others. This study examines the implication of improper solid waste disposal and environmental issues in Lokoja, Kogi state with a view to promoting environmental justice in the area, in view of this, the methods of waste disposal in the study area were assessed and analysed using statistical tools. Five neighbourhoods (Kabawa, Old-market, Ganaja, Phase one and Adankolo) were selected in the study area. Two sets of questionnaires were administered to the residents in regular households, and the staff of government agencies concerned. 1100 residential buildings were identified out of which 10% was sampled using simple random sampling and systematic sampling methods, at the Kogi state waste management authority, one staff was sampled using purposive sampling. The study revealed that there is indiscriminate disposal of waste in some parts of the study area which may be the reason for the prevalence of diseases in the study area. The study also revealed that some of the residents burn their wastes within their compounds thereby releasing smoke which is a poisonous substance into the atmosphere. The study therefore recommends that adequate attention be paid to waste management by both the state and local government in order to ensure a healthy and conducive environment. Generally, the study shows that soil, air and water pollution in the study area are caused by both pathogenic and chemical elements from these heaps of solid waste that dot some of the major streets and open spaces. Therefore, a strong legislation with severe sanction be put in place, complete reorganization of the entire waste disposal system within the city metropolis should be well reorganised and a continuous public enlightenment on the danger of metropolitan waste to the general public.

***Keywords**: Diseases, Environment Issues, Wastes Disposal, Waste Management, Urban justice.*

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1.0 INTRODUCTION

Waste management has gradually become an issue of concern in cities especially in developing nations like Nigeria with rapid increasing population. The generation of waste dates back to the existence of man and increases with increase in population as well as increase in the activities of man. As cited in Douglas (2014), the oxford Advance Learners Dictionary define waste as something that is not or no longer useful and is to be thrown

away or disposed of, they are materials which arise from animal and human life and activities and are discarded as useless and unwanted. Solid waste can be defined as unwanted or discarded products that are solid arising from human and animal activities, it could be municipal solid wastes, i.e. household and domestic, industrial solid waste or agricultural solid waste. According to the United State Environmental Protection Agency, solid wastes are useless, unwanted or discarded materials with insufficient liquid content to be free flowing (Chukwuemeka, Ugwu & Igwegbe 2012). Solid wastes if not properly managed can have negative impacts on the health of people, quality of the environment, urban landscape as well as the social well-being of the people. The messy nature of overflowing dumps, unattended heaps of solid wastes emanating from household or domestic sources, markets, shopping and business centres are major issues that have resulted in urban residents being confronted with health and safety hazards. According to Karibo (2008), stakeholders concerned with the safety and beautification of the environment have come to realize the negative consequences of uncleared human wastes in residential areas, markets, schools and central business districts. It is therefore no longer in doubt that our cities are faced with the challenges of uncleared solid wastes.

The management of solid waste has posed a serious challenge to the development of many developing nations across the globe. According to Adeyemi, Olorunfemi & Adewoye (2011) solid wastes constitute a major problem in most developing countries and the management of such waste is one of the most intractable problems facing city administrators and environmental agencies Ogu (2010) highlighted that about 75-95% of the wastes generated in some low level income communities in Africa are not collected for safe disposal. In Nigeria, the problem of solid waste generation and disposal is one of the pressing environmental and public health issues, the rapidly increasing population which is complemented by rapid urbanization and industrialization in urban areas, the socio-economic status of the residents as well as the predominant commercial activities in the area has resulted into a dramatic increase in the volume of wastes generated. One of the observable impacts of rapidly growing urbanization and economic development in emerging cities is witnessed in the form of heaps of municipal solid waste at inappropriate locations (Agunwamba, 2008, 2013; Babayemi and Dauda 2014). According to Agunwamba (2001), current estimates in Nigeria reveal an annual solid waste generation of 24million tonnes with an urban growth exceeding 6.8% per annum.

