



# THE ENVIRONMENTAL EFFECT OF ILLEGAL DUMP SITES AND LAND FILLS IN EMENE AND ENVIRONS

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## ABSTRACT

*Environmental problems of illegal dumping of refuse are many. The effects of illegal dumping of refuse along the roads and at some designated spot in Emene and environs are enormous. Environmental degradation is the deterioration of the environment through depletion of resources such as air; water, and soil, the destruction of ecosystems and the extinction of wildlife. This paper reviewed the environmental effect of illegal dumping of refuse in Emene Enugu East L.G.A of Enugu State, the causes and effects on the people. Environmental issues such as pollution (air, water), solid waste, global warming, ozone layer depletion, flooding and land degradation with its effects of human activities were also discussed. Primary and secondary data were used for the review of the effect of the environmental problems associated with illegal dumping of refuse. Policy options for upgrading the degraded environment were also suggested.*

**Key words:** Environment, degradation, pollution, solid waste.

## 1.0 Introduction

The combined effect of industrialization, urbanization and increase in population has a serious stress on the urban environment and consequently causing degradation of the environment, there by altering the natural balance of the inhabitant. These human activities have greatly undermine equitable and sustainable development. Waste is generated in all facet of life but there is large variation in its type and quantity generated in any country (Ejiagha, 2018). The level of development of a country greatly influence the quantity of waste generated. Solid waste is defined as any garbage, refuse, sludge from a waste water treatment plant, water supply treatment plant or air dried materials, including solid, liquid, semi-solid or contained gaseous materials resulting from industrial, commercial and agricultural operations and from community activities (United State Environmental Protection Agency, 2005).

Municipal solid waste management is a big challenge due to number of problems including; inadequate management, lack of technology and human resources, shortage of collection and transport vehicles, and

insufficient funding (Islam, Rahman, Hassan & Azam 2016). The solid waste Collection systems may differ remarkably between developed and developing nations. The concept of house-to-house is most common especially for domestic Municipal Solid Waste (MSW) collection in most developed countries (Worrell & Vesilind 2012). However, the utilization of this concept has generally been very low particularly in developing countries due to numerous challenges including financial and economic problems (Government of Ghana, 2010). Most of the developing country resort to communal waste collection system via communal containers. One of the factors that may impinge on the efficiency of the communal container collection system leading to waste overflows and ground dumping is availability and sufficiency of containers at collection sites (Abudulai, Hussein, Bevilacqua & Storrings 2015). The most common problems associated with improper dumping includes; diseases transmission, fire hazards, odour nuisance, atmospheric and water pollution, aesthetic nuisance and economic losses (Basagaoglu, Celenk, Miguel & Usul, 1997; Mohammed & shum, 2014). Solid waste disposal is an

important part of waste management system, and this requires much attention to avoid environmental degradation.

Environmental degradation is the deterioration of the environment through depletion of resources such as air, water, and soil, the destruction of ecosystems and the extinction of wildlife (Wikipedia, 2017). When the environment becomes less valuable or damaged, environmental degradation is said to occur (Etuonovbe & Didiugwu, 2017). This process can happen naturally, or by human activities. Environmental degradation causes loss of rain forest, air pollution and smog, ozone depletion, etc. Environmental Pollution has been occurring all over the world, poisoning the planet even in remote areas. This paper was aimed at reviewing the environmental effect of illegal dump sites and land fill on humans, plants and animals at Emene and its environs.

