

## **Examining Air Pollution and Control Measures in Urban Centers of Nigeria**

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### **Abstract**

Air pollution is an acute problem in developing countries especially their cities. In Nigeria the sources include vehicle exhaust aggravated by the rising car population, industrial emission especially from petrochemical industries and cement manufacture, use of gasoline generation as a result of unstable power supply, use of fuel wood for domestic use and energy for small industries. This paper reviews air pollution and control measures in Nigeria. Data for the study was generated through secondary sources. It was found out that it has been difficult to achieve cooperation for air pollution control in developing countries like Nigeria whose main concern is to provide for the basic needs as food, shelter and employment for her populace. The control measures have not been very effective and fully enforced. This paper therefore proposed preventive measures and sustainable solutions such as vehicle inspection, enforcement of legislations, effective refuse collection and evacuation and steady supply of electricity to stop use of gasoline generators among others to ensure safe environment for the population to live.

**Keywords:** Air pollution, control measures, urban centers, Nigeria.

### **1. Introduction**

Air is one of the most important constituents of man's environment. An average human being requires about 12kg of air each day, which is nearly 12 to 15 times greater than the amount of food consumed [1]. Clean and pure air is very essential for human health and survival. Any change in the natural and normal composition of air

that may adversely affects the living system, particularly the human life invariably causes air pollution [1].

Air pollution is generally defined as the presence in the outdoor atmosphere of one or more contaminants such as fumes, dust, gases, mist, odour, smoke, smog or vapours in considerable quantities and duration of which is injurious to human, animal and plant life or which unreasonably interferes with the comfortable enjoyment of life and property[2]. Thus air pollution is generally disequilibrium condition of air caused due to the introduction of foreign elements from natural and manmade sources to the air so that it becomes injurious to biological communities [2].

The World Health Organization (WHO) defines air pollution as limited to situations in which the outer ambient atmosphere contains materials in concentrations which are harmful to man and his environment [2]. A substance in the air that can cause harm to humans and the environment is known as an air pollutant and air pollutants are expressed as a ppm or  $\mu\text{g}/\text{m}^3$  which is subjected to change to variations of temperature and pressure [3].

Air pollution is a problem that is directly related to the number of people living in an area and the kinds of activities they engaged in. In a place where the population is low and their energy usage is also low, the impact of people in creating pollution is minimal. However where the population is high, the area urbanized and industrialized with high energy usage large quantities of pollutants are released into the environment. It is clearly obvious that the greater the concentration of people in one area, the greater the amount of pollution and the greater the sophistication of a society the more intricate and poignant its pollution [4]. It is based on the above fact that this paper examines air pollution and control measures in urban centres of Nigeria.

Nigeria is located on the west coast of Africa between the Bight of Benin to the fringes of the Sahara desert (between Benin Republic and Cameroun). Nigeria is the most populous country in Africa accounting for approximately one-sixth of Africa's people [5]. Based on the 2006 National Population Census Nigeria has a population of 140,431,790 people and the population is exploding with current estimates of over 170 million and a growth rate of more than 2% per annum [5]. Approximately 50% of Nigerians lived in urban centers and eight cities namely Lagos, Kano, Ibadan, Kaduna, Port Harcourt, Benin City, Maiduguri and Zaria have a population of over 1 million people [6].

## **2. Sources of Air Pollution in Urban Centers of Nigeria**

There are various sources of air pollution in the urban centers of Nigeria. The major sources are highlighted below:

### **2.1 Vehicle exhaust**

The release of vehicle exhaust into the air is one of the major sources of air pollution in Nigeria especially in the urban centers where many people owned motor vehicles and move with them on urban roads. There is rapid urbanization in the major cities of

Nigeria which is accompanied by rising car population and hence increases in the release of vehicle exhaust which causes air pollution [7]. This is particularly the case during period of heavy vehicular traffic that results into traffic congestion. Several studies conducted by experts on the environment has over the years shown that vehicle exhaust or smoke has caused air pollution which destroys the air quality in cities such as Lagos, Ibadan, Kano, Kaduna, and even Abuja the Federal Capital.

## **2.2 Use of gasoline generator**

There is inadequate electric power supply to households, businesses and industries. The result is that many households, businesses and even industries operate small, medium and large capacity fossil fuel electric power generators for electric power supply whose exhaust is a source of air pollution that releases poisonous carbon monoxide. A recent study conducted in 2010 showed that small household generators in Nigeria operate an average of six (6) hours daily, while average distance of generator away from buildings was 5.6m. These alongside poor ventilation have negatively influenced the quality of indoor air in the households causing air pollution [8].

## **2.3 Use of fuel wood**

A large percentage of the people in the urban centers uses fuel wood for cooking and heating. Also small scale industries such as bakeries and businesses such as restaurants use fuel wood during their production processes. The result is that the burning of the wood has become a major source of indoor air pollution in the urban centers both at home and elsewhere. More people are using fuel wood due to the absence of cheap and readily available sources of cooking and heating in the country.

## **2.4 Industrial Emissions**

The distribution of industries in Nigeria is not uniform as they are concentrated in the urban centers. Major industrial centers in the country include Lagos, Port Harcourt, Ibadan, Kano and Kaduna. The industries range from oil and gas, chemicals, cement, textiles, iron and steel, plastics etc.[9]. Even though these industries are located in industrial estates, uncontrolled urban growth has resulted in the expansion of residential buildings very close to the industries. These industries release large quantities of gaseous wastes into the air which are sources air pollution.