The problem of solid waste disposal is becoming interactable as many cities in Nigeria cannot keep pace with urbanization, pollution, and the increasingly concomitant generation of garbage due to changing life styles and consumption patterns. The mountainous heaps of solid wastes that deface Nigeria cities and the continuous discharge of industrial contaminants into streams and rivers without treatment are issues of concern in the country. In an attempt to solve this problems, the Federal government of Nigeria established the Federal Environmental Protection Agency (FEPA) whose desired actions include the collection and disposal of solid waste in an environmentally safe manner;

setting up and enforcement of laws, regulations and standards, encouragement of public participation, environment monitoring and imposition of penalties on defaulters to encourage compliance (FEPA 1989; FRN 1991). A national policy on the environment was formed and its goals were to secure a quality of environment adequate for the health and well-being of the citizens; raise public awareness and promote understanding of the essential linkages between the environments and development; and to encourage individual and community participation in environmental protection and improvement efforts (FEPA, 1989).

A monthly environmental sanitation was also introduced by the state government which the local government were expected to take a cue from and evolve their own solid waste management strategies based on the peculiarities of their environment; many of them did this by setting up waste management boards or authorities. In spite of all these, the environment has not been adequately protected, interest is mainly on aesthetics, which is rarely achieved (Agunwanba, 2008). Wastes collection is irregular and restricted to the major cities. Improperly sited open dumps deface several cities, thereby endangering public health by encouraging the spread of odours and diseases; uncontrolled recycling of contaminated goods and; pollution of water sources (Adegoke, 2008; Singh, 2008). This study examines the assessment of the impacts of improper solid waste disposal in Lokoja, Nigeria with a view to providing an environmentally healthy and friendly area; to achieve this, the various waste disposal methods used in the study area were assessed. Five neighbourhood were identified in the residential area of Lokoja namely, Kabawa, Old market, Ganaja, Adankolo and phase one.

2.0 The Study Area

Lokoja metropolis is the study area and it became the capital of Kogi State when it was created in 1991(Olwoeye, 2012). The city is located between latitude 70 45' 27.56" -70 51' 04.34" N and longitude 60 41' 55.64" -60 45' 36.58" E of the equator with a total land coverage of about 63.82 sq. km. (Adeoye, 2012). The city is strategically located on the confluence of Rivers Niger and Benue, thus given the city unique geographical location both nationally and internationally (Olwoeye, 2015). Lokoja was the first administrative and commercial capital of Nigeria which ended in 1960(Ali, 2012). The city location and surrounding geographical features have influenced the growth pattern over the years from a small fishing village to its present political status. The linear development along Kabawa, Ganaja Road and Muritala -Muhammed Way is one of the prominent features of the city. Cluster population areas are in Adankolo, Anguwar Yashi area of Lokoja. The two features have led to the concentration of commercial activities and residential areas along the roads and subsequent heavy waste generated by them.

Two types of road networks are found in Lokoja. These are the State arterial and local roads. The state roads are controlled and maintained by the state government. These roads are tarred and smooth for some parts of their length. Pot holes have developed on some of these roads which impede the free movement of vehicles on urban routes. The secondary arterial roads which is the local government roads, connect different cultural

features in the city. Some of these roads are not wide and contain numerous pot-holes. However, the generation and disposal of wastes are usually dumping along the road side thereby courses a nuisance to the health of the populace in the study area.

