

Law and Climate Change in Nigeria



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CHAPTER FIFTEEN

CLIMATE CHANGE: LEGAL RESPONSE TO AVIATION EMISSION IN NIGERIA.

BY

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ABSTRACT

*Aviation is a rogue sector and its environmental impact is out of control. Climate change is the most urgent challenge facing humanity and yet aviation policy is doing the opposite of what is needed.*⁷⁸⁸

It is on the basis of the above submission that this paper discusses the impact of aviation on climate change and the Nigerian legal response to greenhouse gas emissions from the aviation sector with a view to knowing the efforts being made by the Nigerian government to reduce the impact of aviation emissions on climate change. The paper finally concludes that Nigeria follow unsuccessful efforts of International Civil Aviation Organization to reduce aviation emissions.

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788 Tony J., Director of Friends of the Earth England, Wales, and Northern Ireland and Vice-chair of Friends of the Earth International < MEME: Aviation Smog <http://www.ipcc.ch/pdf/assessment-report/ar4_syr_spm.pdf> accessed on 1 May, 2010.

I. INTRODUCTION

It is no longer news that climate change or global warming has become a new reality in almost all parts of the world. No thanks to its disastrous effects which include sea-level rise with its attendant consequences, fiercer weather, floods, hurricanes, drought and a host of other health and socio-economic consequences.

This paper intends to look at the impact and legal response to aviation emissions on climate change particularly in Nigeria.

Aviation emissions impact greatly on the Nigerian environment because aircraft engines emit noise, particulates, and gases. All these contribute in no small measure to climate change and global warming⁷⁸⁹.

However, natural and human influences account for causes of climate change⁷⁹⁰. There are various factors that can shape climate forcings. These include such processes as variation in solar radiation, deviation in the Earth's orbit, mountain-building and continental drift and change in greenhouse gas concentrations.⁷⁹¹ The implication is that the climate system can take centuries or longer to fully respond to new external forcings⁷⁹².

In view of the above, climate change can be defined as a change in the statistical properties of the climate system when considered over periods of decades or longer.⁷⁹³ According to the United Nations Framework Convention on climate change, it is a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which in addition to natural climate variability observed over comparable time periods.⁷⁹⁴ It is also, in the context of Environmental Policy, referred to as the changes in the modern climate including the average rise in surface temperature known as global warming⁷⁹⁵. In the word of Intergovernmental Panel on Climate Change, Climate change is the change

789 International Civil Aviation Organization, Air Transport Bureau (ATB) (ND), 'Aircraft Engine Emissions' <<http://www.icao.int/cao/emu/acc/htm>> accessed on 19 March, 2008.

790 Aviation Smog <http://www.ipcc.ch/pdf/assessment-report/ar4_syr_spm.pdf> *ibid*.

791 See <http://en.wikipedia.org/wiki/climate_change> accessed on 16 April, 2010.

792 <http://en.wikipedia.org/wiki/climate_change>, *ibid*.

793 'Climate Change' http://en.wikipedia.org/wiki/Climate_change accessed on 1 April, 2010.

794 UNFCCC, Article 2 (2).

795 Category: Climate Change' <http://en.wikipedia.org/wiki/Category:Climate_change> accessed on 1 April, 2010.

in the state of the climate that can be identified by changes in the mean and/or variability of its properties, and that persists for extended periods, typically decades or longer.⁷⁹⁶

In this regard, like all human activities involving combustion, most forms of aviation release carbon dioxide (CO₂) into the earth's atmosphere which contributes immensely to the acceleration of global warming. It is important to add that most aircraft in flight released CO₂ through the burning of fuels such as Jet-A (turbine aircraft) or Avgas (piston aircraft), the aviation industry also contributes greenhouse gas emission from ground airport vehicles and those used by passengers and staff to access airports, as well as through emissions generated by the production of energy used in airport buildings, the manufacture of aircraft and the construction of airport infrastructure.⁷⁹⁷

While the principal greenhouse gas emission from powered aircraft in flight is CO₂, other emissions include nitric oxide and nitrogen dioxide together termed oxides of nitrogen or NO_x, water vapour and particulates (soot and sulfate particles), sulfioxides, carbon monoxides (which bonds with oxygen to become CO₂ immediately upon release), in completely burned hydrocarbons, tetra-ethyl lead (piston aircraft only), and radicals such as hydroxyl, depending on the type of aircraft in use.⁷⁹⁸

In addition, the contribution of civil aircraft-in-flight to global CO₂ emissions has been estimated at around 2%. However, in the case of high-altitude airliners which frequently fly near or in the atmosphere, non-CO₂ altitude-sensitive effects may increase the total impact on anthropogenic (manmade) climate change significantly. This problem is not present for aircraft that routinely operate at lower altitude well inside the troposphere, such as balloons, airships, helicopters, most light aircraft, and many commuter aircraft.⁷⁹⁹

796 Pachauri P.K. and Reisinger A. (ed.) 'Climate change: Synthesis Report. Contribution of Working Group I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change' (IPCC, Geneva, Switzerland, 2007) p. 104.

797 'Aviation and the Environment', http://en.wikipedia.org/wiki/Aviation_and_the_environment accessed on 16 April, 2010.

