



# Impacts of Waste Dumps on the Health of Neighbours: A Case Study of Olusosun Waste Dump, Ojota, Lagos State, Nigeria

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**Abstract:** Poorly managed and wrongly sited waste dumps in living areas may serve as pathogen and epidemiology centres. Germs (viruses, bacteria and fungi) breed regularly in waste dumps and landfills. Waste dumps, incinerator plants and land-fills may emit toxic compounds that are detrimental to human health and well-being. Exposed waste dumps and land-fills are also eyesores that are social menace to the residents where they are sited. Uncontrolled waste dumps are danger zones to scavengers, mostly youths, who may tramp on infected sharp objects while searching for 'treasure'. Waste dumps, where wastes are burnt openly, generate carbon dioxide, carbon monoxide and other gases due to burning of remnants of chemicals containing sulphide, nitrate, fluoride, benzene, nicotine, lead etc, which react with oxygen to form poisonous gases that are inhaled by residents. These antibodies affect the lung and weaken the heart and other organs in the body. Medical wastes like bandages, cotton wools, medicine containers, syringes, needles and bottles should be professionally managed because their reuse is dangerous. The objectives of this study is to examine the health implication of improper management of waste dumps, to highlight the danger in the local methods of waste management predominant in developing nations, to evaluate the various diseases caused by waste dumping sites, incinerator plants and landfills and to recommend alternative methods of waste management that will imbibe the doctrine of sustainable development. Quantitative and qualitative data were analysed to draw inference on the impacts of waste dumps on public health.

**Keywords:** Air-Borne Diseases, Health and Environment, Medical Wastes, Solid Waste Management, Waste Dumps

## 1. Introduction

The need for this study arose as a result of warts noticed on some people doing business around the waste dump at Ojota, Lagos State, Nigeria. The warts noticed on some traders who had been trading for upward of three years and the abnormality in some children whose pregnancy were conceived while their mother plied their trade around the waste dump prompted this study. According to Adesanya (2014), "viruses, called human papillomavirus (HPV), cause warts. It is easier to catch a virus that causes warts when you have a cut or scrape on your skin". Nitrates which percolate into rivers and water-wells have been found to cause teeth coloration, where drunk. Some poisonous chemicals like Gamoline (a herbicide), leached to the river to endanger

aquatic life. Inhalation of poisonous gases over a long period of time can affect the immune system and lead to cancer. Pregnant women who inhale high level of carbon dioxide, carbon monoxide and other poisonous gases may give birth to abnormal child or have premature birth.

Most cities in developing countries are facing a solid waste management crisis that they are finding difficult to resolve. Wastes dumped in official and un-official waste dumps which are scattered all over the cities in developing nations are eyesores and affect the value of the adjoining properties and the social—political status of nations. They are great concern to environmental scientists. Of greater concern is the health implication of poor management of these wastes. Due to lack of finance to install incinerator or lack of maintenance culture and lack of the technique to properly recycle wastes

in developing nations, solid wastes are left in ubiquitous waste dumps to rot and in some cases wastes are burnt in naked flame to reduce their volume. This burning produces offensive gases that are dangerous to health of the residents.

Conceptually, solid waste or refuse is any solid material which is discarded by its owner, user or producer. Solid wastes are left-over arising from human, animal or plant activities that are normally discarded as useless and not having any consumer value to the person abandoning them. The fact that they are not having either economic or social value to the person discarding them does not mean that they cannot be valuable to any other person (Oyedele, 2014).

Timaru District (New Zealand) Consolidated Bylaw 2007 defined solid waste as “any material that is primarily not a liquid or gas, is unwanted and/or unvalued and is discarded or discharged by its owner” (Timaru District (New Zealand) Consolidated Bylaw, 2007). Wastes or refuses are unwanted and discarded materials from domestic, commercial and industrial operations. Wastes are generated from our daily activities and cannot be eradicated but refuse grounds and dump-sites can be turned into gold-mine (Oyedele, 2014).

Kimani (2007), said that “over the last three decades there has been increasing global concern over the public health impacts attributed to environmental pollution, in particular, the global burden of disease”. Most tropical diseases like malaria fever, rash, typhoid fever, cholera, dysentery, diarrhea, whooping cough etc are due to unsanitary environment. Smokes from waste dumps may be toxic due to the nature of the elements in the waste dumps.

