

EFFECTS OF IMPROPER WASTE DISPOSAL TO THE ENVIRONMENT (CASE STUDY: WUKARI)

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ABSTRACT

This research paper focuses on the effects of improper waste disposal to the environment. (Case Study: Wukari). Waste can be defined as an unwanted substance or Waste can be defined as a material eliminated as no longer useful or required after the completion of a process. It can be grouped into various categories. They include: - hazardous, non-hazardous and municipal solid wastes. Major problems faced in Nigerian communities is the disposal of mostly non-hazardous waste. Some methods that are commonly practiced in wukari involve disposal of waste through incineration and landfill. The data to be evaluated will be collected through the uses of questionnaire's which was analyzed and gives a general information on the adverse effects of waste disposal in wukari, Taraba state. This shows that the most preferred method of waste disposal in wukari is landfill over incineration and the major type of waste disposed is non-hazardous waste.

Key words: Waste disposal, hazardous, non-hazardous, biodegradable, incineration, landfill,

INTRODUCTION

Waste management has been a major problem in developing countries such as Nigeria(1). This research paper focuses on a case study of an area called Wukari; which is one of the local government of Taraba state in Nigeria. Wukari is located in the north east area of the country and it has a population of about 241,546 and an area of 4,308km². The indigenes are predominantly farmers. Wukari is mostly inhabited by a tribe called Jukun and they have a traditional ruler who oversees the general welfare of the people. In Greece, the local authorities face a big challenge in upgrading services in waste management and this requires effective co-operation of different stake holders (e.g citizens, NGO's state, Authoritiesetc). Comparing these services in Greece to what is obtainable in Wukari Taraba State in Nigeria; it shows that there is a wide technology gap which needs to be filled for persons living in Wukari to improve their waste management services thus reducing the effect of improper waste disposal to the environment.(2)

The local government area (Wukari) adapts to major method of waste disposal which involve incineration and landfill. Fig 1 shows the Hierarchy of Waste Management. The most favored options are reuse, minimization and prevention while the least favored options are recycling, energy recovery and disposal.

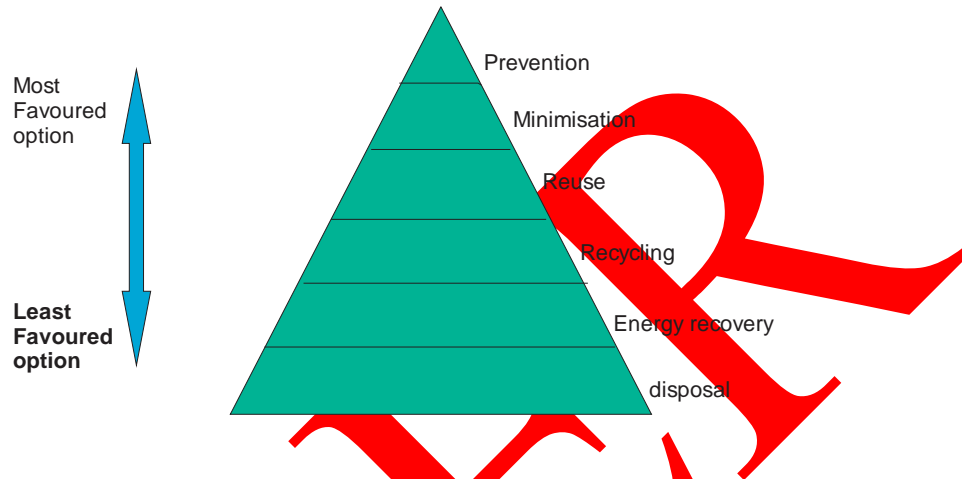


Fig 1 Hierarchy of Waste Management (UNEP. 2005 & EPA.2006)