### **1.1 The Study Area**

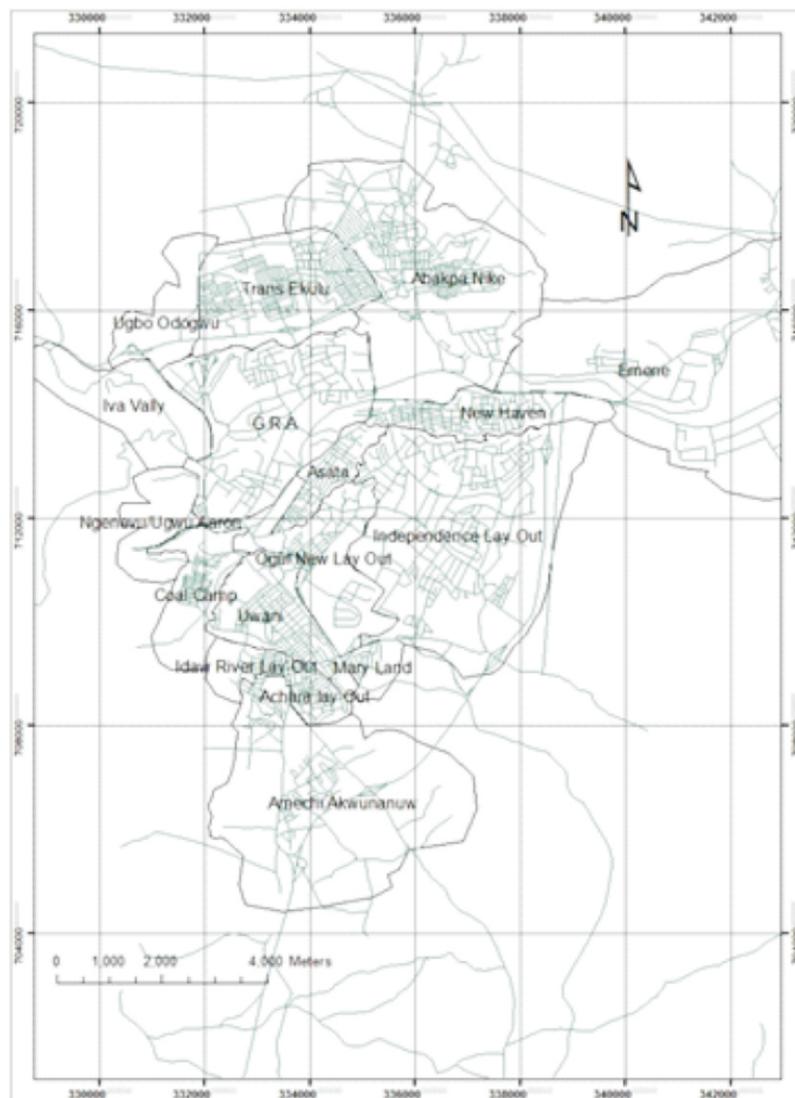
Emene is one of the settlements located within Enugu urban area. Enugu urban area is located within coordinates  $6^{\circ} 22'N$  to  $6^{\circ} 38'N$  and  $7^{\circ} 28'E$  to  $7^{\circ} 37'E$ . Emene is located within Enugu East local government area. The area comprises of residential, commercial and

industrial area. Solid wastes mainly are generated from domestic uses like; food & vegetables waste, waste paper, plastic, poly bags, metals, glass and wooden materials. The settlement is made up of Nike indigenous people. It is both commercial and industrial centre of sort, with its ever busy markets coming up every day within the settlement.

The climate of Emene is basically tropical type. It has an annual temperature around  $27^{\circ}C$  to  $32^{\circ}C$  ([www.enugustate.gov.ng](http://www.enugustate.gov.ng)). There are two distinct climates namely rainy season and dry season. Rainy season normally begins from late April to October and the dry season from November to March. During the rainy seasons, the North Eastern winds come often in spells and can last a few days or more, while at night it becomes chilling and temperature can drop below  $20^{\circ}C$  and during the day  $32^{\circ}C$ . In dry season the hot harmattan wind from the Sahara carry large amounts of dust to the state leaving a thick fog in the morning and a hazy sky for the rest of the day (Ejiagha, et al 2012). The vegetation is made of light mangrove and perennial crops, field crops, tree crops, grass land shrubs.



Fig. 1a: Map of Enugu state showing the three LGA of Enugu urban (study Area) (Source: GIS Unit Dept. of Geography UNN)



*Fig. 1b: Map of Enugu urban area (Study area) showing Emene settlement  
(source: Ejiagha, et al, 2012*

## **2.0 Methodology**

### **2.1 Site Visit**

The methodology involved visitation of various illegal dump sites and comparing the location with the current map of Enugu urban. A total of 14 illegal dump sites with the state waste land fill located along Enugu-Port Harcourt express way were visited and pictures of them taken. Some of the photographs are shown in figure 2.



Figure 2: Waste land fill/dump sites located along Enugu-PH express way

## 2.2 Data Collection

The spatial information of the illegal dump sites were gotten using surveying technique. The spatial information gotten is the geographical coordinates of the illegal dump sites and this defined the location of the sites. The data was collected with the use of a Global Positioning System (GPS) handheld instrument (Garmin 76) and the distance from the dump site to access roads, residential building etc. The extents of the sites were determined from the polygons derived after data computations. Also attribute data was collected through interviews by the people living around the dump site and physical & visual examination of the area also helped in the analysis done.

