

The Legal Implications of Gas Flaring On Climate Change in Nigeria

Olubisi Friday Oluduro

Department of Public Law, Obafemi Awolowo University, Ile-Ife, Nigeria.

E-mail: oluduro2003@hotmail.com

Abstract

Global atmospheric concentration of substances that trap heat causing warming and change of climate is caused mostly by man's activities- anthropogenic. Since efforts to curtail anthropogenic climate change commenced and countries came together to agree under the Kyoto Protocol to reduce carbon emissions, incidentally a larger percentage of the world was left out, constituting the developing countries, some of which eventually turn out to become leading carbon emitters, like Nigeria and others. Nigeria is a large carbon emitter through its oil exploration activities involving gas flaring. The country's mainstay is its oil which predominantly dominates its revenue profile. The consequences of its gas flaring are enormous, which constitutes a threat to its environment and to the entire region.

Keywords: Gas flaring, oil exploration, legislation, pollution, environment.

1 Introduction

The problems and threats posed by climate change in several parts of the world are so staggering and frightening that they call for the urgent attention of all everywhere. The challenges however differ in magnitude in different parts of the globe, unfortunately with the developing world being the worst hit, yet with no equal capability to attend to these challenges. These challenges therefore provide the ultimate demonstration of global interdependence (Freestone & Churchill 1991). Climate change is likely to overwhelm local capacities to adapt to changing environmental conditions and reinforce crisis and tend towards general instability in several parts of Africa, especially, weak and fragile states with poorly performing institutions and systems of government (Brown & Crawford 2009). It could increase dangerously the number of people at risk of hunger by up to 600 million by 2080, particularly in Africa, as modeling predicts decreases in cereal (food) production in low countries, up to 9 per cent in Africa (Slatter 2007). Africa is the world's poorest continent, with almost half the population of sub-Saharan Africa (SSA), living on less than one dollar a day. Life expectancy remains low at 49.6 years compared to the world's least at 50 years, according to the United Nations Development Programme (UNDP), statistics for 2007.

Nigeria is an influential nation for many obvious reasons, prime among which are that it is the most populous black country, with a population of about 160 million people, a conspicuous member of the oil cartel- the Organization of Petroleum Exporting Countries (OPEC), a major contributor to Peace Keeping programmes of the United Nations, (UN) the African Union (AU) and the Economic Community of West African States (ECOWAS), among many other reasons. The country is a net exporter of crude oil, with a proven reserve of about 37.2 billion barrels (2.7%) of world's reserve, and about 187 trillion cubic feet (5.3%) of world's reserve of natural gas (BP Statistical Review of World Energy 2011). With the above quoted figure of Nigeria's gas reserves, it is ranked the world's ninth largest gas reserves holder and indeed the largest in Africa. Recent discoveries and estimates have gas reserves growing to as much as 600 tcf, making it the world's 4th largest after Qatar (Igwe 2011). The country has been described as a gas zone. It is Africa's largest producer of oil and is regularly the fifth largest oil exporter to the United States (Ploch 2010). Demand for Nigeria's oil is high because of its high quality and Nigeria's location outside the volatile Persian Gulf (Ross 2003). The Nigerian government relies on the energy sector for over 85% of its revenues (Ploch 2010). A greater percentage of the associated gas encountered in oil exploration is still being flared, which makes Nigeria a high flarer of gas, second only to Russia, the world's highest flarer. Considering Nigeria's virtual dependence on revenue from oil and its vast gas resources, the rate at which it still flares its gas more than 50 years after the commencement of oil exploration activities cannot but be of concern. It is even more worrisome considering the fact that flaring contributes more to global warming than

The paper is divided into four sections viz: it opens with an introduction, the second part discusses oil exploration in Nigeria and its attendant gas flaring. The third examines the nation's legal provisions guiding oil exploration activities and how effective these have been in contrast with basic international legal standards. The fourth part is an appraisal of the nation's legal standard and its attendant consequences; and the fifth part attempts an appraisal of Nigeria's situation with Saudi Arabia's, while the last aspect is recommendations and conclusions.

