ASSESSING SOLID WASTE MANAGEMENT AND ENVIRONMENTAL SUSTAINABILITY IN LOKOJA, NIGERIA

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Abstract

Waste management has become a common issue of discourse among individuals, groups and governments. This study which assessed urban solid waste management in Kogi state with focus on Lokoja urban specifically sought to find out why indiscriminate solid waste disposal/dumps has persisted in Lokoja urban, investigate the measures put in place to curtail the tide and ascertain the extent to which indiscriminate waste disposal affects people's health and environment. Two null hypotheses were formulated and Human Capital Theory was adopted as the theoretical framework. The study used survey design whereby data were collected from the sample considered to be representative of the population. Taro Yameni's formula was applied to reduce the initial population of 195,261 to a smaller researchable size of 399 while data were collected through structured questionnaire. The data collected were presented in tables containing frequencies of the responses and their corresponding percentages. The two hypotheses of the study were tested using chi-square (X^2) statistical tool and the result of the analyses revealed that: there is currently no government approved dumpsites in Lokoja metropolis, most communicable diseases are contracted from dirty environment, among others. The implications are that most households will soon be cut off by flood arising from the blockage of water channels, some streets and roads will be blocked by heaps of wastes and more epidemics will be contracted by the people if nothing urgent was done. The study concluded that, the Kogi State Environmental Protection Agency (KGSEPA) currently have no required manpower, technical skills and competences to curtail the tide of waste and therefore made the following recommendations: Kogi state government should strengthen the already established departments of Environmental in Kogi State polytechnic (KSP) and the School of Health Technology, Iddah, by providing and equipping them with modern waste management equipment for students to be exposed to practical methods of waste management, Government should contract foreign-based private firm through Public-Private-Partnership (PPP) arrangement to establish waste management industry in Kogi state, immediate provision of permanent waste dumpsites by the government, among others.

Keywords: Environment, Sustainability, Waste management, Lokoja

INTRODUCTION

Waste often generated by human beings since time immemorial has continued to be a threatening problem and a growing one that is of major concern to every nation of the world. In Nigeria today, among the pressing environmental and public health issues are the problems of solid waste generation, control and disposal. Although the problem of solid waste disposal is as old as man's existence that is inextricably linked to the generation of waste, the truth is that in many cities, it has become so intractable that even the government is overwhelmed (Jimoh, 2005, Momodu, Dimuna and Dimuna, 2011). Waste in the words of Douglas (2004) is any unwanted and discarded material that arises from the activities of humans and animals on earth. For Onwughara, Nnorom and Kanno (2010), Urban Solid Waste (USW) covers a broad range of materials including garbage, refuse from factories, commercial refuse, construction and demolition debris, dead animals and abandoned vehicles, food particles, plastics, bottles, polythene material (nylon bag), metallic objects, furniture/wood material, paper and some other unclassified wastes. Rodgers (2011) submits that waste management is a systematic control of the generation, storage, collection, transportation, separation, processing, recovery and disposal of waste. In pre-industrial times, when population was small, waste was disposed on the ground, thrown into water, burnt or thrown into pit where it would turn to compost manure to improve soil fertility. From history, man is believed to have always adopted

dumping, burning, manual recycling and waste minimization as waste management strategies with less than proportionate result in terms of cleaner and healthier environment. One can therefore say that human development or growth has been intrinsically tied to the management of waste, apparently due to its effects on public and environmental health, (Chukwuemeka, Ugwu and Igwegbe, 2012, and Ndinwa, Akpafun and Chukwuma, 2012).