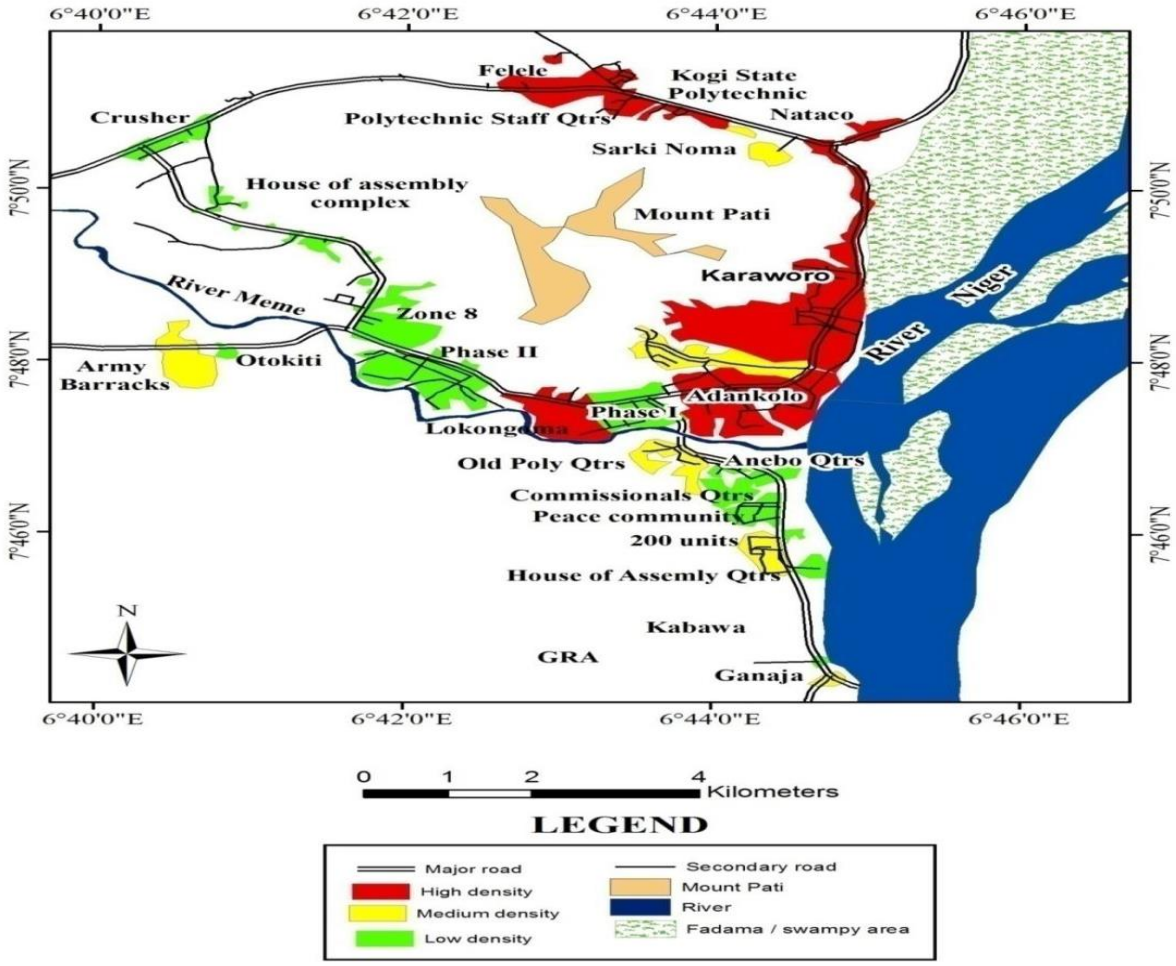

Figure 1: Lokoja Built up Areas
Source: kogi poly GIS Laboratory, (2018)

3.0 Literature Review and conceptual issues for the study

Waste refers to the leaves/twinges, food remnants, paper/cartons, textile materials, bones, ash/dust/stones, dead animals, human and animal excreta, construction and demolishing debris, domestic debris, household hardware like electrical appliances, furniture, etc. according to Bringi (2017), they are materials discharged and discarded from each stage of daily human life activities and could lead to adverse impacts on human health and the environment. Tanaka (2016), states that the volume of solid waste is expected to increase steadily along with economic growth, according to him, the most visible implication of

rapid urbanization is the increasing generation of municipal solid waste; a highly neglected problem with severe health and environmental implications. Zewdu & Mohammedbirhan, (2014) opines that the urban poor suffer disproportionately from bad environmental sanitation, particularly informal waste collectors and recyclers, which bring in illness caused by water and vector borne disease. Hammer (2013) in a report prepared for the World Bank stated that solid wastes disposed indiscriminately result in aesthetic problems, constituting nuisance, pollution of land and water bodies in the study area.

Sharholy, Ahmad, Mahmood & Trivedi (2018) in a study on municipal solid waste management in Indian cities submits that municipal solid waste management is one of the major environmental problems of Indian cities and improper management of such waste causes hazards to inhabitants. According to him, various studies reveal that about 95% of municipal solid waste are disposed of unscientifically in open dumps and landfills, creating problems to public health and the environment. In the study by Ejaz, Akhtar, Nisar & Naeem (2010) on environmental impacts of improper solid waste management in developing countries; a case of Rawalpindi city, it was observed that open dumping, open burning and dumping of solid wastes to un-engineered landfill sites is what is being practiced, and this has led to serious negative impacts such as the presence of dust and filthy dirt, odour and smoke, provision of habitat for rats and other vermin, exposure of toxic gases into the atmosphere, leachates as a result of percolating rainwater through the open dump contaminating ground water resources as well as ill health and poor sanitation. In Pakistan, due to unplanned communities and developments in major cities, environmental and sanitary conditions are becoming very complex; collection efficiency of the existing solid waste systems is very low due to a lack of storage bins and improper management system (Ejaz, et. al, 2010). According to the ministry of the Environment, about 55,750 tons of solid waste are being generated on daily basis in urban area in Pakistan and less than 55 percent of the generated solid waste are collected properly; there is no city in Pakistan that have proper waste collection and disposal system for municipal and hazardous waste (Ejaz et al,2010). Due to improper solid waste disposal and collection systems dwellers are facing serious negative environmental impacts in developing countries (Engineering Planning and Management Consultant, 2016). Solid waste management therefore became a major concern in most cities in developing countries.

