

# THE ENVIRONMENTAL CONSEQUENCES OF POLLUTION IN ADO-EKITI, NIGERIA

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## **Abstract**

*The study examined the environmental consequences of pollution in Nigeria with particular reference to Ado-Ekiti, Ekiti State, Nigeria. Three hundred (300) copies of questionnaire were administered to selected respondents in some of the major zones in the study area. The data collected were analyzed using frequency distribution and tables. The result of the data analysis revealed various causes and consequences of environmental pollution in the city and the result of the analysis showed that pollution causes a lot of problems in the environment which are also dangerous to human health and the biophysical realms of the city. The paper suggests a proactive measure on the part of individuals such as public enlightenment; abstain from dumping of refuse in drainage, improve the quality of the city environment. Also government should enforce environmental laws to curb problems which are caused by environmental pollution in the city with a view to entrenching a sustainable city environment.*

**Keywords:** Environmental Compliance, Environmental Pollution, Environmental Laws, Sustainable.

## **Introduction**

Pollution is regarded as a process by which obnoxious substances are introduced into the environment such that the quality of such an environment becomes degraded. Pollution may be defined as the release of matter or energy into the environment that causes undesirable impacts on the health and well-being of people or other organizations. Cunningham and Gunningham (2012) stated that pollution is anything that makes the environment foul, unclean, dirty; any physical, social activities of living organizations that alters the environment in undesirable ways. Environmental degradation is the spatial act of marking and spoiling of the premises, streets, farmland, air water bodies, holiday's resorts and forests. Hence, environment degradation ranges from careless dropping of rubbish, refuse etc which may result into defacement, devaluation, gradual destruction and defilement of the environment (Ogundele, 2005). The various causes of environmental degradation may be as a result of rapid urbanization, affluence which increases materials consumption and wastes, poverty, which limits choices on how to sustain the use of environmental resources and non-eco-friendly technologies and processes which use energy and national resources.

The environment which is defined as the aggregate of all external conditions affecting the life and development of an organism provides various resources for his development. Although it is evident that man derives many resources from the environment to sustain a living, the process of attaining this aim causes man to exploit the physical environment. Through this, a lot of alteration is done to the environment which are highly detrimental to man's well being.

Principally, every material used by man appears at some time as waste which can affect human health. For instance, the state of conditions of public drains in the country and especially Ado region precisely demand for more care. It is inevitably important to note that health is wealth and one can then infer that a clean environment and also a well protected environment will go a long way in improving the socio-economic and welfare development of the environment. Chitchara (2012) defines environmental pollution as a process which is brought about by the addition of waste products of human activities to the environment.

The major pollutant affecting the environment nowadays is air pollution (Ogundele, 2009). The major identified ambient air pollutants include;

- a) Carbon monoxide which in the result of incomplete combustion of fuels from automobiles or industries. It is an odourless, colourless, poisonous gas that comes mainly from motor vehicles and other combustion exhaust.
- b) Ozone (O<sub>3</sub>) which is a major harmful ingredient in the photochemical smog. It is not emitted directly into the air but produced in the atmosphere when gases or vapours of organic chemicals called hydrocarbons combine with nitrogen oxide compounds in the presence of sunlight. It is harmful in the lower atmosphere and should not be confused with ozone in the upper atmosphere, which protects us from ultra-violet radiation.
- c) Nitrogen dioxide (NO<sub>2</sub>) and related nitrogen oxides (NO<sub>x</sub>) are produced when fossil fuels are burned. High levels of nitrogen dioxide exposure can give people coughs and make people feel short of breath.
- d) Sulphur dioxide (SO<sub>2</sub>) is created when sulphur containing fuel is burned and in diesel engines. It constricts air passage, making it with a problem with people with asthma and for young children.
- e) Suspended Particulate Matters (SPM) includes solid particles and tiny droplets of liquid. It originates from burning of fuels and from air-moving equipments.
- f) Lead (P<sub>b</sub>) has been known as a poisonous substance. Exposure to lead can lead to damage of the blood, brain, nerves, kidneys and the immune system. Other secondary pollutants are smog, water pollution, soil pollution and marine pollutions (Benny, 2009). Ogundele and Bankole (2010) opined that air, water and food are principal sources of environmental health pollutants and heavily implicated are the manner in which household wastes and sewage are managed. The significance of environmental factors to the health and well being of human population is increasing apparent.

