

## CHALLENGES OF SUSTAINABLE NATIONAL DEVELOPMENT FROM THE PERSPECTIVE OF ENVIRONMENT AND ENERGY RESOURCE UTILIZATION

<sup>1</sup>Chukwu Oghenekome & <sup>2</sup>Salami Hope Edore  
<sup>1&2</sup>*Department of Geography College of Education Warri*

### Abstract

Natural resources and endowments which are environment based underpin livelihood. These resources due to consumption and production patterns are become degraded and unsustainably used. Sustainable national development will require judicious use of natural resource, efficient energy exploitation, production and utilization to minimize environmental impacts such that development of future generations is not compromised. This paper reviews the challenges of sustainable development in Nigeria in terms of the environment, impacts natural resource use, energy production and utilization.

**Keywords:** Environment, Natural Resource Exploitation, Energy Utilization, Sustainable Development.

### Background to the Study

About 60% of the world's major ecosystem goods and services required for livelihoods have been degraded or used unsustainably (IMF, 2006). Essentially the economic growth of recent decades resulted from increasing consumption and production patterns, drawing down on natural resources while leading to widespread ecosystem degradation and widening inequity gaps. Another key factor which is a drawback to achieving sustainable development is climate change. Climate change scenarios have change the magnitude and frequency of some extreme weather, increasing the length, frequency and intensity of heat waves, flooding, droughts, intense tropical cyclones, rising sea levels and loss of biodiversity. These hazards accordingly, increase vulnerability to disasters and result in widespread human, material, economic and environmental losses (Anderson and Strecker, 2012).

In Nigeria, the associated issues of climate change environment degradation, energy resource production and utilization is undermining national development in terms of food security, poverty eradication, biodiversity conservation, worsening socioeconomic tensions with widespread implications for migrations, stability and security at local, regional and national levels.

Energy has a major impact on every aspect of our socioeconomic life. It therefore plays an important role in the economic, social and political development of our nation. Inadequate supply of energy restricts socio-economic actions limits economic growth and adversely affects the quality of life. Oyedepo (2013) further posited that improvements in standards of living are direct fallout of increased food production, increased industrial output, the provision of efficient transportation, adequate shelter, health care and other human services. Sustainable energy use and cautious exploitation of environmental resources is at the basis of sustainable national development.

### Objective of the Study

The objective of the paper is to review energy and environmental resource exploitation and the challenges it pose to sustainable national development.

### Challenges of Climate Change

Climate change poses one of the most serious challenges to achieving sustainable development. The associated hazards resulting from climate change increase vulnerability to disasters and result in widespread human, material, economic and environmental losses. These impacts will increase in the future and are exacerbated for poor people and countries with limited resources for adaptation (IPCC, 2007). The effects of climate climate-related changes are severely undermining food security, efforts to eradicate poverty, and other existing pressures on the societies over the long-term, these effects, combined with factors such as population pressure, are likely to lead to environmental degradation and loss of biodiversity. The challenge facing humanity is to sustain the process of poverty eradication and development while shifting gears so as to avoid greater damage to our environment, including from climate change.

Anderson and Strecker (2012) are of the opinion that developed countries must preserve development achievements while focusing on sustainable development and shrinking environmental impacts. On the other hand, developing countries like Nigeria must continue to raise their people's living standards and eradicate poverty while containing increases in their ecological footprint. Within the sub-Saharan region, Nigeria has to contend with the various environmental problems, particularly the encroaching desert from the north and coastal inundation from the south. Eleven out of the thirty-six states in the country referred to as the "frontline state" are gradually being swallowed by desertification, while sea level rise is slowly 'eating – away' the eight coastal states. These are states where the impact of climate change is expected to be severe because it will exacerbate environmental degradation.

Between 1983 and 1993, Nigeria lost 20% of its forests and woodland areas. In northern Nigeria, especially Sudan Sahelian region, where desertification is a key environmental problem, droughts

have been re-occurring for the past three decades thereby affecting food security and increasing dust pollution. The country's annual losses stemming from environmental degradation (combating land degradation, deforestation, drought and desertification, loss of biodiversity, flooding, erosion, urban decay and municipal waste disposal and the adverse effect of climate change) adds up to approximately US \$ 5.1 billion (Okhimamhe, 2008).

IPCC (2007) reported that most of the observed increase in globally averaged temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations. It is also widely recognized that although climate change, impacts will affect all countries, the poor will be disproportionately affected. Their reliance on local ecological resources, coupled with existing stresses on health and wellbeing and limited financial, institutional and human resources leave the poor most vulnerable and least able to adapt to the impacts of climate change. In Nigeria, Table 1 shows the likely socioeconomic consequences of climate change and environmental degradation in Nigeria.

