

ASSESSMENT OF AWARENESS OF THE CAUSES AND EFFECTS OF ATMOSPHERIC POLLUTION AMONG RESIDENTS OF RIVERS STATE, NIGERIA

Ndudi Agba, and Edwin Oduweze Ordu, Ph.D
Department: Science Education, Abia State University, Uturu.
E-mail: ndudiagba@gmail.com, eddynja@gmail.com

ABSTRACT

This study Assessment of Awareness of the Causes and Effects of Atmospheric Pollution among residents of Rivers State, Nigeria. The general objectives of this study is to assess the level of awareness of the residents of Rivers State regarding the Causes and Effects of Atmospheric Pollution in Rivers State. The dissertation has six (6) research questions and six (6) hypothesis that guided the study. The research design adopted was survey plan of simple random sampling, with a population of 42 respondents that returned the questionnaires. Instrumentation used in data collection were oral interview and the structured questionnaires, which was administered to the respondents. The statistical tool used in testing the hypothesis is Chi-Square. The indicators such as gas flaring, bush burning, use of old cars, road construction, automobile exhaust emission, pipeline explosion etc were identified as the Causes of atmospheric pollution in Rivers State. Also indicators such as respiratory morbidities, deterioration of building materials such as roofing sheets, paints, precious stones, walls, presence of soots in rain water, blighting of crops were identified as effects of the depreciation of air quality in Rivers State. As regard the level of awareness of the people on the causes and effects of atmospheric pollution, it was well adduced that the people are aware of the causes and effects of atmospheric pollution, but could not do anything to salvage the situation due to poor government policies on the mitigations of atmospheric pollution in Rivers State. Suggestions and recommendations aimed at mitigating the ugly trend were provided such as making of policies by the state government to stop the gas flaring, illegal refineries, the use of fissile fuel as to use renewable energy in powering their generators, cars, heavy duty power plants etc.

Keyword: Assessment, Awareness, Causes and Effects, pollution, Residents Rivers State.

INTRODUCTION

In Nigeria, atmospheric pollution presents problems that are detrimental to human life, vegetation, and aquatic Resource, infrastructures. The various layers in the atmosphere; now taking a tremendous dangerous trend to the existence and survival of man. This is as a result of anthropogenic activities i.e. man's zealous quest for development of via exploration and exploitation of the earth's natural resources without due regard to the environment and its resources. This has resulted in the release of pollutants into the atmospheric environment.

Background to the Study:

The interactions of most primary pollutants been released with normal atmospheric constituents produce more concentrated and toxic secondary pollutants in the atmosphere. A principal example is smog, which is associated to metropolitans and industrial cities formed by the reaction of Nitrogen oxides and unburned hydrocarbons originating from automobiles.

Notably, gas flaming in Rivers state releases about 35 million tous of a Carbon-dioxide a year, and about 12 Million tons of methane. According to E. A. Dosumu of Department of Medicine faculty of Health sciences University of Ilorin, gas flaring virtually goes on twenty-four hours every day in every oil field in Rivers State.

Harrison R.M. (2020): Airborne particulate matters Phil.Trans. R. Soc. A., 378

Airborne particulate matter (PM) is a pollutant of concern not only because of its adverse effects on human health but because of its ability to reduce visibility and soil buildings and materials. It can be regarded as a suite of pollutants since PM covers a very wide range of particle sizes and also has

a diverse chemical composition. Historically, much of the PM arose from coal burning and was measured as black smoke. However, in the second half of the twentieth century in developed countries, there was a reduction in black smoke emissions from coal burning and PM steadily became dominated by carbonaceous particles from road traffic exhaust and the secondary pollutants, ammonium salts and secondary organic carbon. This is exemplified by the composition of fine particles (referred to as PM_{2.5}) as measured in London, Delhi and Beijing. Steadily, as control strategies have addressed the more tractable sources of emissions, so sources previously regarded as unconventional have emerged and have been seen to make a significant contribution to airborne PM concentrations. Among these are non-exhaust particles from road traffic, cooking aerosol and wood smoke. The particle size distribution of airborne PM is hugely diverse, ranging from newly formed particles of a few nanometres in diameter through to particles of tens of micrometres in diameter. There has been a great deal of interest in ultrafine (nano) particles because of suspicions of enhanced toxicity, and as traffic emissions decrease as a source, so regional nucleation processes have become much bigger relative contributors to particle number, but not mass. This article is part of a discussion meeting issue 'Air quality, past present and future'