## 2.3 Data Analysis

The geographical and attribute data collected was put into ArcGIS 10.2 software to create a buffer within the study area to identify the proximity of the dumpsite to residential homes. The buffer was established by taking 3meters radius from a defined point within the site to show proximity.

## 3.0 Discussions: Causes and its effect

## on the Environment

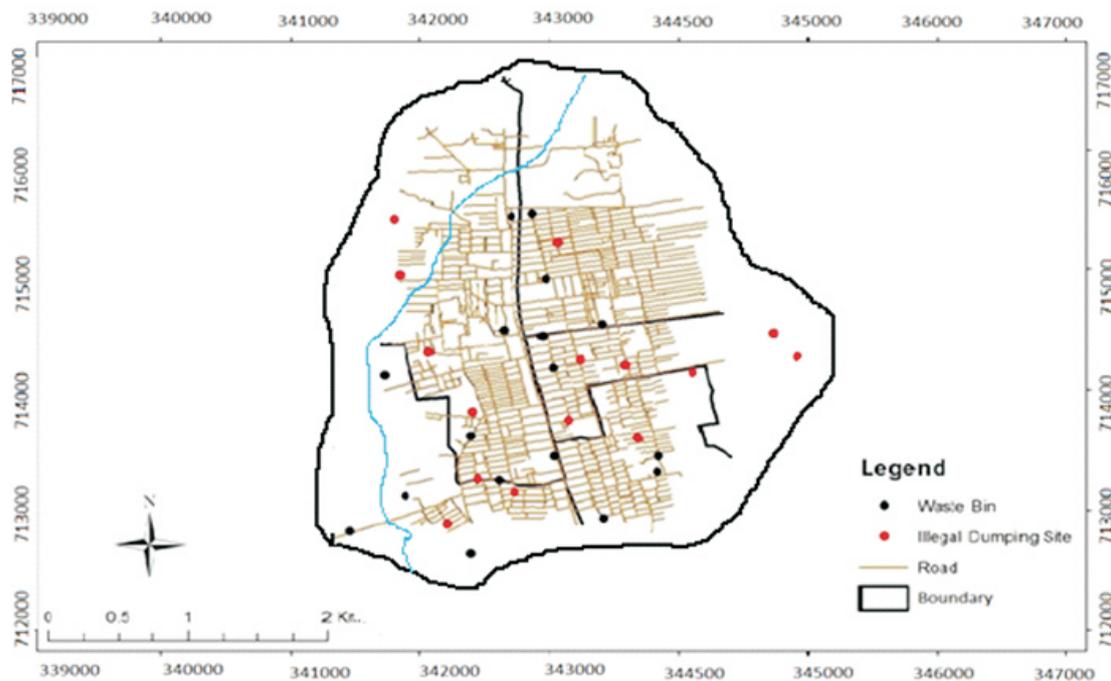
### 3.1 Human Activities on the Environment

The activities of human beings on the earth have serious effects on the environment which man lives. This is because any activity of man is done in the environment and the resultant effect is either positive or negative to man (Etuonovbe & Didiugwu, 2017). Uchegbu (1998), states that these negative effects of human activities on the environment causes economic loss and domestic disturbances. Characterization of waste is important to determine its possible environmental impacts (Hai & Ali, 2005). Per capita waste generation would obviously depend on a number of socio-economic parameters affecting consumption and other behavioural characteristics (Islam, 2016).

In the study a survey was conducted to determine the composition of solid waste generated at Emene and environs. The results showed that the solid waste generation rate is 0.46 kg/capita/day. Then on estimation about 365.43tons of solid waste were generated per day in the study area (Table 1).Solid wastes in

the study area are mostly generated from residential (59%), commercial (25%), industrial (13%), and health institutions (3%) (Table 1). Industries and Hospitals waste are frequently mixed with the solid wastes, and are poorly collected and disposed. This method normally creates public health hazards. The analysis showed that most of the wastes are from residential area and they include waste from domestic uses like; food, vegetables, paper, plastic, poly bags, metals, glass and wooden materials. The composition of the waste are 85% food wastes, 4.5% paper, 3.5% plastic and polythene, 2% wood and

leaves, 0.4% glass and ceramics and 4.6% other wastes (Table 2). This illegal waste disposal has a very bad and negative impact on the entire environment. This has led to blockage of drains and increased flooding, and quick spread of diseases. Also this indiscriminate dumping of waste destroys the aesthetic value of the area, causes irritating odour and dust. This illegal dumping of waste along the street is a major source of contaminations and this lowers the civic pride and causes property in the area to lose value.



