CLIMATE CHANGE AND THE NIGER DELTA: SOME SOCIO-ECONOMIC IMPLICATIONS AND COPING STRATEGIES

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Abstract
The Niger Delta Region is the bedrock of Nigeria’s economy. It generates over 90% of the nation revenue through oil production. Essentially, oil related activities have caused severe climate and environmental changes with attendant adverse impacts on the people’s livelihood. This paper highlights some of the main climate and environmental changes that have occurred in the Niger Delta Region highlighting the relationship between these changes and the people’s socio-economic prospects, and suggests possible institutional approach to ameliorating the problem.

Introduction
The Niger Delta is located in Atlantic Coast of southern Nigeria where River Niger divides into numerous tributaries. It is the second largest delta in the world with a coastline spanning about 450 kilometers terminating at the Imo River entrance (Awosika, 1995). The region spans over 20,000 square kilometers and it has been described as the largest wetland in Africa and among the three largest in the world (CLO, 2002). About 2,370 square kilometers of the Niger Delta area consist of rivers, creeks and estuaries, while stagnant swamp covers about 8600 square kilometers. The delta, with mangrove swamps spanning about 1900 square kilometers has the largest mangrove swamps in Africa, (Awosika, 1995). The delta falls within the tropical rain forest zone. The ecosystem of the area is highly diverse and supportive of numerous species of terrestrial and aquatic flora and fauna and human life. As opined by Iyayi (2004), it is richest in the world. The region is divided into four zones namely coastal inland zone, mangrove swamp zone, freshwater zone and lowland rain forest zone (ANEEJ, 2004).

The Niger Delta is highly susceptible to adverse environmental changes caused by climate change because it is located in the coastal region of the world. Coastal regions of the world are already experiencing flooding due to rise in sea level. Amid the impact of climatic change, the region is also faced with myriads of environmental problems resulting from oil exploration and exploitation activities. Reports on the environmental state of the Niger Delta are conclusive that the area has become an ecological wasteland. The objectives of this paper is to highlights in details the climatic and environmental changes that have occurred in the Niger Delta region and shows the relationship between these changes and poverty. It will reveal the weaknesses and deficiencies in the Nigerian Constitution in administering environmental rights.
to the people and suggests institutional and constitutional solution to the environmental degradation in the region and elsewhere.

**Climate Changes Induced Problems**

**Coastal Erosion**
The Niger Delta region is a coastal environment. The rise in sea level has been linked with global warming by the IPCC. According to the IPCC (1990), working with records over the last 100 years, have shown that a strong correlation exist between greenhouse gases emission and climate change and between global temperature and sea level rise. Global temperature is expected to rise by between 0.2 to 0.5°C per decade. The rise in temperature is expected to cause thermal expansion of sea and melting of polar ice. These will cause the sea level to rise for about 3-10 cm per decade during the next century.

In another report IPCC (2001), revealed that the large scale loss of land ice and thermal expansion of sea water has very likely contributed to the observed sea level rise. According to the International Federation of Red Cross (IFRC, 1999), sea level rise and flooding are already affecting millions of people world wide. IFRC report revealed that 10 million people are at constant risk of coastal flood and floods in general are making 3 million people homeless every year, and that the number of people affected by sea level rise is on the increase annually.

The occurrence of coastal erosion has been reported in the Niger Delta by Okon and Egbon (1999). The report of Awosika (1995) showed a rise in sea level along Nigerian coastal water. They did a mechanical analysis of tide data from 1960 — 1970 and reported mean sea level rise to be 0.462m above zero level of the tide gauge. In the report of Agbola and Olurin (2003), the World Bank ranked coastal erosion as needing moderate priority in the Niger Delta. Okali and Eleri (2004) reported that sea-level rise and repeated ocean surges will not only worsen the problems of coastal erosion that are already a menace in the Niger Delta, the associated inundation will increase problems of floods, intrusion of sea-water into fresh water sources and ecosystems destroying such stabilizing system as mangrove, and affecting agriculture, fisheries and general livelihoods.

