DEFORESTATION AND CLIMATE CHANGE IN THE NIGER DELTA: EXAMINING THE ROLE OF ENERGY POVERTY

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Abstract

Mainstream analyses of causal factors of climate change in the Niger Delta are dominated by arguments on oil industry-related climate-unfriendly causes (oil spills from facility failure and gas flaring), and community actions (facility sabotage, oil theft, illegal refining, and timber logging). While these arguments are valid, they overlook the place of energy poverty and how it contributes to climate change. Households in the region's mostly rural and riverine areas with no access to energy for their basic daily energy needs continue to rely on the rainforests and mangrove forests for their energy supplies. The continuous exploitation of trees and undergrowth for energy results in gradual and steady depletion of the forests and change in climatic conditions. Depleting forest areas means less forest cover and easy discharge of dangerous gases into the atmosphere. With efforts ongoing to tackle climate change in the Niger Delta, this paper seeks to spotlight the energy challenge by asking key questions: How successful can these efforts be if the prevalent energy poverty in the region is not addressed? Is deforestation for energy purposes receiving as much attention as other climate change concerns in the region?

Keywords: Energy Poverty; Climate Change; Deforestation; Fuel Wood Consumption; Biomass; Renewables.

Introduction

It is well documented that poor access to modern energy in Nigeria is largely responsible for slow economic development and poverty in the country (Social Action, 2009, p.3). Since the majority of Nigerians are energy poor, access to energy has for decades been an issue of concern in the country. Ayo (2013), for example, notes that stable electricity supply is the number one public utility Nigerians have demanded from successive government administrations – this highlights the continued significance of energy concerns in the collective consciousness of most Nigerians.

According to Ewah, Okechukwu and Precious (2012), only 40% of Nigerians are connected to the National Grid, and over 60% depend on firewood for cooking. This, they say, is due to failed investments in electricity generation and distribution from one government administration to another.

Ewah et al (2012, p.4) noted that:

...An estimated 72% of Nigerians depend solely on wood as a source of fuel for cooking Deepening poverty has forced a reversal in the transition to modern and efficient energy forms. Today, more Nigerians are climbing down the energy ladder - moving from electricity, gas and kerosene to fuel wood and other traditional biomass energy forms.

Despite the huge amounts declared to have been invested by the government, statistics on energy access and usage continue to show a disturbing decline. This decline has come with increasing poverty as homes and businesses spend too much on self-generation. A significant number of businesses collapse every year due to lack of power (Femi, 2014). The country currently produces about 4000MW of electricity. This is grossly inadequate for a country whose energy need has been put at 200,000MW (Daily Independent, 2013; The Punch, 2014).

The federal government of Nigeria in November 2014 approved contract for the procurement of 750,000 units of clean cooking stove and 18,000 wonder bags (a portable nonelectric eco-friendly cooker) for energy poor households to discourage the use of fuel wood (Vanguard, 2014). The aim, according to the government, was to provide 20 million stoves in five years (4 million each year). This expensive undertaking is further proof of the disturbing energy situation in the country.

A typical poor Nigerian household spends a minimum of N1,000 per week on fuel to generate their own power, while small businesses and corner shops spend at least N1,500 per week (Allison, 2014). What they spend on generating their own electricity takes a significant portion of their meagre income as most of the homes and businesses make monthly returns below the N18,000 national minimum wage (Allison, 2014). This situation requires an intervention that will differ radically from previous failed efforts and ensure more households and businesses begin to access power from the national grid and clean alternative sources.

The Niger Delta region of Nigeria is a quintessence of energy poverty. Despite its huge oil and gas resources, not more than 30% of its over 21 million population have access to modern energy (Living Earth Foundation, [n.d]; National Population Commission, 2006). Access to a significant number of towns and villages is by water - an excuse put forward by government for the poor infrastructural development and failure to extend national electricity infrastructure to the region. The majority of the people cannot afford modern alternative energy because of mass poverty (Amnesty International, 2011).