Incineration simply means to burn (something) completely. Incineration of wastes produces emissions to the atmosphere, contamination wastewater and contaminated ash. Under emissions to atmosphere the following are generated which are odour dust and litter, particulate, heavy metals, pollutant gases such as HCl, HF, SO_x, NO_x and products of incomplete combustion – dioxins and furans, PAH. Under contamination of waste water, the following are generated which are: Bottom ash quench, air pollution control residues. Other types of incinerators are starved-air incinerators e.g. hazardous waste incineration and rotary kiln incinerators e.g. hazardous waste incineration. According to Zia et al (2007) findings it shows that: “Increase cost and decreasing space of landfill are forcing considerations of alternative options for solid waste disposal”. As a result of a rising increase in waste generation in developing countries, the cities authorities of these countries face a great challenge in management of waste (3). According to Sujuddin et al. (2008) factors that constitute to generation of waste include family size, their educational level and personal monthly income. Skekdar (2009) suggests that: “the quantity of solid waste generation can generally be attributed to an economic status of a society.” Hence this means that a country with a lower GDP will generate lesser quantity of solid waste.

The major source of development in Wukari Taraba state is the siting of a federal university which is generally the main source of employment to individuals and thus would account as the highest generator of solid waste. Because of the lack of experts in waste management systems the wukari local government has been restricted to local landfill practices and incineration practices. Even though various donations from developed countries have been invested to developing countries; yet these funds are misappropriated and projects are never completed.

Waste undergoes three stages of incineration which include:

- Drying and devolatilization
- Combustion of volatiles and soot
- Combustion of the solid carbonaceous residue

Advantages of incineration

- Incineration can be carried out close to the point of waste collection.
- Waste can be reduced to a sterile ash.
- 10% of its original volume.
- 33% of its original mass.
- Used as a source of energy.
- Increasing use of bottom ash for income.
- More environmentally acceptable.

Disadvantages of Incineration

- Generally, much higher costs and longer pay back periods due to the high capital investment.
- Sometimes a lack of flexibility in choice of waste disposal options once the incineration route is chosen because of the high capital cost the incinerator must be tied to long term waste disposal contracts.
- The incinerator is designed on the basis of a certain calorific value for the waste. By removal of materials such as paper and plastics for recycling, this may reduce the overall calorific value of the waste and consequently may affect incinerator performance.
- Whilst modern incinerators comply with existing emissions legislation there is some public concern that the emitted levels may still have an adverse effect on health.
- The incineration process still produces a solid waste which requires management.

Landfill is a system in which waste materials are buried under the ground.

ADVANTAGES OF LANDFILL

- Fast method of disposal
- Waste reduced to a sterile ash
- Reduced to 10% of original volume
- Reduced to 33% of original mass
- Energy Recovery
- Pyrolysis/Gasification – other products

DISADVANTAGES OF LANDFILL

- High capital costs
- High operational and maintenance costs
- May lead to lack of flexibility in future waste option choices
- Generates toxic pollutants
- Public opposition to incineration

METHODOLOGY

A process of distribution of questionnaires to various indigenes of wukari local government area in Taraba state to determine the type of waste that they dispose in a week and the method of waste disposal most frequently use, then to determine the frequency at which these individuals of this local government area have fallen sick from improper sanitation of the environment, the type of waste that they dispose in a week, information of drainage system in the surroundings. Information about stagnant water in drainages in their environment and also knowledge of how often they clean their surroundings in a week. These questionnaires were shared and filled within a period of 6 months from December 2015 to May 2016. This information is collected in questionnaires and deduced into tabular form and then analyzed and discussed in the next chapter.

