

The Impacts of Energy Extraction on the Environment in Southern Nigeria

Suleiman Iguda Ladan
Department of Basic and Applied Sciences
Hassan Usman Katsina Polytechnic Katsina
Katsina State, Nigeria

ABSTRACT

Concerns about the impact of extraction of energy sources on the environment are one of the major challenges facing both developed and developing countries in contemporary times. In the developing countries in particular energy extraction from the environment without degrading the environment has become a difficult task and energy is a key ingredient for the development of all sectors of the economy of any nation. Data for this research were generated through field surveys and observations made through visits to the region and descriptive analysis were used to analyze the data. The results indicate that the geographical region of southern Nigeria is well endowed with energy sources which include crude oil, coal/lignite and biomass energy resources. However, over the years the extraction of these energy sources has brought about negative impacts on the environment such as deforestation, gas flaring, oil spillage, forest fires, destruction of the natural landscape and vegetation. These negative impacts have over the years led to host community discontent, kidnappings, hostage taking and violent militancy action particularly in the Niger Delta region which has affected oil production and energy supply to the other parts of Nigeria. It is therefore recommended that conscious efforts should be made to minimize the impacts on the environment and the people to accelerate the pace of development of the region and the nation at large.

Key words: Impact, energy extraction, environment, southern Nigeria

1. INTRODUCTION

Energy and the environment posed major scientific and technological challenges for 21st century. New technologies for increasing the efficiency of harvesting and utilizing energy resources are essential to a nation's economic competitiveness. At the same time the quality of life depend inherently on the environmental impact of energy production and utilization. The interdependence makes it imperative to develop a better understanding of the environment and new strategies for minimizing the impact of energy-related activities^[1].

Energy is required by human beings for cooking, lightening, heating, cooling etc in our homes. It is required to move locomotive engines and transport goods. It is required to run machines and all forms of mechanical equipment to speed up the execution of work and to run industries^[2]. Energy is fundamental to the quality of life on the earth. It is a key ingredient in all sectors of modern economies. Man is totally dependent on an uninterrupted supply of energy for living and working. Meeting the growing demand for energy sustainably is one of the major challenges of the 21st century^[3].

The environment is where energy sources are obtained by man to satisfy his needs. There is thus strong interaction between energy and the environment. This paper is aimed at examining the energy-environment interaction using southern Nigeria as case study.

Southern Nigeria was a British Protectorate in the coastal areas of modern day Nigeria formed in 1900 from the union of the Niger Coast Protectorate with territories chartered by the Royal Niger Company below Lokoja on the River Niger^[4]. Today southern Nigeria is a geographical region of Nigeria that is made up of seventeen (17) out of the thirty six (36) states that comprise the Federal Republic of Nigeria. The region covers about forty percent (40%) of Nigeria's land area of 928,800 square kilometers. It is a populated region, based on the 2006 National Housing and Population Census; the states have a population of 64,403,577 representing 47.03 per cent of the total population^[5]. The region is the economic hub of Nigeria that contain mineral resources such as petroleum, natural gas, coal, limestone etc and over 60 per cent of Nigeria's industries are located here. These plus the import-export trade and seaports located in Lagos, Port Harcourt and Calabar.

2. ENERGY SOURCES EXTRACTED IN SOUTHERN NIGERIA

Nigeria has variety of energy sources that are utilized for various purposes. Some of these sources are found in the southern part which includes crude oil, coal/lignite and biomass.

Crude Oil

Crude oil production in Nigeria is entirely based in the southern part. Nigeria is the 12th largest producer of petroleum in the world and the 8th largest exporter and has the 10th largest proven reserves^[6]. In the south, the Niger Delta region is the main oil producing region, hosts the world's 10th largest reserves at about 25 billion barrels with a daily average production of over 2 billion barrels. The region has the capacity to increase the reserve to 30 billion barrels per day and production of about 4 billion barrels per day^[6]. The exploration of the crude oil is managed by multi-national companies with the Nigerian National Petroleum Corporation (NNPC). There are four refineries, three of which are located in the southern region. The distribution of petroleum products is done by pipelines buried underground mostly within the southern region^[7]. There are also about 1,100km of various diameters of gas pipelines including the Lagos-Escavos Gas pipeline, spread across the east and the west of the southern part of the Niger River, with an extension up to Ajaokuta^[7].