Although there have been attempts to increase access to energy in the region, most of the efforts have failed for not being pro-poor (Ewah., et al, 2012). This is to say that whilst provisions are being made for alternative energy supplies, the costs are prohibitive for low-income households. Nonetheless, the demonstration of solar and renewables as alternative energy sources¹ have shown promise and indicated that steps are being taken in the right direction. However, the success of these innovations hinge upon huge capital investments and government subsidies because otherwise, low-income households will fail to benefit from these new innovations due to the enormous cost barriers. As a result of the continuing challenge of gaining access, the quest to satisfy daily energy needs, especially lighting and powering appliances has resulted in illegal oil refining, a development that has devastated a significant amount of forests through bush fire and pollution.

In separate initiatives, Songhai Farms, and IIED (through its SUNGAS project) have tried these alternatives in Rivers and Bayelsa States. The pilot cases have been successful but government and private sector willingness to look in the direction of alternatives is a key concern. Reasonable investments will help make modern off-grid energy accessible to the people. In analysing research on the causes of climate change in the Niger Delta, it became clear that there is a tendency to focus on carbon emissions from oil exploitation. Large-scale gas flaring by the multinational oil companies in the region is widely agreed to be a major contribution to climate change (Nasiru, 2011; Newswatch Times, 2013; Sawhney, 2013). Also emphasized is illegal oil refining, oil theft and associated environmental impacts (Stakeholder Democracy Network (SDN), 2013, 2014). Other contributing factors appear not to be given enough weight or completely ruled out. As a result, much of the efforts have focused on incrementally reducing gas flaring, curbing oil theft and illegal refining.

While it is sensible to consider these factors when discussing climate change, ignoring areas outside the extractive industries leaves gaps in our understanding of climate change and as a result, in the

proposed solutions for tackling climate change in the Niger Delta. We need a more comprehensive understanding in order to present functional solutions. Thus, when discussing climate change in the Niger Delta, we ought to consider deforestation in the region as a significant contributor to the changing climate. With the above considerations, this paper argues that energy poor people in the Niger Delta region are forced to resort to the forests for their daily energy needs and are thus contributing to the gradual depletion of large forest areas. This practice reduces the forest cover and carbon sequestration capacity in the region. With the prevailing challenges to access grid power, increasing access to alternative energy will reduce deforestation for purposes of energy and complement other efforts of tackling climate change in the Niger Delta.

Analytical Framework

In addressing deforestation and climate change in the Niger Delta, this paper adopts the Energy Poverty analytical approach. It defines being energy poor by the minimum energy consumption needed to sustain life and whether it is accessible, and if so, whether it is adequate. Like the income poverty framework, the approach lays down energy thresholds by rationalizing that there are points in human lives when energy is essential. For example, we have to consider that energy is required by people to cook their food, get heat for their homes, and is essential for the provision of minimum level of lighting from dusk to dawn (Douglas, Shahid & Samad, 2013).

Basic tasks here include powering appliances for cold or hot storage, powering equipment necessary for obtaining basic information (television, radio, phones), lighting for reading and eating in the evening. It is expected that a rise in income will increase energy consumption if energy is accessible. It, therefore, means that absence or short supply of modern energy for the basic needs of cooking, warmth, lighting, and essential energy services as well as income generation establishes a case of energy poverty (International Energy Agency (IEA, 2010); Practical Action, 2009).

The framework is preferred because it sets clearly the energy poverty line, that is, when energy for basic needs is either absent, inadequate or unaffordable (Ben & Auta, 2012). Households and businesses that cannot use energy for any of these reasons are in effect energy poor. To fulfil their basic energy requirements, especially for cooking, the energy poor are compelled to rely on biomass, particularly fuel wood. The wood used as substitute for fuel due to the lack of conventional grid energy tends to come from wood logging in the local forests. It has been well documented that the prolonged harnessing of the forest reduces forest caps, which in turn contributes to climate change.

Access to Energy and Climate Change Concerns in the Niger Delta

An Energy Poor Region

By geography, the Niger Delta region is comprised of six southern Nigerian states of Akwa Ibom, Bayelsa, Cross River, Delta, Edo, and Rivers. There is, however, also a political definition of the region that includes the eastern states of Abia and Imo and the western state of Ondo. In both the geographical and political categorisation of the Niger Delta, the region is notable for its huge oil and gas resources. This paper looks at the Niger Delta through the geographic lens because the region is not defined just by oil, but by the abundance of rain forests, mangrove forests, swamps, rivers and rivulets traversing the landscape.