2 Oil Exploration and Gas Flaring in Nigeria

Oil exploration activities attained commercial level in the early 1960s and by the late sixties and early seventies, production level of over 2 million barrels of crude oil a day had been attained. By the turn of the century, the nation has become the world's sixth largest crude exporter, reaching a 2.44million barrels per day (bbl/d), in January 1979(Udosen 2009), and peaking at close to 2.9 million bbl/d in 2010 (U.S. EIA 2011). Oil exploration in Nigeria has carried with from the inception the stigma of gas flaring, in other words, the burning of associated gas or hydrocarbon gasses, a by-product of crude oil extraction from the reservoirs. Nigeria has since been a substantial and consistent flarer, at a time flaring 2.5 billion cubic feet (bcf) of its annual 3.5bcf, or 70 per cent (Pyagbara 2007). According to the National Oceanic and Atmospheric Administration (NOAA), Nigeria flared 536bcf natural gas in 2010- about a third of gross of gross natural gas produced according to the Nigerian National Petroleum Corporation (NNPC). Flaring costs Nigeria US \$2.5 billion per year in lost revenue (U.S. EIA 2011).

A country touted to possess enormous deposit of gas as Nigeria cannot continue to flare this resource, to the risk of the environment indefinitely without a check. Going by statistics, globally, some 150 bcm (5.3tcf)of natural gas are being flared yearly. From 2005 – 2010, flaring of associated gas reduced by 22 per cent, from 172 bcm to 134 bcm according to satellite estimates commissioned by the Global Gas Flaring Reduction (GGFR) partnership(Rios 2012). Russia, world highest flarer was estimated to have flared 58.3 bcm in 2005, reducing it to 35.2 bcm in 2010, with the coming on stream of the Nord Stream Gas twin-Pipeline (NGSP), whose first phase has a capacity to transmit 27.5 bcm of gas, and the second phase inaugurated in 2012 with a total capacity of 55 bcm per year (Key Data NGSP 2012). Nigeria is number two highest flarer after Russia, flaring 23.0 bcm in 2004, 21 bcm in 2005; 18.9 in 2006 the equivalent of 45 million tonnes of carbon dioxide (CO₂) (ICF International 2006), reduced to 15 bcm in 2009 (Al Fathi 2012). The reduction being for reason of the unrests in the Niger Delta region during the period under review, which threatened to cripple the nation's oil production, until the Federal Government packaged an amnesty programme, which became operational in 2009, and soon after flaring again went up, reaching 33.6 bcm. It flared 15.2 bcm of natural gas in 2010 (Owen 2012). And for January 2012, has flared 30 bscf (Nain 2012). It has been estimated that 13 per cent of the annual global gas flared or about 23 bcm out of the 168 bcm come from Nigeria. The NNPC has said that the rate of gas flaring in the country currently stands at 21.93 per cent (Dada 2012). Gas flare figures escalate with improvement in oil production in Nigeria. Shell with the highest production rate in Nigeria at the height of its operations, produced one million barrels of oil daily, has 349 drilling sites (Abah 2009), meaning 349 sites of flaring for only one company, and there are many of them operating simultaneously in an area about the size of the United Kingdom. The country flared 23.0 bcm of gas in 2004, according to satellite research by the World Bank, estimates from OPEC, NNPC and CEDIGAZ indicated it flared 22 bcm in 2007, in 2009 it flared 33.6 bcm (Stockman 2009), and in 2010, it flared 536 bcf or about a third of gross natural gas produced in 2010, and 14.6 bcm in 2012, according to NNPC (U.S. EIA 2011). World Bank satellite research reports a slight increase of about 5 per cent in global gas flaring in 2011, from 134 bcm in 2010 to around 140 bcm in 2011, due to a shale rise in North Dakota in the US, propelling the US to a position in the top ten chart (Owen 2012).

Gas flares are toxic fires that burn the natural gas that is released when oil is extracted from the ground, otherwise called associated gas (Bast 2009). It is dangerous to both the environment and the lives of human, animal and aquatic in the environment. Gas flaring has a global impact on climate change by adding the equivalent of some 400 million tonnes of CO₂ in annual emissions (Orfao 2010). What more, gas flaring is waste of energy resource (Donnelly 2007), which could have been harnessed to generate energy for the nation, which is in virtual darkness, causing industrialization is sliding down dangerously, causing unemployment to rise astronomically, while the economy is arguably, at a very low ebb. The consequences of gas flaring are enormous and indeed frightening. An aide to the Executive Governor of Bayelsa state in the Niger Delta area of the country said it is not just Nigeria that is suffering from flaring, and that the whole world should be concerned (Murdock 2012). According to the World Bank, gas flaring accounts for a third of Nigeria's carbon emission and constitutes about 1.2 per cent of carbon emissions worldwide (Murdock 2012).