Emberson L. 2020: Effects of Ozone on Agriculture, Forest and grasslands. Phil. Trans. R. Soc. A, 378. The damage and injury that ground level ozone (O₃) causes vegetation has become increasingly evident over the past half century with a large body of observational and experimental evidence demonstrating a variety of effects at ambient concentrations on crop, forest and grassland species and ecosystems. This paper explores the use of experimental data to develop exposure-response relationships for use in risk assessment studies. These studies have typically identified the USA mid-West, much of Europe, the Indo Gangetic Plain in South Asia and the Eastern coastal region of China as global regions where O₃ is likely to threaten food supply and other ecosystems. Global risk assessment modelling estimates yield losses of staple crops between 3 to 16% causing economic losses of between US\$14 to 26 billion in the year 2000. Changes in anthropogenic emissions of O₃ precursors in recent decades have modified O₃ concentration profiles (peaks versus background O₃) and global distributions with the Northern Hemisphere seeing increases in O₃ levels of between 1 and 5 ppb/decade since the 1950s and the emergence of Asia as the region with the highest O₃ concentrations. In the future, O₃ mitigation could focus on methane (CH₄) and nitrogen oxide (NO_x) emissions; these will differentially influence global and local/regional O₃ concentrations and influence daily and seasonal profiles. The consequent effects on vegetation will in part depend on how these changes in O₃ profile alter the exceedance of detoxification thresholds for plant damage. Adaptation options may play an important role in enhancing food supply while mitigation strategies are being implemented. An improved understanding of the mechanisms by which O₃ affects plants, and how this might influence detoxification thresholds and interactions with other environmental variables such as water stress and nutrients, would help develop O₃ deposition and impact models to support the development of crop, land-surface exchange and ultimately earth system models for holistic assessments of global change.

The destruction of the Ozone Layer by chlorofluorocarbon (CFC) as a result of oil exploitation has led to excessive ultraviolet radiation into the earth's biosphere causing severe damage to human skin (Braller M., Yan C. Zhy T. 2020). The adverse consequences of these pollutants in our environment will be the destruction of sources of livelihood (Flora and Fauna), ravaged farmlands, corroded buildings, a devastated environment, increased health risk, food shortages and subsequent migration.

Stephen C.J., Bell JNB, Brimblecombe P., Clark CM, Dise NB, Folwer D, Lovett GM, Wolseley P.A., (2020): The Impact of Air Pollution on Terrestrial Managed and Natural Vegetation. Although awareness that air pollution can damage vegetation dates back at least to the 1600s, the processes and mechanisms of damage were not rigorously studied until the late twentieth century. In the UK following the Industrial Revolution, urban air quality became very poor, with highly phototoxic SO₂ and NO₂ concentrations, and remained that way until the mid-twentieth century. Since then both air quality, and our understanding of pollutants and their impacts, have greatly improved. Air

pollutants remain a threat to natural and managed ecosystems. Air pollution impacts through four major threats to vegetation are discussed through a series of case studies. Gas-phase effects by the primary emissions of SO₂ and NO₂ are discussed in the context of impacts on lichens in urban areas. The effects of wet and dry deposited acidity from sulfur and nitrogen compounds are considered with a particular focus on forest decline. Ecosystem eutrophication by nitrogen deposition focuses on heath land decline in the Netherlands, and ground-level ozone at phototoxic concentrations is discussed by considering impacts on semi-natural vegetation. We find that, although air is getting cleaner, there is much room for additional improvement, especially for the effects of eutrophication on managed and natural ecosystems.

Also, prior to the present level of industrial growth, rainwater was a major source of drinking water to peasant farmers, rural and urban cities dwellers in Rivers State.