The presence of oil in the region is an added wealth to the rich ecosystem. However, in spite of its enormous resources, access to modern energy is poor in the Niger Delta as is general infrastructural

development. As had earlier remarked, government's excuse for the unacceptable rate of development in the region is that its terrain makes development difficult, and sometimes, impossible. What this means is that while access to energy is generally poor nationwide, it is arguably worse in the Niger Delta.

There is the argument that in the midst of the region's energy woes lays a solution - the conversion of incessantly flared gas to useable energy (Social Action, 2009; Living Earth Foundation, [n.d]). This may have inspired some Gas to Power initiatives like the Bonny, Egi, and Gbarain-Ukubie cases in Rivers and Bayelsa States. As successful as some of the initiatives have been, they have only impacted a fraction of the region's energy poor people. Efforts to expand and replicate them have been slow and unpromising because of government's poor commitment to electrification, and private investors' scepticism about the commercial viability of energy investments in the region.

In recent years, with the support of foreign governments and international donor agencies, some investments had been made to research and develop solar and renewable energy alternatives for the region's energy poor. Some pilot studies carried out had shown that there is a strong appetite for these alternative energy sources (SDN, 2011). These alternatives can overcome the challenges of erecting long distance power lines from points of generation to points of consumption, a reason advanced for why grid power cannot be accessed easily in the region.

Renewable alternatives can be delivered in small to large scale from individual homes and businesses, to cluster of homes, and a cluster of contiguous communities. However, we found that sustainability concerns due to mass poverty and lack of capacity to pay huge tariffs remain the strongest barrier to short and long term access to these alternative energy sources. These concerns were prominent and need to be taken seriously in the effort to eradicate energy poverty in the region.

Deforestation for Energy

Poor access to modern energy leaves the majority of the people, particularly those in the rural areas with no choice but to harness the forest to satisfy basic energy needs. A substantial part of forests rain and mangrove forests in the Niger Delta have been depleted through fuel wood sourcing. Most depleted is the mangrove forest: "...This is primarily owing to the fact that rural livelihood in this region depend on the exploitation of the mangrove forest and its resources. The mangrove forest is utilized as a source of fuel wood..." (Prince & Samuel, 2010, p.29).

According to Rhett (2014), the Niger Delta has lost a substantial amount of forest area in the last decade (2001-2012) through logging, land development, industrialization, agriculture, and fuel wood collection in the six Niger Delta states. Audu (2013) conducted a study on fuel wood consumption in Nigeria that gives meaning to Rhett's study. His Report shows how much forest is lost to fuel wood consumption in the Niger Delta. Data from the Report which relied on the 2006 National Population Census figures show the percentage of the population that depend on fuel wood for energy:

Table 1: Fuel Wood Usage in the Niger Delta

State	Population (based on 2006 census report)	Fuel Wood Usage (%) of population
Akwa Ibom	3,902,051	81.0 or 3,160,661
Bayelsa	1,704,515	57.6 or 981,800
Cross River	2,892,988	79.8 or 2,308,604
Delta	4,112,445	76.6 or 3,150,132
Edo	3,233,366	78.7 or 2,544,659
Rivers	5,198,716	65.2 or 3,389,562

Source: Audu, NPC

The statistics paint a grim picture of how much of the region's forest is converted to energy as the electrification process remains slow while poverty rises. Deforestation for purposes of energy is likely to continue thereby escalating climate change impacts in the region unless proper attention is given to the energy challenge the people grapple with.

Local Community Experience

The authors' experience in communities in Bayelsa and Rivers states corroborate Audu's findings. The experience is grounded in working with energy poor communities where the majority of homes and businesses engaged in production rely on fuel wood for energy (Allison, 2014, 2011).

Bayelsa State

Bayelsa State arguably has the most challenge with internal road access and general infrastructure because almost 80% of the state is fluvial and rural. Little efforts have been made to provide roads. About 90% of the people live in the rural areas accessible only by water. Less than 25% of the population are connected to the national grid. Alternatives are difficult to find. Poverty rate is 47% in the state (National Bureau of Statistics, 2012). Due to energy poverty, 8 out of every 10 homes burn wood for cooking and preservation of food while the remaining 2 alternate between wood and kerosene (Allison, 2011).