Poorly managed and wrongly sited waste dumping sites are pathogen and epidemiology centres where germs breed and diseases spread among residents and passers-by. Viruses, bacteria and fungi which breed regularly in waste dumps, landfills, waste tanks and waste-bins can produce infectious diseases, toxic gases and radioactive elements. Waste dumps and land-fills may emit toxic compounds or harbour radioactive materials that are dangerous to human health and well-being.

Waste dumps, where wastes are burnt openly, generate carbon dioxide, carbon monoxide, nitrogen dioxide, nitrogen monoxide and other gases due to burning of remnants of chemicals in bottles and other containers containing sulphide, nitrate, fluoride, benzene, nicotine, lead etc, which react with oxygen to form poisonous gases that are inhaled by residents. This is why burning of wastes has been banned in some countries. Some European countries like Germany and United Kingdom already banned open burning of wastes and landfill.

World Health Organization (WHO) estimates that about a quarter of the diseases facing mankind today occur due to prolonged exposure to environmental pollution. Unsanitary environment can encourage the spread of malaria fever, typhoid fever, cholera, tetanus, eczema, dysentery, dengue fever and inhaling carbon dioxide can worsen such ailment as emphysema and asthma.

Drugs, medicines and medical wastes like drug remnants, syringes, needles and bottles should be professionally

managed because their reuse is dangerous as they can transfer diseases to the users. Nitrates which percolate into rivers and water-wells have been found to cause teeth coloration where drunk over a long period. Some herbicides (leachates) like Gamoline can be washed by rain and leach to the river to endanger aquatic life. Inhalation of poisonous gases over a long period of time can affect the immune system and lead to cancer. Pregnant women who inhale high level of carbon dioxide, carbon monoxide and other poisonous gases may give birth to abnormal child or have premature birth.

This study will examine the health implication of improper solid waste management, highlight the danger in the local methods of waste management predominant in developing nations and recommend alternative methods of sustainable waste management.

## 2. Literature Review on Waste Management at Sulous Waste Dump, Ojota and Public Health

Olusosun waste dump, located along Lagos – Ibadan expressway at Ojota, Lagos State, Nigeria, is one of the three official waste dumping sites in Lagos State. The other two are at Igando and Abule-Egba. The site is directly in the heart of the city and close to Alausa, the seat of power in Lagos State. It occupies 25 acres of land. Surrounding the dump site are Oregun Industrial Estate, Ojota Residential, Ikosi Residential and Oregun Residential Areas.

Over 2,500 tonnes of waste generated and collected from various locations in Ojota, Maryland, Magodo and Ikeja and their environs are deposited on a daily basis into the dumpsite. This site was initially planned as a landfill but later turned into a big mountain of refuse. Dumping at the site is unrestricted and industrial, agricultural, domestic and medical wastes (including used syringes and needles) are seen strewn all over the dumping site.

Odo Alaro (River Alaro) passes at about a kilometer to the dumpsite. Some of the wastes from the dump end up into the river due to the action of rain water thus extending environmental and health risks to the communities living within the vicinity as well as those living downstream who could be using the water for domestic and construction purposes.

According to Oresanya (2011), “Out of approximately 9,000 metric tonnes of waste generated daily in Lagos, about 1,200 metric tonnes of waste is now being converted to other useful resources under a formal arrangement with the private sector”. The unconverted wastes pose as a big challenge to the residents in term of eyesore and social menace scattered all over. These wastes, which are mostly unattended to, are menaces to the health of the residents and passers-by during degradation process.

Solid wastes can be classified in terms of their degradation into biodegradable and non-biodegradable wastes; or into types as: agricultural wastes; auto wastes; construction,

demolition works, municipal solid wastes generated in streets, parks, beaches and households, mineral activities wastes; radioactive wastes; medical wastes; e-wastes (from electrical materials and electronics) and sewage residue.

Solid wastes can also be grouped as organic and inorganic wastes. Plastics, tyres, nylon etc are organic while vegetables, wood, papers etc are inorganic. In the rural areas, agricultural wastes formed over 80 per cent of the wastes, hence management of wastes becomes no problem as wastes are left to de-compost in waste dumps and houses are built in far places from wastes.

In urban areas, with high density of dwellers, wastes are complex to define with many of them having chemical characters and difficult to manage. Rate of decomposition is lower to the rate of generation. The wastes also decompose to form chemical compounds and react with oxygen during burning to form toxic products which cause havoc to living things through the medium.