### **Types of Environmental Pollution in Ado-Ekiti**

There are three basic types of environmental pollution. These are; Air, Water and Land pollution. But the major pollution types affecting the environment are Air and Water pollution.

**Air Pollution:** Air pollution refers to a situation where man or his agent in the process of man-environment interaction emits various gaseous substances in the atmosphere in shorts, air pollutions turn clear, odorless, air into smelly air that harms health, kills plants and animal damage properties. Smog is a type of outdoor air pollution that affects the environment. It is caused by chemical reactions between pollutants derived from different sources, primarily automobile exhaust and industrial emissions (Benny, 2009) cities are often centres of these types of activities, and many suffer from the effects of smog, especially during hazy or winters period. While automobile have become an indispensable part of modern life, there is an increasing concern about its impacts on the environment, particularly the negative effective effects on air

quality and health. The proportion of pollutants emitted has increased tremendously because of the increase in the number two (2) vehicles with the environment.

**Water Pollution:** Water pollution is anything that degrades water quality. According to Cunningham and Cunningham (2012) water pollution is any physical, biological or chemical change in water quality that adversely affects living organisms or makes water unsuitable for desired uses. Water pollution affects a wide area of the earth planet, because water comprise, over 70% of the earth's surface. Causes of water pollution include sewages, fertilizers containing nutrients such as nitrates and phosphates in excess levels. Society's main concern with water pollution has mostly been drinking water.

**Land Pollution:** Land pollution is the degradation of earth's land surface often caused by human activities and its misuse. Land pollution is simply the occurrence of unwanted materials or wastes on land. It is the haphazard disposal of urban and industrial wastes. The commonest pollution are the waste products that are often scattered on land areas in the cities. Most environmental problem arises due to the production or consumption of goods whose products translate easily into pollution. Land pollution damages the thin layers of fertile soil that covers much of the earth land that is essential for growing crops vegetables and fruits.

**Household Wastes:-** Poorly managed wastes (either liquid or solid) constitute serious threat to the environment. Human excreta of urine and faeces are dangerous to human health. Urine, though relatively harmless, can cause the spread of schistosomiasis in tropical countries. Human faeces are dangerous to human health because of the pathogens they contain (Ogundele, 2008). Solid wastes according to (Ogundele, 2005) could be classified into:

- Garbages:- These consist of putrescent organic material and will decompose rapidly especially in warm weather. Example is food remnants.
- Rubbish:- Consists of paper and paper product, plastic, can, metals ceramic, dirt, dust etc.
- Ashes:- These are residue from combustion process resulting from household activities and on site incineration.
- Bulky Wastes:- Include furniture, appliances, mattresses, springs etc which require special handling and collection.
- Construction:- This class include; timbers, bricks, concrete, waste electrical wiring etc associated with construction of old buildings and new ones.
- Special wastes:- Resulting from normal street clearing, road side litters, catch basin debris, dead animals and abandoned vehicles.

The menace of environmental pollution is clearly noticed in our major cities. The causes and consequences of pollution had generated a serious concern to private individuals, scholars and government agencies.

Therefore, there is need to curb the constraints of environmental pollution in the city. The focus of the study in this paper will improve the living condition of the people in the city.

The objectives of the study are therefore to:

- i. examine the impacts of environmental pollution in Ado-Ekiti, Ekiti State in terms of socio-economic and welfare of habitats.
- ii. Find-out the sources of environmental pollution in Ado-Ekiti region
- iii. examine the effort of the state government in the area of storage, collection and disposal of waste.
- iv. proffer solutions to the various degree of environmental pollution in Ado-Ekiti region in particular and Nigeria in general.