Today, due to rapid industrialization, increase in population and urbanization, the generation, disposal or management of waste has proved to be a major environmental and public health issue. This experience is always so, especially in developing countries like Nigeria where there is lack of or inappropriate strategies for managing wastes. Urban waste management today has become an intractable environmental problem that can be likened to a monster staring everybody on the face. Solid waste dumps apart from its gory sight that destroy the aesthetics (beauty) of the environment have always affected the people's health by decomposing to produce provoking odour or contaminating our drinking water. This no doubt, causes avoidable epidemics. This was what promoted the federal government of Nigeria to promulgate decree 58 for the establishment of Federal Environmental Protection Agency (FEPA) on 30th December, 1988 (Momodu et al (2011). A National Policy on the Environment was also formed to secure for all Nigerians a quality of environment adequate for their health and well-being. He submitted that in spite of the formulation of FEPA and a national environmental policy, the environment has not been adequately protected. It should be recalled that, prior to the creation of Kogi state in 1991, Lokoja urban was faced with myriad of environmental problems ranging from inadequate environmental education and awareness campaign to poor personal and environmental hygiene. Every street was adorned with heaps of refuse while Niger and Benue rivers, in Lokoja urban were converted to dumping arena for domestic wastes and human excreta. It was in response to the foregoing realities in Kogi State upon its creation in 1991 that prompted the government to set up the Kogi State Environmental Protection Agency (KGSEPA) on 6th December, 1995, to clean, protect and conserve the environment.

While it cannot be denied that for quite some time, Kogi State Environmental Protection Agency(KGSEPA) as a state government agency has always embarked on some routine clearance of wastes, especially in the capital city (daily, weekly and monthly), provision of plastic dustbins for waste collection and evacuation, stationing of waste collection trucks in strategic places within the metropolis and its suburbs, house-to-house sanitary inspection and waste collection, the intractable nature of urban wastes always noticeable in Lokoja urban leaves much to be desired especially as the local government whose constitutional responsibility it is to properly dispose and control these wastes, have been doing nothing. This has been why the commonly repeated experience is a simple transfer of refuse from one point to another in open trucks to some undesignated sites where they are either burnt or buried (Onwughara et al, 2010 and, Nkwede and Nwuzor, 2015).

The problem of solid waste generation, control, especially, disposal or simply, management, has continued to be a threatening global and environmental health issue but more pronounced in developing countries like Nigeria. In fact, Nigeria's major urban centres including Lokoja are today grappling with the problems caused by indiscriminate heaps of solid wastes from the environment. This is despite the continuous government and individual efforts including daily, weekly or monthly environmental sanitation. Waste disposal habit of the people, lack of experienced and skilled manpower, inadequate/lack of modern plant and equipment, among others, militate against any waste management effort/strategy in Nigeria, particularly in Kogi State metropolis (Lokoja urban). The failure of relevant agencies to stem the tide of reckless waste dumping and littering of our capital city and surrounding bushes indicate a clear pattern of non-enforcement or non/poor implementation of existing environmental sanitation laws (Momodu et al 2011). Unfortunately too, the concerned local governments whose constitutional responsibility it is to properly collect and dispose of these wastes (refuse) have either forgotten or consciously neglected their duties.

Residents of Lokoja urban are today apprehensive of epidemic outbreak as refuse takes over the metropolis. Indeed, heaps of refuse have become common sights along major roads, streets, common markets and at bus stops within the state capital prompting residents to express fear that the situation can lead to an avoidable epidemic outbreak if urgent steps were not taken by relevant stakeholders to ameliorate the situation. Although Kogi State government has always claimed to have imported some machines to be used in waste management including promising and paying the contractors on actuality bases, the truth is that such machines/equipment if any, have not been seen to be doing anything especially as there is still no matching manpower skills and intelligence to manipulate them even among the Kogi State Environmental Protection Agency (KGSEPA) staff as the agency is statutorily and structurally deficient in that regard.

Therefore, the persistent increase in the number of indiscriminate solid waste disposal/dumps despite the provision of the customized Kogi State Environmental Protection Agency (KGSEPA) waste bins/stationary trucks which has continued to affect people's health and environment in Lokoja urban without any concrete management strategy in place necessitated this research. The broad objective of the study was to assess waste management in Lokoja urban. Specifically, the study sought to:

• Find out why the number of indiscriminate solid waste disposal/dumps has continued to increase in Lokoja urban despite the provisions of the customized Kogi State Environmental Protection Agency (KGSEPA) waste bins/stationary trucks.

• Investigate measures already put in place to ensure that the Kogi State Environmental Protection Agency (KGSEPA) equipment curtail the tide of indiscriminate solid waste dumps in Lokoja urban.

• Ascertain the extent to which indiscriminate solid waste disposal/dumps have contributed to health complications suffered by the people in Lokoja urban.