The state of solid waste management in Nigeria has been a major concern to stakeholders (Ezeah & Roberts, 2013). According to Ogwueleka (2009) some of the characteristics of waste management in Nigeria are inefficient collection and unsafe disposal, there is a general lackadaisical attitude on the part of the government towards waste management (Agunwamba, 2008). It was observed by Adeyemi et al (2011) that the management of municipal solid waste in Nigeria revolves mainly around open burning, open dumps, land filling, reuse/recycling and waste conversion. Adeoye, Sridhar, Adeoluwa & Akinsoji

(2015) in a study on the Evaluation of Naturally Decomposed Solid Wastes from municipal dump sites for their manorial value in Southwest Nigeria observed that there are illegal solid waste dumps in several parts of Lokoja in Kogi state and found that these waste dumps undergo physical and chemical changes under the intense heat of the sun thereby posing the risk of pollution to the ecosystem.
This study is conceptualized in line with the concepts of sustainable development which deals with meeting the present need of the people without jeopardizing the ability to the future generation to meet their needs and the zero waste concept which guides people in the redesign of their resource use system with the aim of reducing waste to zero. Zero waste requires maximization of existing recycling and re-use efforts, while ensuring products are designed for the environment and having the potential to be repaired, reused or recycled. The zero-waste strategy is to turn the outputs from every resource use into the input for another use. Awosusi, Oriye, & Owoeye (2012) used zero waste city concept for waste management and development in slum communities of Ado-Ekiti. According to the study, cities are over consuming and the per capital waste generation is relatively higher in high consuming cities compared to low consuming cities.

Cities are not only over-populated and over-consuming in nature but complete global finite natural resources at a high level. There is a positive relationship between urbanization and poverty (UN-Habitat, 2008) and the relationship indicates that expanding cities in a sustainable manner is an important factor for global sustainability. Manzini (2008) and Awosusi et.al. (2012) opines that the issue of how to redesign existing systems, design new products for consumption systems and design new scenarios for quality of life are now major questions for urban planners and researchers. These concepts are well suited to the study because the selected areas, that is, Ganaja, Adankolo, Old-market, Kabawa and Phase one are majorly areas of concerned within the Lokoja metropolis.

4.0 Materials and Method

Two sets of questionnaires were used to obtain data from the population audiences of the research; the first set of questionnaires was administered to the residents in regular households in the study area while the second set was administered to the staff of government agencies concerned. 1300 residential buildings were identified out of which 10% was sampled; one (1) staff of the Kogi state waste management authority was sampled. Total number of questionnaires administered was 130. Table 1 below shows the breakdown of the sample frame and size of the residents in the study area.

Table 1: Sample Frame and Size for the study.

S/N	AREA	NO. OF BUILDINGS	10% Sampled
1	Ganaji	250	25
2	Old-market	260	26
3	Adankolo	290	29
4	Kabawa	230	23
5	Phase	1270	27
TOTAL		**1300**	**130**

Source: author's fieldwork, 2019.

The simple random sampling and the systematic sampling methods were used to administer questionnaires to the residents in the study area while purposive sampling was employed at the Kogi state waste management authority. The simple random sampling was used for sampling the buildings in the study area while systematic random was used for the interval of the buildings to each other in the area e.g. (every 5th house) and one household per building was sampled. Analysis and presentation of data was done using the statistical package for social sciences (SPSS) and Microsoft word.

5.0 Findings and Discussions

5.1 Sources of solid waste generated in the study area

The study revealed three major sources of solid waste generated in the study area, these are Domestic, Agricultural and Commercial wastes. Domestic wastes are generated from the households; agricultural wastes are generated from farming activities, falling of leaves from trees and animal grazing in the study area, and commercial wastes are generated from markets, shops and other commercial activities in the study area.

