

GLOBAL WARMING AND GREENHOUSE EFFECT

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Abstract: Global warming is the alleged worldwide increase in the average atmospheric temperature of Earth's near-surface air and oceans since the mid 20th century and its projected continuation. The historical perspective increase since the middle of the 20th century has been caused by increasing concentrations of greenhouse gases (heat trapping gases) because they produce the greenhouse effect (i.e. these gases absorb the heat energy and tend to prevent infrared heat radiation from escaping into space from the earth, thus causing the *Greenhouse Effect*). The principal greenhouse gases are carbondioxide, methane and nitrous oxide. Others are halocarbons, ozone and water vapour. The effect of global warming (both positive and negative) on the environment causes of global warming (natural and anthropogenic) and what is being done by the people, and the governments to stop global warming were also examined. In conclusion, "a more aggressive approach to global warming should be adopted as it is undeniable and urgent" according to the words of one time 2008 U.S. Republican Presidential candidate, John McCain.

Keywords: Global warming, greenhouse effects.

INTRODUCTION

Global warming is the alleged worldwide increase in the average atmospheric temperature of earth's near-surface air and oceans since the mid20th century and its projected continuation (ANNON a, 2010; ANNON c, 2010; ANNON d, 2010). According to the 2007 Fourth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC), global surface temperature increased $0.74\pm 0.18^{\circ}\text{C}$ ($1.33\pm 0.32^{\circ}\text{F}$) during the 20th century (IPCC, 2007). This type of *climate change* is seen as a period of increases in global temperature which is alternating with periods of global cooling and is a natural occurrence as part of an interval warming trend which has occurred multiple times throughout Earth's geological history (ANNON c, 2010).

Historical Perspective of Global Warming

The term *global warming* was probably first used in its modern sense on 8th August, 1975 in a science paper by Wally Brocker in the journal, Science, called, "Are we on the

brink of a pronounced global warming?” (ANNON a, 2010). Broecker’s choice of words was new and represented a significant recognition that the *climate* was warming, previously the phrase used by scientists was, “inadvertent climate modification”, because while it was recognized humans could change the climate, no one was sure which direction it was going (ANNON a, 2010). The National Academy of Sciences first used *global warming* in a 1979 paper called the Charney Report, it said, “if carbondioxide (CO₂) continues to increase, we find no reason to doubt that *climate changes* will result and no reason to believe that these changes will be negligible (ANNON a, 2010). The report made a distinction between referring to surface temperature changes as global warming, while referring to the changes caused by increased CO₂ as climate change (ANNON a, 2010). The distinction is still often used in science reports, with *global warming* meaning surface temperatures and climate change meaning other changes (increased storms, etc) [Theodore, 2001].

Global warming became more widely popular after 1988 when the National Airspace Agency (NASA) scientist, James E. Hansen, used the term in a testimony to the American Congress (ANNON a, 2010). He said, “global warming has reached a level such that we can ascribe with a high degree of confidence a cause and effect relationship between the greenhouse effect and the observed warming”. His testimony was widely reported and afterward *global warming* was commonly used by the press and in public discourse.

Greenhouse Gases/Global Warming

Greenhouse effect: It is the process by which absorption and emission of infrared radiation by gases in the atmosphere warm a planet’s lower atmosphere and surface. It was proposed by Joseph Fourier in 1824 and was first investigated quantitatively by Syante Arrhenius in 1896 (Spenser, 2008; ANNON a, 2010). The question in terms of global warming is how the strength of the presumed greenhouse effect changes concentration of greenhouse gases in the atmosphere (ANNON a, 2010).

The greenhouse effect makes the earth appropriate for people to live on. Without it, the earth would be freezing, or on the other hand it would be burning hot (ANNON d, 2010). It would be freezing at night because the sun would be down. We would not get the sun’s heat and light to make the night somewhat warm. It would be freezing at night because the sun would be down. We would not get the sun’s heat and light to make the night somewhat warm.

During the day, especially during the dry season, it would be burning because the sun would be up with no atmosphere to filter it, so people, plant and animals would be exposed to all the light and heat (ANNON d, 2010).

Although the greenhouse effect makes the earth able to have people living on it, if there gets to be too many gases, the earth can get unusually warmer and many plants, animals and people will die. They would die because there would be less food (plant like corn, wheat and other vegetables and fruits). This would happen because the plant would not be able to take the heat. This would cause us to have less food to eat, but it would also limit the food that animals have. With less food, like grass, for the animals that we need to survive (like cows), we would even have less food. Gradually, people, plant and animals would all die of hunger (ANNON d, 2010).