• Ascertain the number of ways in which indiscriminate solid waste disposal/dumps affect the Lokoja urban environment.

The Concept of Waste Management

The concept of waste management has attracted a lot of attention from researchers, scholars and the general public. In Nigeria today, the issue is so burning that the government seem to be helpless on the best alternative measure or strategy to be adopted to curtail the tide of waste. This is because, apart from the horror sights that these wastes create in our urban centers, their negative health and environmental consequences (effects) are always far-reaching. "With the advent of industrial revolution, waste management became a critical issue. This was owing to the increase in population and massive shifts in population from rural areas to industrial towns and cities during mid-18th century. There was a consequent increase in industrial and domestic wastes posing threat to human health and environment".

However, the submissions of Chukwuemeka and others that increased urbanizations and industrialization were the major causes of waste management challenges, were vehemently criticized by Adejobi and Olorunnimbe, 2012, Tobore, 2013 and Attah (2013) when they argued that the volume of waste generated do not actually constitute the major environmental problem but rather, the inability of governments, individuals and waste management/disposal agencies to keep up with the task of proper and efficient management of waste. This also is defective in that it lacks specificity on how or where government should concentrate. Waste management simply means the collection, keeping, treatment and disposal of waste in such a way as to render them harmless to human life and the environment in general, Attah (2013). He went further to conceptualize waste management to be the organized and systematic dumping and channeling of waste through or into landfills or pathways to ensure that they are disposed off with attention to acceptable public health and environmental safeguard. He concluded that proper waste management will result in the abatement or total elimination of pollution. Attah understands of waste management to mean a situation where waste is removed in such a way as to avoid its health and environmental harm, has some elements of truth but one-sided.

This is because, disposal or evacuation as his definition suggests, is only an aspect of management. Burning, burying and the likes, reduce the health and environmental effects of waste, but they are not complete management in themselves since waste is said to be managed if apart from the foregoing, it is utilized to serve another purpose or add marginal utility. Rodgers (2011), quoted in Chukwuemeka et al (2012), contends that waste management is a systematic control of generation, storage, collection, transportation, separation, processing, recovery and disposal of solid waste. This definition address critical processes of solid waste management but, it is selective as the only emphasis is on solid waste. It should be noted that other wastes including liquid and gas can be converted or managed to serve valuable uses.

Waste must not always be seen as something that is completely valueless or rubbish that must be discarded, but as something which when properly managed can create wealth. In line with this, Nwude, Igboro, Umar and Okuofu (2006:85), advised that: "Waste should not be regarded as something to be thrown away or disposed off, but as raw material. So, like the biosphere, all wastes generated by industries or consumers should be put back into the industrial economy as much as possible. This is what recycling or management is all about. Sridhar (2006), in agreement with Nwude et al, noted that waste management is at once a technical, cultural and financial problem and so involves various steps including; collection, transportation and recycling. To him, this will help in waste minimization or reduction. It should be noted that waste recycling as a strategy for waste management, will as much as possible guarantee waste to wealth options.

It is timely to point out that waste management is an aspect of environmental management or sustainability which can be interpreted as a conscious and systematic effort by one or more persons acting in concert to produce an aesthetically pleasing, economically viable and physically healthy environment. This may be why Oyediran (1997), defined waste management as the collection, transportation, storage, treatment and disposal of wastes including the after care of the disposal site. It also comprises all administrative, financial, legal and planning functions, as well as, the physical aspects of solid waste handling. For us, waste management is a calculated, conscious and timely efforts made through variety of measures/techniques or strategies by individuals group(s), agency or government to effectively generate, sort and dispose waste for better uses and still preserve and protect the people's health and environment. Simply put, waste management implies any strategy or method that will nip waste in the bud by eliminating its harmful effects and making it useful to man.

Types of Solid Waste

Solid wastes are classified into different types depending on their sources namely, household generated waste, known as municipal waste. Industrial waste is described as hazardous waste, while waste generated in the hospital is termed infectious waste. Oreyomi (2005) classified solid waste as combustible items such as cartons, boxes, plastic, clothing etc. And non-combustible articles such as cans, ashes, glass, metals, furniture and bathtubs etc. Oreyomi (2005) further observed that garbage denotes waste resulting from growing, handling, preparation and consumption of food. It attracts and breeds flies and other insects, tats and it emits odour. Rubbish comprises of combustible and non-combustible items such as papers, plastic, cans and glass, while industrial wastes are sawdust, paper and iron. Agricultural wastes are wastes originating from agricultural products such as corncob, banana stub, skin and leaves etc.