**Fig 3: Current locations of Enugu State Waste Management Authority (ESWAMA) waste collecting containers with illegal dumping sites.**

Table 1: Total waste generation and its distribution by source

Solid waste generation (ton/day)	Residential (%)	Commercial (%)	Industrial (%)	Health institutions (%)
365.43	59.00	25.00	13.00	3.00

(Source: ESWAMA, 2016)

Table 2: Solid waste composition of the study area

Waste composition	Percentage by weight
Food waste	85
Paper	4.5
Plastic and Polythene	3.5
Wood and leaves	2.0
Glass and ceramics	0.4
Others	4.6

(Source: ESWAMA, 2016)

## .2 Global Warming

This is the continued build-up of greenhouse gases in the atmosphere (Etuonovbe and Didiugwu, 2017). These gases include carbon dioxide, methane, nitrous oxide and chlorofluorocarbons; which increase as a result of constant burning of the refuse in illegal dump sites in trying to reduce/decrease them thereby blocking some of the heat radiated from the earth to cause a greenhouse effect. According to the inter government panel on climate change, the last two decades of the 20th century were the hottest on record. The major causes of increasing emissions of greenhouse gases at these areas are the constant burning of the refuse, fossil fuels as a result of transportation. Global warming leads to the rise in seawater level, soil erosion, flooding and drought.

### 3.3 Depletion of the Ozone Layer at the area

The ozone layer comprises of the stratosphere, lithosphere and troposphere and they are found at a height of about 20 – 30km above sea level. This layer is the protective layer, which prevents the penetration of the sun harmful ultraviolet rays. The pollution of the atmosphere from the release of Chlorofluoro carbons (CFCS) gases causes

the depletion of the ozone layers and this result in environmental degradation (Etuonovbe & Didiugwu, 2017). It was discovered that at this area constant emission of gas caused by burning of the refuse resulted in a very serious environmental degradation like ozone layer depletion. Ukpong (1994), complained that most of the skin diseases and the low productivity in agriculture are caused by ultra- violet rays and that an increase in ultra-violet radiation affects water bodies, disturbs aquatic life, which supports the food chain, and causes the death of fishes that feed us. This depletion also causes the deterioration of synthetic materials such as paints, and other products used in the buildings within the area affected.

### 3.4 Environmental Air Pollution

As a result of the burning process there is a lot of air pollution within the environment. This phenomenon occurs whenever potentially harmful substances are released into the environment as a result of burning of refuse which contain residential, commercial, industrial and medical wastes. Pollution that occurs at this area can be categorized into two major types: air pollution and water pollution.

Air pollution is the contamination of the air

with unwanted gas, smokes, particles and other substances. According to the World Bank Report (1980), air pollution is the presence in the outdoor atmosphere of one or more contaminants such as dust, fumes, gas, mist, odour, smoke or vapour in such quantities, characteristics and duration as to make them actually harmful or potentially injurious to human, plant or animal life or property, or which unreasonably interfere with the comfortable enjoyment of life and property. The burning of refuse has serious effect on the livelihood of the people living in the area and this exposes them to an increased risk of premature deaths, child respiratory illnesses, asthma and cancer.

### **3.5 Land Degradation effect of illegal dump site**

This illegal dumping of refuse has caused serious land degradation. This is one of the worst environmental problems facing many people in the area. The intensification of the use of fragile and marginal ecosystems has led to progressive degradation and continued desertification of marginal agricultural lands even in years of normal rainfall (Etuonovbe & Didiugwu, 2017). Ukpong (1994) listed some of the causes of land degradation to include; improper resources management, destructive logging of our forest, overgrazing and over-cropping of arable lands, flooding, wind and soil erosion etc. As a result of massive refuse dump the soil at these places are normally being eroded and washed away whenever it rains. This exposes the sub soil and washes away the mineral nutrients of the soil that helps to maintain the natural balance. During the cause of this erosion; the flood also carries some of these harmful chemicals, substances, wastes from industrial, commercial and residential area that are being deposited at the dump site to the drains and nearby river. This activity distorts the natural floral of the area that maintains healthy living. Constantly these drains are blocked with debris of refuse from the dump site. Ukpong (1994) also identified

other indirect causes of land degradation to include population growth and population influx, property ownership issues, lack of control, enforcement measures and jurisdictional overlap which are due to lack of authority and the use of inappropriate technology for farming and even for producing manufactured goods.