The term medium is used in the environmental field to mean air, water and land – the ‘media’ to which pollutants are emitted or on which they are placed for disposal. Air, water and land are also called ‘sinks’. The word signifies a medium capable of absorbing wastes. None of the media is truly permanent sink for pollutants.

Waste dumps have high concentration of airborne particles. Airborne particles settle out; airborne chemical interact with one another and with components of the air and come down again, e.g. as acid rain. Waste placed on or under the land may come in contact with seeping precipitation and release pollutants to aquifers (Jewel, 1975: 1).

The exponential increase in waste in developing nations calls for change in the practice of waste management. World Health Organisation (WHO) reported that over four million people die prematurely from illness attributable to the household air pollution from cooking with solid fuels. Exposure to smokes from waste dumping sites over a long period of time is deadly.

The solid waste market is not just a public service, it is also an important economic sector, which is worth USD 390 billion in OECD countries (Chalmin and Gaillochet, 2009) and large emerging economies combined, and provides up to 5% of urban jobs – including waste pickers – in low-income countries. Air captured around waste dumping sites is pathogenic and unsafe for breathing.

Municipal Solid Waste has significant negative externalities, with impact on the environment and health. Uncollected solid waste in cities provides a favourable habitat for insects, vermin, and scavenging animals, which proliferate and spread airborne-, and waterborne-, diseases such as plague, dengue fever, rash and diarrhoea among local populations.

The cholera epidemic in Lagos in 1952 which killed scores of people was directly linked to unsanitary environment. Cholera has been reigning in Nigeria ever since. ”A new wave of cholera epidemic blowing across the country may have claimed hundreds of lives since January and does not seem to be abating anytime soon with the onset of the rainy

season” (Daily Trust, 2014).

The Nigerian Centre for Disease Control (NCDC) also confirmed the outbreak of the infectious disease in 14 states across the nation, where it said 9,006 cases were reported, with 106 deaths in the first quarter of 2014, adding that the situation was not this critical last year.

In contrary, Officials from state health agencies said the casualty figures for the last three months could be much higher as some deaths that happened outside health facilities, which are many, are not officially reported, while many others victims do not even know the cause of death.

Experts say cholera, an acute infectious disease, is caused by a bacterium, *Vibrio cholerae* (*V. cholerae*) which results in painless diarrhea with the main symptoms being watery stool and vomiting; and infection in most cases comes primarily from drinking water or eating food that has been contaminated by the faeces of an infected person, including one with no apparent symptoms. Water from the nearby Alaro River can be contaminated by stool and vomit washed from the waste dump by rain water.

There is also anatomical problem of deformity in the physical structure of the animals living in the vicinity of waste dumps due to availability of therratogenic substances (therratogenes) (Ashiru, 2004). Carbon monoxide poisoning in pregnancy is the most fatal causes of birth defects and fetal death. Carbon tax and pollution tax are introduced to curtail excessive carbon emission by vehicles and industries.

A Stanford scientist has spelled out for the first time the direct links between increased levels of carbon dioxide in the atmosphere and increases in human mortality, using a state-of-the-art computer model of the atmosphere that incorporates scores of physical and chemical environmental processes. The new findings come to light just after the Environmental Protection Agency's recent ruling against states setting specific emission standards for this greenhouse gas based in part on the lack of data showing the link between carbon dioxide emissions and their health effects (Stanford University, 2008).

“Exposure in the first two months of pregnancy to air pollution from traffic sharply increases the risk for birth defects; a new study has found. Researchers used data from two large studies carried out in eight counties in the San Joaquin Valley in California. One has tracked birth defects since 1997, and the other has recorded concentrations of nitrogen dioxide, nitrogen oxide, carbon monoxide and particulate matter at 20 locations in the valley since the 1970s. Setting aside defects attributable to other known causes, there were 849 cases of birth defects. The researchers adjusted for smoking, maternal age and other variables, and compared these cases with 853 healthy control subjects” (Bakalar, 2012)

Hvistendahi (2007), said “Coal, meanwhile, is believed responsible for a host of more quotidian problems, such as mining accidents, acid rain and greenhouse gas emissions. But it isn't supposed to spawn three-eyed fish like Blinky. Over the past few decades, however, a series of studies has called these stereotypes into question. Among the surprising

conclusions: the waste produced by coal plants is actually more radioactive than that generated by their nuclear counterparts. In fact, the fly ash emitted by a power plant—a by-product from burning coal for electricity—carries into the surrounding environment 100 times more radiation than a nuclear power plant producing the same amount of energy”.