Efforts towards Waste Management in Nigeria

If there is any problem in which both the government and individuals are tired of, confused and losing sleep about in Nigeria, it is squarely and mainly that of environmental wastes. Nigeria's major urban centers are today fighting to clear mounting heaps of solid wastes from their environments. Nigerian government since independence has been mapping out strategies making different efforts towards curtailing the tides of the ever increasing wastes in its urban centers but with little or no appreciable results. The Nigerian government being aware of the need for high quality urban

environment accordingly made bold attempts at improving urban environmental management. In the first place, Nigeria is committed to a national policy that ensures sustainable development based on proper management of the environment in order to meet the needs of the present and future generations (Federal Republic of Nigeria, 1990). To achieve this laudable objective, the Federal Environmental Protection Agency (FEPA) was established in 1988 and was charged with the responsibility of setting, monitoring and enforcing national environmental quality standards (Madu, 2001). It was also authorized to handle all forms of environmental problems and formulate policies dealing with them (FEPA 1989 cited in Madu, 2001).

FEPA has now been scrapped and its activities incorporated in the Ministry of Environment. Dimuna (2004:132) noted that: Specifically, the national guidelines and standards for environmental pollution and control of 1991 and the pollution abatement in industries and facilities generating waste regulation also of 1991 stipulate guidelines for the design, construction, maintenance and operation of landfill and the requirements for landfill permit. On the other hand, the Environmental Impact Assessment (EIA) decree 86 of 1992 makes it mandatory for new major projects (including waste disposal facilities) to undertake EIA. Some states including Kogi, have implemented the monthly clean up exercises to the later including setting up mobile environmental courts to try defaulters but our urban cities have been overwhelmed by indiscriminate wastes. Kogi state governments through KGSEPA has gone to the extent of contracting some private firms with the mandate of ride of the city of wastes and are being paid on actuality basis. The foregoing are evidences that Nigerian government at all levels have not been sleeping on duty in trying to keep the environment clean.

The various planning and policy documents in Nigeria show that sufficient attention has been given to environmental policies and programmes and so, the persistent problem of environmental deterioration in the country must therefore be explained by the wide gap existing between policy goals and achievements. In every state for instance, there are state environmental protection agencies whose mandate it is to ensure clean and healthy environment for all inhabitants. In Kogi state, the agency is known as the Kogi State Environmental Protection Agency (KGSEPA).

MATERIALS AND METHODS

Study Area

Lokoja is located in the western part of kogi state of Nigeria surrounded by river Niger and Benue forming confluence from where the name is derived. Lokoja is located in the guinea savanna zone of Nigeria, within longitude 06^0 $57^{'}$E – 06^0 $63^{'}$E and latitude 07^0 $74^{'}$N – 07^0 $79^{'}$ N (Longman, 2000).

The North-east distance of the confluence is about 104 km while from the east to the west; it stretches for about 78km to Jamata. The confluence covers an area of about 6,400km2 (Oyebanji, 1993). The location of the confluence in Nigeria is within latitude 8^0 $28^{'}$ E and 10^0 $02^{'}$ E. Within this area, Lokoja metropolis lies on latitude 9^0 $52^{'}$ N and longitude 8^0 $50^{'}$ E,

Lokoja town has two seasons, the wet and the dry seasons, with two maximal rainfalls between April-October and the dry season between November-March. The highest peak of the rain is between July and September. Lokoja area is hot, average daily temperatures range from 24^0c to 36^0c. The hottest months are February to April. In the latter month, temperature used to drop to below 24^0c and relative humidity as high as 60%. In the period of cool November to January, temperature drop to 18^0c and rise again to 24^0c during the rainy season around May to September. The average annual rainfall is about 158cm (1540mm). The wet season started in April and terminates in October while the dry season lasts from November to March. (Olaniran, 2002).