The crude oil refined in the refineries plus some imports and are used for domestic consumption and the same applies to the gas. Besides the petroleum and natural gas that are used to generate thermal electricity at Okpai, (Delta State), Egbin (Lagos State), Afam (Rivers State).

Coal and Lignite

Coal is a major source of energy and it has played an important role in Industrial Revolution in Europe and North America. In Nigeria coal was first discovered in 1909 and further detailed survey indicate reserves in Enugu, Afukpo, Okaba, Orukpa etc all in the south^[8]. Sub-bituminous coal is the major type of coal found in Nigeria. It is important as a fuel because it burns slowly and provides a lot of heat. The coal reserves in Nigeria are estimated to be in excess of 2.5 billion tones^[8]. Coal deposits are found in the southern states of Anambra, Cross River, Edo, Enugu, Imo and Ondo. The Nigerian government monopoly on the mining of coal is among the reasons for the decline in production over the years. Coal is still used as fuel for locomotive engines, industries and homes. It is also used to generate thermal electricity at Oji River near Enugu^[9]. Nigeria like many other countries is exploring the avenues to use coal for electricity generation to augment supplies from other energy sources.

Nigeria still holds large coal reserves, estimated to be at least 2 billion metric tons. The discovery of bituminous coal suitable for use in coke production for the iron and steel industries opens up potential new domestic markets^[9].

Biomass energy

Nigeria as a whole has abundant biomass energy resources. The availability of biomass resources follows the pattern of the nation's vegetation. The main forest in the south generates the highest quantity of woody biomass^[10]. In Nigeria, 20 percent of the land area is covered by forest vegetation which is entirely found in the south. There are three types of forests in the south which are salt water swamp, fresh water swamp and high forests. These vegetation types generate a variety of trees which include mangroves, Mahogany, Raffia palm, Iroko, Obeche, Palm trees etc. There is high demand for fuel wood for use in households for cooking and for cottage industrial activities. According to the National Bureau of Statistics in 2005, 69.98 per cent of the population use fuel wood for cooking and heating. Other sources of biomass energy come from agricultural residue and municipal solid wastes. In the south, with large percentage of the population engaged in agriculture, crop residues are abundant. Also the south contain very large cities such as Lagos, Ibadan, Enugu, Port Harcourt, Calabar, Aba etc. that generate a large quantity of municipal solid wastes. There are also saw dust and wood wastes that are also other important biomass resources associated with the timber industry that are used in the southern part.

3.IMPACTS OF THE EXTRACTIONS OF THE ENERGY SOURCES ON THE ENVIRONMENT

The various energy sources are extracted from the environment and these extractions have consequences on the environment in southern Nigeria.

Crude oil extraction

Crude oil extraction in Nigeria has over the years been associated with massive negative consequences on the environment of the Niger Delta and the surrounding areas which has led to community discontent and violent

militancy action. These consequences can only be highlighted in this paper in view of the large literatures and studies on the region.

Prospecting for oil has resulted in the deforestation of swampy and marshy areas along the coast in the Niger Delta region which has adversely affected the local biodiversity of the region. The variety of plants and animals of the region have virtually disappeared as a result of oil exploration.

Gas flaring associated with crude oil when it is pumped up from the ground. Gas flaring not only wastes a potentially valuable source of energy (natural gas), it also adds significant carbon emissions to the atmosphere. Moreover, flaring combustion is typically incomplete, releasing substantial amount of soot and carbon monoxide which contribute to air pollution problems^[12]. The heat produced as a result of gas flaring is a source of thermal pollution as the burning gas increases the temperature of the local environment there^[13].

The most easily observed effects of gas flaring on the environment is the reduction in visibility produced from the scattering of light emanating from the surface of air-borne particles. People living in areas where gas is flared do not see clearly compared to those residing far away from flaring zones^[13].