Table 1: Socioeconomic Consequences of Climate Change and Environmental Degradation

Environmental Problem	Environmental Consequences on Agriculture /Food Security, Biodiversity, Water Resources	Socioeconomic Consequences
Flooding	Washes away and submerges farmlands, crops and animals; contaminates water as during each flooding event, water takes about 40 days to recede.	Increases cost of food stuff and fish; men embark on temporary migration for off farm jobs and leave the women and the aged to care for the family; drinking water is affected causing diarrhea and cholera.
Erosion	Washes away top soils and causes damage to buildings and farmlands.	Increase cost of available land; scarcity of land for farming; and grazing land.
Drought	Destroys crops and livestock; reduction of vegetation cover; causes water scarcity (quality and quantity) etc.	Increase cost of foodstuff and fish; leads to occasional purchase of water from Mairuwa (male water hawkers).
Desertification	Deposits sands on farmlands, accumulating as dunes; and kills animals.	Reduction in arable land for farming.
Deforestation	Removal of trees, exposure of top soil to erosion by both wind and water; destruction of quality and quantity of biodiversity (e.g. plants and animals).	Scarcity of fuel wood such that women have to purchase from neighbouring villages; or trek for longer distances into bushes rising life and increasing fatigue.
Overgrazed land	Exposes top soil to erosion, degrades pasture land and destroys fertile farmlands.	Exposure of soils to further degradation, abandonment by farmers as the land becomes infertile, use of fertilizer makes farming expensive.
Windstorm	Blows top soils away, uproots plant and destroys buildings.	Increases incidence of cardio - respiratory illnesses due to wind laden fine dust particles as storm may last for hours.
Heat wave	Dries up shallow water bodies.	Exhaustion reduces hours spent on productive activities; increases cost of water.

Source: Julia and Okhimamhe (2009)

### Energy and Sustainable Development in Nigeria

Energy production and utilization is intricately connected to the level of productivity in the industry, commerce, or agriculture and other business activities. Energy consumption is also a benchmark for measuring the standard of living of a people or nation. Energy demand is measuring in terms of producing more products, travel and comfort. Common energy sources in Nigeria are coal, petroleum, natural gas, nuclear fuels, biomass etc. The mostly widely use are the hydrocarbon compounds or fossils fuels which account for more than 80% of global primary energy consumption (Awwad and Mohammed, 2007). Fossil energy usage has become a worrisome issue in the past years and there has been growth awareness and an increase in taking responsibilities in preventing environmental pollution by minimizing energy waste. Energy is a key factor to economic development worldwide, however sourcing, production and utilization has two major drawbacks. The overall energy system has been very inefficient with major environmental and social problems at local and global associated with it (Oyedepo, 2012).

Climate change and external environmental problems associated with energy consumption is a major international concern. This is usually associated Green House Gas (GHG) emissions. Mitigating GHG emission can help reduce climate change problem. This can be achieved through change problem. This can be achieved through improving energy efficiency in the industrial sector, reduction in gas flaring and exploitation of renewable energy options. Nigeria is well endowed with abundant fossil fuels and other renewable energy sources. The energy mix which includes both conventional and non-conventional sources and reserves is shown in the Table below;

**Table 2: Conventional and Non - Conventional Sources of Energy in Nigeria**

Resources	Reserve	Reserve/Energy units (billion tones)
Crude oil	23 billion barrels	2.138
Natural gas	4293 billion m <sup>3</sup>	3.679
Coal and Lignite	2.7 billion tone	1.882
Tar sands	31 billion barrels of oil equivalent	4.216
Hydropower	10,000 MW	
Fuel woo	43.3 million tones	1.6645 (over 100 years)
Animal waste and crop residue	144 mil lion tones	3.024 (over 100 years)
Small scale hydropower	734.2 MW	0.143 (over 100 years)
Solar radiation	Land areas (Perk)	
Wind	2.0 – 4.0 ms <sup>-1</sup>	

Source: Enete and Alaba (2011)

The energy situation in Nigeria shows lack of structure and improper management in such a way to ensure sustainable energy development especially in the industrial sector. Nigeria is presently experiencing energy crises due to poor resource and financial management, a crippling dependence on imports particularly second-hand goods built with out-dated, inefficient technology. Therefore as a nation that has limited technological capacity but sees industrialization as constituting a crucial leverage and pre-condition for meaningful development, Nigeria should judiciously manage her scarce energy resources (Eleri, 1995; Oyedepo, 2012).

Energy drives all forms of economic activities and is central to sustainable development. Energy is also a critical factor of production in terms of producing goods and services needed for growth and poverty reduction. The energy sector in Nigeria is still characterized by the widespread use of ecologically and economically questionable private diesel generators which account for over 50% of the active generation capacity. The negative consequences are high cost of electricity to business owners/consumers with environmental impact on the society. These in turn portend danger to sustainable economic and social development in the country while negatively impacting on environment and poverty reduction.

Oyedepo (2014) is of the opinion that the use of renewable natural resources combined with efficient supply and use of fossil fuels with cleaner technologies, can help reduce the environmental effect of energy use and help Nigeria grow her economies while also replacing existing, inefficient polluting fossil technologies that pollute the environment. In addition, careful management of energy resources is important to promote economic growth, protect ecosystems and provide sustainable natural resources.