UNECE (2016): Towards cleaner air: Scientific Assessment Report (2016) Emep Steering Body and Working Group on effects of the convention on long – range Transboundary Air Pollution. Because of its serious large-scale effects on ecosystems and its transboundary nature, acid rain received for a few decades at the end of the last century wide scientific and public interest, leading to coordinated policy actions in Europe and North America. Through these actions, in particular those under the UNECE Convention on Long-range Transboundary Air Pollution, air emissions were substantially reduced, and ecosystem impacts decreased. Widespread scientific research, long-term monitoring, and integrated assessment modelling formed the basis for the policy agreements. In this paper, which is based on an international symposium organized to commemorate 50 years of successful integration of air pollution research and policy, we briefly describe the scientific findings that provided the foundation for the policy development. We also discuss important characteristics of the science–policy interactions, such as the critical loads concept and the large-scale ecosystem field studies. Finally, acid rain and air pollution are set in the context of future societal developments and needs, e.g. the UN's Sustainable Development Goals. We also highlight the need to maintain and develop supporting scientific infrastructures.

The acid rains in some parts of Europe and America Devastated Tropical forest to mere desert (R.M. Harrison 2020), which is a direct consequence of atmosphere pollution. The fear now is unimaginable following the level and pace of industrial development in Agriculture, production processes, automobiles, use of kerosene stove and bush burning in the environment.

Rao S., et al. (2017): Future air pollution in the shared socio – economic pathway. *Global environ. Change*, 346 – 358. Emissions of air pollutants such as sulfur and nitrogen oxides and particulates have significant health impacts as well as effects on natural and anthropogenic ecosystems. These same emissions also can change atmospheric chemistry and the planetary energy balance, thereby impacting global and regional climate. Long-term scenarios for air pollutant emissions are needed as inputs to global climate and chemistry models, and for analysis linking air pollutant impacts across sectors. In this paper we present methodology and results for air pollutant emissions in Shared Socioeconomic Pathways (SSP) scenarios. We first present a set of three air pollution narratives that describe high, central, and low pollution control ambitions over the 21st century. These narratives are then translated into quantitative guidance for use in integrated assessment models. We provide an overview of pollutant emission trajectories under the SSP scenarios. Pollutant emissions in these scenarios cover a wider range than the scenarios used in previous international climate model comparisons. The SSP scenarios provide the opportunity to access a more comprehensive range of future global and regional air quality outcomes.

From the foregoing, the question now is, is our atmosphere safe? And what will be the situation in future? If this continues.

Statement of the Problem:

The effects of atmosphere pollution in Rivers State have been on for the past four decades, although unnoticed for a very long time. The situation worsened following the introduction of

automobiles, industrial gas plants, uncontrollable gas flaring, dumping of refuse and indiscriminate setting of illegal refineries (kpo fire). These were aftermaths of the discovery of crude oil in 1956 at Oloibiri in Bayelsa State in commercial quantity.

Scope of the Study:

Rivers State is located in South-South Geo-Political region of Nigeria, which was created since 27th of May, 1967 by the then head of State and Commander-in-Chief of the Armed Forces of the Federal Republic of Nigeria, General Yakubu Gowon which was later divided into more states namely Bayelsa State. Rivers State has its geographic coordinates as Longitude of 4057'15" North and Latitude 70'45" East (4.9543911, 7.0126247) Areas with its headquarters in Port Harcourt. The State is bounded in the North with Imo State, in the East with Akwa-Ibom and Abia States, and in the West with Delta and Bayelsa States and in the South, it is bounded with Atlantic Ocean.

Nevertheless, Rivers State is a vital economic and geographic hub located in the Niger Delta region of Southern Nigeria. Covering a land area of 11,077 square meters, spans across diverse ecological zones from tropical rain forest in the upland areas to dense mangrove swamps and coastal sand ridges near the Atlantic Ocean. The geographic coordinates on Latitude between 4020'N and 505°E. The Latitude between 6020E and 7035'E. The topography and climate land scope is highly amphibious, being roughly 45% riverine. The terrain is low-lying with much of the land situated less than 20 meters above the sea level, making it highly prone to network-wide creek flooding. The climate is characterized by high, year-round humidity and a lengthy rainy season that decreases from about 4,700mm near the coast to 1,700mm in the Northern limits.