3 Nigeria's Legal Regime on Oil Exploration

Curbing gas flaring requires a combination of international and concerted effort by national governments and industry, as well as financial institutions and local communities (Kaldany). Nigeria commenced meaningful legislation on the environment only in the late 1980s (FEPA Decree 1988), after the Koko Waste Dumping

incident.¹ Section 20 of the Constitution of the Federal Republic of Nigeria (CFRN), 1999, provides for the State to protect and improve the environment, and safeguard the water, air and land, forest and wild life of Nigeria. This provision however comes under the Fundamental Objectives and Directive Principles of State Policy in Chapter II of the Constitution, which is non-justiciable. This makes the Constitution, the supreme law of the land, from which other legislations derive authority and power to be porous in environmental matters as it were. This is unlike a couple of countries which have specific enforceable constitutional provisions on climate change, like Ecuador (2008), Dominican Republic (2011), Bolivia and Tunisia, while over 90 countries have provisions on the right to live in a healthy environment in their constitutions. A World Bank report in March 2013 had stated that climate change is already damaging people's livelihood and well-being in Tunisia, and without action, it will deepen the already significant poverty and unemployment. Recognizing that climate change played a significant role in the Arab Spring causing an interplay between climate change, food prices and politics as a stressor that helped fuel the revolutions, Tunisia therefore, gave its citizens the right to ask their government to deal with climate change, and has also elevated the concept of climate change to one of an international law (Aulakh 2014). Aside the constitution, there are other legislations on oil and gas exploration activities, and which seek to regulate climate matters in the country such as the following statutes.

3.1 The Petroleum Act and The Petroleum (Drilling and Production) Regulations, 1969, Cap P10 LFN, 2004

The Nigerian government first moved to end gas flaring in 1969, promulgating the Petroleum Act, 1969 and the Petroleum (Drilling and Production) Regulations, when it brought under the control of the Minister responsible for Petroleum matters, issues on pollution of the waters and the atmosphere. The Act requires a licensee or lessee to submit to the Minister, not later than five years, a feasibility study, programme or proposal for the utilization of natural gas, be it associated with oil or not, discovered in the area.² The Act failed to accomplish its goal of regulating gas flaring act by the transnational oil corporations.

3.2 The Associated Gas Reinjection Act, 1979, Cap A25, LFN 2004

This Act also required the oil companies to develop gas utilization projects by 1980 and outright ban of gas flaring from January 1984. It was amended by the Associated Gas Re-Injection (Continued Flaring of Gas) Regulations, 1984, which provided exemptions to flaring under certain spelt out conditions, which been unobserved by the players. It required a company to secure a certificate from the Minister to flare.³ And in 1985, a further amendment stipulating a fine of 2 Kobo (equivalent to US\$ 0.9) per 1000 scf of gas flared was promulgated, which fine was rather preferred by the companies because it paltry and easier to pay than put in place machineries to halt flaring.

3.3 Other Legislations

Several other legislations have been enacted but all of which have similarly failed to fix the problem of flaring in Nigeria, until it became an international embarrassment to the nation. Some of such legislations include the Federal Environmental Protection Decree No.58 of 1988,⁴ which was intended to be an omnibus law on environmental matters in the country, but which falls short on Gas flaring, that it is best described as a caricature of its intent. It only provided for the Act to prescribe national environmental standard for air quality, atmospheric protection, ozone protection, noise control, water quality and such the likes.⁵ There is the National Environmental Standards and Regulations Enforcement Agency Act, 2007, which came in replacement of the FEPA Act which was repealed upon the creation of the ministry of the Environment. The Agency was saddled with the responsibility of ensuring the enforcement of all policies, laws, standards and regulations relating to the environment, including international agreements, protocols, conventions and treaties on the environment (Odujinrin 2011). The Agency suffered a latent flaw in that it was barred from carrying out almost all its major functions in relation to the oil and gas sector, the governing council of the Agency is obliged by law to include a representative of the Oil Exploratory and Production Companies in Nigeria. There is likewise, the Environmental Impact Assessment (EIA), Act No. 86, of 1992, Cap E12, LFN 2004. The Act by virtue of its purpose is expected to play an integral role in the planning process for the development of oil and gas fields, yet has not impacted positively to curtail the effects of flaring in the development of oil fields.