Energy utilization efficiency and sustainability involve the sustainable use of energy in the overall energy system. This includes processes and technologies for harvesting of energy sources, their conversion and the utilization of energy to provide energy service such as operating communication systems, lighting buildings and cooking. Energy sustainability which is at the centre of economic, industrial and overall national development implies sustainable energy system i.e. Systems that use sustainable energy resources and that process, store, transport and utilize these resources sustainably.

Renewable energy and technologies have immense potential to provide solutions to the current energy dilemma confronting the nation. Promoting a diffusion of renewable energy can aid sustainable development. Importantly, depending on fossil fuel (petroleum and natural gas) will not totally complement the energy needs of the country. Since Nigeria is blessed with vast renewable energy resources such as hydroelectricity, solar, wind, tidal and biomass, there is need to harness these resources to meet the increasing energy demands of the nation. In this regard, the

government has a responsibility to make renewable energy technologies available and affordable to all.

### Energy Use Efficiency and Sustainable Development

Sustainable energy can be defined as energy which provides affordable, accessible and reliable energy services that meet economic, social and environmental needs within the overall developmental context of society, while recognizing equitable distribution in meeting those needs. This will require new approaches in the mobilization of energy resources for development involving a shift to renewable energy sources; development and wide dissemination of sustainable energy technologies; energy efficiency and conservation; and technological developments that allow the use of fossil fuels in a cleaner way (Tsighe, 2001; Oyedepo, 2014).

### Conclusion

Sustainable development is generally viewed as development that meets the present needs, goals and aspirations of the population without compromising the ability of future generations to meet theirs. It requires that the production and use of energy should not endanger the quality of life of current and future generations; should not exceed the carrying capacity of ecosystems as well as limit climate change impacts.

Furthermore, this will involve a deliberate shift towards the exploitation of renewable energy options, use of new technologies with better energy performance, energy efficiency and reduced dependence on fossil fuels consumption.

### Recommendations

To surmount the increasing challenges of sustainable national development a number of actions will be necessary and should include the following;

- 1 Provide education and awareness on climate change issues and sustainable development;
- 2 Draw on the various global funds and resource to reduce vulnerability, increase adaptation and enhancing coping capacity to hazards associated with climate change scenarios.
- 3 Create and implement appropriate policy to regulate the utilization of renewable energy in Nigeria.
- 4 De-emphasize the use of fossil fuels, while investing considerably both in renewable energy options and clean technologies.



## References

- Anderson, A. & Strecker, M. (2012). "Sustainable Development" A case for Education. Available at: <http://www.environmentmagazine.org>.
- Awwad, A.A. & Mohammed, A.A. (2007). "World Energy Roadmap" Perspective; WEC 2007 Energy Future in an Interdependent World.
- Eleri, E.O. (1995) "Nigeria Energy for Sustainable Development" Journal for Energy & Development, 19(1):104.
- Enete, C.I. & Alabi, M.O. (2011) "Potential Impacts of Global Change on Power & Energy Generation" Journal of Knowledge Management, Economics & Information Technology, 6: 1-14.
- International Monetary Fund, IMF (2006) "World Economic Outlook Database" Washington DC, <http://www.imf.org>.
- IPCC (2007) "Impacts, Adaptation & Vulnerability" Contribution of working group II to the IPCC Fourth Assessment Report. Parry, M.L., Canziani, O.F., Palutikof, J.P., Vander Linden, P.J. & Hanson, C.E. (eds). Cambridge: Cambridge University.
- Julia, A. & Okhimamhe, A.A. (2009) "Gender & Climate Change in Nigeria" a study of four communities in North-Central & South-Eastern Nigeria. Available at: [www.bvellnigeria.org](http://www.bvellnigeria.org).
- Okhimamhe, A.A. (2008) "Current Vulnerabilities & Latest Adaptation Strategies" Nigeria Situation as it Relates to Women in Climate Change (First Lady Initiative). A paper presented at the awareness workshop on the challenges of climate change adaptation & sustainable livelihood, organized by the Federal Ministry of Environment, Housing & Urban Development (FMEHUD) in collaboration with the Heinrich Böll Foundation on the 25 – 28 June 2008, Shukura Hotel, Sokoto.
- Oyedepo, S.O. (2012) "On energy for sustainable development in Nigeria" Renewable & Sustainable Energy Reviews, 16: 25-83.
- Oyedepo, S.O. (2014) "Towards achieving energy for sustainable development in Nigeria" Renewable & Sustainable Energy Reviews, 34: 255-272.
- Tsighe, Z. (2001) "Opportunities & constrains for sustainable energy in Eritrea" In: Oyedepo, S.O. Energy in Perspective of Sustainable Development in Nigeria. Sustainable Energy, 2(1): 14-25.