## The Study Area

The study was carried-out in Ado-Ekiti region, the capital of Ekiti State, Nigeria. The city located within latitudes  $7^{\circ} 45^{\circ}$  and  $5^{\circ} 3^{\circ}$  North of the equator and longitudes  $7^{\circ} 25^{\circ}$  and  $5^{\circ} 3^{\circ}$  East of the Greenwich Meridian.

Ado-Ekiti experiences both rainy and dry season under the influence of the south westerly monsoon wind from the Atlantic Ocean and dry continental North Easterly wind from the Sahara desert respectively. The rainy season lasted from April to October with an average annual rainfall of about 600mm. The city falls mainly in the deciduous forest. The temperature fluctuates throughout the year. Relative humidity is high during the rainy season and falls in the dry season.

Ado-Ekiti is under laid by Precambrian basement complex rocks which yields low lying residual hills and rocks. Generally, the terrain is undulating the characteristics nature of the rocks give rise to fertile clayed and loamy soils. The soils are marked by differentiation of horizon and abundance of area falls within the rain forest belt of Nigeria. However the natural forest has been cleared and converted to various land useful such as farming, residential, recreational and commercial. Crops grown in the area includes Cocoa, Maize and Cassava.

The selected observatory areas as shown in fig. 1 include;

1. The Central Business District (CBD) of the town (old Garage-Oja Oba Area.)
2. Ajilosun Area
3. Odo-Ado to Poly Road
4. Okesa – Dallimore/Stadium Road
5. Oke-Ila, Adebayo – Opopogbooro Road

The selected locations were the areas that are thickly and densely populated and are being affected by environmental pollution.

## Conceptual Framework and Literature Review

The Concept of Sustainable Development is applied to this study. The concept of sustainable development was propounded by the World Commission on Environment and Development (WCED) in 1987. This concept noted that sustainable Development is a development that meets the needs of the present generation without compromising the ability of future generation to meet their own needs. Development involves the purposeful change of the inherently complex environmental systems. The natural and man-made system are commonly consumed and multi-purpose in their social and economic roles.

Consequently, the effects of environmental pollution spread both geographically and socially (Birch, 2007). From the foregoing, it is crystal clear, that agricultural activities, environmental activities, environmental factors, climate change, human needs and natural resources are independent. Thus, a system analysis or assessment of the total environmental, agricultural, industrial and socio-economic developmental activities, and the storage of food products should be part of the overall planning process, otherwise, it will result into the pollution of our environment. In making developmental decisions, efforts to maintain or improve environmental quality, sustainable agricultural production and food security should be given sufficient weight. This is the basis of the concept of sustainable development, an idea first proposed in the eighties by the World Commission on Environment and Development (Rilwani and Osayande, 2003).

In essence, Sustainable Development is a process of change, in which the exploitation of agricultural resources, the direction of economic production and investment, the orientation of technological storage facilities and developmental activities are all in harmony and enhances both the present and future potentials to meet human needs and aspiration (WCED, 1987).

The environmental is referred to as the complex physical, chemical and biological factors/processes, which sustain life (Okorodudu-Fubara, 1998). The natural elements in the world both in the rural and urban

environment, all have organic and inorganic realms. The inorganic realms are the atmosphere, the hydrosphere and the lithosphere (Oruwari, 2001).

Akinbode (2002) stated that the environment is the totality of the places and the surroundings, in which we live, work and interact with other people in our cultural, religious, political and socio-economic activities for self fulfillment and the advancement of our communities, societies and nations. In general, the environment is the most precious asset that we own, share and use together with other people for mutual benefits and enhanced welfare of the society at large. Thus, environment refers to all the conditions and objects that surrounds man.