Oil spillage which routinely occurs in the Niger Delta region releases barrels of oil into the land swamp, estuaries and coastal waters. Example Goi Trans Niger pipeline oil spill in 2004. In 2008 also Royal Dutch Shell pipeline spill a lot of oil into the environment of Bodo town in the Niger Delta and up till today (2013) the local plants and wildlife are dying.

The oil spill kills aquatic animals in the riverine and coastal areas of the Niger Delta. Recently the people of Idjerhe in Ethiopia West local government area of Delta State claimed that they have lost fish ponds worth N445 million to the pollution of River Ethiopia through the activities of NNPC^[14]. Besides this, the oil spill also cause land pollution which resulted that farmers could not use their farmlands to grow crops.

In the oil producing region pipelines buried underground sometimes contain refined petrol and local people break the pipelines to scoop fuel for sale. This has resulted to disastrous fires that burn the people and set up forest fires in the locality. These fires not only consume a lot of forest vegetation and wildlife but also release carbon dioxide (CO₂) into the atmosphere. Examples are many and they include the 1998 Jesse, Delta State wildfire, the Onitcha-Aneyi fire of 2004 and the Lagos pipeline fire of 2010^[15].

Coal/Lignite Extraction –

The extraction of coal/lignite involves digging of underground tunnels in order to obtain the coal that occurs in layers called 'seams'. This results in the destruction of the plant cover and the soil profile becomes disrupted. The coal mining area generally suffers from environmental degradation which if not properly managed can spark off host community discontent^[8]. This besides the health and safety risks of the miners working in such an environment.

A common negative impact of coal mining on the land surface is the destruction of the natural landscape, creating open spaces in the ground and generating heaps of rock wastes that cannot be easily disposed of. This can be seen in the coal mining areas of Enugu, Okaba and Afikpo to mention a few^[16].

Beside the land, the vegetation of the mining area has suffered destruction during the exploration and exploitation in localities of coal mining whether the old or relatively new mines. The vegetation damage is more extensive at the time of mine development and mining operations and is more expansive when crop plantation is affected^[16]

The use of coal to generate thermal electricity as in Oji River site near Enugu causes generation of huge quantities of fly ash waste. This beside emitting air pollutants like particulate matter and poisonous gases such as sulphur dioxide, nitrogen dioxide and other gases.

Fuel wood Extraction –

The high usage and demand for fuel wood has resulted in the cutting of many trees in the forest region of the southern part of Nigeria. In the south, many areas that once had forest vegetation have only derived savannah vegetation today due to many years of deforestation. In particular, the area between the River Niger and the Cross River has seen its forests more or less disappear to be replaced by grasslands mainly due to incessant cutting for fuel wood.

With depleting natural wood reserves, women and children have to travel as far as six kilometers to collect wood, sometimes fresh trees are cut down and allowed to dry for harvest as fuel wood thus putting further pressure on the vegetation^[10]. The deforestation is expected to increase if no special programme is put in place to discourage the use of fuel wood, promote the use of alternatives and replenish through deliberate afforestation and fuel wood lots. This has grave implications for sustainable environment of the low income households who depend on fuel wood^[10].

The burning of fuel wood for domestic energy produces a lot of air pollution and the smoke affects the users eyes and lungs when inhaled, this have serious negative impact on the personal health and wellbeing of many women in Southern Nigeria

4. CONCLUSION

Energy sourcing from the environment is today inevitable part of economic growth, development and human welfare. However the case in southern Nigeria is one in which the environment has suffered various forms of degradation which has generate discontent and violent reactions from the host communities particularly those in the Niger Delta. Recently one of these communities has decided to take their case to the courts of the United Kingdom.

There is the need to minimize the problems associated with energy sourcing from the environment and its negative consequences on the people. The government should impose the legislation required to make it mandatory for the companies to practice all necessary precaution in their operations that will prevent or minimize environmental damage. Besides this special programme should be put in place to discourage the use of fuel wood, promote the use of alternatives and restore the lost forest cover through reforestation and afforestation thereby improving the environment.

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