Indeed, Rivers State is divided into three Senatorial Districts namely Rivers East Senatorial district comprising of Emohua, Etche, Ikwerre, Obio-Akpor, Ogu-Bolo, Okirika, Omuma and Port Harcourt City Local Government Areas. Rivers South – East Senatorial District comprising of Andoni, Eleme, Gokana, Khana, Oyigbo, Opbo-Nkoro and Tai Local Government Areas while the Rivers West Senatorial District comprising of Ahaoda East, Abua-Odua, Ahaoda West, Akuku-Toru, Asari-Toru, Bonny, Degema and Ogba-Egbema-Ndoni Local Government Areas.

Purpose of the Study

- (i) Determine the level of awareness among residents of Rivers State regarding the causes of Atmospheric pollution.
- (ii) Access residents awareness of the environmental effects of atmospheric pollution in Rivers State.

Significance of the Study:

The Finding of this study will in no small way provide useful information on causes and effects of atmospheric pollution to Rivers State Government, Urban and rural dwellers. It will also proffer ameliorative measures that will serve as a reference point to government functionaries, parastatals, and researchers.

This research work will also create an awareness among resident of Rivers State on the causes of atmospheric pollution in Rivers State. It will definitely raised the awareness among the residents of Rivers State on the effects of atmospheric pollution on the environment and health of Rivers State which occur due to atmospheric pollution arising due to anthropogenic and natural occurrence of air pollution in Rivers State.

Research Questions:

- (i) What is the level of awareness among residents of Rivers State regarding the Causes of atmospheric pollution?
- (ii) What is the level of awareness among residents of Rivers State regarding the environmental effects of atmospheric pollution?

Hypothesis

- (i) That the level of awareness among residents of Rivers State regarding atmospheric pollution has no significant on the causes of atmospheric pollution in Rivers State.
- (ii) That the level of awareness among residents of Rivers State regarding atmospheric pollution has no significant effects on the environment quality in Rivers State.

Conceptual Background

Zheng M. C. Zhu T. (2020) noted random, lead and toxic chemicals as three other air pollutants to have significant effect on the health and welfare of people. The primary sources of lead are gasoline and paint, for many years lead was added to gasoline to help engines run more effectively. Recognition that lead emissions were hazardous resulted in the lead additives being removed from gasoline in North America and Europe. Another major source of lead is paints. Many older homes have points that contain lead, since various lead compounds are colourful pigments. Dust from flaking paint or remodeling or demolition is released into the atmosphere. Although the amount of lead may be small, its presence in the home can result in significant exposure to inhabitants, particularly, young children who chew pointed surfaces and often eat point chips. Air toxics are harmful chemicals that are released into the atmosphere on purpose or are released accidentally as a result of leaks or poorly designed, manufacturing processes. Materials such as pesticides are purposely released to kill insects or other pest. However, the majority of air toxics are released as a result of manufacturing processes.

The most noticeable health effects have been observed during pollution episodes periods when atmospheric concentrations reached dangerous levels for short periods. They very first occurred in the Meuse Valley in Belgium in 1930, the second in Donora, Pennsylvania in 1948 and the third in London in 1952. (Zheng M. C. Zhu T. (2020).

In each incident, pollution rose to dangerous levels as a result of temperature inversions that lasted three to four days. In addition, in each episode, pollution came primarily from burning coal in homes and factories. In Belgium, 65 people died, in Pennsylvania 20 succumbed, and in London, 4000 people may have died as a result of toxic level of particulates and sulphur dioxides. In all locations, many other people became ill. Those who die or became ill were usually old or suffering from cardiovascular diseases (CD) and therefore, were unable to cope with the added stress caused by the heavily polluted air.

Air pollutants at levels humans are expected to have a wide range of effects on experimental animals. Fluoride and arsenic released from smelters can seriously poison cattle grazing downwind. Acids produced from power plants, smelters, industrial boilers, and automobiles have been shown to be extremely harmful to wild-life, especially fish and forests. In Southern California, millions of Ponderosa pines have been damaged by air pollution, mostly ozone from Los Angeles (Zheng M. C. Zhu T. (2020).

Air pollutants severely damage metals, building materials (stones and concrete) paints, textiles, plastics, rubber, leather, paper, clothing, and ceramics (see table 2.2) sulphurdioxide, sulphuric acid, ozone and nitric acid have been identified as the most corrosive and harmful pollutants (Zheng M. C. Zhu T. (2020). Many buildings in the world are being defaced by sulphur dioxides air pollution. Sulphuric acid, nitric acids cause cosmetic damage to metals and reduce their strength. In the Netherlands, bells that had been ringing time for three or four centuries have recently gone out of tune because of acid pollutants that have eaten away at them, lowering their pitch and rendering once familiar tunes indecipherable. Ozone cracks rubber products, necessitating costly antioxidant additives. Particulates blown in the wind erode the surfaces of stone, causing significant damage.