Studies in Foropa, Lobia 1 & 2, and Koluama 1 & 2 (riverine communities in Bayelsa State) show that the major source of fuel wood for cooking and food preservation is the mangrove forest that is the main vegetation around the communities. Traveling by a 75HP speedboat, these communities are 2 hours and 30 minutes from Yenagoa the state capital. The implication is that they are not close to getting connected to the national grid.

These communities are along the Atlantic Ocean. Findings show that they continually harness the mangrove resource for making fire. A resident of one of the communities, Mrs. Zikenah who has lived in the community for over 66 years notes:

I have lived here all my life and the mangrove trees have been my source of fire for cooking and smoking fish. My parents themselves and even their parents relied on the mangrove trees for cooking. You know how long it took you by speed boat to get here; we are so cut off from Yenagoa that we are not sure government's electricity supply will get to us in my life time. (*The response was translated from the local language*).

Mrs. Zikenah states that her home like most of the households in her community, had not used an electric or gas cooker at all. She notes that at some point she tried the kerosene stove but stopped when it became unreliable and expensive. Kerosene was scarce in the area because there was no formal supply system from the city. When black marketers brought kerosene, it was almost three times its cost in Yenagoa and her family's income could not sustain using the product. She turned again on the mangrove forest. The story was consistent in a dozen households.

Due to their geographic location (sitting next to the Atlantic Ocean), the people engage in fishing for subsistence and commerce. Much of the fish supplied to major towns come from these communities. The lack of access to power makes cold storage of fish impossible. Our study did not find one cold storage facility in the area. The solution, therefore, is to smoke the fish using fire wood to keep them preserved for domestic consumption and for buyers coming in from the cities. As a result, large expanse of the mangrove forest has been lost.

Rivers State

Unlike Bayelsa State, there are more communities connected to the national grid in Rivers state even though access to energy in the state is still far below what one might expect in a more urban setting vis- a -vis Bayelsa.. There is a near-balance between riverine and inland communities. While connection to the national grid is poor in riverine communities in the Okrika, Kalabari, Andoni and Opobo areas, a sizable number of inland communities in Ogoni, Ikwerre, Etche, Ogba, and Oyigbo areas are connected. However, poor supply continues to deprive the people of energy.

Surveys in EleleAlimini, Egbeda, and Ubima (inland communities) show that despite the connection to grid power, 6 out of every 10 homes burn wood every day to cook. The communities are surrounded by the rain forests that showed signs of depletion. Mr. Nwosu, a school teacher said much of the forest is lost because people use them to make fire. He acknowledged that the activities of loggers contribute to the fast disappearing rain forests but warned that more worrying is the use of the forest as a source of energy because this happens all year round.

A common commercial activity in the communities is palm oil production. Large palm plantations are commonplace. Fruits from the palms are milled for oil and sold throughout the Niger Delta and beyond. Processing the palm fruits requires energy and the rain forests have been the steady source. Firewood is used to cook the fruits before oil is extracted. Mr. Ndah took ownership of his father's oil production business following his demise. He notes that for about 17 years since he began operating the business as his father's assistant and as owner, they collect and burn wood every week to keep production going even though the quantity used per week varies. He continues that many times the use of electricity was contemplated but unstable supply Made them to jettison the idea. He said all oil production businesses use wood because it is cost effective and always easy to get. He also said some tried self-generating power but could not break even due to the cost of fuel.

The situation is the same in most other communities in the region. This is why energy poverty in the Niger Delta must begin to receive greater attention like other causes of climate change. The mangrove forests and rain forests do not only accommodate bio-diversity but also play important roles in the absorption of carbon and providing forest cover from the sun's intensity. With gas flaring by oil companies and illegal oil refining in the Niger Delta discharging large amount of carbon daily into the atmosphere and causing climate change concerns, depleting mangrove and rain forests exacerbated by energy poverty makes the situation worse.

Besides absorbing greenhouse gases, forests also minimise the effects of flooding and hurricanes. Trees help to shield houses from devastation by storms. The implications of wood burning and usage of kerosene as alternative energy sources is far reaching beyond the emission of gas into the atmosphere.