RESULTS AND DISCUSSION

List of questions were arranged on the questionnaire to gather information which will enable to determine the most used method of waste disposal in wukari. For easy understanding the waste were categorized into hazardous and non-hazardous waste. Table 3 shows a break down from the questionnaire with zero to five indicating the frequency of occurrence of the two different types of waste categories. Zero and the first column indicates No occurrence, one represents a low occurrence, two represents a less occurrence while three indicate a medium occurrence, four indicates a frequent occurrence and five the most frequent occurrence. From table 3 it shows that for the disposal of either hazardous or non-hazardous waste in wukari the questionnaires returned gave a value that indicates that most of the indigenes in wukari do not dispose of any hazardous waste while this shows that they mostly dispose of Non-hazardous waste with a medium, frequent and periodically occurrence. Hence from the questionnaire one can deduce that Non-hazardous wastes are mostly deposited in wukari than hazardous waste. This can be as a result of no major industries in this local government area.

Table 3.0 Categories of Waste Disposed

<i>Frequency of occurrence</i>	<i>Hazardous</i>	<i>Non – hazardous</i>
0	11	0
1	0	0
2	0	5
3	0	5
4	0	6
5	0	6

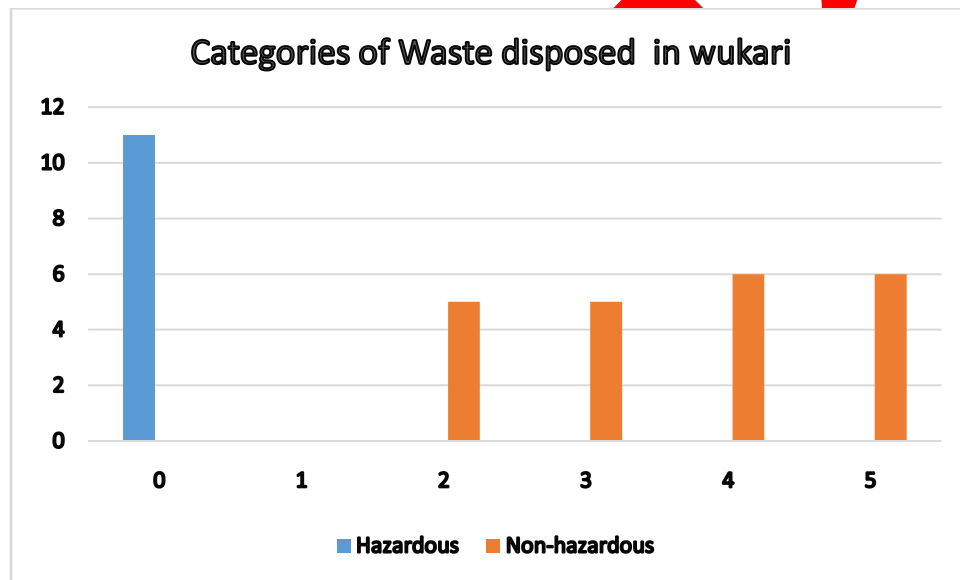


Fig 3.0 Categories of Waste disposed in Wukari

From the Table 3.0 a graphical representation is developed and this shows that the hazardous waste disposed in wukari is at the highest on zero occurrence which means that no hazardous waste is disposed in wukari town. While the other histograms on the graph shows that the mostly disposed type of waste is the non-hazardous waste. From Table 3.1 which is also gotten from the questionnaire shows that landfill is the most preferred option of waste disposal followed by incineration. Hence the indigenes of wukari engage in burying of waste and this is what is practiced in wukari Taraba State.

Table 3.1 Waste Disposal methods

	<i>Yes</i>	<i>No</i>
<i>Incineration</i>	3	8
<i>Landfill</i>	8	3

A graphical representation is deduced from table 3.1 and this becomes fig 3.1 waste disposal methods from the graph its clearly indicates that landfill method of waste disposal is mostly

being practiced in wukari town with landfill method showing a higher frequency by those who ticked yes on the questionnaires to incineration which is lower. This can be attributed to the fact that there are not major industries in wukari and the major type of waste disposed are non-hazardous waste which are mostly gotten from domestic household or waste generated from hospitals, schools and churches. These type of waste are either landfilled or locally burnt as indicated from the graph generated from table 3.1. This landfill method is most preferred because it is easier to maintain by the community and does not cause a source of air pollution as in the case of incineration. Although practiced on a small scale these landfill sites are located far away from inhabitants so as to avoid outbreaks of any diseases to the members of the wukari town. Fig 3.1 clearly expresses that landfill is the method that is used in wukari local government area of Taraba state.