According to National Centre for Biotechnology Information March 13th 2026 PusMed. Central (Air Pollution). The beginning of a chemical climatology. It was not until the late 1960s and early 1970, however, that acid rain was recognized as a regional environmental issues affecting large

areas of Western Europe and Eastern North America. As a global environmental issues, it is frequently overshadowed by climate change.

He emphasized that Acid deposition includes acidic rain as well as other forms of acidic wet deposition such as snow, sleet, hail and fog (or cloud water). Acid deposition also includes the dry deposition of acidic particles and gases, which can affect landscapes during dry periods.

Jerry A. Nathanson (2026) stated that normal rain water is weakly acidic because of the absorption of carbon dioxide (CO₂) from the atmosphere – a process that produces carbonic acid and from organic acids generated from biological activity. In addition, volcanic activity can produce sulphuric acid (H₂SO₄), nitric acid (HNO₃), and hydrochloric acid (HCL) depending on the emissions associated with specific volcanoes. Other natural sources of acidification include the production of nitrogen oxides from the conversion of atmospheric molecular nitrogen (N₂) by lightning and the conversion of organic nitrogen by wild fires. However, the geographic extent of any given natural source of acidification is small, and in most cases it lowers the PH of precipitation to no more than about 5.2.

Ehler V. (2016) stated how garden plants affect the climate and season. He said the static continuity of architectural and urban monuments, garden and landscape. Spaces are dependent on maintenance, which determines whether the form envisioned by the original designed will endure or change over decades or centuries.

He emphasized that time and climate are closely interrelated in their effects on garden and landscape spaces. Because relations between temperature and moistures, light and shade, change daily throughout the year. Every region and locality on Earth – in fact, every building site has its own climate, unlike any other.

However, climate factors having major impact on garden and landscape design are temperature range (hot to cold) precipitation range (high to low, rain to snow), their combinations (hot, wet summers; hot, dry winters; cold, dry winters; and so on).

Here I would want to review other notable authors and their research work as to determine the gap created which make my work relevant:

Stephen C.J., Bell JNB, Brimblecombe P., Clark CM, Dise NB, Folwer D, Lovett GM, Wolseley P.A., (2020): The Impact of Air Pollution on Terrestrial Managed and Natural Vegetation.

Although awareness that air pollution can damage vegetation dates back at least to the 1600s, the processes and mechanisms of damage were not rigorously studied until the late twentieth century. In the UK following the Industrial Revolution, urban air quality became very poor, with highly phototoxic SO₂ and NO₂ concentrations, and remained that way until the mid-twentieth century. Since then both air quality, and our understanding of pollutants and their impacts, have greatly improved. Air pollutants remain a threat to natural and managed ecosystems. Air pollution imparts impacts through four major threats to vegetation are discussed through in a series of case studies. Gas-phase effects by the primary emissions of SO₂ and NO₂ are discussed in the context of impacts on lichens in urban areas. The effects of wet and dry deposited acidity from sulfur and nitrogen compounds are considered with a particular focus on forest decline. Ecosystem eutrophication by nitrogen deposition focuses on heath land decline in the Netherlands, and ground-level ozone at phototoxic concentrations is discussed by considering impacts on semi-natural vegetation. We find that, although air is getting cleaner, there is much room for additional improvement, especially for the effects of eutrophication on managed and natural ecosystems. **Gap:** The gap was centered geographical gap which is based in UK and Netherlands and not in Rivers State, as this research is trying to assess the level of awareness of the resident of Rivers State regarding the Causes and effects of atmospheric pollution in Rivers State.

Braller M. et al (2016: Ambient air pollution exposure estimation for the Global burden of diseases 2013 Environ. Sci. Technol., 50,79 – 88.