The most important environmental problem facing the Niger Delta is coastal erosion. Although the World Bank has rated coastal erosion as needing moderate attention in the region, it is the most important impact of sea level rise in the region and should be given high priority attention.

Settlements in the coastal region have been uprooted by coastal erosion. In some places in the region especially in Forcados, some oil wells have been lost to the ocean due to erosion. Flooding of low-lying areas in the region has been observed. Coastal erosion poses serious problem for the economic activities in the Niger Delta especially natural sectors such as farming and fisheries; about 50% of the fishes consumed in Nigeria is from the Niger Delta and coastal vegetation especially the mangroves have been lost to coastal erosion (Awosika, 1995).

The Niger Delta could lose over 15000 square kilometers of land by the year 2100 with a one meter sea level rise. Calculations have also shown that a 20cm rise in sea level will inundate 3,400 km2 of region’s coastland (Onofeghara, 1990). It is estimated that with a sea level rise of 30cm, about 1 to 2 million people will be affected. It has been predicted that Nigeria will lose about $9 billion as a result of the sea level rise while at least 80% of the people of the Niger Delta will be displaced due to the low level of the region.

Other adverse effect of sea level rise in the Niger Delta is increase in salinity of both surface and underground water due to the instruction of sea water. This will lead to the death of aquatic plants and animals that can not tolerate high salinity. The brackish water is the home of several species of fishes and it is the breeding sites for several others. Apparently, the ecology of the brackish waters will greatly be affected and this may lead to lose of species. Some terrestrial plants that have low tolerance for high salinity will also be affected. Sea water instruction will have serious impact on food security in the region; because of it impacts on coastal agriculture. The salinization of underground water will lead to shortage of fresh water in the region, which will lead to insufficient drinking water. Many people in the region depend on underground water as their main source of water for drinking and for other domestic use. Other impacts of sea level rise on the Niger Delta region are changes in ocean dynamics and precipitation and health hazards.
General Flooding
While climate change will lead to increase aridity and desertification in northern Nigeria, it will lead to increase flooding in the southern part especially in the coastal regions. Flood in general has impacted negatively the livelihoods of many communities in the region. Flood and erosion remove top soil, destroy roads, affect fresh water resources and threaten lives and properties. Many people have been rendered homeless by floods and several roads have been made impassable. The usefulness of several roads has become seasonal, only passable during the dry months of the year.

In Egor and Ogida communities in Edo State, several houses have been abandoned by the owners due to floods and many more areas in the region are vulnerable to floods. Owners of the affected houses did not anticipate the problem they now find themselves when their houses were being built. For occupants of some of the affected house who are unable to relocate for financial reason will have to cope with the situation. This makes them vulnerable to different kinds of water-related disease such as malaria, dysentery, cholera, and diarrhea. Trauma resulting from the problem can lead to non-pathogenic diseases such as hypertension and diabetes. In some other instances, some areas are cut from other parts of the community. Some communities have gone to the extent of constructing woody pedestrian bridges across flooded areas so that they can have access out of their localities to carry out economic activities. The bridges have short life span because wood is biodegradable and it may last for only two or three raining seasons.

Changes in Rainfall Pattern
Meteorological data have shown that rainfall pattern in Nigeria has changed in the past decades. Oladipo (1995) reported that decline in the rainfall in Nigeria started in the beginning of the 1960s when a decade of relatively wet years ended. According to him, the persistence of below-mean rainfall in the last two decades in Nigeria is an indication of an abrupt change in climate. The region lie predominantly in the tropics having two seasons — the wet and dry seasons. The wet season occur from May to September, while the dry season begins in October and ends in April. The agricultural sector is highly sensitive to rainfall pattern especially in southern Nigeria where rain-fed agriculture is mainly practiced.