798 'Aviation and the Environment', *ibid.*

799 'Aviation and the Environment', *ibid.*

II. THE IMPACT OF CLIMATE CHANGE IN NIGERIA

It is important to note that the impact and effects of aviation emissions on climate change in Nigerian can be vast. It is argued in some quarters that Africa need not care about climate change because in global dimensions African itself produces negligible greenhouse gases. Climate change is primarily caused by the developed countries, so they should be the ones to deal with it. But unfortunately, Africa is the only continent that will probably suffer most from its consequences.⁸⁰⁰

The global effect of aircraft emissions is global warming, which has been described as the long-term increase in average temperature and scientifically shown to be caused by the increase of carbon dioxide in the atmosphere by human activities.⁸⁰¹

In Nigeria, the Nigerian Meteorological Agency (NIMET) in its statement said that weather is changing gradually for the worst because of impact of climate change caused by Green House Gases which will continue to affect soil, food production and its cost in general.⁸⁰² It also affects Nigerians through changes in temperature resulting in desertification and drought in the Northern Sahel region to increase precipitation and rise in sea level in the coastal areas, which will have wide range consequences on agriculture⁸⁰³, infrastructure⁸⁰⁴, health⁸⁰⁵, water resources⁸⁰⁶ and ecosystem.⁸⁰⁷

800 See <<http://www.kaside/proj/home/pub/33/2/dokument-id-11468/index.html>> accessed on 16 April, 2010.

801 See 'Global Warming', http://climatelab.org/Climate_Change accessed on 2 February, 2010.

802 AH Tina 'Climate Change and Food Challenge', Daily Trust, <http://www.news.dailytrust.com/index.php?option=com_content&view=article&id=1805:climate-change-and-fa> accessed on 5 May, 2010.

803 Rise in temperature will definitely dry up the soil thereby destroying macro & microorganism required for crop production and thereby leading to food scarcity.

804 Infrastructure will be exposed to increase stress from rise in temperature. Flood and drier condition, which greatly contributes to accelerate wear and tear, resulting in higher maintenance cost and reduced lifetime of building structure

805 Health: rise in temperature will result in heat waves that can be devastating for elderly people, while vector-borne and water borne disease may proliferate in warmer climate, spreading through floods and damp conditions.

806 Water will become scarcer in the North and South as we have experienced in the last 3 months in Ilorin, Kwara State.

807 Anindita A. et al, 'Climate Change in Nigeria: Risks, Implications and Policy Options', (Global Classroom Initiative, IDS, University of Sussex, 2008) pp. 26-30.

III. STRUCTURAL IMPACT AND EFFECTS OF AVIATION EMISSIONS

The contribution of aircraft-in-flight to climate change in Nigeria can be divided into four groups.

The first is Carbon dioxide (CO₂) emissions from aircraft-in-flight. It results from burning of fossil fuel of aircraft.⁸⁰⁸ The amount of CO₂ emitted is a direct function of fuel consumption and this gas can remain on the atmosphere for 100 years.⁸⁰⁹ This element contributes significantly to aviation's total contributions to climate change.⁸¹⁰

The Intergovernmental Panel on Climate Change (IPCC) has estimated that aviation's total climate impact is some 2-4 times that of its CO₂ emissions alone.⁸¹¹

The second is Oxides of nitrogen (NO_x) which is the element emanating from the high altitude flown large jet airliners around the tropopause. Emissions of NO_x are particularly effective in forming ozone (O₃) in the upper troposphere. High altitude (8-13km) NO_x emissions result in greater concentration of O₃ than surface NO_x emissions, and this in turn has a greater global warming effect. The effects of O₃ concentrations are regional and local while emissions of CO₂ are global.⁸¹²

NO_x emissions reduce ambient level of methane, another greenhouse gas, resulting in a climate cooling effect. But this effect does not offset the O₃ forming effect of NO_x emissions. It is now believed that aircraft sulfur and water emissions in the atmosphere tend to deplete O₃, partially offsetting the NO_x induced O₃ increases. The major ozone (O₃) depleting substances are (volatile organic compounds, carbon monoxide, carbon dioxide, chlorofluorocarbons, methane, nitrous oxide etc) which

808 'Carbon Dioxide', <http://climatelab.org/Carbon_Dioxide> accessed on 2 April, 2010.

809 'Aircraft CO₂ Emissions', <[http://www.airportscatalog.com/aircraft-CO₂-emission.php](http://www.airportscatalog.com/aircraft-CO2-emission.php)> accessed on 5 May, 2010; JAL, 'Reducing our impact on the Environment', <<http://www.jal.com/en/corporate/csr2007/environment/04.html>> accessed on 5 May, 2010.

810 <<http://en.wikipedia.org/wiki/Aviation>> and the-environment> accessed on 16 April, 2010.

811 <<http://en.wikipedia.org/wiki/Aviation>> and the-environment> *ibid.* see also 'Airplane Emissions', <http://climatelab.org/Airplane_emissions> accessed on 2 May, 2010.