The vegetation of Lokoja is Guinea savanna type. It is vegetation that made up of scattered deciduous trees and grasses forming the lower stratum. The savanna here is modified by relief thus, the trees are fewer and the grasses are longer than those of the adjoining villages, but the vegetation does not form a true montaine plant cover (Adefolalu, 1990). Because of land water cover, over cultivation and grazing, only relics of the original vegetation still remain especially areas far from the city (Adejuwon, 1999).

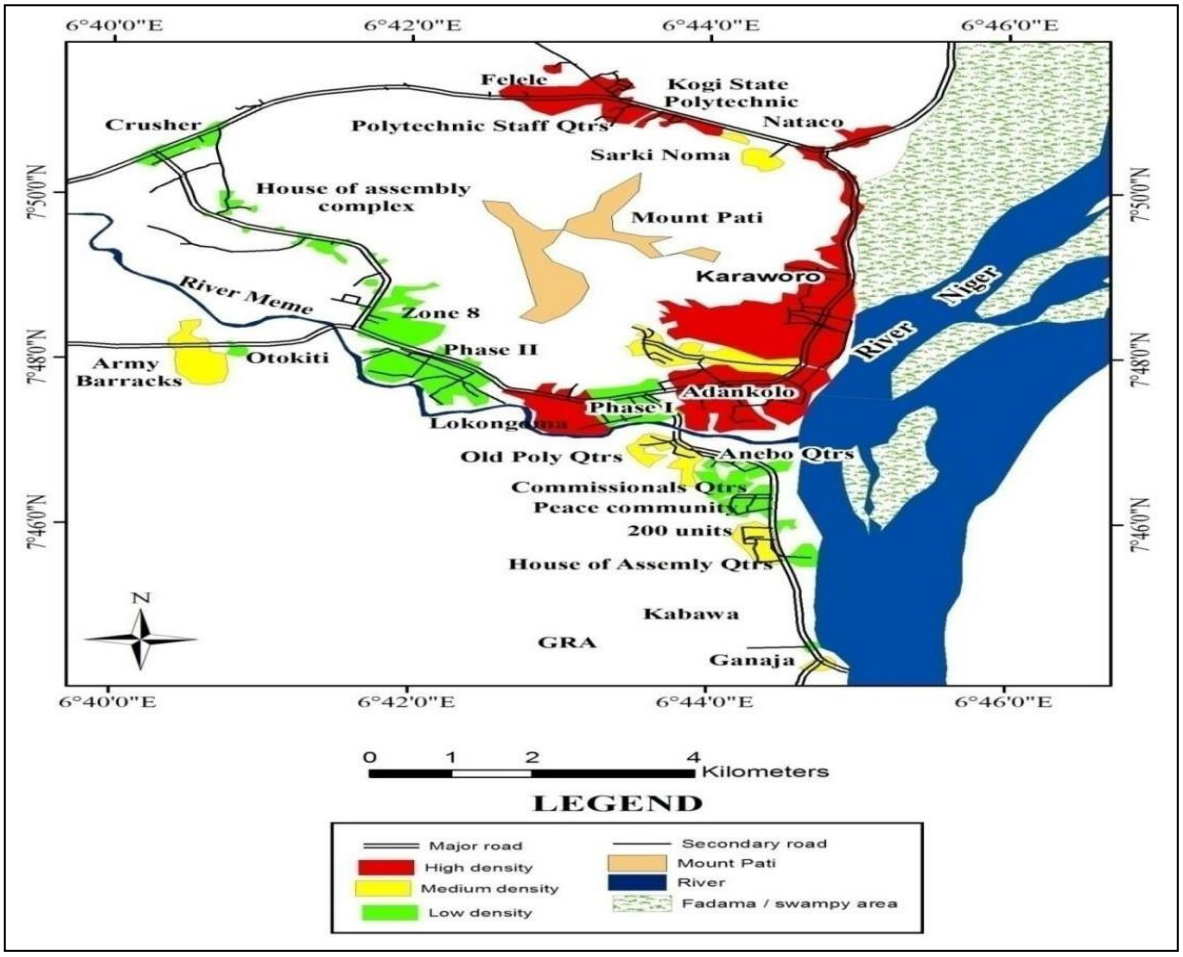

Figure 1 Kogi State showing Lokoja Built-Up Area
Adapted from Ukoje, 2013.