The researchers at Stanford University led by Amy M. Padula, a postdoctoral researcher, found that a mother living in areas with the highest levels of carbon monoxide or nitrogen oxide concentrations (the top 25 percent) was almost twice as likely to give birth to a child with neural tube defects — severe and often fatal defects of the brain and spinal cord—as one living in areas with the lowest concentrations.

According to Le Courtois (2012), the waste sector is typically broken down into five main categories of waste: Municipal Solid Waste (MSW); waste resulting from industrial activities; construction, demolition, and mining waste; agricultural waste; and hazardous waste generated by all of the above-mentioned waste producers and normally including medical waste. Around half of world waste production is MSW from the residential, commercial and service sectors.

Mosquitoes are common site in waste dumps. Malaria is and remains a formidable disease that is transmitted to humans by the anopheles mosquito. This pathogen is a protozoan of the genus *Plasmodium*. Malaria is very deadly if contacted. Mosquitoes, which breed regularly in stagnant water especially rain water inside containers in waste dumps, help the plasmodium to complete its lifecycle.

Kimani (2007) listed public effects of waste dumps as: (1) Skin Disorders – Fungal infection, allergic dermatitis, pruritis

and skin cancer, (2) Respiratory Abnormalities – bacterial upper respiratory tract infections (pharyngitis, laryngitis and rhinitis), chronic bronchitis and asthma (3) Abdominal and Intestinal Problems – bacterial enteritis, helminthiasis, amoebiasis, liver cancer, kidney and renal failure, (4) Dental Disorders – dental carries and dental pain, (5) Ear Infections – otitis media and bacterial infections, (6) Skeletal Muscular Systems – back pain, (7) Central Nervous System – impairment of neurological development, peripheral nerve damage and headaches (8) Eye Infections – allergic conjunctivitis, bacterial eye infections (9) Blood Disorders – Iron deficiency anaemia and (10) Others – malaria, chicken pox, septic wounds and congenital abnormalities, cardiovascular diseases and lung cancer.

Remember the "Bubonic Plague" called the "black death" in the middle ages. This is an infectious disease caused by the bacteria, *Yersinia pestis*, which is associated with high rate of fatality. It is characterized by generalized lymphadenopathy, some of which are suppurative (boils or bubos) and accompanied by intense adenitis and pneumonia. This plague, which was transmitted to humans from infected rats by rat fleas, devastated mankind then (Scott-Emuakpor, 2010).

According to UNEP (2014), In planning a landfill it is useful to think about the facility in terms of four key phases from initial concept to final closure. These phases are:

- Siting
- Design
- Construction, operation, and environmental monitoring
- Closure and post-closure.

**Table 1.** Toxic heavy metals with established health effects.

Heavy Metal	Sources of Environmental exposure	Minimum Risk level	Chronic exposure toxicity effects
Lead	Industrial, vehicular emissions, paints and burning of plastics, papers, etc.	Blood lead levels below 10 µg/dl of blood*	Impairment of neurological development, suppression of the haematological system and kidney failure
Mercury	Electronics, plastic waste, pesticides, pharmaceutical and dental waste	Below 10 µg/dl of blood*	Oral exposure of 4mg/kg/day** Gastro-intestinal disorders, respiratory tract irritation, renal failure and neurotoxicity
Cadmium	Electronics, plastics, batteries and contaminated water	Below 1 µg/dl of blood*	Irritation of the lungs and gastrointestinal tract, kidney damage, abnormalities of the skeletal system and cancer of the lungs and prostate

µg/dl\*: micrograms per decilitre of blood; mg/kg\*\*: milligrams per kilogram; Source: Kimani (2007).

### 3. Research Methodology

Case study approach was adopted in this research. Thomas (2011) stated that "case studies are analyses of persons, events, decisions, periods, projects, policies, institutions, or other systems that are studied holistically by one or more methods. The case that is the *subject* of the inquiry will be an instance of a class of phenomena that provides an analytical frame — an *object* — within which the study is conducted and which the case illuminates and explicates". According to Creswell (2009), data collection in a case study occurs over a "sustained period of time. All participants chosen were more than ten (10) years trading without break around the waste dump.

25 participants including 15 women trading in areas not

farer than 100 metres to the waste dump were interviewed to find out their health situation and the birth history of their children. These mothers were chosen at random and spread to cover the radius of the waste dump. Another 25 participants including 15 women who are trading at distances over 500 metres but less than 1,000 metres to the waste dump were also interviewed for control. The women targeted were all less than 40 years old to ostracize old age from the possible cause of birth defects. There is a leading theory that older women are at greater risk for having miscarriage and child with birth defects.