Pollution is the introduction of contaminants into the natural environment that cause adverse change. Pollution can take the form of [chemical substances](#) or [energy](#), such as noise, heat or light. [Pollutants](#), the components of pollution, can be either foreign substances/energies or naturally occurring contaminants. Pollution is often classed as [point source](#) or [nonpoint source pollution](#) ([Definition from the Merriam-Webster Online Dictionary](#)". Merriam-webster.com,2010 ).

Pollution started from the prehistoric times when man created the first fires. According to a 1983 article in the journal *Science*, "[soot](#) found on ceilings of prehistoric caves provides ample evidence of the high levels of pollution that was associated with inadequate ventilation of open fires. Spengler and Sexton (1983) noted that the forging of metals appears to be a key turning point in the creation of significant air pollution levels outside the home. Core samples of glaciers in Greenland indicate increases in pollution associated with Greek, Roman and Chinese metal production, but at that time the pollution was comparatively less and could be handled by nature ([Hong, et al. 1996](#)).

## Methodology

Data for this study were collected from primary and secondary sources. The primary sources of data collected were from physical survey and the administration of three hundred (300) questionnaires, through multi-stage random sampling techniques. This was used in the selection of household within the study area.

A total number of three hundred questionnaires were administered on respondents in this research, and 100% return rate of the questionnaires administered was achieved. The questionnaire was administered during the week days and on weekends. Descriptive method of data analysis using frequency table and percentages was adopted in this research.

## Findings and Discussions

The data collected were from the primary source through personal observation and collection of samples from the entire population of the city. However, data were collected mainly through the use of questionnaire. Specifically, 150 copies of structured questionnaire were printed and administered. The procedure for questionnaire administration involved dividing the entire city into zones and from each zone and from each zone certain numbers of people were interviewed. Data obtained through the secondary sources include those from offices, agencies and organizations where research could get the needed data.

The presentation of the various data was carried out using frequency distribution tables and measures of central tendencies such as the means and the range frequency distribution is the tabular arrangement of data into classes with the corresponding classing of frequencies of each variable.

Social Economic characteristics of respondents and environmental pollution awareness in Ado-Ekiti are greatly affected among other things by socio-economic variables in relationship with the quality, standard and environmental condition of the people in Ado-Ekiti.

It is obvious that wastes are produced due to various human activities on the landscape overtime. The economy of the people in the region is based on agriculture, cottage industries and craft trade (Ogundele,

2005). The local population is high in the area of agricultural production. This has been the major factor which has led to solid wastes generation that constitute the major pollutant in the area.

**Sources of Pollutants in Ado-Ekiti, Ekiti Region.**

The sources of pollutants within the study area are traceable to the human activities in the city. The domestic activities in the city constitute the most prominent sources of pollutant. Domestic activities produce pollutants which usually lead to the production of faeces, urine and many other nitrogenous compounds known as sewage. Cooking activity in homes also result to smoke emission of carbon dioxide.

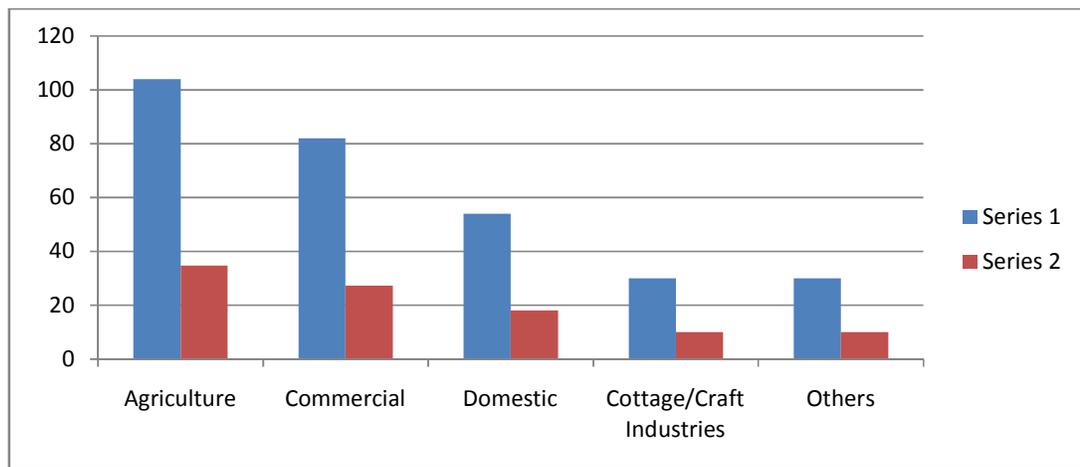
The distribution of goods which involves breaking the bulk, retailing the packets and final consumption by consumers usually involve generation of wastes such as packing containers, bottles, plastics etc. which are disposed off as waste which pollute the environment. Most of these wastes are dumped in drainage channels which retard water flow during rainfall and results to flooding within the environment.