812 'Airplane Emissions', *ibid.*

lead to unprecedented assault on the planet's life-support system and could have horrendous long term effects on human health, animal life, and the plants that support the food chain.⁸¹³ These effects have not been quantified and the problem does not apply to aircraft that fly lower in the troposphere, such as light aircraft or many commuter aircraft.⁸¹⁴

The third is Water vapour (H₂O), a greenhouse gas emitted by very large aircraft-in-flight at high altitude. Water vapour under certain atmospheric conditions form condensation trails, or contrails and visible lines that form in cold, humid atmosphere and are thought to have a global warming effect (though one less significant than either CO₂ emissions or NO_x induced effects).⁸¹⁵ Contrails are extremely rare from lower-altitude aircraft, or from propeller aircraft or retrocraft.⁸¹⁶

In addition, the amount of dissolved oxygen in water is inversely related to temperature as such there will be less oxygen available for animals and plants at high water temperatures. A slight change in water temperature can alter the growth rates of small aquatic organisms while a temperature change may cause changes in the species composition of communities of larger organism such as fish.⁸¹⁷

The fourth is Particulates, the least significant which release soot and sulfate particles. Soot absorbs heat and has a warming effect; sulfate particles reflect radiation and have a small cooling effect.⁸¹⁸ In addition, they can influence the formation and properties of clouds. All aircraft powered by combustion will release some amount of soot.⁸¹⁹

IV. LEGAL RESPONSE TO AVIATION EMISSIONS IN NIGERIA

Nigeria as a sovereign state has done a lot to protect its environment through National and International enactments.

813 Adeniyi A.A., 'Environmental Pollution' (eds), 'Fundamentals of General Studies', a Publication of the General Studies Division, Lagos State University (Rex Charles Publication, Lagos 1997) p. 648.

814 <<http://en.wikipedia.org/wiki/Aviation-and-the-environment>>, op. cit.

815 <http://www.ipcc.ch/SPM2.pdf>, accessed on February 7, 2011

816 <<http://en.wikipedia.org/wiki/Aviation-and-the-environment>>, op. cit.

817 Fashina-Bombata H.A., 'Science, Human and Environmental Different' (eds) 'Fundamentals of General Studies', op. cit, p. 574.

818 <<http://en.wikipedia.org/wiki/Aviation-and-the-environment>>, op. cit.

819 <<http://en.wikipedia.org/wiki/Aviation-and-the-environment>>, ibid.

a) INTERNATIONALENACTMENTS

However, before any international legislation could become enforceable in Nigeria, it must have been sanctioned by the Nigerian Government in accordance with the relevant provisions of the 1999 Constitution of the Federal Republic. The relevant section provides as follows:

The National Assembly may make laws for the Federation or on part thereof with respect to matters not included in Exclusive Legislative list for the purpose of implementing a treaty⁽²⁾

Therefore, many international enactments relating to environmental protection particularly on aviation industry, such as Chicago Convention 1944, United Nations Framework Convention on Climate Change, 1992, and Protocol to United Nations Framework Convention on Climate Change, 1997 have been made to have force of

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law in Nigeria through the application of Section 12 of 1999 Constitution. These international enactments will now be discussed in seriatim below.

1. CONVENTION ON INTERNATIONAL CIVIL AVIATION⁸²²

This Convention establishes International Civil Aviation Organization⁸²³ as a specialised Agency of the United Nations with authority to coordinate and regulate international aviation matters. The Convention was signed on December 7, 1944, came into force on April 4, 1947 and received the requisite ratification on March 5, 1947. This Convention has since been revised eight times.⁸²⁴

Application Of The Chicago Convention In Nigeria

The application of the Convention to aviation industry in Nigeria is made possible pursuant to Section 12 of the Constitution of Federal Republic of Nigeria, 1999 and Section 30 of the Civil Aviation Act⁸²⁵ respectively.

The combined effect of the above provisions is to the effect that while Civil Aviation Act adopts provision of Chicago Convention relating to aircraft engine emissions, Constitutional provision sanctions and validates same.

More importantly, the very much aspect that relates to this paper is the provision of Annex 16 volume II of Chicago Convention.

Annex 16 Volume II of Chicago Convention.

The Chicago Convention is supported by eighteen annexes containing standards and recommended practices (SARPs)⁸²⁶ amongst which is an aspect dealing with environmental protection.

⁸²² Hereinafter referred to as the Chicago Convention.

⁸²³ Hereinafter referred to as the ICAO.

⁸²⁴ See Convention on International Civil Aviation <http://en.wikipedia.org/wiki/Convention_on_International_Civil_Aviation> accessed on 12 April, 2010.

⁸²⁵ Civil Aviation (Repeal and Re-enactment) Act, No 6, 2006.

⁸²⁶ Convention on International Civil Aviation, *op. cit.*

Annex 16 is divided into two volumes. While volume I deals with aircraft noise pollution, volume II deals with aircraft engine emissions.

Volume II of Annex 16 came into being as a result of adoption of a Resolution in 1971 which later led to specific action on question of aircraft engine emissions and detailed proposals for ICAO standard for control of certain type of aircraft engine emission. As a result of this, Committee on Aircraft Engine Emissions (CAEE) was established with mandate to develop specific standard for aircraft engine emissions. The standard setup was adopted in 1981⁸²⁷.