The waste dump was also visited to interview those who are working as guard and the scavengers. The health centre near the waste dump was also visited to interview the health

officials about the nature of sicknesses of attendants in the hospital and major causes. Airborne and waterborne diseases like cholera, dysentery, fungi infection, diarrhea, nauseating, child birth defect, pregnancy abortion, premature birth etc were made main focus of the interview.

Questions were asked on whether the participants have experienced any of these diseases or situation and how often. The frequency of the occurrence of each disease were recorded and compared with the occurrence and frequency of the diseases in the control area.

This study is based on Convention Heat Transfer Theory. When there exists a temperature gradient within a body, heat energy will flow from the region of high temperature to the region of low temperature. This phenomenon is known as conduction heat transfer, and is described by Fourier's Law (named after the French physicist Joseph Fourier),

$$q = -k \nabla T$$

This equation determines the heat flux vector  $q$  for a given temperature profile  $T$  and thermal conductivity  $k$ . The minus sign ensures that heat flows down the temperature gradient.

The same way heat can transfer through a medium called conduction is the way diseases transfer through medium like air, water or solid materials called infection. Diseases will transfer from a region of higher concentration of pathogens to a region of lower or no traces of pathogens through such medium as air contamination, water contamination and physical contact. The nearer a subject is to pathogens, the higher the propensity of the subject to contact diseases.

## 4. Research Analysis

**Table 2.** Table of Types of diseases of the traders around Ojota Waste Dump and the Frequency.

	Study Area (Area that is less than 100 metres to the waste dump) with percentage in bracket		Study Area (Area that is less More than 100 metres but less than 1,000 metres to the waste dump) with percentage in bracket	
Number of study participants with lung infection	17	(68%)	8	(32%)
Number of study participants with cholera.	13	(52%)	7	(28%)
Number of study participants with tetanus.	12	(48%)	5	(20%)
Number of study participants with fungi infections.	17	(68%)	6	(24%)
Number of study participants with dysentery.	15	(60%)	4	(16%)
Number of study participants with diarrhea	13	(52%)	9	(36%)
Number of study participants with nauseating.	18	(72%)	11	(44%)
Number of study participants with child birth defect.	11	(44%)	3	(12%)
Number of study participants with pregnancy abortion.	13	(52%)	5	(20%)
Number of study participants with premature birth.	14	(56%)	4	(16%)

Source = Field Survey 2014.

**Table 3.** Survey of Deaths of Scavengers on Ojota Waste Dump.

Identity	Sez	No. of years spent scavenging on Dump	Year at death
Study 1	Male	12	39
Study 2	Male	8	42
Study 3	Male	11	41
Study 4	Female	7	29
Study 5	Male	14	51
Study 6	Female	9	32
Study 7	Male	10	44
Average		10.14	35.14

Average lifespan of Nigerians according to WHO = 47 years (Male) and 57 years (Female). Source = Field Survey 2014.

**Table 4.** Elements found on Ojota Waste Dumps, their percentage and effects.

Name of element	Percentage	Effects of burning
Lead from Diode batteries	0.1%	If inhaled, can cause lung infection Burning can cause acidic gas.
Metals	3%	Sharp objects can cut scavengers and allow tetanus infection
Glass and glass bottles	7.5%	Sharp objects can cut scavengers and allow tetanus infection
Agricultural and food wastes	23%	Can cause sooth, carbon dioxide and carbon Monoxide when burned
Plastics	13%	Can cause sooth, carbon dioxide and carbon Monoxide when burned
Papers and cardboards	18	Can cause sooth, carbon dioxide and carbon Monoxide when burned
Cloth	8%	Can cause sooth, carbon dioxide and carbon Monoxide when burned
Medical wastes	5%	Can cause sooth, carbon dioxide and carbon Monoxide when burned. Re-use of needles can transfer deadly diseases
E-wastes	7%	Can cause sooth, carbon dioxide and carbon Monoxide when burned
Others	15.4%	Can cause sooth, carbon dioxide and carbon Monoxide when burned

Source = Field Survey 2014.