Last but not least is the Petroleum Industry Bill, which has been submitted to the National Assembly for debate and passage by the President. With the much expectation placed on this Bill, it is feared that it might likely go the way of all the earlier regulations before it. It provides for gas flaring in sections 200 and 201, requiring the licensee or lessee to submit within a stipulated time, an environmental management plan to the inspectorate for approval.¹ It also provides that the lessee shall pay such gas flaring penalties as the Minister may determine from time to time.² The provisions on gas flaring in this Bill as contained in S. 277 prohibits anybody or company engaged in petroleum operations to flare gas. It also empowers the Minister to grant a permit to flare or vent, but for a period not exceeding one hundred days, and places a penalty not less than the value of gas flared without such permission on any offender.³ The Bill however, left the determination of the flare-out date to the prerogative of the Minister.⁴ It has been widely reported that the 31st of December, 2012 has been fixed for cessation of flaring and venting, whereas the National Assembly is yet to pass the Draft Bill submitted to it by the President on 18th July, 2012 (Cocks 2012), as it has since been on long recess only resuming mid-September. The array of legislations have all been virtually of no effect because of their archaic nature in that, a situation as gas flaring was not envisaged to become an issue of serious climatic concern as it has become over the years. This is thus an exposition of the failure of these laws to meet a basic requirement of a good law, being prospective to be able to care of unanticipated situations as these. These laws ought to have been, in the very least, reviewed to meet with current circumstances. Coupled with this is that Nigeria has so far proved that it lacks the will-power to implement and enforce its legal rules on such sensitive issues as gas flaring, oil spill and such other deleterious issues arising out of its oil exploitation activities, not minding the welfare of the legitimate and law-abiding citizens of the vast areas where oil prospecting activities are carried out.

4 An Appraisal of Nigeria's Legal Regime with the Basic Minimum International Standard

It is evident that the problem of gas flaring in Nigeria is not just solely that of inadequate legal regulations and policy framework in place, but the government on its part is also not willing to implement and enforce its own legal standards. It is not just how so stringent and level of enforcement that make a law effective, providing solution to the situation it is meant to curb, but enacting the appropriate laws would suffice. Such customary international law standards as the principles of precaution and prevention would have gone a long way if such have been employed in dealing with the situation.

Precautionary principle presupposes prevention involving concepts of good environmental management, which ideals are inherent in elements of risk analysis and potential for harm, borne out of the fact that it is impossible to guarantee a complete absence of any risk in the conduct of human activities (Codex Alimentarius Commission 2005). This principle sustains on taking anticipatory measures to protect human health and the environment in the face of scientific uncertainty (Hanson 2004), envisaging environmental activities defined as hazardous on purely subjective grounds (Page 2007). It thus prescribes due care and restraint in the environmental protection or human health, even where there is no evident threat of harm or risk from the activity or substance (Ebbesson 1996). The concept of pollution as it stands, transcends real materialized or harm, to imagined risks for such, hence, the whole essence of precaution in environmental law (Ebbesson 1996). Preventive principle on the other hand is a fundamental principle of international law regarding the responsibility of a polluting state for transboundary pollution (Soroos 2001). This is a direct flow from Principle 21 of the Stockholm Declaration, which requires states responsibility "to ensure that activities within their jurisdiction or control do not cause damage to environment of other states or of areas beyond the limits of national jurisdiction." (Principle 2 UNCED Declaration 1992) This principle seeks to avert "certain" hazards, while the precautionary principle seeks to avert "uncertain" hazards, hence both might be appropriately described as two sides of a coin. Prevention envisages the elimination of the problem-causing activity in a fashion that is as economically efficient and socially acceptable as possible (Stirling 2006), which is what Nigeria actually should have employed. Power generation and supply in the country is absolutely low, it could have thus enhance power generation using the gas that is being indiscriminately and uneconomically wasted, just like Saudi Arabia, which makes the best of its oil and gas resources locally. In the context of the oil industry, effective prevention involves establishing an appropriate regulatory system based on international best practice and the effective enforcement of regulations. By continuing to balk, Nigeria has simply traded the human dignity of its people at the expense of government's interests and its corporate partners (Tsunga 2012).