Annex 16 Volume II of Chicago Convention prohibits the international venting of raw fuel to the atmosphere from all turbine engine powered aircraft manufactured after 18th February, 1982; limits the emissions of carbon dioxide, carbon monoxide, hydrocarbon(unburned) and oxide of nitrogen from large turbo-jet and turbofan engines intended for subsonic propulsion and manufactured after 1st January, 1986.⁸²⁸

2. UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE, 1992.⁸²⁹

Historically, efforts to develop international consensus that will address the rampaging greenhouse gases that affect climate not covered by Vienna Convention 1985⁸³⁰ and Montreal Protocol⁸³¹ brought about United Nations Framework Convention on Climate Change. In 1990, at the Second World Conference in Geneva, it becomes clear that there was North-South argument on how the developed and developing countries viewed the issue of climate change.

In the opinion of the North, climate change was viewed as a scientific and environmental issue, while the South emphasized the implications for poverty and development of any future regime. Also, while one group was of the opinion that greenhouse gas emissions should be reduced, the other group vehemently opposed

827 <http://www.icao.int/eshop/pub/anx_info/an16_info_en.pdf> accessed on 17 April, 2018.

828 <<http://en.wikipedia.org/wiki/Aviation-and-the-environment>> *ibid.* See also Chivanyi J. 'The Role of the EU in Attempting to 'Green' the ICAO', EPIGOV Paper No 35, Ecological Institute for International and Environmental Policy, Berlin, 2008, p. 9.

829 Hereinafter referred to as UNFCCC.

830 This is a Convention for the protection of the ozone layer, 1985.

831 This is a Protocol on substances that depletes the ozone layer, 1987.

any environmental regime that will reduce their revenue generation through restriction on the use of fossil fuel and charcoal. As a result of this divergence of opinions, argument and counter-argument, the International Negotiation Committee for a Framework Convention on Climate Change was established⁸³² with mandate to negotiate a framework Convention and any related instruments as might be agreed upon, to be opened for signature at the 1992 United Nations Conference on Environment and Development (UNCED) in Rio, Brasil. As a result of UNCED efforts, United Nations Framework Convention on Climate Change was opened for signature at UNCED from 4th – 14th June, 1992 and subsequently at the United Nations Headquarters in New York until 19th June, 1993⁸³³ with 165 signatories and subsequently entered into force on 21st March, 1994⁸³⁴ with the goal of achieving "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate change"⁸³⁵

The countries that ratified this convention agreed to develop programmes to slow climate change; to share technology and cooperate to reduce greenhouse gas emissions; and to develop a greenhouse gas inventory listing national sources and sinks.

At the Second Earth Summit in Rio, the general consensus was that the responsibility to reduce greenhouse gas emissions and to fight against climate change falls on the developed countries as they were the major contributors to climate change; hence they were made to provide both technical and financial assistance to the parties to the Convention.⁸³⁶

The main objective of this Convention is to stabilize greenhouse gas emissions concentration in the atmosphere at a level that would prevent dangerous

832 Here-in-after referred to as INC which came into being through Resolution 45/212 of 21 December, 1990.

833 See UNFCCC, Article 20.

834 See UNFCCC, Article 23.

835 See UNFCCC, Article 2. See also <http://unfccc.int/essential_background/convention/background/items/1353.php> See also 'Building a Post-2012 Global Climate Regime: the EU's Contribution' <http://ec.europa.eu/environment/climat/future_action.htm> accessed on 8 April, 2010. See generally, 'Audiovisual Library of International Law: United Nations Framework Convention on Climate Change', New York, 9 May, 1992, <<http://untreaty.un.org/cod/avl/ha/ccc/ccc.html>> accessed on 8 April, 2010.

836 'The Woods Hole Research - Kyoto Protocol', <<http://www.whrc.org/resources/online/publications/warmingearth/kyoto.htm>> accessed on 14 April, 2010.

The principle to be adopted in reducing or preventing green house gas emissions to the barest minimum is to act on the basis of equality and in accordance with their common but differentiated responsibilities and respect capabilities⁸³⁸; take precautionary and preventive measures to minimize the cause of climate change and mitigate its effect⁸³⁹; and to provide appropriate policy that will protect climate system against all human-induced changes in accordance with the condition of each party⁸⁴⁰, taking into consideration formula, implementation, publication and regular update from national and regional programmes containing measures to mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol; and to promote and cooperate in the development, application and diffusion, including transfer, of technologies, practices and process that control, reduce or prevent anthropogenic emissions of greenhouse gases not controlled by the Montreal Protocol in all relevant sectors including the energy, transport, industry, agriculture, forestry and waste management sectors⁸⁴¹.

From the foregoing, the UNFCCC committed parties to prevent or reduced and control greenhouse gas emissions from all its sources. However, the relevant portion of the above provision is where the parties to the Convention are committed to reduce or prevent transport⁸⁴² of greenhouse gas emissions. It therefore behoves on the parties to the Convention to design policy to prevent or reduce aircraft greenhouse gaseous emissions.