If there was no greenhouse effect in nature, the heat of the earth would readily escape to space, leaving the earth too cold for life as we know it. Experts tell us that without the greenhouse effect in nature, the earth would be 33°C colder than it is now, a mean temperature of -18°C instead of the 15°C that it is now (CCN, 2004; Sodipo, 2007a).

The Greenhouse Gases

The heat trapping gases are known as GREENHOUSE GASES (CCN, 2004; Sodipo, 2007a) because they produce the greenhouse effect (i.e. these gases absorb the heat energy and tend to prevent infrared heat radiation from escaping into space from the earth, thus causing the greenhouse effect) (Sodipo, 2007a, ANNON a, 2010).

The principal greenhouse gases according to Sodipo 2007a; ANNON a, 2010 are:

- **Carbondioxide (CO₂):** It contributes greater than 9-26% of greenhouse effect
- **Methane (CH₄).** It contributes 4-9% of greenhouse effect
- **Nitrous oxide (N₂O).** It contributes 6% of greenhouse effect Others are
- **The Halocarbons:** They are also ozone depleting and contribute 14% of greenhouse effect
- **Ozone (O₃):** It causes 3-7% of the greenhouse effect
- **Water vapour (H₂O):** It causes about 3 6-70% of the greenhouse effect
- **Clouds** also affect the radiation balance, but they are composed of liquid water or ice, and so have different effects on radiation from water vaopur (ANNON a, 2010).

According to the IPCC, 2007; ANNON a, 2010, naturally occurring greenhouse gases have a mean warming effect of about 33°C (59°F).

Causes of Global Warming

Most of the observed temperature increase since the middle of the 20th century has been caused by increasing concentrations of greenhouse gases (CBPO, 2005; Sodipo, 2007a; ANNON a, 2010). The increase in the concentrations of these greenhouse gases may be natural or anthropogenic (manmade) (ANNON a,c, 2010).

Natural Causes

Natural causes of global warming are not by people or their activities (CBPO, 2005; Sodipo, 2007a; ANNON c, 2010). They include:

1. Green plants and trees - emit large amount of carbondioxide (C02) and hydrocarbons which are volatile organic compounds (VOC) [Air pollution, 2007; Sodipo, 2007a].
2. Dust storms - can create large amounts of particulate matter (Air pollution, 2007; Sodipo, 2007; ANNON c, 2010).
3. Volcanic eruptions - they emit particulate matter (CBPO, 2005; Air pollution, 2007; Sodipo, 2007a).
4. Wild animals - in their natural habitat are also considered natural causes of global warming as they emit methane by the digestion of food e.g. cattle (Air pollution, 2007; Sodipo, 2007a).
5. Changes in solar luminous may also lead to global warming (ANNON a, c, 2010).
6. Variations in earths orbit round the sun, leading to temperature changes (ANNON a, 2010).
7. Cosmic dust - from natural sources usually large areas of land with little or no vegetation (Air pollution, 2007a; Sodipo, 2007 a)

Natural causes of global warming is being supported by climate change reported in other planets apart from the earth where human activities do not take place. The average temperature on Mars has risen 0.6°C (1.1°F) just as the average temperature on earth has risen. Human industrialization is clearly not to blame for the change on Mars (ANNION c, 2010). Neptune is also undergo global warming. Measurements taken at the Lowell observatory in Arizona, U.S.A. have shown an increase in Neptimes brightness and temperature since 1980, and this may be due to solar variations (ANNON c, 2010). Pluto has also been found to be undergoing global warming. The overall temperature increase in Pluto has been greater than on the earth (ANNON c, 2010). On the other hand, Uranus has had no net change in temperature since 1977. A rapid increase in temperature reversed itself. The reasons for this are not understood (ANNON c, 2010).

The fact that global temperatures change on other planets even when there is no life, strongly supports the idea that humans are not necessarily the cause of the earth's global warming. Moreover, the temperature on Uranus has fluctuated back and forth. There is no reason that fluctuation cannot occur on earth too.

Anthropogenic Causes

Human activity since the Industrial Revolution (about 1750-1850) has increased the amount of greenhouse gases in the atmosphere, leading to increased radiative forcing from carbon dioxide (CO₂), methane (CH₄), tropospheric ozone (O₃), chlorofluorocarbons (CFCs) and nitrous oxide (N₂O) (ANNON a, 2010). The concentrations of CO₂ and CH₄ have increased by 36% and 148% respectively since 1750 (ANNON a, 2010). These levels are much higher than at any time during the last 650,000 years, the period for which reliable data has been extracted from ice cores (ANNON a, 2010). Less direct geological evidence indicates that CO₂ values higher than this were seen about 20 million years ago (Ramaswamy et al., 1992; ANNON a, 2010).