The geology and geomorphology of confluence Lokoja came about through complex processes which are briefly described here; the geology comprises basement complex rocks which have been intruded by igneous and metamorphic rocks. There are older and younger granites. The basalts are made up of older basalts, and newer basalts. According to textural and mineralogical composition, the older granites are divided into three sub-groups, biotite hornblende, porphyritic, biotite which are made of granite and quartz which are mostly non- porphrite and have medium to coarse grains and there are biotite and biotite granite, characterized by fine to medium grain sizes. The latest granites were intruded into Precambrian gnesis during the Jurassic age and because they are more recent than the older basement granites, they are referred to as younger granites (Oyebanji, 1993).

Soils of Lokoja are predominantly zonal tropical ferruginous type, sedimentary along mid- Niger, Alluvial along Niger and Benue, Humus further inland and are characterized by deep chemical weathering profiles as deep as 45m in some places (Faniran, 1994) and 1.5m to 2m thick in other places. The deep weathering profiles can be attributed to periodic high tropical temperature, abundant rainfall and high susceptibility of the rocks to weathering. Lithosols which are a zone soil, occur on the base slopes of the granitic hills and mountains. The lithosols are thin and poorly developed because they are made up of screed, thus, they are of poor agricultural value. There are also vertisols and hydromorphic soils. Verticals occur along the flood plains or fadama areas. They have high content of swelling clays which crack readily when dry resulting to shrinking, and mass movement (Faniran, 1992).

The hydromorphic soils area suborder of intrazonal soils, they are formed under conditions of poor drainage in marshes, swamps areas or flat (Adejuwon and Ekanade,1998)

Methodology

This study adopted human capital theory as its framework of analysis. Arthur Lewis is said to have begun the idea of human capital when he wrote in 1954 about the economic development with unlimited supplies of labour but it was first discussed by Arthur Cecil Pigou. According to this theory, the principal source of productive capacity or management whether in an economy or organization, rests in the capacity of the people and so, human capital has to do with the stock or a collection of resources - all the knowledge, talents, skills, abilities, experience, intelligence, training, judgment and wisdom possessed individually and collectively by people and which represents a form of wealth which can be used to overcome any challenge and directed to accomplish the goals of the nation or state or a portion thereof. Human capital is directly related to human development and effective and efficient uses of the wealth of nation, and so, where there is human development, the qualitative and quantitative progress of a nation or any part thereof is inevitable. This human resource can be transformed into human capital with effective inputs of education, health and moral values and the transformation of raw human resource into highly productive human resource with these inputs is the process of human capital formation. Madu (2001) argued that human capital development is a sure-bet for solving any human or environmental issue that involves proper exploitation of the physical environment as solutions to human challenges revolve around human development. He stressed that human capital involves the skills, knowledge and intelligence required in tackling technical matters. Since this research was more suggestive than reactive, the theory was applied through identification and suggesting the institutional framework and practical approach that can be used in managing the ever increasing wastes in Lokoja urban center. Although one may want to criticize this theory by pointing to the difficulty in measuring its key variables and how far their use can guarantee an advance in productivity, the theory was relevant for this study in that it was an avenue to open new vistas in making waste less harmful and more useful through proper management. It also uncovered the reasons for the dismal performance of government even through KGSEPA in waste management. This will surely give room for concerned stakeholders in waste management to fashion out new strategies that would be adopted or adopt the suggested strategies that will nip indiscriminate solid waste disposal in the bud in Lokoja urban.