It is important to note that the UNFCCC has a Protocol annexed to it known as the Kyoto Protocol. It equally aims at fighting global warming.⁸⁴³ The protocol was adopted in December 1997 and came into force 16 February 2005. The countries that have ratified the protocol particularly, industrialized parties, contained in Annex I have committed to cut emissions from carbon dioxide, Co₂, Nitrous oxides, N₂O, Methane CH₄, Hydrofluorocarbon (SF₆), through their collective efforts to reduce

837 UNFCCC, Article 2.

838 UNFCCC, Article 3(c)

839 UNFCCC, Article 3 (3)

840 UNFCCC, Article 3(4)

841 UNFCCC, Article 4 (1)(b) and (c). (*Italic mine*)

842 Note that transport includes aviation transport.

843 See 'Building a Post 2012 Global Climate Regime: the EU's Contribution', *op. cit.*

greenhouse gas emissions by 5.2% below the emission levels of 1990 by 2012⁸⁴⁴.

It should be noted that the Protocol directs that parties to it reduce emissions from the aviation industry in collaboration with ICAO⁸⁴⁵

According to the Protocol:

The parties included in Annex 1 shall pursue limitation or reduction of emissions of green house gases not controlled by the Montreal Protocol from aviation and Marine bunker fuels, working through the International Civil Aviation Organization and International Maritime Organization, respectively⁸⁴⁶

From the above provision of the Kyoto Protocol, it is clearly shown that the issue of aircraft engine emissions was referred to International Civil Aviation Organization⁸⁴⁷

b) NATIONAL ENACTMENT.

Historically, Nigerian Civil Aviation Policy was formulated in 1989, following the adoption of the report of the Air Commodore Kola Falope Committee which subsequently brought about the creation of defunct Federal Civil Aviation Authority as the Regulatory body in Aviation businesses in Nigeria⁸⁴⁸.

In 1995, as a result of reform in aviation sector in Nigeria, the then Federal Civil Aviation Authority of Nigeria was scrapped and the Safety Regulation Authority in relation to aviation business was transferred to Department of Safety Regulation and Monitoring in the Ministry of Aviation⁸⁴⁹.

844' Global Warning Resources: Carbonify.com. Putting Co₂ Where It Belongs!'
<<http://www.carbonify.com/articles/kyoto-protocol.htm>> accessed on 8 April, 2010.

845 Protocol to UNFCCC, Article 2 (2). See also 'Kyoto Protocol',
<http://en.wikipedia.org/wiki/kyoto_protocol> accessed on 8 April, 2010.

846 Protocol to UNFCCC, Article 2 (2).

847 Greenaironline.com, 'International Aviation Emissions' Now Firmly on the Post-Kyoto Climate Talks Agenda' <<http://www.greenaironline.com/news.php?viewStory=46>> accessed on 17 April, 2010.

848 Callistus E.U., *Introduction to Civil Aviation Law in Nigeria*, 1st ed. (Lagos 2006) p. 51.

849 *Introduction to Civil Aviation Law in Nigeria*, p. 52.

Nigeria's growing influence in both national and international aviation businesses leads to the adoption of International Conventions and Treaties⁸⁵⁰; Protocols⁸⁵¹ and Agreements⁸⁵² which later brought about review of her policy in 1999 on aviation matters. Further review of aviation policy in Nigeria brought about Aviation policy, 2001.⁸⁵³

The Chapter Three of the Civil Aviation Policy, 2001 deals with aviation environmental protection. It seeks to secure compliance with the provisions of International Civil Aviation Convention, 1944⁸⁵⁴, particularly, Annex 16 Volume II which is an aspect relating to aviation engine emissions⁸⁵⁵ which have been earlier dealt with.

1. THE CIVIL AVIATION (REPEAL AND RE-ENACTMENT) ACT NO 6, 2006.

The Act established Nigerian Civil Aviation Authority⁸⁵⁶ and provides fresh guidelines for the smooth operation of aviation business in Nigeria⁸⁵⁷. The Act contributes to the protection of environment by adopting relevant provisions of Chicago Convention on aviation's engine emissions.

The Act provides:

The Authority may by regulation make such provision as expedient: for carrying out the Convention on International Civil Aviation...concluded at Chicago on the 7th day of December 1944,

850 Such as Montreal Convention, 1999; United Nations Framework Convention on Climate Change, 1992; International Civil Aviation Convention, 1944 and its subsequent amendments, amongst others.

851 Such as Montreal Protocol on substances that deplete the Ozone Layer as either adjusted and amended in London, 1990, Copenhagen, 1992, Vienna 1995, Montreal 1997 and Beijing 1999; Kyoto Protocol, 1997.

852 Inter carrier Agreement; Open Skies Agreement amongst others.

853 Introduction to Civil Aviation Law in Nigeria, op. cit.

854 Here-in referred to as the Chicago Convention, 1994.

855 See Chicago Convention, 1944, Annex 16 termed "Environmental Protection" (Volume I and II) dealing with both Aircraft Noise and Aircraft Engine Emissions.

856 Here-in-after referred to as NCAA. See Section 2 of the Act. The authority to administer all laws, regulations and agreements relating to aviation business including environmental protection relating to aviation industry. See Section 30 of the Act.

857 <http://www.ncaa.gov.ng/index.php?option=com_content&view=article> accessed 16 April, 2010.