Some of the causes of anthropogenic global warming are:

1. Increase in population: The rapid expansion of population is one of the most important factors of global warming. The present world population would be doubled after 40 years. This increase in population leads to global warming and emission of greenhouse gases. Increase of population is directly related to loss of forest and natural resources (CBPO, 2005, Sodipo, 2007a).

2. Agricultural activities: Agricultural operation, those that raise animals and grow crops, can generate emission of gases, particulate matter and chemical compounds e.g. animals confined to a barn or areas (rather than field grazing) produce large amounts of manure. Manure emits various gases into the air. These gases can be emitted from the animal houses, manure storage areas or from the land after the manure is applied (CBPO, 2005; Sodipo, 2006).

3. Land use change especially deforestation: Plants maintain the balance of CO₂ and oxygen (O₂) in nature. Plants purify air by using CO₂ for photosynthesis. Fast-increasing population is responsible for deforestation (ANNON a, b, d, 2010; Sodipo, 2007a). In the 1990s, Nigeria lost nearly 500 sq miles of forested land annually in part to firewood consumption (NCA, 2003; Sodipo, 2007a).

4. Burning of fossil fuels and fires: They produce three quarters of the increase in CO₂ over the past 20 years (ANNON a, 2010). The conventional source of energy source of energy is

wood, coal and fossil fuels, etc. (Air pollution, 2007; Sodipo, 2007a). About 98% of energy we use in our homes and industries are generated by oil, natural gases and coal. These are mainly fossil fuels (FEPA, 1991; Sodipo, 2007a). According to the Special Report on Emissions Scenarios (SRES) of the IPCC, by the year, 2,100, the atmospheric concentration of CO₂ could range between 90-250% above the concentration in the year 1750. Fossil fuel reserves are sufficient to reach these levels and continue emissions past 2,100 if coal, tar sands or CH₄ clathrates are extensively exploited (ANNON a, 2010). Also, the National Oceanic and Atmospheric Administration (NOAA) an agency of the United States Government, stated that CO₂ levels in the atmosphere are rising due to human activity, and that the surface of the earth has warmed, on average, quickly over the last 50 years (ANNON c, 2010).

5. Chlorofluorocarbons: (CFCs). They are a family of inert, non-toxic and easily liquefied chemicals used in refrigeration, air-conditioning, packaging, insulation, or as a solvent or aerosol propellant; because they are not readily destroyed in the lower atmosphere, drift into the upper atmosphere (the stratosphere) (FEPA, 1991), where it contributes to global warming by destroying the stratospheric ozone (ANNON a, 2010).

6. Cement manufacture also increases greenhouse gases (ANNON b, 2010)

7. Garbage: When we throw our garbage away, the garbage goes to landfills. Landfills are those big hills that you go by on an expressway that stink. They are full of garbage. The garbage is then sometimes burned. This sends an enormous amount of greenhouse gases into the air and makes global warming worse (ANNON d, 2010)

Effect of Global Warming on the Environment

Global warming is affecting many parts of the world for good or for bad.

Beneficial Effects of Global Warming

Some researchers point out that benefits of health global warming have been overlooked or minimized. As far back as 1996, Thomas Gale Moore, Senior Fellow at Hoover Institution (Stanford University) contented that positive deaths and amenity effects would be a result of projected increases in temperature (ANNON c, 2010). Another benefit is that health related to colder weather would drop significantly in areas that see extreme cold temperature, leading to decreased health costs. Warmer temperature would also mean less energy being used to heat houses and buildings, helping to conserve energy. With the changes brought about by global warming, more land would become available for uses like farming

and living. Forests and plants would grow stronger, healthier and more abundant because of the warmer weather, and this would mean more oxygen being released into the atmosphere (ANNON c, 2010).

Harmful Effects of Global Warming

Global warming is affecting many parts of the world adversely. Global warming makes the sea rise, and when the sea rises, the water covers many low land islands. This is a big problem for many of the plants, animals and people in islands (ANNON d, 2010). The water covers the plants and causes some of them to die. When they die, the animals lose a source of food, along with their habitat. Although animals have a better ability to adapt to what happens than plants do, they may die also. When the plants and animals die, people lose two sources of food; plant food and animal food. They may also lose their homes. As a result, they would also have to leave the areas or die. This would be called a *break in the food chain, or a chain reaction*, one thing happening that leads to another and so on (ANNON d, 2010).