Also, the study adopted survey research design. This means that some carefully selected people were studied through collecting and analyzing data (primary-structured questionnaire) from them as they were considered to be the representatives of the population. The sample size of the study is 399 and it combined simple random, stratified and purposive sampling techniques. The simple random sampling ensured that every member of the population had equal and independent chance of being selected in the samples studied. Stratified sampling ensured that samples were divided into groups (strata) on the bases of their common characteristics, while purposive sampling ensured that the targeted respondents competently represented each stratum and quickly and objectively too, provided unbiased information about the issue under investigation. The respondents comprised some selected Landlords/caretakers, leaders of markets/traders associations, civil/public servants and carefully selected residents/occupants of the affected areas. In line with these, the researchers applied Bowley's Proportional Allocation Formula to determine the actual number of persons to whom questionnaire were administered in the study area. Data collected in the field were analyzed using frequency distribution tables and simple percentage technique. But, in testing the hypotheses as to achieve the objectives of the study, the researcher used chi-square (X^2) statistical tool thus:

$$\chi^2 = \frac{\Sigma(O-E)^2}{E} \quad (1)$$

Where; χ^2=Chi-square; Σ=Summation;
O=observed frequency; E=expected frequency

Test of Hypothesis:

Ho_1: Lack of clear knowledge and skills to make solid waste useful is not the main reason for the persistent increases in the number of indiscriminate waste dump in Lokoja urban area

Ho_2: The destruction of the aesthetics, blockage of roads and water channels in Lokoja urban area are not caused by heaps of indiscriminate slid wastes dumped

General Decision Rule

If the calculated chi-square (X^2) value is greater than the critical value, the null hypothesis (H_o) is rejected.

$$\text{Expected Freq (E)} = \frac{\text{Total no of respondents}}{\text{No of reponse options}} \quad (2)$$

$$\text{Expected Freq (E)} = \frac{375}{4} = 938 \quad (3)$$

The Chi-square (χ^2) test was calculated as follows:

Ho_1:

Table 1 Chi-square (x^2) table

Observed Freq (O)	Expected Freq (E)	O-E	$(O-E)^2$	$(O-E)^2/E$
92	93.8	1.8	3.24	0.04
84	93.8	9.8	96.04	1.02
99	93.8	5.2	27.04	0.29
100	93.8	6.2	38.44	0.41
Total				1.76

Ho_2:

Observed Freq (O)	Expected Freq (E)	O-E	$(O-E)^2$	$(O-E)^2/E$
84	93.8	-9.8	96.04	1.02
81	93.8	-12.8	163.84	1.75
100	93.8	6.2	38.44	0.41
110	93.8	16.2	262.44	2.80
Total				5.98

Therefore, the calculated chi-square (X2) values are: 1.76, and 5.98 for hypotheses 1 and 2 respectively.

RESULTS AND DISCUSSION

Table 2 shows how often waste management personnel came to evacuate refuse in the area. It revealed that 102 (30.0%) of the respondents stated once in two weeks, 94 (27.5%) of the respondents reported once in a week, 93 (25.0%) observed that it was once in a month, while 86 (17.5%) of the respondents had not noticed the presence of waste removing equipment in their area. The implication of this is that untimely evacuation of waste in the study area could be partly responsible for health hazards in the area.

Table 2 How often waste management personnel evacuate refuse in the area

Issues	Frequency	Percentage
Once in two weeks	102	30.0
Once in a week	94	25.0
Once in a month	93	27.5
Not notice at all	86	17.5
Total	375	100.0

Source: Author's Fieldwork Report, 2019

The results on how solid waste disposal sites are managed by waste management personnel showed that 90 (30.0%) observed burning of solid waste materials, 220 (60.0%) stated by burying, while 65 (10.0%) indicated abandoned solid waste site (See table 3).

Table 3 How the Final Solid Waste Disposal Sites are managed by Waste Management Personnel

Issues	Frequency	Percentage
Burning of waste	90	30.0
Burial of waste	220	60.0
Abandoned the waste	65	10.0
Total	375	100.0

Source: Author's Fieldwork Report, 2019.

The results on how the public could be involved in waste management showed that 65 (15.0%) of the respondents stated payment for service, 135 (50%) reported general environmental sanitation, 45 (5.0%) chose voluntary donation of tippers/lorries for use, 75 (20.0%) stated individual cleaning of surroundings, while 55 (10.0%) noted environmental awareness of the danger of improper solid waste disposal. This reflected that majority of the people solely depended on the monthly general environmental sanitation to tidy their surroundings.