The region requires energy but it has to be clean because of the changing climate. Energy from fossil fuel has been suggested as quick alternative to wood but there is also the health problem with fossil fuel usage: it is worth noting that the inhalation of fumes from a kerosene lamp is the toxic equivalent to smoking between 3-20 packets of cigarettes a day. This is not safer than fuel wood usage. The World Health Organisation (WHO, 2007) estimates that 79,000 die annually from biomass energy smoke in Nigeria – the third biggest killer after malaria and HIV/AIDS (SDN 2014). A shift from inefficient traditional fuel uses will therefore have significant health benefits as well as reduce climate change.

Mitigating Climate Change in the Niger Delta

Otiosa and Matthew (2007) state that the Niger Delta remains susceptible to effects of climate change because it is located in the world's coastal region prone to experiencing flooding due to rise in sea level. Thus, there is the argument that mitigating climate change in the Niger Delta is largely dependent on global efforts. Seen from coastal flooding, the argument holds that rise in sea level globally will continue to affect the region notwithstanding efforts made locally (Ogba&Utang, 2007).

Also, there is the general agreement that unless gas flaring in the region by oil companies is stopped, the harmful emissions will continue to impact on the region's climate. This paper agrees with these arguments but argues that climate change in the Niger Delta can be mitigated if efforts also target access to energy to reduce the conversion of forests to energy because there is evidence linking energy poverty, deforestation and climate change in the region.

Tackling Energy Poverty

SDN (2011, 2014) conducted surveys on “energy use and usage perceptions”, and “willingness to pay” for power consumption in some Niger Delta communities. The findings are that the people have basic energy needs that they fill by using grid power (limited to some communities), self-generating (an expensive option), off-grid supply (mainly gas turbines delivered by oil companies to a few communities), charcoal (not so common), fossil fuel (gas and kerosene depending on availability and income of the household), and firewood (mostly used due to poverty and lack of access to modern alternatives). The studies also indicate that the majority of households can afford to pay N1, 000 to N1, 500 per month for electricity consumed, and small scale businesses between N1, 000 to N3, 000 depending on the degree of consumption. These amounts are informed by current income levels and expected incomes.

Tackling energy poverty, therefore, must accommodate income levels. Due to widespread poverty in the region, only a few can afford huge electricity tariffs. Because the poor can easily satisfy basic energy needs by burning wood, cost of using electricity must be reasonably pro-poor to discourage fuel wood usage. Giving the difficulty with extending national electricity infrastructure to all parts of the region, this paper agrees with the general opinion that gas released into the atmosphere by the oil companies be channelled to providing power. Most of the energy poor communities either host companies that flare gas or are close to flare sites. Like the Bonny experience where the Nigeria Liquefied Natural Gas (NLNG) company and Shell Petroleum Development Company (SPDC) supply power to the people from gas turbines and distribute through a commercial utility setup, more Niger Delta communities can be provided power through same model.

Alternatively, there are prospects for success with cleaner alternatives like solar and biomass (excluding firewood). There have been demonstrations with more than 70% success rates. Government and private investors must realize the viability of renewables and its many advantages over other options. The geographical peculiarity of the region makes the renewables option more suitable.

Conclusion

As climate change concerns continue to generate attention in the Niger Delta, it is important for stakeholders to look at the many causes and aggravating factors in the region. Much of the responses to the challenging situation have targeted oil companies' negative practices and the activities of operators of illegal refineries. These actors contribute substantially to climate change in the Niger Delta but are not the only contributors.

Energy poverty is a factor mostly ignored in climate change responses. With a largely energy-deprived population, the region has seen significant portions of its rain forests and mangrove forests destroyed by people who must satisfy basic energy needs of cooking and food preservation, and business whose products require heating before finishing. They burn wood to get energy and the forests continue to deplete.

With revelations by Nigeria's Power Minister under the Goodluck Jonathan Administration, Chinedu Nebo, that about 200,000MW is needed to meet current energy demands in the country while it currently generates about 4,000MW from 9 hydro and thermal power stations (Daily Independent, 2013; The Punch, 2014), it is imperative to begin to consider off-grid solutions in the Niger Delta- off-grid options such as associated gas to power turbines, and renewables like solar, wind and cleaner biomass.

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