The oceans are affected by global warming in other ways as well. One thing that is happening is *warming waters*, caused by global warming. It is harming and *killing the algae* in the ocean (ANNON d, 2010).

Algae are producers that float on the top of the water. (A producer is something that makes food for other animals through photosynthesis, like grass). The floating green algae is food to many consumers in the ocean (A consumer is something that eats the producer). Examples of consumers are small fish, crabs, some whales and many other animals. Fewer algae is a problem because there is less food for man and many animals in the sea (ANNON d, 2010).

Global warming is also destroying many huge forests (ANNON d, 2010). The pollution that causes global warming is linked to acid rain. Acid rain gradually destroys almost everything it touches (ANNON d, 2010). When the oxides of nitrogen (nitrogen dioxide and nitric oxide combine with water vapour, it results in acid rain i.e. nitric acid (HNO₃) (Sodipo, 2007a). Robert Angus, 1872, gave this term “acid rain” i.e. presence of acid in rain water (Bhatia, 2006; Sodipo, 2007a).

Global warming is also causing many more fires that wipe out whole forest. This happens because global warming can make the earth very hot. In forests, some plants and tree leaves can be also dry that they catch fire (ANNON d, 2010).

Global warming increases the concentration of methane (marsh gas) in the atmosphere. Methane occurs in air at a volume of 0.0002%. Its higher effect creates narcotic effect on man (Sodipo, 2007a).

Increasing concentrations of carbondioxide in the air would make ice cap to melt and raise the sea level, causing flood in coastal areas, as a slight increase in temperature is likely to disturb the earth's thermal balance (CCN, 2005; Sodipo, 2007a).

Water vapour also absorbs infrared radiation, resulting in the rise of atmospheric temperature (CCN, 2004). In this way, we may expect the temperature of the earth's surface will go on increasing, which will imperil the very existence of life on earth (Sodipo, 2007a).

Global warming is making people get very bad illnesses that could make them disabled, very sick and sometimes even die (ANNON d, 2010). Nitrous oxide is present in the air up to 0.22ppm (Sodipo, 2007a). The concentration is 10 to 90 times greater in urban areas as compared to the rural areas (Bhatia, 2006, Sodipo, 2007a). Nitrous oxide is oxidized to nitric oxide which is turn can retard the process of photosynthesis. This is called *chiorosis*. 100ppm of nitrogen dioxide cause leaf spotting and break down of plant tissues. 100ppm nitric oxide show reduced absorption of CO₂ and the photosynthetic activity in plants will be less (Bhatia, 2006; Sodipo, 2007a). Exposure to 50-100ppm of nitric oxide irritates the eye. Exposure to about 500ppm of nitric oxide for 4 days causes death (Sodipo, 2007a). Nitrogen dioxide irritates the eyes. It is sometimes associated with fires. It is a deep, lung irritant capable of producing pulmonary oedema. The type I cells of the alveoli appear to be the cells chiefly affected on acute exposure (Katzung, 2004; Sodipo, 2007a).

Signs and symptoms of acute exposure to nitrogen dioxide include irritation of the eyes and nose, cough, mucoid or frothy sputum production, dyspnoea (difficulty in breathing), chest pain, pulmonary oedema may appear within 1 to 2 hours. In some individuals, the clinical signs may subside in about 2 weeks, the patient may then pass into a second stage of abruptly increasing severity, including recurring pulmonary oedema and fibrotic destruction of terminal bronchitis (bronchitis obliterans) (Sodipo, 2007a).

Nitrates/nitrites are also toxic to humans. Nitrates (NO₃) themselves are not toxic in the amount we normally encounter (Sodipo, 2007b). The toxicity of nitrates is as a result of their conversion to nitrites (NO₂) within the body. The highest levels of nitrites originates in our own saliva where bacteria in our mouth change nitrates to nitrites (Wetzlich, 1991; Sodipo 2007a). Nitrites easily enter the blood stream and causes *methaemoglobinaemia* (Lawrence et al., 1997; Sodipo, 2007a). haemoglobin (Hb) is the compound in the red blood

cells responsible for transporting oxygen throughout the body. The nitrites oxidise the ferrous (Fe^{2+}) molecule in the Hb to the ferric (Fe^{3+}) state. Hb containing a ferric ion molecule is unable to carry oxygen and is called *methaemoglobin*. Too much *methaemoglobin* in our system causes methaemoglobinaemia. The condition is characterized by cyanosis (a bluish colour to the skin), stupor and cerebral anoxia (a lack of oxygen in the brain) [Sodipo, 2007a, b,].