The non recognition and adoption of these seemingly simple rules of international law has caused Nigeria much in economic, social, environmental and many other spheres. It is one lapse too many for the impoverished nation. It goes to depict the state of the law of the nation.

5 An Appraisal of Nigeria and Saudi Arabia's Systems

Saudi Arabia has the world's highest proven oil reserves- approximately 260 billion barrels and an additional 2.5 billion barrels in the Saudi- Kuwait neutral zone. This constitutes approximately one-fifth of the world's proven oil reserves, it is thus the largest oil producer and exporter of total petroleum liquids in 2010 (EIA Saudi Arabia 2011). It produces about 10 million barrels per day (mmb/d). It is second to Russia. It has proven natural gas reserves estimated at 275 trillion cubic feet (Tcf), the fourth largest in the world after Russia, Iran and Qatar. About 50-60 per cent of the natural gas in Saudi Arabia is associated with petroleum deposits. Energy consumption is about 56 per cent oil and 44 per cent gas (EIA Saudi Arabia *ibid*). In contrast to the US, Saudi Arabia has only the beginnings of a gas market. Despite this lack of consumer base, the country has one of the highest utilization rates in the free world, outside the US. Saudi Aramco spent about 70 million US Dollars on research and on substantial capital projects leading to the utilization of oil well gas. At present more than 50 per cent of this gas is put to use. Saudi Arabian gas plays a double role in Aramco's conservation projects, as most of it is returned to the underground oil reservoir, stored for future use. Several different gas injection systems are used (Saudi Aramco World).

The country's use of natural gas became increasingly important since the mid 1980s and now accounts for 32.1 per cent of total fossil-fuel CO₂ emissions. In 1974, gas flaring accounted for 76 per cent of its fossil-fuel emissions, but has since fallen sharply to less than 1 per cent of total emissions (CDIAC). This it was able to achieve by enhanced domestic use and aggressive marketing outreach through the Master gas system mega-project which came online in 1982 and today gathers almost 100bcm per year, making it the world's largest single hydrocarbon network, with approximately half of the gas previously flared being channeled into the system (Saudi Gazette). It was thus in the 1980s able to reduce gas flaring from 38bcm/y to less than 1bcm/y in the development of their petrochemical industry (Svensson *sd.*). So far, Saudi Arabia stands as one of the world leaders in the application of advanced conservation practices, adopting the notion of frugality through technology and economic development (Saudi Aramco World *sd.*).

Saudi Arabia produces more than 10 million barrels of oil per day, and yet has this impressive record of gas flaring, hence it smacks of any understanding for Nigeria which produces about 2.5 million barrels per day to continue flaring on the upward since 2010, on the guise that flaring increase with the rise of crude oil exploration. Nigeria would also do well to tow the path of Saudi Arabia, by spending much more on research, marketing and step up local utilization of gas to further improve on its flaring record which has improved of late. According to the GGFR and US National Oceanography and Atmospheric Agency (NOAA), worldwide, flaring has declined in 16 countries, mainly in Latin America and Africa, according to estimates based on satellite photos taken over a 12 year ending in 2006 (Broere, *sd.*). Among others, Nigeria's limited institutional, legal and regulatory frameworks for gas including associated gas will continue to affect it in this regards. Without a clear-cut gas legal framework, it might be a bit hard to effectively contain gas flaring issues in Nigeria, the Nigerian Gas Masterplan and Policy notwithstanding, whose effect has been largely unfelt in the industry.