Exposure to ambient air pollution is a major risk factor for global disease. Assessment of the impacts of air pollution on population health and evaluation of trends relative to other major risk factors requires regularly updated, accurate, spatially resolved exposure estimates. We combined satellite-based estimates, chemical transport model simulations, and ground measurements from 79 different countries to produce global estimates of annual average fine particle (PM_{2.5}) and ozone concentrations at 0.1° × 0.1° spatial resolution for five-year intervals from 1990 to 2010 and the year 2013. These estimates were applied to assess population-weighted mean concentrations for 1990-2013 for each of 188 countries. In 2013, 87% of the world's population lived in areas exceeding the World Health Organization Air Quality Guideline of 10 µg/m³ PM_{2.5} (annual average). Between 1990 and 2013, global population-weighted PM_{2.5} increased by 20.4% driven by trends in South Asia, Southeast Asia, and China. Decreases in population-weighted mean concentrations of PM_{2.5} were evident in most high income countries. Population-weighted mean concentrations of ozone increased globally by 8.9% from 1990-2013 with increases in most countries-except for modest decreases in North America, parts of Europe, and several countries in Southeast Asia.

Gap: The gap created is on geographical and demographic issues as this study centered on North America, parts of Europe, and several Southeast Asia countries and does not mentioned Rivers State and the time in which the work was carried out is outdated and cannot represent the current situation of 2026. Also, the population was based Southeast Asia, North America, parts of Europe. Therefore, my research shall explore and expose the current level of ambient air pollution and the impacts of air pollution on health in Rivers State and it will determine the level of awareness on the residents of Rivers State regarding the impact of air pollution on the health of the residents of Rivers State. Hence to carry out this research in Rivers State at this particular time cannot be under estimated.

METHODOLOGY

For the purpose of this study, the researcher adopts survey plan of probability sampling which is based on simple random sampling as a method of collection of data which are relevant to assessment of awareness of the "causes and effect of Atmospheric pollution" in Rivers State.

Therefore, this work will help us find out the problem which created room for the occurrence of pollution in Rivers State, and also find the level of awareness among residents of Rivers State regarding the causes, environmental effect, health effects of atmospheric pollution in Rivers State. It will also find out the influence of demographic variables such as gender, educational level and place of residence on residents awareness on the causes and effects of atmospheric pollution in Rivers State. Finally, it will help us to determine the level of awareness on control and preventive measures as to apply appropriate mitigation to prevent a reoccurrence of Atmospheric Pollution in the Area.

A total number of 52 questionnaires were administered to rural and urban dwellers in Rivers state. The distribution is as follows:

Port Harcourt zone is 10, Igwuruta zone is 10, Eleme zone is 13, Degema zone is 11, and Obagi zone is 8.

A total number of 42 questionnaires were also retrieved representing 80.77% of the total number of questionnaires distributed.

A breakdown of the questionnaires retrieved indicate that port Harcourt city zone, Igwuruta zone, Eleme zone, Degema zone, and Obagi zone returned rate of 7,9,13,9 and 4 respectively.

As shown in figure 4.2, Eleme zone had the highest response with 100% while Obagi zone had the lowest response with 50%.

DATA ANALYSIS

The level of awareness among residents of Rivers State regarding the causes of atmospheric pollution in area

S/N	INDICATORS	YES	%	NO	%	TOTAL
1	Gas flaring	40	95.24%	2	4.76%	42
2	Use of generator	13	30.95%	29	69.05%	42
3	Industrial plants	27	64.29%	15	35.71%	42
4	Bush burning	37	88.10%	5	11.91%	42

Responses shows that 40 representing 95.24% identified that gas flaring contributes to the cause of atmospheric pollution in Rivers State, while 9 responses representing 21.43% were negative. On the use of generator and cars, was also identified as another indicator by 13 (30.95) of responses as one of the causes of atmospheric pollution in Rivers State while 29 (69.05%) of respondents were on the negative. On industrial plants, 27 responses representing 64.29% attain that the use of industrial plants contributes immensely on the occurrence of atmospheric pollution while 15 responses representing 35.71% did not acceded. Also, 37 (88.10%) of the total respondents indicated that bush burning contribute to the causes of atmospheric pollution in Rivers State while 5 (11.91%) of respondents did not accept as shown in the table above. In a general term, it is obvious that majority of the people are aware of the causes of atmospheric pollution in Rivers State.