About 1% of the Hb in adults is normally methaemoglobin and a little less than 2% in children is methaemoglobin. Levels between 10 and 20% can cause methaemoglobinaemia and levels greater than 60% can cause death (Wetzlich, 1991; Lawrence *et al.*, 1997; Sodipo, 2007a, b). Infants under 4 months of age are at greater risk to the toxic effects of nitrites than are older children. The methaemoglobinaemia caused by nitrites in infants is called *blue baby disease* (Sodipo, 2007a).

The major acute toxicity of organic nitrates/nitrites is a direct extension of therapeutic vasodilation; orthostatic hypotension, tachycardia and throbbing headache. Organic nitrates are polyoi esters of nitric and while organic nitrites are esters of nitrous acids (Hardman and Limbird, 2001; Sodipo, 2007a). Exposure to nitrates decreases the tissue sulphhydryl group (Sodipo, 2007a).

Control of Global Warming

Global warming can be controlled by reducing the amount of future climate change (mitigation) and adaptating to the change that has already taken place.

Global Warming Mitigation

Mitigation is reducing the amount of future climate change (ANNON a, 2010). The IPCC defines mitigation as activities that reduce greenhouse gas (GHGs) emissions or enhance the capacity of carbon sinks to absorb GHGs from the atmosphere (ANNON a, 2010). Many things are being done to reduce or stop global warming. These include:

1. **Sequestering of emissions:** Emissions may be sequestered from fossil power plants or removed during processing in hydrogen production. When used on plants, it is known as bio-energy with carbon capture and storage (ANNON a, 2010).
2. **Carbon capture and storage (CCS):** It is a process that traps CO_2 produced by factories and gas or coal power stations and then stores it, usually underground (ANNON a, 2010).

3. **Carpooling:** It is driving with someone to a place that you are both going to. This minimizes the amount of the greenhouse gases put into the air by a car (Sodipo, 2007a; ANNON d, 2010).

4. People are being more careful about leaving things turned on like the television, computer and the lights. A lot of people are taking time away from the television and instead, they are spending more time outdoors. This helps our planet out a lot (ANNON d, 2010).

5. More people are using public transportation when available (Sodipo, 2007a, ANNON d, 2010), walking to school and riding their bicycles to lower the amount of greenhouse gases in the air (ANNON d, 2010).

6. Planting trees and recycling also helps to reduce global warming (ANNON d, 2010). If you recycle, less trash goes to the dump, and less trash gets burned. As a result there will be fewer greenhouse gases in our atmosphere.

7. Watching the things we buy can reduce greenhouse gases. Many things such as hairspray and deodorant now are made to have less of an impact on the atmosphere. Less greenhouse gases will rise into the air and global warming will slow down (ANNON d, 2010).

8. **Increased use of renewable energy resources:** The utilization of renewable energy sources in Nigeria remains quite limited (Sodipo, 2007a). Nigeria's usage of hydropower, geothermal and solar energy is still small, although there is a realization that the renewable energy sector must grow in order for the country to develop substantially (Sodipo, 2007a). Solar power is being promoted as a method to improve electricity services to rural villages not connected to the country's electric power grid. In May, 2003, a Nigerian NGO, the Centre for Renewable Energy Development in Nigeria (CREDN), called on the Nigerian government to take added steps to boost the use of renewable energy sources and thereby diversify the country's energy consumption from petroleum (Sodipo, 2007a). the NGO is also pushing the increased use of renewable energy sources such as solar, biomass, wind and geothermal sources in order to supplement the country's power production and provide a constant supply of electricity to all Nigerians (NCA, 2003; Sodipo, 2007a).

9. **The Clean Air Act:** It is acknowledged that air pollution has significant effect on health, environmental monitoring agencies should therefore be set up in various parts of the world. In the 1960s, 70s and 90s, the United States Congress enacted a series of Clean Air Acts which significantly strengthened regulation of air pollution. Individual US states, some European nations and eventually the European Union followed these initiatives. The Clean

Air Act sets numerical limits on the concentration of basic group of air pollutants and provide reporting and enforcement mechanisms (Air Pollution, 2007; Sodipo, 2007a; ANNON, d, 2010). Part of the law says that you may not put a certain amount of pollutant in the air. Hairspray and some other products, like foam cups, had this problem. Making and using these products let out too much volatile organic compounds (VOCs), ozone-destroying chemicals (Chlorofluorocarbons) (CFCs) and related chemicals (such as CO₂) into the air. Now, almost all of these products have a label on them telling people what these products can do to the environment and many people. By 2015, all products listed in the Clean Air Act will have this label on them (ANNON d, 2010).