*any annex to the Convention which relates to international standards and recommended practices and is adopted in accordance with the Convention or of any such annex which is made in accordance with the Convention*⁸⁵⁸

The above provision of the Act is to the effect that an aspect relating to environmental protection in aviation industry under the Chicago Convention is very much relevant in Nigeria in order to protect and reduce aircraft engine emissions of greenhouse gases.

The Act further provides:

*The Authority in exercising its functions in relation to licensing of aerodromes shall have regard to the need to minimize so far as practicable any adverse effect the presence of such aerodrome(s) may have on the environment*⁸⁵⁹

It is therefore incumbent upon the Authority to consider protection of environment before aerodrome⁸⁶⁰ is licensed.

2. FEDERAL AIRPORTS AUTHORITY OF NIGERIA ACT CAP. F5 LAWS OF THE FEDERATION ON NIGERIA 2004.

The Federal Airports Authority Act⁸⁶¹ is divided into six parts. Part one establishes a body to be known as the Federal Airports Authority⁸⁶² who shall be a corporate entity with perpetual succession and common seal and may sue and be sued in its corporate name and hold or dispose property, whether movable or immovable.⁸⁶³ Part one further establishes Governing Board for the Authority.⁸⁶⁴

858 *Civil Aviation Act, Section 30(1)(a).*

859 *Civil Aviation Act, Section 40.*

860 *Aerodromes is any machine that can derive support in the atmosphere from reactions of the air other than reactions of the air against the earth's surface. See Civil Aviation Act, Section 78(1).*

861 *Here-in referred to as the Act.*

862 *Here-in-after to be called the Authority.*

863 *See Federal Airports Authority of Nigeria Act. Section 1(1) and (2) respectively*

864 *Federal Airports Authority of Nigeria Act. Section 2*

Part Two of the Act provides for the general functions of the Authority⁸⁶⁵; Part Three provides for the staff of the Authority⁸⁶⁶; Part Four for financial provisions⁸⁶⁷; Part Five gives the Authority power to acquire and hold land compulsorily⁸⁶⁸.

It merits mentioning that the aspect that relates to this topic under consideration is contained in part two of the Act.

The Act provides:

*Notwithstanding any other provision of this Act, the Minister may give to the Authority directions to do a particular thing which it has power to do or refrain from doing a particular thing if the Minister considers it appropriate to give such directions: in order to prevent or deal with noise, vibration, pollution or other disturbance attributable to aircraft used for the purpose of civil aviation and in so far as any directions given in pursuance of this paragraph conflict with the requirements of any enactment or instrument relating to the Authority except in time of war whether actual or imminent, or of great national emergency, those requirements shall be disregarded (emphasis added)*⁸⁶⁹

From the above provision of the Act, it is suggested that the phrase other disturbance attributable to aircraft used for the purpose of civil aviation can be said to mean aircraft greenhouse gaseous emissions including but not limited to carbon dioxide. Therefore, the Aviation Minister is authorized to make standard and recommendation to control aircraft engine emissions that affect climate negatively. From the foregoing, it is our findings that legal response to aviation related pollution causing climate change in Nigeria followed the path of international legislations on the subject matter.

V. CONTROL STRATEGIES.

The importance of protecting our environment from the hazardous effect of emissions from aircraft cannot be over emphasized.

- 865 Federal Airports Authority of Nigeria Act, Section 3-8
- 866 Federal Airports Authority of Nigeria Act, Sections 9-11
- 867 Federal Airports Authority of Nigeria Act, Sections 12-16
- 868 Federal Airports Authority of Nigeria Act, Sections 17-20
- 869 Federal Airports Authority of Nigeria Act, Section 8(f)

In the recent time, UK government policy statements have stressed the need for aviation to address its total climate change impacts and not simply the impact of CO₂. The UK government has even gone far as to exclude emissions from internal aviation from 2050 emissions targets⁸⁷⁰. The government is working ceaselessly in response to climate change as it drags the aviation industry into the 21st century⁸⁷¹.

Modern jet aircraft are significantly more fuel efficient (and thus emit less CO₂ in particular) than 30 years ago. Moreover, manufacturers have forecast and are committed to achieving in both CO₂ and NO_x emissions with each new generation of design of aircraft and engine⁸⁷².

Another possible reduction of the climate change impact is the limitation of cruise attitude of aircraft. This would lead to a significant reduction in high-altitude contrails for a marginal trade-off of increase flight time and an estimated 4% increase in CO₂ emissions. Drawbacks of this solution include very limited airspace capacity to do this, especially in Europe and North America and increased fuel burn because jet aircraft are less efficient at lower cruise attitude.⁸⁷³

However, some scientists and companies such as GE Aviation and Virgin Fuels are researching bio fuel Technology for use in jet aircraft. As part of this test, Virgin Atlantic Airways flew a Boeing 747 from London Heathrow Airport to Amsterdam Schipol Airport on 24 February 2008, with one engine burning a combination of coconut oil and Babassu oil⁸⁷⁴. But Green peace's Chief Scientist Doug Parr said that the flight was "high-altitude greenwash" and that producing organic oil to make bio-fuel could lead to deforestation and a large increase in greenhouse emissions.⁸⁷⁵

The majority of the World's aircraft are not large jetliners but smaller piston aircraft, and many are capable of using ethanol as a fuel with major modifications. Though, ethanol also releases CO₂ during combustion, the plants cultivated to make it draw

870 <<http://www.greenpeace.org.uk/climate/aviation>> accessed 16 April, 2010.