Secondly, the level of awareness among resident of River State regarding the environmental effect of atmosphere pollution in the area

S/N	INDICATORS	YES	%	NO	%	TOTAL
1	Stream/ rivers pollution	40	95.24%	2	4.76%	42
2	Air pollution	13	30.95%	29	69.05%	42
3	Rain water pollution	27	64.29%	15	35.71%	42
4	Material and building effects	37	88.10%	5	11.91%	42

Analysis of indicators on effect of pollution on the environment in table 4.2 revealed that 40 (95.24%) of the respondents indicate that the stream and rivers were highly polluted in River State and while 2 (4.76%) did not agreed to that. In air pollution 13 (30.95%) of the respondents agreed that the air is highly polluted due to presence of pollutants in the atmosphere, while 29 (69.05) respondents did not agreed, also, 27 represent 64.29% identified that the rain water were highly polluted with atmospheric pollutants, while 15 representing 35.71% did not agree that the rain water is pullulated. Considerably 37 representing 88.10% of the respondents indicated materials and the building were affected the atmospheric pollutant by affecting the galvanize iron rooting sheets, precious stone, paints and walls of the building, while 5 representing 11.91% of the respondents disagreed. Indeed, form the above analysis; it is obvious that the atmospheric pollutants affects streams, rivers, air, Rain water and materials of building which are the components of the environment. It also indicated that most of the residents are aware of the effects of atmospheric pollution on our environment.

Test of Hypothesis–Chi-Square Contingences on the level of awareness among residents of Rivers State regarding atmospheric pollution has no significant on the causes of atmospheric pollutions in Rivers State.

S/N	YES		NO		TOTAL	CALL	CRITICAL	DF
	O	E	O	E		VALUA	VALUS	
1	40	(29.25)	2	(12.75)	42			
2	13	(29.25)	29	(12.75)	42	50.08	7.815	3

3	27	(29.25)	15	(12.75)	42			
4	37	(29.25)	5	(12.75)	42			
	117		51		168			

Also, from the Chi-Square table Hypothesis calculated above the Chi-Square value of 50.08 is higher than the critical value of 7.815 at 0.05 significant levels. Therefore, we reject the null Hypothesis which state that the level of awareness among residents of Rivers State regarding atmospheric pollution had no significant on the causes of atmospheric pollution and accept the alternate Hypothesis that there is significant level of awareness among residents of Rivers State regarding the causes of atmospheric pollution in Rivers State.

Secondly test of Hypothesis -Chi Square Contingency on the atmospheric pollution has no significant effects on the environment quality in Rivers State.

S/N	YES		NO		TOTAL	CALL VALUE	CRITICAL VALUE	DF
	O	E	O	E				
1	40	(29.25)	2	(12.75)	42			
2	13	(29.25)	28	(12.75)	42	50.08	7.815	3
3	27	(29.25)	15	(12.75)	42			
4	37	(29.25)	5	(12.75)	42			
	117		51		168			

From Chi-Square Table above calculated Chi-Square value of 50.08 is higher than the critical value of 7.815 at 0.05 significant levels. Therefore, we reject the null Hypothesis, which states that atmospheric pollution had no significant effect on the environment quality in Rivers State. Hence we accept the alternate hypothesis that there is significant effect of atmospheric pollution on the environment quality in Rivers State.

Summary of Finding

This Study Investigate Assessment of Awareness of the causes and effects of atmosphere pollution among residents of Rivers State. The stratified areas of five zones in Rivers State were randomly sampled and data collected through primary and secondary sources with the use of questionnaires, oral interviews, textbooks, lecture notes and journal. From the responses of the respondents, it is obvious that majority of the Residents of Rivers State are aware that exhaust from automobiles, and industrial plants, Bush burning, illegal Refinances, road construction, and gas flaring amongst, others were identified as the causes of atmospheric pollution. Also, it was identified that the residents of Rivers State are aware that the pollutants produce, have negative consequences to man, vegetation and the entire earth's atmospheric properties and environmental components. Considerably, there was also awareness on the health effects of atmospheric pollution in Rivers State. There was also presence of sooths in rain water due to illegal refineries in Rivers State and its environments. Due to educational level and place of resident to the Respondents, there this great awareness of the residents of Rivers State on the way in which these pollutants can be controlled and prevented.