5.2 Composition of solid wastes generated in the study area

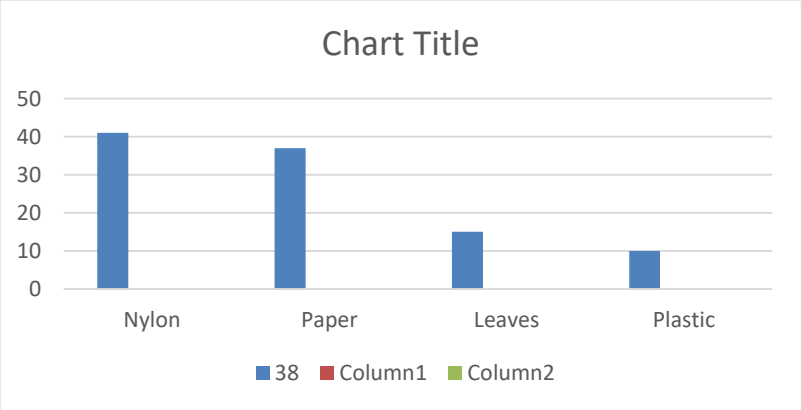

Figure 2: sources of solid waste generated in the study area
Source: Author's field work, 2019.

Figure 2 above shows as revealed by the study the composition of the waste generated in the study area and it was discovered that nylon was the most common waste generated in the area followed by paper, leaves and plastic.

5.3. Methods of Waste Disposal in the Study Area

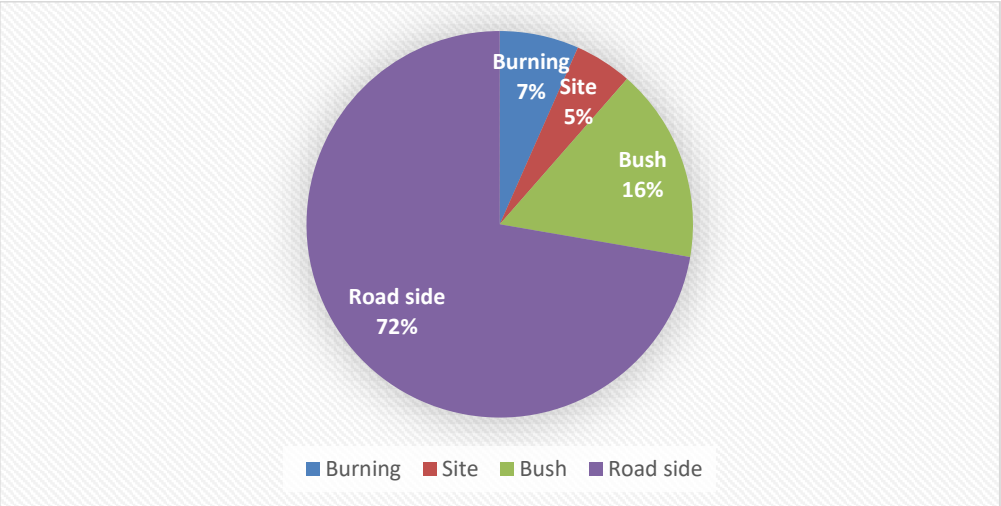

Figure 3; various methods of disposing waste in the study area.

Source; Author's field work, 2019.

The study shows as revealed in figure 3 above that 72% of the respondents dispose their waste using the road side dumping, 7% burn within their compounds, 16% dump their waste in nearby bush while the remaining 5% dump their waste in an open dumpsite. The result shows that majority of the respondents sampled do not dump their waste properly in the designation area and these are the major reason for the environment still being unkept as shown in plates 1 to 5 below.

Plate 1. Indiscriminate dumping of waste in Adankolo area.
Source: Author's field work, 2019

plate 2. Urban solid waste along Old-market area.
Source: Author's field work, 2019

Plate 3. Urban solid waste at Phase 1 area
Source: Author's field work, 2019

Plate 4. Urban solid waste at Ganaja showing children selling sugar cane around the waste.
Source: Author's field work, 2019

Plate 5 Composition of waste and its indiscriminate disposal in Kabawa area
Source: Author's field work, 2019

5.4. Methods of Storing Waste before Disposal

The study revealed that 9.5% of the respondents store their refuse in polythene bags, 35.5% in dustbins, and 39% in plastic containers while 2% stores theirs in a drum. It was also discovered that most of the respondents that store their refuse in polythene bags, drums do not have access to the services of the waste management authority and therefore dump their refuse in bushes, vacant plots, gutters or canals.