Table 1 shows the various sources of wastes generated with the study area.

Table 1: Sources of Waste/Pollutants in the region

Sources of Wastes Generated	Response	Percentage
Agriculture	104	34.66
Commercial	82	27.34
Domestic	54	18
Cottage/Craft Industries	30	10
Others	30	10
<b>Total</b>	<b>300</b>	<b>100.00</b>

Source: Fieldwork Report, 2013.



Source: Fieldwork Report, 2013.

From the observations agricultural and commercial activities (about 62%) carried the most prominent sources of pollutants within the area. The major pollutants through the use of solid fuels (Biomass) for household cooking (about 35%). It is observed that the large percentage of fuel and biomass (wood and agricultural residues) are burned into carbon-dioxide resulting into various Health Hazards.

In Nigeria, it is difficult to qualify the amount of solid wastes that are being generated per households, but it is observed that over 75% is the total wastes generated monthly are mainly from urban centres (Nnamani 2000).

Agricultural activities constitute major source of waste generation in Ado-Ekiti. The result of analysis has being a source of environmental pollution in the city. Pollutants generated from farming activities came from households gardening, cultivation of maize on few plots of lands on the fringes of the city of particular notice is the use of chemicals such as fertilizers, pesticides and insecticides in crop production. The effect of chemicalised farming reflects in the pollution of streams. When rain falls and the chemicals are washed down the stream/ channels through erosion, such chemicals consequently pollutes water bodies. Also, droppings of poultry birds constitute another agricultural waste which generate fowl odour that result to man and animal diseases.

Another source of environmental/ pollutants is the transportation of goods and services. Atmosphere pollution generating hazards to health in urban center are linked with engines producing carbon-monoxide. There is no doubt therefore that transportation of goods and services across the city space could also generate pollutants in the environment.

### Methods of Waste Disposal in Ado-Ekiti.

The methods currently available for refuse disposal within the study area are sanitary landfill, composition and incineration. Although these methods are mostly used, it is also common that two or more methods can be combined and for waste disposal.

- The Sanitary Landfill:- In a method of waste disposal on open land in a manner that minimizes environmental hazards and nuisance. This is done by spreading and compacting waste in layers and covered with earth. The method is good, and is the simplest and most economical.
- Incineration:- A process of burning waste in specially constructed chamber has an advantage of reducing volume of waste up to 85%. The incineration method of waste disposal was introduced by the Federal Government in Ado-Ekiti in 2012. The composition method is the biodegradation of organic fractions of solid waste materials. However, the method is less practiced in Ado-Ekiti.

The process of waste management in the Ado-Ekiti involves placement of disposal waste bins in strategic locations in different areas all over the state. People dump their refuse in the waste bins and are being carried by refuse compactor vehicle depending on when they get filled up and dumped at dumping sites.