Discussion of Findings

The results in table 4.1 which indicate that the atmospheric pollution is in the atmosphere The indicators are the presence of gas flaring, use of generators, cars, industrial plants bush burning and illegal refineries which generate atmospheric pollutants like CO_2 , SO_2 , NO_2 cfc, sooths in rain water leading to deterioration of materials quality and respiratory diseases. Also, the presence of rising numbers of powers generation plants, open burning of fuels and automobile exhaust introduces suspended particulate matters into the atmosphere.

Indeed, it is equally obvious that from table 4.2 shows that the people are aware that atmospheric pollutants affect the environmental components such as streams, rivers, air, rain water and materials of building such as the walls paints, roofing sheets etc. It is also obvious that the gas flaring which are consciously present in all part of the state produce heat which lead to global warming.

Consequently, The residence of Rivers State are aware of the health effects of atmospheric pollutants to humans which are responsible for the occurrence of respiratory disease such as bronchitis, cardiovascular disease, itching of the eye, throats irritation and skin disease, high blood pressure and high temperature .

The Analysis of hypothesis confirmed an earlier analysis of data that atmospheric pollution has significant effects on the environment quality and the health of rural and urban dwellers in Rivers State.

Appropriately, 85.71% of residence of Rivers State had one forms of education or other, which enlightened them to know what atmospheric pollution is, thereby raising the awareness of the causes and effect of atmospheric pollution. It also indicates that most of the residence lives in urban, semi-urban and rural areas and they are aware of the activities of these oil explorers via their pipeline laying. Flare sites installations and oil wells sites which are located both in urban semi-urban and rural areas of Rivers State and its environs.

Nevertheless, it was indicated that removal of worn-out vehicles from the road, stoppage of gas flaring sites, discouragements of indiscriminate dumping of refuse and bush burning mounting of environmental awareness campaigns in all communities on atmospheric pollution problems and institution of stiffer penalties in table 4.4 will assist tremendously in reducing or if not possible eliminate atmospheric pollution in River State.

CONCLUSIONS

The study revealed that the residents of Rivers State are aware that indiscriminate bush-burning exhaust automobile emissions, gas flaring amongst others are the causes of atmospheric pollution in Rivers State.

The presence of soot in rain water the deterioration of materials such as galvanized non-roofing sheets and respiratory and cardiovascular disease are well known to them that these are the environmental and health effects of atmospheric pollution in Rivers State.

Furthermore, air quality of the environment was rated poor because of these pollutants resulting in impaired vision and diseases as continuous bush – burning, gas flaring, indiscriminate dumping of refuse will aggravate the situation, if not checked.

Carrying out study like this has a lot of educational implications to the educationist and students, who may delight in studying the causes and effects of atmospheric pollution. The contents of the study are so rich and bounded with critical thinking on the causes and effects of atmospheric pollution in Rivers State. It will equally guide the students on the preventive and control measures of atmospheric pollution. The government can also make use of it by making policies on the use of renewable energies, which will help in reducing the atmospheric pollutants in the atmosphere. Also, government can develop curriculums for our primary, secondary and tertiary institutions, thereby making it more robust in our academic pursuits.

The study is highly educational, as it revealed the damages inherent in gas flaring, indiscriminate dumping of refuse, the continuous use of fossil fuels in our automobiles, generators and plants and mounting of illegal refineries which are the causes of atmospheric pollution in Rivers State. Also, it is highly educational because it revealed the control and preventive measures.

RECOMMENDATIONS

In view of the findings summarized above the paper recommended among other that adequate law that will prevent old worn-out vehicles from the roads should be made and that oil companies and the general public should adhere strictly to all laid down rules and regulations instituted by government concerning air pollution.

Limitations of the Study

Lack of funds, in accessibility to hinter lands of Rivers State and dearth of literature were identified to be some of the major impediments to the successful completion of this dissertation.

Suggestions for further Research:

The following suggestions have been made for further research

1. The importance of renewable energy in prevention and control of atmospheric pollution in Niger Delta.
2. Planting of flowers, trees and garden as veritable tools in curbing climate change in Rivers State.
3. Poor environmental protection: a major cause of global warming in South – South region of Nigeria.

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