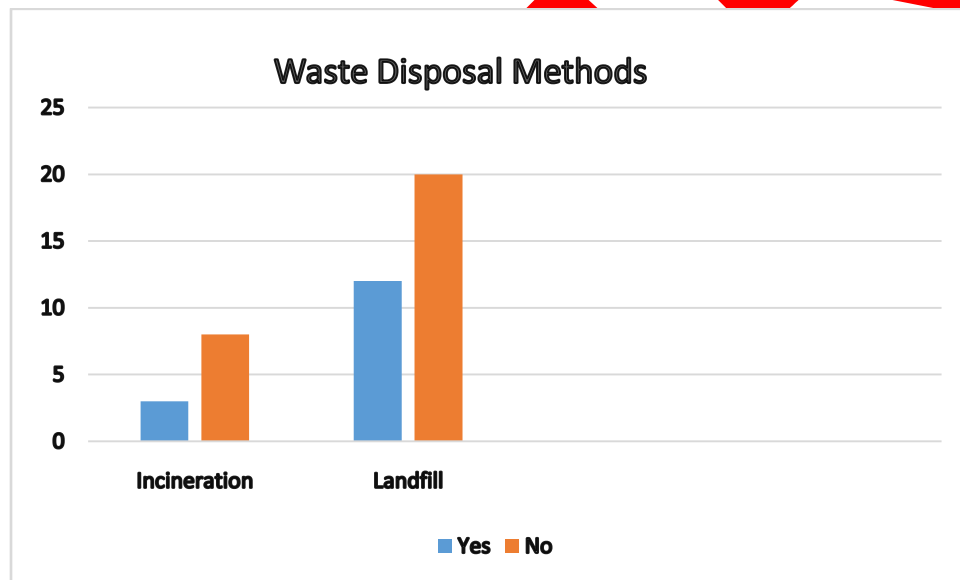


Fig 3.1 Waste Disposal Methods

Table 3.2 deduced from the questionnaire explains how many people have either fallen sick from poor sanitation of their environment. This result reflects that the number of persons affected by poor sanitation of their environment is less than that who are carry out routine sanitation of their environment weekly. This can be attributed to a compulsory monthly sanitation which was established by the federal government of Nigeria in which every last Saturday of the month all the environment and surroundings within and outside any citizens of the country's premises is kept clean and this proves from the questionnaire that only 3 incidents of sickness from improper sanitation occurred in wukari. Hence, it can be said that the environment of wukari local government area of Taraba state is always kept clean and thus, very few cases of diseases from lack of cleanliness of environment occurs.

Table 3.2 Results of Sickness from Poor Sanitation

	<i>Yes</i>	<i>No</i>
<i>Sickness from poor sanitation</i>	3	8

Fig 3.2 is deduced from table 3.2 and it represents a histogram that shows that there are very few cases of sickness which arise from the improper sanitation of the environment. From the questionnaires distributed and answered the results shows that only 3 persons indicated that either they or a family member have fallen sick from improper sanitation of their environment and it also shows that a high number of 8 persons filled on the questionnaires that they or their family members have not fallen sick. That is, they frequently clean their environment and there are cases of sickness as a result of poor sanitation of their surroundings.