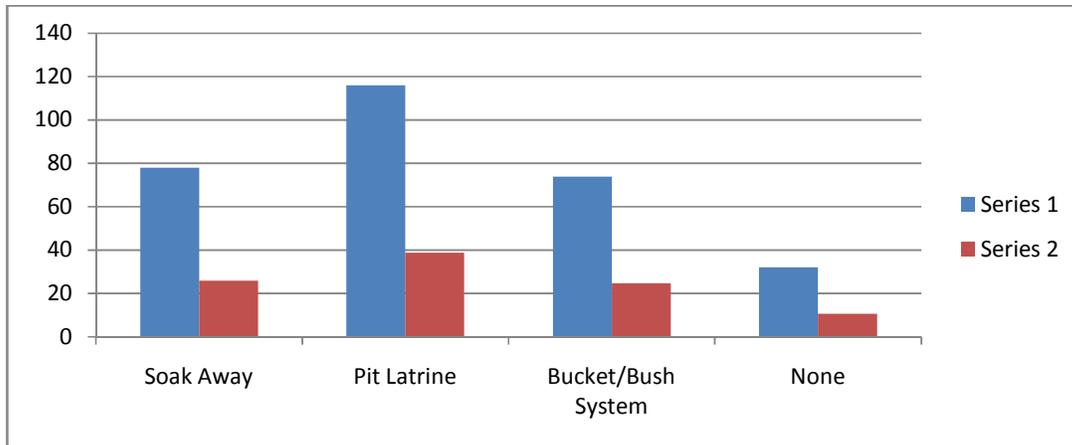
- Also, a Decomposing site has been located in the out sketch of the town (Ilokun Village) where the refuse are being recycled for agricultural use. This has reduced the accumulation of refuse in the dump site for further use.

Apart from solid waste generation, disposal of liquid wastes equally constitute environmental pollution to the area. Many residents, mostly in the Centre Business District, Oke-Ila and Okesa have no toilet facilities to dispose their wastes properly. Table 3 shows the respondents perception to sewage disposal.

Table 2: Respondents' Perception on the Possession of Toilet Facilities

Types of Toilet	Response	Percentage
Soak Away	78	26.0
Pit Latrine	116	38.7
Bucket/Bush System	74	24.7
None	32	10.6
<b>Total</b>	<b>300</b>	<b>100.0</b>

Source: Fieldwork Report, 2013.



**Source: Fieldwork Report, 2013.**

Above data shows the responses from the people interviewed and houses inspected during the fieldwork exercise.

Untreated sewage constituted greater important factor to environmental pollution. Table 3 shows that few houses (26%) have soak-away pit for sewage treatment. Also about 39% of the respondents used pit latrine which flies and other diseases breed and caused contaminated diseases to the environment.

Apart from the fact that pit latrine could pollute ground water if sunk close to the well; chicken odour emitted by pit latrine also pollutes the environment. Almost 11% of the respondents within the region have no toilet facility at all, but results to the use of bucket system which is as good as having no toilets facility. Most of the people without toilet facilities at places such as Oke-Ila, Odo-Ado and Okesa resort to dumping faces around bushes and public drains an unhygienic behaviours popularly known as 'short put'. Similarly some of the people that used bucket system are also as bad as subjecting themselves to serious health hazards.

Another cause of environmental pollution is related to the non-planning of some areas of the city. Many buildings were constructed without regard to the town planning regulations. Such examples are found in areas like Oke-Ila and Odo-Ado where the buildings existed even before the creation of Ekiti State.

The old buildings were built without good toilet facilities and lack of adequate ventilation and space in between buildings. The unplanned structure of the buildings creates a lot of sanitation problems. For example, it usually very difficult to bring in syringe tank to some buildings when pit latrines are filled and needed to be evacuated.

### **Environmental Consequences of Pollution**

Environmental pollution has a great effect on health, economy, climatology and socio-aesthetics consequences on the well-being of people. Improper disposal of wastes which pollutes the environment has resulted in a number of diseases and infections (Ogundele 2005). From investigations, over 60% of respondents have illness ranging from fever, cough, diarrheas which attributed to the indiscriminate disposal of wastes which pollute the environment.