5.5. Health related problems

Indiscriminate disposal of waste which leads to environmental pollution exposes the residents to health hazards; figure 4 below shows as revealed by the study the prevalent disease in the study area. Cholera has the highest value after which malaria comes, other diseases that the respondents in the study area have are typhoid, asthma and diarrhoea. The disposal of waste into open dump sites, bushes and vacant plots, along streets and roads, etc favours the breeding of mosquitoes and other flies and insects as well as contamination of water bodies which could lead to malaria, cholera, typhoid fever and other types of diseases. This may therefore be the reason for the high rate of malaria and diarrhoea in the study area.

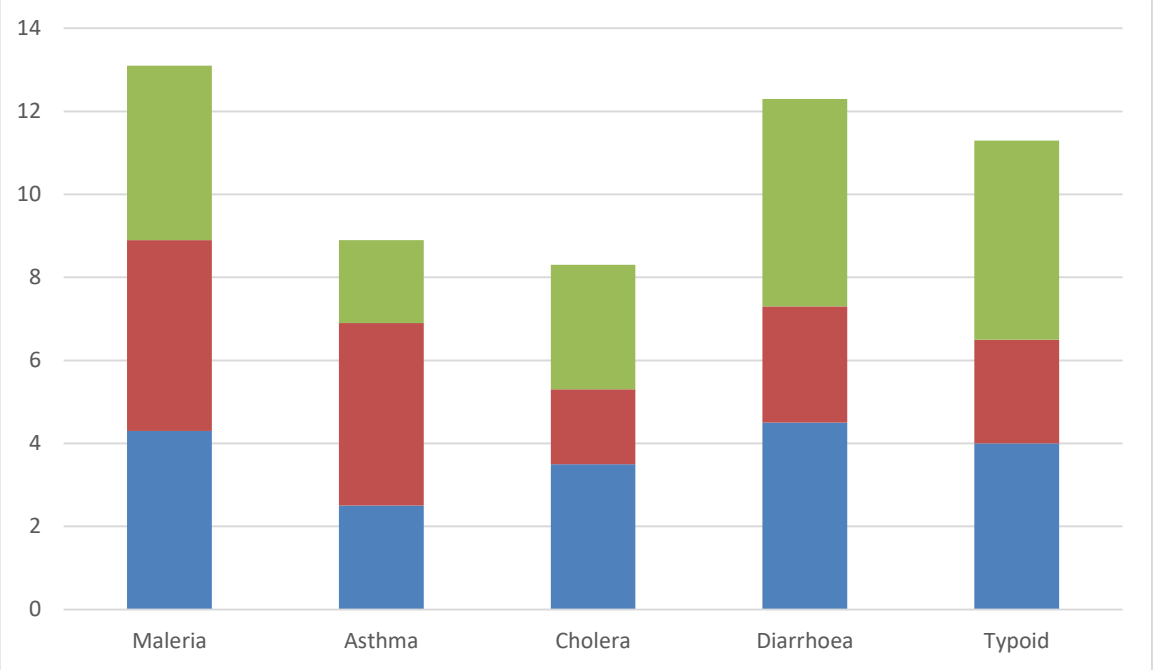

Figure 4; Common diseases associated with waste disposal in the study area.
Source; Author's field work, 2019

Plate 6 indiscriminate dumping of waste along the River Niger in the study area.
Source; Author's field work, 2019

5.6. Economic Development Problem

Improper solid waste disposal has been observed to degrade the resource base of an area. Its impacts are seen in market environment, blockage of drainage, odour quality, and

movement of pollutants, infrastructure and building uses, and effects of flooding (Dlamini, 2014). The presence of dirt in the area as well as indiscriminate dump sites does not make the area attractive to business or even individual who want to develop residential buildings. The aggregate of wastes that are not been properly managed in the study area can therefore affect the economic development of the area.