### **4.0 Effects of environmental degradation on living and non-living things**

In Nigeria, like in many developing nations, the resultant environmental problems are legion: aggravated soil erosion, flood disasters, salinization or alkalization, and desertification due to the effects of shifting agriculture on fragile soils, forest clearing in erosion prone and flood prone areas, bush burning, animal over-grazing and poor, construction and maintenance of roads and irrigation system; pollution of water, air and land due to improper disposal of domestic and industrial waste; pollution through oil spillage; pollution from noise; proliferation of slums in urban areas, unsanitary and unsafe housing; congestion of traffic houses in urban area and lack of open space for active outdoor recreation (Etuonovbe & Didiugwu, 2017). These environmental problems affect both human, plants and animal that lives in affected environment.

Sulphur dioxide is one of the major constituents of air pollution at the dump site. The wastes come from industrial, commercial and residential sources which has different levels of chemical compounds inherent in them. Constant burning of these refuse triggers evaporation of sulphide gas. Sulphur dioxide, has a pungent, suffocating and irritating smell which can cause respiratory tract diseases. Sulphur compounds have been known to affect visibility, reduction of sunlight, unpleasant smells, irritation and smarting in the eyes, nose and throat. The sulfur pollution seriously changes the environment and it will greatly contribute to

an increase in hospital admission, absence from work, school and therefore increase in mortality rate.

Depletion of the ozone layer causes eye and skin diseases. It is because of the adverse effects of Ultra Violet (UV) radiation. When the eye and skin is exposed directly to sunlight and solar UVR, it results in an acute or long-term eye and skin damage. (Norval, 2007) upheld that when the skin is exposed directly to solar UVR, and the development of skin cancer is the main adverse health outcome of excessive UVR exposure.

As said before depletion of the ozone layer disturbed plant life-cycles. Pollutants such, as sulphur dioxide, chlorine gas, ammonia, hydrogen chloride and mercury etc enter the plant via the stomata in the course of photosynthesis of the plant. Damages that are done to plants include collapse of the leaf tissues, bleaching or colour changes, reduction in growth rate and finally death of the plant.

Marine life is not left in this environmental degradation. The ozone layer depletion exposes the water body to direct UVR from the solar system. Animal's health may be in danger when the animal feeds on plants covered by toxic particles such as fluorine. Air pollution also affects non-living materials like building surfaces, clothing and structures. The sulphuric acid released as a result of burning of refuse and which is present in the air within the area polluted is mostly responsible for the attack on the cloth material or fabric, which leads to bleaching and discoloration. Hydrogen sulphide produces acid rain which corrodes materials such as paints, electrical contacts and textiles.

## **5.0 CONCLUSION / RECOMMENDATIONS**

As can be seen from the research, the residence of these areas where these illegal refuse dumps are located are the recipients of all these environmental degradation. Government failure to implement appropriate policies to

stop illegal dumping of refuse at residential areas has increased the environmental problems of those areas. Good and proper management policy and speedy removal of any refuse dumped at any place within human habitation will help to improve the quality of life. Therefore a comprehensive or holistic approach is necessary to address the social and economic predicaments of the people living in the affected area. In this context the following measures are recommended.

- i. There is every need to provide proper refuse disposal facility where these refuse can be properly disposed and treated.
- ii. Effort should be made to stop the burning of refuse at those areas to avoid air pollution, contamination and spread of diseases.
- iii. The refuse found at any illegal spot should be removed with immediate effect by the appropriate authority and the public discouraged from dumping refuse indiscriminately.
- iv. Develop carbon capture and storage processes and improve soil carbon management strategies.
- v. There is a need to seriously carry out a general policy implementation on environmental sanitation, by increasing environmental sanitation practice and encourage proper waste disposal.
- vi. There should be a proper land reclamation policy for those areas that have been taken by illegal refuse dump.
- vii. Joint Community-Government participation is encouraged to harness all the points mentioned above.

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