Incessant dumping of refuse along the drainage and stream channels has resulted into seasonal and occasional flooding within the area. Apart from occasional reports of lost of lives as a result of flooding, it has led to the destruction of many valuable properties within the region.

The high concentration of buildings, structures, machines and people within the region has resulted into excessive microclimatic modifications within the study area whereby within the Central Business

Districts has provided the “Heat Islands” of the town resulting to adverse effects on the thermal comfort of the people (Ogundele, 2002).

On socio-aesthetics, the littering of the surroundings with refuse has variable gasses which pollute the environment. The major ambient on pollutants include carbon-monoxide, sulphur and particulate matters. Carbon-monoxide is an odourless, colourless but poisonous gas that comes mostly from motor vehicles and burning of refuse. This affects human blood by depriving oxygen to enter into the blood system. The health effects of particulates are linked with particle size. Small particles, especially from fossil fuel if inhaled deeply are more dangerous to health. Exposure to particulate pollution can cause wheezing and other symptoms in people with asthma or sensitive airways.

Noise pollution can result to noise-induced hearing; non-auditory physiological effects which include cardiovascular and gastric effects, headaches, increased reliance on sedations and sleepy pills and even increase mental hospital admission rates. Other effects are on sleep, annoyance and communication interference.

### **Recommendations and Conclusion**

In order to effectively control environmental impact of pollution in Ado-Ekiti, the following measures are being suggested for ensuring a disaster free space.

- (i) Government should pay more attention to primary health in order to rid the community of diseases originating from un-sanitary environment.
- (ii) Refuse bin and sludge tank for waste collection should be built within a distance of 200metres to 500metres for effectiveness of utilization. Daily evacuation will also be necessary in this case.
- (iii) Use of pit and bucket latrine and open burning of waste should be discouraged. However, sanitary land fill sites should be located from the town and boreholes should be by about 40metres to any existing pit latrine.
- (iv) Members of the public should be adequately educated and enlightened on matters relating to the environment through mass media, private organization and individuals.
- (v) Law enforcement agencies should be strengthened in order to effectively enforce environmental sanitation exercise coming up at every last Saturday of every Month. Better still, it is being suggested such an exercise should be done on bi-weekly basis if possible.
- (vi) Water pipes should be laid underground. Laying of water pipes in gutters and dump grounds should be discouraged. Leaking pipes should be urgently repaired to avoid water pollution.
- (vii) Proper arrangement should be made to manage waste generated at any event or function. This can be done by seeking the services of the waste collection unit at the end of those functions and events.
- (viii) The ever increasing population within the region has led to increasing volume of waste generated. Consequently, the Local Government Units should try to obtain more modern equipment like mammoth compactor vehicle to handle the waste.
- (ix) The Central Business District should be given a face lift, by improving the sanitary conditions. The use of more dust bin like drums should be enforced and encourage. Wastes should be dumped in the waste bins and placed outside the house for eventual collection by the environmental sanitation vehicles to a central waste disposal centre outsider the town. (The Decomposting Centre at Ilokun).
- (x) Regular cleaning of gutters, roadsides and bushes beside home should be done by interested group, communities or individual in the city.
- (xi) Noise reduction among residents living along motor ways can be achieved using a wide-set back between buildings and motor way. Proper land use planning and zoning will help in limiting noise production and residential zones.

- (xii) Public address system used by religion centres, music advertisements and other related issues should be discouraged to reduce the noise pollution within the environment.

### Conclusion

Impacts of environmental pollution have become a predominantly social problem neglected by the constituted body responsible for it. Consequently, environmental pollution requires the call for urgent attention by the concerned bodies such as the Federal, State and Local Governments who are involved in the task of improving the quality of the environment. It must be emphasized that if the recommendations suggested could be adequately enforced to curb the menace of environmental pollution, the effects will no doubt create a virile and sustainable environment.

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