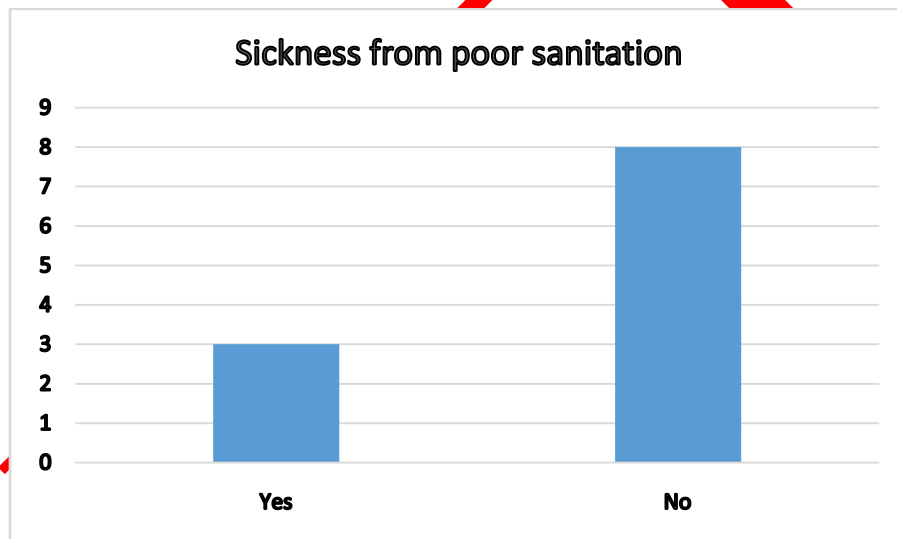


Fig 3.2 Sickness from Poor Sanitation

Table 3.3 shows the rate at which the surroundings are kept clean is at its utmost best because the individuals of this state are naturally accustomed to ensuring that their environment is kept clean and tidy. Thus, from the questionnaire passed around it is no wonder the frequency at which the individuals clean their environment in a week is high. As most individuals ticked the highest option on the questionnaire indicating that they always clean their environment and this keeps them healthy. Thus, there are no stagnant water left in drainages.

Table 3.3 Result of Stagnant Water in Drainages

<i>Frequency of occurrence</i>	0	1	2	3	4	5
<i>Stagnant water in drainages around your surroundings</i>	10	0	0	1	0	0

Fig 3.3 deduced from table 3.3 shows the frequency of stagnant water in drainages and from the graphical representation it shows that most of the people who filled the questionnaire picked the zero option which indicated that they have no stagnant water in the drainages in this local government area and thus there will be less cases of malaria which is as a result of mosquito breeding grounds which are mostly found in areas where stagnant water exists. This can also be said that the individuals of this local government area wukarialways keep their surroundings clean.