Food security has been defined as the ability of people to grow and obtain food (Sarah La Troije, 2002). It has been predicted that climate change will pose serious threat to food security. Climate change creates uncertainty in the rainfall pattern (timing and amount) and affects agricultural activities. As noted earlier, agriculture in the Niger Delta is highly dependent on rain and irrigation is seldom practiced. Changes in the rainfall pattern have greatly affected the agriculture in the region. Farmers in the region begin cultivation at the beginning of the rainy season. They plant their crops as the rain begins to fall in April. The rain falls periodically till the month of June/July (the peak of the rainy season), when rain fall more or less continually during the day. The periodic rainfall pattern before the peak of the rainfall in June enables farmers to cultivate various crops.

Farmers who plant after the first or second rain in March run into huge loss because the rains are delayed beyond the usual. The crops are scotched causing huge economic loss. Before this time farmers can predict the rain and they know precisely when to plant their crops. The crops after they are planted are watered periodically by rain before the peak of the rainfall in June. The amount of rainfall within the period before the peak is necessary for the optimum performance of many crops most especially the maize which is widely consumed in every part of Nigeria.

Changes in Vegetation
One important feature observed in the region is the almost complete absence of primary forests. This may be partly due to climate change and mainly due to human activities. Uncontrolled logging, agricultural activities, acid rain, oil exploration and exploitation, urbanization and mining activities contribute to lose of vegetation. The vegetation was dominated by grasses, sedges and shrubs with few scattered trees and they were mainly palm trees. In some parts, trees grow close to one another to form thick canopy over undergrowths. The changes in vegetation will have great implication for biological productivity consequently affecting biomass production. It will lead to the impoverishment of biodiversity and various plant species presently growing in the region may die off. The regeneration rate of biomass may also decline significantly affecting the amount of fuel wood available for local people. Fall in the availability of
Biomass for local energy generation will bring more hardship to local people. Many will have to travel long distances in search for fuel wood. Women and children are the most affected since they are responsible for the fetching of food for cooking.

**Socio-Economic Implications**

The people of the Niger Delta are highly dependent on the environment for their source of livelihoods. The region has been described as the richest wetland in the world and the home of numerous species of aquatic and terrestrial plants and animals. Before the discovery of oil in the Niger Delta, the people depended so much on the resources from their natural environment. They made their living from the exploitation of the resources of their land, water and forest as farmers, fishermen and hunters. They were attached and protective of their environment. The economic activities of people were soon distorted due to environmental degradation caused by climate change and exploration and exploitation activities of multinational companies. The devastating effect of the changing climate and the activities of oil companies on their farmlands, crops, creeks, lakes, economic crops and rivers are so severe that the people can no longer engage in productive farming, fishing and hunting as they used to do.

These days, the dominant economic activity of the people is trading. Only very few are employed in the industries and in the civil service. Though some still engaged in farming and fishing, they work more with little in return. Their fishing and farming have been impaired by the deploring environment. Their soil has been degraded. This is a major cause of poverty in the region.

**Coping Strategies**

Community-based adaptation has become an important term in the climate change debate. It recognizes the fact that environmental knowledge and resilience to climate change lie within societies and cultures (Mitchell and Tanner, 2006). Thus an understanding of how communities cope with climate change is important to develop community-based adaptation projects. The goal of community-based adaptation project is to increase the climate resilience of communities by enhancing their capacity to cope with less predictable rainfall patterns, more frequent droughts, stronger heatwaves, different diseases and weather hazards of unprecedented intensity (Mitchell and Tanner, 2006). We have already seen that the people of the Niger Delta are vulnerable to climate change. In the remaining part of this section, we will highlight the different ways communities and individuals have been coping with changes.