6 Recommendations and Conclusion

The consequences of unmitigated climate change on the developing countries and the world at large, might be far more than could be accurately envisaged. It could more be disastrous than the pandemic HIV/AIDS, and the dreaded Malaria syndrome. It thus warrants that not the mere attention, but the contribution of all in many ways, even by sacrifice on the path of the rich nations, which today do not see the need to reduce their rate of carbon emission nor contribute to global efforts in confronting this menace confronting humankind. The effects and consequences are felt much more in different parts of the globe and in greater torrents than ever before. The cyclones, the hurricanes are waxing stronger and more ferocious, heat waves in many other parts where the effects are devastating, Polar ice caps are melting in greater dimension necessitating sea rise which in turn is submerging whole islands and threatening coastal communities in other parts, threatening human existence in those places.¹ More devastating incidents of severe droughts, often the highest in several decades, necessitating famine, displacements and deaths of the people affected who are mostly helpless. Forests and wildlife are not spared either (Climate Change Threats & Impacts 2011). The effects could be summarily limitless.

In consequence of these, no nation should be so privileged to constitute an unwarranted to other nations on the excuse of sovereignty or whatever. The Nigerian government should be implored by whatever means to find lasting solution to the gas flaring scourge attending its oil exploration, as a nation wholly dependent on its resources like the kingdom of Saudi Arabia. What more, it has far higher proportion of gas deposit than oil. It should see the need to implement and enforce its laws and policies regulating the industry, without affecting the responsibility of playing its own part financially, in the joint venture agreement or production sharing contract it is involved in with the transnational oil corporations within its domain, failing which these would never see the reason to stop flaring.

Above these, the status and sphere of influence of the UN Environment Programme (UNEP), should be enhanced to make more meaningful effects on climate change than it presently is. Efforts might be geared towards encouraging countries to combat climate change on regional groupings like in the enviable of the European Union, for better results, than on the uncoordinated individual countries efforts, yielding insignificant or no results outrightly.

NOTES

1. Koko toxic waste dumping incident by Gianfranco Raffaelli in 1987.
2. See S.9 of the Act.
3. See S. 3(2) of the Act.
4. Cap F10, Laws of the Federation of Nigeria (LFN), 2004.
5. See S. 37 FEPA Act, 1988.
6. See S.200 (1) of the Draft Bill.
7. See S.201 (1) of the Draft Bill.
8. See S. 277 (1), (2) and (3) of the Draft Bill.
9. See S. 275 of the Draft Bill.
10. The case of submerging Kiribati Islands and other small islands is instructive here.

REFERENCES

- Abah B., (2009), 'When Blessing Becomes a Curse in the Niger Delta,' Environmental Rights Action/Friends of the Earth Nigeria, Women in Action, No.2. 2009.
- Al Fathi S., (2012), 'Efforts Needed to Reduce Gas Flaring,' Gulf News at [gulfnews.com](http://www.gulfnews.com/business/opinion/efforts-needed-to-reduce-gas-flaring-1.959662). Also at <http://www.gulfnews.com/business/opinion/efforts-needed-to-reduce-gas-flaring-1.959662> . Accessed 17-09-2012.
- Aulakh R., (2014), 'Tunisia Embeds Protection of Climate in New Constitution,' The Star Online 1 February, 2014. Also at http://www.thestar.com/news/world/2014/02/01/tunisia_embeds_protection_of_climate_in_new_constitution.html . Accessed 23-06-2014.
- Bast E., et al., (2009), 'Shell Guilty TV Ads Launched to Hold Shell Accountable for Gas Flaring in Advance of Wiwa v Shell Trial,' Platform Online, June 2009. Also at <http://platformlondon.org/p-pressreleases/shell-guilty-tv-ads-launched-to-hold-shell-accountable-for-gas-flaring-in-advance-of-wiwa-v-shell-trial/> . Accessed 18-10-2013.
- BP Statistical Review of World Energy, June 2011. Available at www.bp.com/assets/bp_internet/globalbp/globalbp_uk_english/reports_and_publications/statistical_energy_review_2011/STAGING/local_assets/pdf/statistical_review_of_world_energy_full_report_2011.pdf
- Broere, W., 'The Elusive Goal to Stop Flares' Shell Word, sine die. Also at <http://www.ebooktake.in/view/ebook/aHR0cDovL3NpdGVyZXNvdXJjZXMud29ybGRiYW5rLm9yZy9JTIRHR0ZSL1Jic29lcmNlcy9zaGVsbF9mbGFyaW5nX2FydGJibGUucGRmW2J3b1lCeSBXZW5kZWwgQnJvZjIIFdvcmxkIEJhbmsgR3JvdXA> . Accessed 25-06-2013.
- Brown, O. and Crawford, A., (2009), 'Climate Change and Security in Africa: A Case Study for the Nordic-African Foreign Ministers Meeting,' International Institute for Sustainable Development, Winnipeg, 2009.
- Cocks, T., (2012), 'Refile- Nigeria Oil Bill to Outlaw Gas Flaring by End – 2012,' Reuters, May 28, 2012. Available at <http://www.reuters.com/article/2012/05/28/oil-nigeria-flaring-idUS>.
- Dada, B. T., (2012), 'Rate of Gas Flaring Now Over 22%- NNPC,' Leadership Newspaper, 29/06/2012. Also at http://www.leadership.ng/nga/articles/28487/2012/06/29/rate_gas_flaring_now_over_22%_nnpc/ . Site visited 20-09-2012.
- Donnelly J., (2007), 'Russia Tops Offender in Gas-flare Emissions: US Study Uses Satellite Images for Findings,' The Boston Globe, June 2007. Also at