Environmental Issues

The environmental consequences of urban solid waste in Lokoja are enormous. If the solid wastes were not managed properly, decomposition and putrefaction may take place, causing land and water pollution when the waste products percolate down into the underground water resources. The organic solid waste during decomposition may generate obnoxious odours. Stray dogs and birds may sometimes invade garbage heaps and may spread it over the neighbourhood causing unhygienic and unhealthy surroundings.

Plate7. Air and land pollution for USW at Ganaja, Ajaokuta road, Lokoja

Source; Author's field work, 2019

6.0 Kogi State Waste Management Authority

6.1. Functions of KSWMA

The Kogi state waste management authority (KSWMA) was established in march, 1995 to address the problem of waste in Kogi state and started experiencing great improvement by enforcing laws on the people living in the state. The authority is to work with the local governments and other agencies within and outside the state to among other things; complement or take part in the organization, monitoring and supervision of environmental sanitation campaigns so as to generate adequate awareness of the need for effective storage, collection and disposal of waste in kogi state and, ensure that every owner or occupier of a premises (household/commercial shops or stalls) is to provide and maintain at least one portable covered refuse bin, which the size and type of which should be

approved by the authority's officials for the collection and storage of refuse in their premises.

6.1.2. Facilities Available for Waste Collection and Disposal

It was discovered in the course of the study that the Authority has eight (8) side loading trucks out of which with five (5) are functioning, seven (7) Rear end compactors out of which five (5) are in use, seven (6) compactors with five (4) in use, one thousand (1000) communal bins out of which seven hundred (700) has been distributed across the city and the Environs.

Table 2: Vehicles and Equipment Owned by the Authority

Type of vehicle or equipment	Number available	Number in use
Side loading trucks	8	5
Rear end compactors	7	5
Compactors	6	4
Communal bins	700	500

Source: Author's field work, 2019.

This research identified 1300 buildings in the study area which is more than the total number of communal bins possessed by the authority for the entire city and it environ, it may therefore be inferred from this that the vehicles and equipment possessed by the authority would not be sufficient for collection and disposal of waste.

6.2.3: Disposal of Waste by the Authority

The study revealed that sold waste collected from the study area are transported to an open dumpsite located along Ganaja-Ajaokuta highway. This open dumpsite which is supposed to be a sanitary landfill is still far from it as all necessary facilities required to make it so are yet to be put in place. As a result of this, there is need for daily operation and maintenance which requires the use of some more equipment like bulldozers which the authority does not have. It may therefore be inferred from this that the open dumpsite used by the authority is unorganized and may lead to problems in the near future if proper care is not taken.

6.2.4: Summary of findings

Solid wastes generation in the study area is on the high side, the wastes are mostly from domestic, agricultural and commercial sources, the solid waste generated in the study area are composed of degradable and non-degradable materials. The following solid waste components were identified, food material, plastic/nylon, tin/cans, leaves/paper, metals. Improper waste disposal in the study area is one of the major causes of pollution in the

study area and it has a negative impact on the health of the respondents as well as the quality and beauty of the environment they live in, the activities and operation of KSWMA is not sufficient for waste management in the study area, the open dumpsite used by the authority is unorganized and may lead to problems in the near future if proper care are not taken.

Conclusion and Recommendations

Waste generation is a daily affair and if not properly managed, it would lead to an environment whose quality are very low, it will affect the life and living conditions of the citizens and also destroy the beauty of the environment as discovered in the study. Improper management of solid waste also affects the economic development in the area as discovered in the study and exposes the inhabitants to different types of disease from pollution. Water, air and soil pollution all occur when they become contaminated with hazardous materials such as wastes which causes harm to wildlife and contribute to a possibility of a widespread, greenhouse, gas effect.

Dumping of refuse by the road side, nearby bush or vacant plots, open dumpsite etc which is common to the residents in the study area does not only disfigure the environment, it causes air pollution which are very dangerous and breeds mosquitos and other poisonous insects or flies, built up waste creates soot and smog in the atmosphere and results in poor air quality, reduced oxygen levels for plants and vegetation and increased rates in respiratory diseases. Burning of wastes releases smoke into the atmosphere, exposes gas such as carbon monoxide and methane to the air and contribute to the creation of greenhouse gas effect which have a negative impact on the earth. There is therefore a need for both the state and local government to pay adequate attention to the management of waste in the study area, especially the areas where the Kogi state waste management authority (KSWMA) does not cover. Awareness and public enlightenment programmes should be organized to educate people on the importance of proper waste disposal.

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