**Change of Occupation**

All parts of the earth will be affected by climate change, but the degree of damage resulting from the phenomenon will differ from region to region and will depend on the capacity of the different regions to cope with changes. Adaptation to climate change depends on the level of socio-economic and technological development. Many people in the Niger delta whose source livelihood once depended on natural sectors such as farming and fishing had to change their means of livelihood. Because of the degradation of their environment, they can no longer engage in farming and fishing. Hence, many are now traders, dealing on different kind of goods. Few persons work in the civil service, still fewer ones are employed by the multinational oil companies operating in the area and other industries. Some others are engage in multiple activities in other to increase their income. For example those in the civil service may combine their civil service work with trading.

Change in occupation has caused the rate of rural-urban migration to increase at an alarming rate. This has particularly affected the workforce in the rural communities. Many people of the youthful age group migrate from the rural areas to the urban areas to seek for jobs in the formal sectors and to involve in trading creating a scenario where the urban areas are highly populated with people belonging to the country’s workforce. The elderly men and women are left in the rural communities. Change in occupation seems to be the only option for the people since their natural environment they once depended on has been adversely affected. Development strategies in the region should consider occupational changes and seek to strengthen this coping strategy.

**Coping with Floods**

As has been noted earlier, some areas are affected by flood and they are cut off from other parts of the community. In such areas, the use of pedestrian bridge has been developed locally so that the affected areas can have access to other parts of the community to enable them embark on their daily activities. The
pedestrian bridge are made of wood, in some other cases they are constructed with earth materials such as sand, pieces of broken building blocks or some cases large granite stones. The bridges are constructed on community efforts and initiative, usually after waiting for the government for a long time without results. The bridges constructed with wood have disadvantage; wood are biodegradable and thus have short life span. Those constructed by heaping sand are soon eroded by water.

At extreme cases of flood, many abandon their houses and completely relocate to other areas that are not affected by flood. Some others live in their houses for few months of the year during the dry season, after which they relocate and come back when another dry season begins.

**Coping with Changes in Rainfall Pattern**

We have seen that a large percentage of the people in the Niger Delta depend on climate-sensitive sectors such as agriculture and fishery. The changing climate has created uncertainty in the timing and amount of rainfall in every part of Nigeria. The pattern will be more severe in the rain forest zone of the Niger Delta where rain-fed agriculture is mainly practiced. Because of the uncertainties in predicting the rain, farmers now delay their time of planting. After the first or second rains watch the rains for sometime to ensure that the rains fall regularly enough before planting. These they do to keep their crops from being killed because of insufficient rain. The govern authorities in charge of climate data need detailed record of rainfall data from year to year and preinform farmers on the time to start planting working with the rainfall data from previous year. This will help to strengthen this strategy for adapting to variation in rainfall pattern.

Another way farmers in the region are overcoming this problem is by the use of fast-maturing varieties. Fast-maturing varieties of maize with high yields have been introduced and are being used by farmers. The risk involved in this strategy is that local species are being displaced by these varieties, though some farmers still cultivate the local ones. In future, new hybrid species may completely displaced local species; this may lead to the extinction of local ones. It is important that the right mechanisms are put in place to protect local species from extinction. Other crops such as cassava that are not affected by excess rainfall can be planted close to the peak of the rainy season, although fast-maturing species of cassava are also being used by farmers.

**Concluding Remarks**

We can see so far that the people of the Niger Delta are faced with myriads of environmental problems caused by climate change and the activities of multinational oil companies operating in the region. It against this background, that I propose an integrated approach in solving the problem in the Niger Delta. By an integrated approach, I mean a combination of several development strategies packaged into one piece. The integrated approach must have this key element. It must be participatory. The local people are the primary targets of development and development can only be precisely defined by them. It is only the definition of the local people to whom development strategies is directed at that is acceptable. Thus every development strategic must seek to view development from the perspective of the local people. The United Nations Declaration on the Rights to Development of 1986 recognized that the human person is the central subject of the development process and that development policy should therefore make the human being the main participant and beneficiary of development.
References
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