871 <<http://www.greenpeace.org.uk/climate/aviation>>, *ibid*.

872 <<http://en.wikipedia.org/wiki/aviation-and-the-environment>>, *op. cit*.

873 <<http://en.wikipedia.org/wiki/aviation-and-the-environment>>, *ibid*.

874 <<http://en.wikipedia.org/wiki/aviation-and-the-environment>>, *ibid*.

875 <<http://en.wikipedia.org/wiki/aviation-and-the-environment>>, *ibid*.

that same CO_2 out of the atmosphere while they are growing; making the fuel closer to climate-change-neutral.⁸⁷⁶

Another alternative to reduce the environmental impact of aviation is to constrain demand for air travel. This can be done through economic instrument.⁸⁷⁷

A study published by the campaign group Aviation Environment Federation (AEF) concludes that by levying \$9 billion of additional taxes, the annual rate of growth in demand in the UK for air travel would be reduced to 2%.⁸⁷⁸

VI. CONCLUSION AND RECOMMENDATION(S)

It is not an exaggeration that Aircraft engine greenhouse emissions are one of the major contributors to climate change in Nigeria, even though Nigeria is not one of the industrialized countries. These emissions upon been released into the atmosphere seriously affect the climate negatively.

As a result of this negative impact on Nigeria climate, the Federal Government through national and international enactments seeks to reduce or limit the aircraft engine emissions. Such national enactment includes Nigeria Civil Aviation Act, and Federal Airports Authority of Nigeria Act, while international enactment includes Chicago Convention, United Nations Framework Convention on Climate Change and Protocol to United Nations Framework Convention on Climate Change which were made applicable in Nigeria through constitutional provision.

At this juncture, it merits mentioning that although Nigeria has taken giant steps in combating aircraft engine emissions through the applications of both national and international enactments, it is however stated that while national enactments places reliance on international enactments, international enactments also places reduction and limitation of Aircraft engine emissions on the collaboration of both the party and the ICAO.

⁸⁷⁶ <<http://en.wikipedia.org/wiki/aviation-and-the-environment>>, *ibid.*

⁸⁷⁷ <<http://en.wikipedia.org/wiki/aviation-and-the-environment>>, *ibid.*

⁸⁷⁸ <<http://en.wikipedia.org/wiki/aviation-and-the-environment>>, *ibid.*

While corroborating the above submission, in a media release, ICAO stated that it has been recognized as the global instrument for developed countries to pursue the limitation or reduction of green house gas emissions from international aviation. ICAO further stated that it has been in charge of environmental issue ever since the 1960s, but encountering difficulties in incorporating aviation emissions of green house gases into emissions agreement was too hard due to problems in allocating them to specific countries.⁸⁷⁹

Addenda to the above finding are the key decisions taken by the ICAO with regard to the aviation and climate change in the following order:

- In 1996, the ICAO Council adopted a resolution to the effect that all the related emission levies on air transport should be in the form of charges rather than taxes.⁸⁸⁰
- In 2001, 33rd ICAO Resolution reaffirmed ICAO Council Resolution in 1996⁸⁸¹. Also, ICAO ruled out possibility of establishing Green Gashouse Emissions standards for aircraft.⁸⁸² They further opposed the application of close emission trading schemes for aviation, that is, scheme designed in such a way as to limit or reduce emissions within one sector only, without providing access to allowances or credit from outside that sector. The report of the fifth meeting of ICAO concluded that a closed emissions trading system does not show cost benefit results to justify further consideration. Instead, the 33rd Assembly resolution endorsed the development of an open emissions trading system for international aviation⁸⁸³.
- In 2004, ICAO ruled out the possibility of establishing a specific global emissions trading scheme for aviation but however recommended the inclusion of aviation emissions in the existing emissions trading schemes.

879 See 'SourceWatch: Greenhouse Gas Emissions from the International Aviation Industry', <http://www.sourcewatch.org/index.php?title=Greenhouse_gas_emissionsfrom_the_i> accessed on 18 April, 2010.

880 'ICAO: Council Resolution on Environmental Charges and Taxes', adopted by the Council on 9 December, 1996 at the 16th Meeting of its 149th Session, <<http://www.icao.int/icao/env/taxes.htm>> accessed on 28 April, 2010.

881 'ICAO: Council Resolution A33/7, 'Consolidated Statement Of Continuing ICAO Policies And Practices Related To Environmental Protection', <<http://www.icao.int/icao/en/env/a33-7.htm>> accessed on 28 April, 2010.

882 CAEP: The Fifth Meeting of the Committee on Aviation Environmental Protection (CAEP/5) held in Montreal from 8-17 January, 2001.