- http://www.boston.com/news/world/article/2007/06/21/Russia_tops_offender_in_gasflare_emissions/ . Site visited 10-11-2011.
- EurActiv, 'Nord Stream Pipeline Feeds Europe's Natural Gas Dependence,' EurActiv.com, 10 October, 2012. Also at <http://www.euractiv.com/energy/nord-stream-pipeline-feeds-europe-analysis-515277> . Accessed 21-05-2014.
- Freestone, D. and Churchill, R. (Eds.), (1991), 'International Law and Global Climate Change,' London, Graham and Trotman.
- ICF International, 'Nigeria Carbon Credit Development for Flare Reduction Projects,' Guidebook, ICF Consulting Ltd. And Triple 'E' Systems Associates Ltd., June 2006.
- IGWE Godwin, 'Gas Transmission/ Distribution Challenges in Nigeria,' Business Day, 25 July, 2011. Available at <http://businessdayonline.com/NG/index.php/analysis/commentary/25060-gas-transmissiondistribution-challenges-in-nigeria> . Visited on 16-09-2012.
- Kaldany, Rashad, Opening Remarks at First Regional Forum on Flaring Reduction and Gas Utilization in the Middle East and Africa, Oil, Gas, Mining and Chemicals Department, World Bank, and Global Gas Flaring Reduction Steering Committee.
- KASICA Stephen Wayne, 'Tunisia Commits to Climate Change,' Outside Online, 14 February, 2014. Also At <http://www.outsideonline.com/news-from-the-field/Tunisia-Writes-Climate-Change-into-Constitution.html/>. Accessed 23-06-2014
- Key Data, 'Nord Stream Gas Pipeline (NGSP), Russia- Germany,' Hydrocarbons-technology.com. Also at <http://www.hydrocarbons-technology.com/projects/negp/> . Accessed 17-09-2012. See also, AL FATHI Murdock, H.,(2012), 'Nigeria Mulls Gas Flare Crackdown,' Voice of America, 03 July, 2012. Also at <http://www.voanews.com/content/Nigeria-mulls-crackdown/1360709.html> . Accessed on 16-09-2012.
- Saadallah, Efforts Needed to Reduce Gas Flaring, Gulf News at [gulfnews.com](http://www.gulfnews.com/business/opinion/efforts-needed-to-reduce-gas-flaring-1.959662), January 2012. Also at <http://www.gulfnews.com/business/opinion/efforts-needed-to-reduce-gas-flaring-1.959662> . Accessed 17-09-2012.
- Nain, C., (2012), Nigeria to Ban Gas Flaring by End of 2012, Oil Review Africa, Nain Charles Publishing, 31 May, 2012. Also at <http://www.oilreviewafrica.com/gas/gas/Nigeria-to-ban-gas-flaring-by-end-of-2012> .
- Onyeaso, N., (2011), 'Production Sharing Contract in the Nigerian Oil and Gas Sector,' Blackfriars LLP, HG Global Legal Resources, March 2011. Available at <http://www.hg.org/article.asp?id=21398> . Site visited 14/09/2012
- Orfao, A. et al., (2010), 'Angola LNG, Not Just Another Gas Project,' 2010. Also at [http://www.siteresources.worldbank.org/.../AngolaLNG\(articleIGU\)2010.pdf](http://www.siteresources.worldbank.org/.../AngolaLNG(articleIGU)2010.pdf). Accessed 22-08-2013.
- Owen, C., 'Shale Gas Flaring Cause of Re-Rise in Pollution- Report.' Also at <http://www.oilandgastechology.net/health-safety-environment-shale> - . Accessed 15-09-2012.
- Paramaguru, K., (2014), 'Tunisia Recognises Climate Change in its Constitution,' Time Magazine Online, 29 January, 2014. Also at <http://www.science.time.com/2014/01/29/tunisia-rcognises-climate-change-in-its-constitution> . Accessed 05-06-2014.
- Ploch, L., (2010), 'Nigeria,' Congressional Research Service Report for Congress,' June 2010.
- Pyagbara, L. S., (2007), 'The Adverse Impacts of Oil Pollution on the Environment and Wellbeing of a Local Indigenous Community: The Experience of the Ogoni People of Nigeria,' International Expert Group Meeting on Indigenous Peoples and Protection of the Environment, UN Department of Economic and Social Affairs. See also, Wikipedia, 'Petroleum Industry in Nigeria.' Also at http://en.wikipedia.org/wiki/Petroleum_industry_in_Nigeria . Accessed on 16-09-2012.
- Rios, M. and Neal, C., (2012), 'At A Glance, Global Gas Flaring Reduction,' The World Bank, March 2012. Also at <http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:21032487~menuPK:34480~pagePK:34370~piPK:116742~theSitePK:4607,00.htm> . Accessed 17-09-2012.
- Ross, M., (2003), 'Nigeria's Oil Sector and the Poor, Los Angeles,' 2003. Available at <HTTP://www.sscnet.ucla.edu/polisci/faculty/ross/NigeriaOil.pdf> .
- Slatter, R. et al., (2007), 'Climate Change, Agricultural Growth and Poverty Reduction,' Overseas Development Institute.
- Stirling, A. et al., 'A Framework for the Precautionary Governance of Food Safety: Integrating Science and Participation in the Social Appraisal of Risk,' in Fisher, E. et al. (Eds.), (2006), 'Implementing the Precautionary Principle: Perspectives and Prospects,' Cheltenham, Edward Elgar Publishing.