The Clean Air Act has also made car companies change some of the things inside the cars. Cars pollute a lot while cars make more than half of the world's smog (a collection of visible air pollutants in the cloud consisting of ozone, nitrogen dioxide, particulate matter and humidity, all mixed together), many things that cars need to move and heat up make even more pollution (FEPA, 1991; Grant, 1996; CBPO, 2005; Sodipo, 2007a; ANNON d, 2010). Some things that are inside the cars, buses, trucks and motorcycles, like gasoline, pollute the air when the fuel is burned. It comes out as a chemical and when mixed in the air forms smog (ANNON d, 2010).

10. **Geoengineering:** This is engineering of the climate. This policy response is largely unproven and reliable cost estimates for it have not yet been published (ANNON a, 2010).

11. Banning of importation of cars by the Federal Government of Nigeria that are more than five (5) years old in an attempt to limit the number of old, polluting automobiles in Nigeria(Sodipo, 2007a).

12. Cutting down on hours spent on watching television and turning off the light when not needed reduces greenhouse gases (ANNON d, 2010).

Adaptation to Global Warming

Adaptation to climate change may be planned e.g.

- a) by local or national government or
- b) Spontaneous i.e. done privately without government intervention.

Most countries are parties to the United Nations Framework Convention on Climate Change (UNFCCC). The ultimate objective of the convention is to prevent "dangerous" human interference of the climate system. As is stated in the convention, this requires that GHGs are stabilized in the atmosphere at a level where ecosystems can adapt naturally to climate change, food production is not threatened and economic development can proceed in

a sustainable fashion (NCA, 2003; Sodipo, 2007a, ANNON a, 2010). In the Kyoto Protocol (an international treaty on global warming, which came into force in 2005) to the UNFCCC, most developed countries (listed in Annex I of the treaty) ratified this protocol and took on legally binding commitments to reduce their emissions of carbondioxide and five other greenhouse gases or engage in emission trading if they maintain or increase emission of these gases (Sodipo, 2007a; ANNON d, 2010). Policy measures taken in response to these commitments have reduced emissions. For many developing countries like Nigeria that have not ratified the protocol (listed as non-Annex I) under the UNFCCC, reducing poverty is their overriding aim (NCA, 2003; Sodipo, 2007a; ANNON, 2010). At the 15th UNFCCC conference of the parties held in 2009 at Copenhagen, several UNFCCC parties produced the Copenhagen Accord. Parties agreeing with the Accord aim to limit the future increase in global mean temperature to below 2°C (ANNON a, 2010).

The Nigerian Federal Government is now showing willingness to enforce environmental laws. In July, 2002, the Nigerian Government ordered oil companies operating in the country to comply with Environmental Guidelines and Standards for Oil Industry, published by the Department of Petroleum Resources (DPR), the monitoring arm of the Nigerian National Petroleum Corporation (NNPC) or risk paying a fine. The 200-page guidelines provide rules to reduce pollution and procedures for environmental monitoring. The DPR has also been tasked with conducting regular health, safety and environment audit of the oil companies (NCA, 2003; Sodipo, 2007a). To show her seriousness about enforcing environmental regulation, in March 2003, the Nigerian subsidiary of Shell was ordered to pay \$1.5 billion to Ijaw tribe for the company's action in the state of Bayelsa over a 50 year period (NCA, 2003; Sodipo, 2007a).

The Nigerian government is also promoting the performance of environmental risk assessments, prior to project initiation. There is also tighter regulation and enforcement of existing environmental laws (Sodipo, 2007a).

CONCLUSION

Most scientists accept that humans are contributing to observed global warming whilst some scientists and non-scientists have questioned aspects of global warming. Anthropogenic factors are human activities that change the environment. In some cases, the change of casuality of human influence on the climate is direct and unambiguous while in others it is less clear. Various hypotheses for human-induced climate change have been argued for many years. Presently, the scientific consensus on climate change is that human

activity is very likely the cause of the rapid increase in the global average temperature. Consequently a more aggressive approach to global warming should be adopted as it is undeniable and urgent according to a one-time 2008 U.S. Republican candidate, John McCain.

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