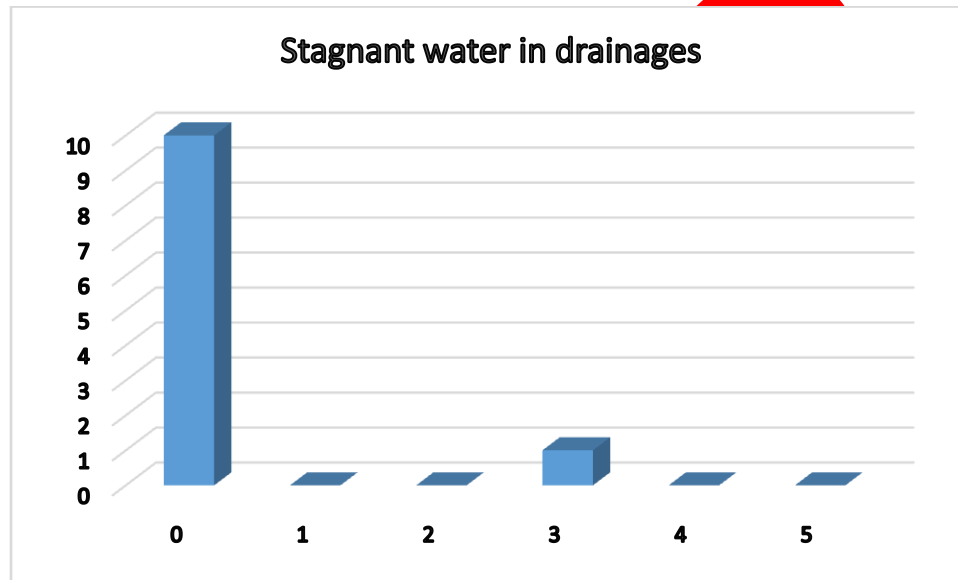


Fig 3.3 Stagnant Water in Drainages

Table 3.4 shows the frequency of the cleanliness of the surroundings and from the questionnaires it shows that most people who filled it ticked the most favored option of tidying their surroundings more that thrice in a week and this attains to the low cases of sickness and death rates recorded in wukari. The table indicates that most individuals clean their surroundings very often and this keeps them healthy and prevents cases of diseases.

Table 3.4 Frequency of Cleaning of Surroundings

<i>Frequency of Occurrence</i>	0	1	2	3	4	5
<i>Frequency of cleaning surroundings in a week</i>	0	0	0	4	2	5

Fig 3.4 is a pie chart which is deduced from table 3.4 and it shows the highest number of individuals who indicated that they frequently clean their surroundings is higher than those who don't clean their surroundings. This clearly represents the fact that the wukari town is clean and free of diseases which arise from improper maintenance of the environment.

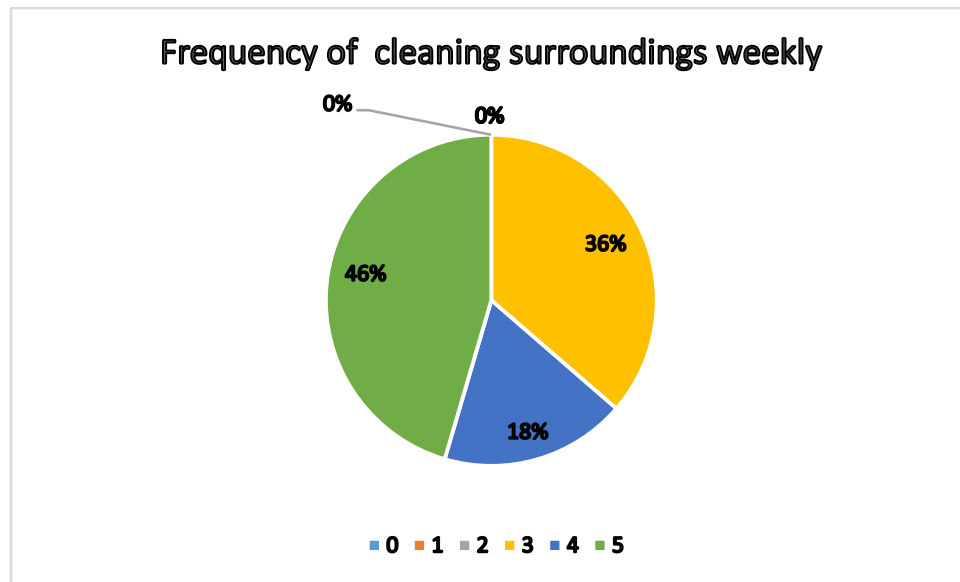


Fig 3.4 Frequency of Cleaning of the surroundings in a week.

CONCLUSION

A general conclusion can be deduced from the questionnaires and this is that improper waste disposal to the environment is harmful to human health and it breeds various diseases that cause sicknesses such as malaria or typhoid or other uncleanliness disease related illnesses. In wukari Taraba state the main method of disposal of waste mostly practiced is landfill and incineration with the latter being the most preferred. This form of disposal of waste is easier to carry out as the individuals of the wukaritown maintain and keep their surroundings clean hence resulting to low cases of illnesses from improper waste disposal. More research should be conducted into the area of waste management systems and this will improve the existing usage of mostly local landfill and incineration in Wukari Taraba state.

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