## **2.5 Domestic and industrial wastes**

The improper disposal and ineffective management of municipal solid waste and industrial waste creates major environmental and aesthetic problems in most of Nigeria's urban areas [10]. Due to over-population and the creation of slums, most municipal areas generate more waste that can be disposed which led to the accumulation of waste heaps that over time decomposes which becomes source of air pollution. In addition waste burning method of disposal as practiced by most residents of the urban centers results in air pollution due to release of gases such as carbon

monoxide, sulphur dioxide, oxides of nitrogen, halogenated carbons and other particulate matter[10].

### **3. Air pollution Control Measures in the Urban Centers**

There are several measures for air pollution control in the urban centers which include:

#### **3.1 Environmental Legislation**

In December 1988, the Federal Environmental Protection Agency (FEPA) was established by Decree 58 of 1988 of the FEPA decrees and was amended by decree 59 of 1992[10]. The agency was given responsibility for control over Nigeria's environment, its resources, exploitation and management and the development of processes and policies to achieve this. The agency has published sectoral regulations aimed at air pollution control among others. These regulations are:

- National Guidelines and standards for environmental pollution control in Nigeria.
- National Environmental Protection (pollution abatement in industries and facilities generating wastes) Regulation 1991.
- The Management of Solid and Hazardous Wastes Regulations 1991 which gave a comprehensive list of dangerous and hazardous wastes.

The agency has been able to control pollution to some extent particularly in Abuja, the Federal Capital. The agency is now known by the name of National Environmental Standards and Regulation Enforcement Agency (NESREA).

#### **3.2 States Environmental Protection Agencies**

These are agencies concerned with general environmental protection in the 36 states of Nigeria. One of the departments in the state agencies is waste management and environmental pollution control department as in the case of Katsina state, northern Nigeria [11]. The department work to control pollution in the states, they receive complains of air pollution from the people and act accordingly to stop or reduce the pollution with some measure of success. In some states of Nigeria, particularly in the east, the agencies were now having powers to enforce legislations on the environment, arrest offenders and even put the offenders on trial in mobile courts in their premises. They are also engaged in public enlightenment programmes on radio and television to enlighten the people on the effects of air pollution.

#### **3.3 Environmental Education**

There are series of programmes on the print and electronic media in the states of the federation aimed at controlling the levels of air pollution particularly in the urban centers which are mostly affected. The ministries of environment and the states environmental protection agencies carry out various programmes like Radio and television discussion programmes, production of posters, pamphlets and leaflets to educate the people about air pollution, its effects and need for control for healthy

living. Despite these efforts air pollution problems still persist in the urban centres. This has indeed called for continuous environmental education as it provide the public with information on the causes of pollution, the effects of pollution and what they can do to prevent or mitigate the effects of pollution[12].

#### **4. Preventive Measures/ Sustainable solutions to air Pollution Problems**

The control measures for air pollution in the urban centres of Nigeria have not substantially reduced air pollution. It was particularly noted that most commuters and urban dwellers are constantly exposed to the hazards of air pollution on daily basis [13]. It is based on this that the paper put forward preventive measures/sustainable solutions as listed below:

- Vehicle inspection is an important preventive measure that will ensure drivers not only service their cars periodically but also old vehicles that emit to much smoke are taken off the roads and only vehicles in good condition ply the roads[14].
- Improvement in electric power supply will drastically reduce the use of gasoline generators that are found at home, business premises, offices and industries. Nigeria has numerous sources of generating energy from renewable sources that could effectively harness to supply regular electricity to the people thereby reducing the use of gasoline generators.
- The use of fuel wood can be reduced by providing readily available alternative means of cooking and heating both for homes and small scale industrial use. Biogas is an alternative energy source that can be promoted and subsidized to the people to reduce the use of fuel wood that is a source of indoor and outdoor air pollution.
- Effective refuse collection in the urban centers will ensure that waste materials do not accumulate in the locality to be burnt or incinerated. The regular waste collection and disposal will also ensure that there is no time for the waste to decompose and generate bad odour which pollutes the air.
- Manufacturing industries operating in the urban centers should be compelled to adhere strictly to the various pollution control legislations that are enacted in the country. In line with this NESREA should ensure that the industries fully comply with the pollution control regulations.
- Enforcement of air pollution legislations across the country will ensure that people, organizations and groups that carryout activities that are sources of air pollution are reduced. It is important to enforce pollution control legislations as the laws are there for many years but not fully enforced.
- There is the need to continuously enlighten and educate the public about the causes and effects of air pollution so that they realize the dangers and health hazards of living in polluted environment. Environmental organizations in Nigeria need to form themselves into pressure groups to not only raise

awareness about environmental issues but also pressurize the government to take action against those who pollute the environment.

## 5. Conclusion

Urban dwellers in Nigeria are among the millions of people particularly in developing countries that live in urban areas with unhealthy air due to pollution from automobiles, factories, power plants etc. In Nigeria, the governments' main concern is to provide for the basic needs of the people such as food, shelter and employment for the populace. Therefore pollution control has not been the priority programme of all levels of governments. It is based on this scenario that environmentalists foresee that controlling pollution will become more difficult and complex in the near future if the current trend continues [9]. It is therefore vital for healthy and sustainable living that the preventive measures and sustainable solutions to ensure safe environment for the population to live.

## 6. References

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