- Stockman, L. et al., (2009), 'Shell's Big Dirty Secret: Insight into the World's Most Carbon Intensive Oil Company and the Legacy of CEO Jeroen van der Veer, Shell Guilty Campaign: Oil Change International,' Friends of the Earth (International, Europe U.S. and The Netherlands), PLATFORM, and Greenpeace, UK.
- Svensson, B., Gas Flaring Worldwide- Policy and Regulation, Regional Forum, Oman. Also at http://www.menaflaringforum.org/docs/2-Bent_Svensson_OmanFinal.pdf . Accessed 12/09/2012.
- Tsung A., (2012), 'South Africa: ICJ Concerned by the Tragic Events at the Lonmin Mines,' August 17, 2012. Available at <http://www.icj.org/south-africa-icj-concerned-by-the-tragic-events-at-the-lonmin-mines/> . Site visited 11-10-12.
- Udosen, C. et al., (2009), 'Fifty Years of Oil Exploration in Nigeria: The Paradox of Plenty,' Global Journal of Social Sciences, Vol.8, No.2, 2009.
- U.S. Energy Information Administration, 'Nigeria,' August 2011. Available at <http://www.eia.gov/countries/cab.cfm?fips=NI> . Site visited 16-09-2012.
- Warn, E., 'Adaptation, Adaptation, Adaptation; Migration, Climate Change and National Adaptation Plans in South America,' Inter Cambio Climático, 20 November, 2013. Also at <http://www.intercambioclimatico.com/en/2013/11/20/adaptation-adaptation-migration-climate-change-and-national-adaptation-plans-in-south-america/>. Accessed 05-06-2014.

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:
<http://www.iiste.org>

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: <http://www.iiste.org/journals/> All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: <http://www.iiste.org/book/>

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digital Library, NewJour, Google Scholar