Table 4 How could the public get involved in waste management

Issues	Frequency	Percentage
Payment for service	65	15.0
General environmental sanitation	135	50.0
Donation of lorries for use	45	5.0
Individual cleaning of surroundings	75	20.0
Environmental awareness	55	10.0
Total	375	100.0

Source: Author's Fieldwork Report, 2019

The findings on the problems of solid waste management agency in the study area showed that 75 (20.0%) of the respondents noted shortage of vehicles, 55 (10.0%) observed shortage of waste containers, 95 (30.0%) of the respondents observed shortage of personnel, 85 (25.0%) of the respondents stated poor funding/encouragement by Government, while 65 (15.0%) stated lack of dedication to duty (As shown in table 5). This suggested that there is need to increase/improve on the level of facilities and human resources in the Waste Management Board, to ensure their success in their fight against health hazards from solid waste materials in the area.

Table 5 Problems of solid waste management agency in the study area

Issues	Frequency	Percentage
Shortage of vehicles	75	20.0
Shortage of containers	55	10.0
Shortage of personnel	95	30.0
Poor funding by government	85	25.0
Lack of dedication to duty	65	15.0
Total	375	100

Source: Author's Fieldwork Report, 2019

CONCLUSION

In the course of presenting, analyzing and testing the hypotheses formulated for this study, the following findings as summarized were made:

1. There is no government approved permanent waste dumpsites anywhere in Kogi state including Lokoja urban, to serve as final wastes collection points and residents do not help matters through their poor waste disposal habits. The most commonly repeated experience is the simple transfer of wastes from one unapproved site to another.
2. Government through KGSEPA and individuals has not made significant efforts to curtail the tide of indiscriminate solid wastes dumps/disposal in Lokoja urban area.
3. Indiscriminate waste disposal/dumps in Lokoja urban that are not in any way put into any good use (managed), significantly contribute to spreading avoidable communicable and other life threatening diseases such as typhoid, cholera, malarial.
4. KGSEPA as a waste management agency in Kogi state lacks the required modern equipment and technical competence to handle the ever increasing wastes in Lokoja urban center. A situation in which only 4 experts serve in environmental, pollution control and waste management in the Agency is a pointer.
5. The local government (Lokoja LGA) have failed in their constitutional responsibilities of ensuring proper evacuation and disposal of urban solid wastes and Kogi state government currently seem to have no concrete plan to ensure proper waste management.

The findings of this study exposed the devastating effects of urban solid waste in Lokoja as a result of inappropriate and inadequate management. Therefore, both the individuals and the government through KGSEPA have not made appreciable efforts to get and train the required manpower with technical skills and competences that would nip the ever-increasing solid wastes in Lokoja urban in the bud through proper generation, disposal, control, sorting and other management strategies, and should the current state of affairs in handling wastes in Lokoja urban area continue, the resultant negative consequences will have multiplier effects on the present and future inhabitants of the area.

Government is therefore advised to sit up and treat Lokoja urban solid wastes problem with the seriousness it deserves in order to protect the environment and lives of people in the area.

In line with the findings of this study and its implications, the following recommendations were therefore made:

1. Kogi State Government through State polytechnic should as a matter of urgent public importance, strengthen the already established department of Environmental and Public Health in the School of Environmental Technology, of the State Polytechnic (KSP) Lokoja by providing them with modern equipment including machines, for students to be exposed to practical methods of contemporary waste management.
2. Kogi State Government should partner with foreign-based waste management firm under public-private-partnership (PPP) arrangement to commence operation in Lokoja. Such firm should at least be a specialist in any waste management operation including; generation, sorting/separation, recycling and conversion. The firm shall be encouraged to collaborate with KGSEPA staff to complement the manpower needs. The firm apart from serving as a source of revenue to the government will also serve as a training center for Industrial Training (IT) students.
3. Kogi State government should as a matter of urgent public importance, provide permanent waste dumpsites that must be far from markets, schools, churches, commercial and residential areas. This will at least, reduce the dangers of communicable and other life threatening diseases. This should be immediately followed with public enlightenments.
4. The landlords and other inhabitants of the state should be properly represented when planning for any waste minimization or management strategy.
5. Urban and regional planning should be encouraged throughout the state for a livable and aesthetic living environment.
6. Recruitment of more experts in environmental, pollution control and waste management into KGSEPA should be one of the priorities of the current government in Kogi State.

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