883 CAEP: Market Based Measure-Report from Working Group5 to the fifth meeting of the Committee on Aviation Environmental Protection, CAEP/5-IP/22, 5/01/2001. See also 'The Role of EU in Attempting to Green the ICAO', op. cit.

endorsed voluntary trading schemes that interested Contracting states and international organizations might propose and to provide guidance for use by Contracting States to incorporate emissions from international aviation into Contracting States' emissions trading schemes consistent with the UNFCCC process.⁸⁸⁴

In 2007, during the ICAO 36th session, the Assembly made the following conclusions:

- i. continuing to play its leadership roles in civil aviation matters, environment and Greenhouse gas emissions;
- ii. continuing to study available policy options to limit or reduce the environmental impact of aircraft engine emissions; and
- iii. continuing to cooperate with other policy-making organizations including UNFCCC.⁸⁸⁵

However, according to Yvo de Boer⁸⁸⁶ while addressing the delegates in Bangkok Climate Change on 10th April, 2008:

*I think everybody agrees that we have to find some way of addressing emissions from aviation and shipping*⁸⁸⁷

From the comment of Yvo de Boer above, it is clearly shown that the world is coming out with something reasonable globally to tackle the difficulties in incorporating aircraft engine emissions into global enactment as emissions from aviation represents one of the fastest growing source of greenhouse gas emissions⁸⁸⁸

Despite the statement of Yvo de Boer, the world aviation sector under the leadership of ICAO has been in difficulty of agreeing on a particular Convention or Protocol to limit or reduce aircraft engine emissions. The testimony to this statement can be

⁸⁸⁴ 'ICAO: Council Resolution A35/5, Consolidated Statement Of Continuing ICAO Policies And Practices Related To Environmental Protection', <<http://www.icao.int/env/a35-5.pdf>> accessed on 29 April, 2010.

⁸⁸⁵ ICAO: Resolutions Adopted by the Assembly at its 36th Session, A36-22: Consolidated statement of continuing ICAO policies and practices related to environmental protection, 09/2007, <<http://www.asil.org>>

⁸⁸⁶ Yvo de Boer is the United Nations Framework Convention on Climate Change Executive Secretary.

⁸⁸⁷ Yvo de Boer, on international aviation emissions now being firmly on the Post-Kyoto Climate talks agenda. Accessed at <<http://www.greenairline.com>>

⁸⁸⁸ See 'The Position Paper of the European Union on the Status Of Aircraft And Shipping Emissions'. See also de Boer, *op. cit.*

found from the report of working paper on High-Level Meeting on International Aviation and Climate Change where Nigeria presented a paper on behalf of other African states to the effect that they opposed unilateral measure by state or regional sector but by collective efforts of all the states. They further reaffirm their support for ICAO leadership and roles in overcoming the challenge of aviation emissions through the UNFCCC's principle of Common but Differentiated Responsibilities on all ICAO's ongoing efforts to reduce or limit all aviation emissions.⁸⁸⁹

After the High-level meeting, the world still has the opportunity of meeting again at Copenhagen summit on 22nd December, 2009 wherein some aviation related issues such as engine emissions were discussed but no concrete agreement was made on how to reduce aviation emissions, hence, the whole aviation sector with regard to aviation emissions remain standstill.⁸⁹⁰

In Nigeria, the challenge of aviation sector in relation to aircraft emissions reduction or limitations still persist as the Nigeria Civil Aviation Authority relied on ICAO's principles, rules and regulations governing environmental protection on aviation sector.

At this juncture it needs be said that even Section 40 of Civil Aviation Act, No 6, 2006 only provides that the NCAA shall take cognizance of environment while licensing aerodrome. It therefore merits mentioning that the aerodrome mentioned is not aircraft. Also part 16 of the Civil Aviation Regulation, 2006 only provides for Noise pollution

From the foregoing discussions it is clearly shown that the issue of aviation related greenhouse gaseous emissions has not been adequately taken care of as same was left for the ICAO to implement. Also, there is no clear enactment relating to aviation related pollution in Nigeria.

889 *'Working paper on High-Level Meeting on International Aviation and Climate Change' held at Montreal, between 7-9 October, 2009. This paper was presented by Nigeria on behalf of African states on proposal for strategies and measures to reduce or limit aircraft emissions.*

890 *'Transport and Environment Copenhagen Analysis: What are we Left With on Aviation After Copenhagen?' <<http://www.greenaironline.com/news.php?viewStory=713>> accessed on 27 April, 2010; 'Transport and Environment Copenhagen: Analysis: Aviation and Shipping Emissions after Copenhagen', <<http://www.transportenvironment.org/News?2010/1/Analysis-Aviation-and-Shipping-Emission-after-Copenhagen/>> accessed on 27 April, 2010.*

Furthermore, as we have stated earlier, from the international scene, the major problem militating against reduction or limiting aviation greenhouse emissions is that of how to allocate percentage of greenhouse gas emissions to a particular state. Thus in order to make progress on aviation emissions reduction, the following are hereby recommended:

- Nigeria should specifically provide for a particular regulation on Aircraft Emission Reduction
- The World should work through ICAO and UNFCCC to adopt global sector approach for aviation that does not distort competition amongst airline.
- Nigeria government should work with other members of ICAO to take a global approach to emission reduction.
- Nigeria should allow full access to all available abatement measures outside the aviation sector.

Nigeria should join the rest of the world to address the issue of emissions with a view to reach international consensus on measure to reduce aviation emissions.