## 5. Discussion of Analysis

Table 2 shows the table of Types of diseases of the traders around Ojota Waste Dump and the Frequency of the disease. 17 people out of 25, that is, 68% of the people trading around the Ojota waste dump had lung infection compared to people trading at a far distance who are 32%. 13 people out of 23, that is, 52% had cholera compared to 28% of those who trade far away. 48% had tetanus in areas close to the waste dump compared to 20% in far area, while 60% had dysentery in closer area to the waste dump compared to 16% in far away area.

In the case of diarrhea, 52% of the people interviewed had the disease in area closer to the waste dump, while 36% contacted diarrhea I area farer away from the waste dump. Malaria fever affected 76% of the people in closer area to the waste dump and 64% in farer away areas. 72% of the people near the waste dump experience nauseating while 44% of the people far away experience nauseating.

Child birth defect affect 44% of the people near the waste dump but only affected 12% of the people far away. Pregnancy abortion affected affected 52% of the people trading around the waste dump while it affected 20% of the traders at far away distance. 56% of the people interviewed had premature abortion in the area close to the waste dump while 16% of the people in far away area had it.

Table 3 shows the Survey of Deaths of Scavengers on Ojota Waste Dump within the last five years of the study date. Seven people died within the last five years among those scavenging on the waste dump in the past five years after sickness. The deaths recorded had five male and two female. The average age of those that died while working at the waste dump was 35.14 against at least 52 years for Nigerians.

Table 4 shows the Elements found on Ojota Waste Dumps, their percentage and effects. The high percentage of sharp objects is dangerous to the health of the scavengers who struggle for their harvests. The high percentage of bio-fuel which can cause greenhouse gases, pollute the environment and deplete the ozone layer should be a concern to the environmentalists.

## 6. Summary of Findings

The results of this study shows that waste dumps near living areas are havocs to good health and confirmed the researches in the literature review (Ashiru, 2004; Bakalar, 2012; Daily Trust, 2014; Kimani, 2007; Hvistendahi, 2007; Stanford University, 2008). Residents and traders in areas near a waste dump are prone to rash, lung infection, cholera, tetanus, dysentery, diarrhea, nauseating, child birth defect and pre-mature birth more than those who live or trade in far away areas. Waste dump can serve as breeding ground for mosquitoes, fly, rodents and rats. These animals can transmit diseases to human being either from the waste dump or other sources.

The lifespan of those who scavenge unprotected on waste dumps is lesser than for national average. Though causes of deaths were not known, they were not due to accidents. The presence of very high percentage of remnants of metals, chemicals and medical wastes is a great challenge to waste management. Metals are not yet being recycled fully and there are still high reserves of metals on our waste dumping sites.

The government does not have plan to move the waste dump at Ojota to a safer place and has no plan of modernizing the waste dump. Apart from this dump, there are various dumps around residents and industries which are not catered for by the government.

## 7. Conclusion and Recommendations

Waste dumps which are common sights in developing nations' cities are source of epidemiology and generate pathogens which are dangerous to people working or living in nearby environment. Improperly manage waste dumps can cause diseases and affect the lifespan of the people working on it. Waste dumps are unsightly and can cause stress to the people living or working around it. Rodents, which cause Ebola disease, can breed easily on waste dumps. Over 30% of people residen in Lagos are exposed to health hazards in their daily activities without awareness.

The traders around the waste dump at Ojota are not aware of the havoc the waste dump is doing to their health because they are all illiterates. Those that have children with birth defects attribute the cause to nature or spiritual. The scavengers are aware that they are prone to danger working on the waste dump, especially as they regularly fall sick, but they have no other means of livelihood. They are aware of safety boots but they cannot afford them.

Waste dump should be properly managed and control so that there can be health and safety measure on site. The waste dump should be located inside buffers or green zone where they will not be eyesore to residents. Residents can protest and protect their right to healthy living. In early 1980s African Americans in Warren County, North Carolina, protested the siting of a polychlorinated biphenyl (PCB) landfill in their community. Residents should be encouraged to recycle waste through levy (polluters pay method). The percentage of food wastes found on wastes dumps is too high for a poor nation like Nigeria.

The waste dump at Ojota should be relocated and the site turned into a park. The traders should be educated on the effects of the pollution on the health. Incinerators should be introduced to properly burn wastes that cannot be recycled. Siting of hazardous waste dumping sites, waste tanks, sewerage plants and landfills is correlated with economic status of people in surrounding communities. Residents of highbrow areas are aware of the implications of pathogen and epidemiology centres in their vicinity and will resist their siting, whereas residents in lowly branded areas will not.

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