

# **Climate Change and Poverty: Sustainable Approach in the Niger Delta Region of Nigeria**

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## **Abstract**

*The Niger Delta region is the bedrock of Nigeria's oil production, which accounts for 97% of the government total revenue. Since the discovery of oil in the region, oil exploration and exploitation have caused severe climate and environmental changes which have impacted the lives of the inhabitant adversely. Prior to the discovery of oil, the people of the Niger Delta made their living from the exploitation of the resources of the land, water and forest as farmers, fishermen and hunters, this made them attached to and protective of their environment. The devastating impacts of the oil industries on farmland, crops, economic trees, creeks, lakes and other components of the environment are so severe that the people can no longer engage in productive farming, fishing and hunting as they use to do. The most affected groups are women and children. This paper 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 reveals 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.*

## **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 and 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 (ANEJ, 2004).

Politically, the region cut across nine states in southern Nigeria (though this is still controversial), which include Abia, Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Imo, Ondo and River States. The region has emerged as one of the most ecologically sensitive region in Nigeria. Resources (oil and gas) from the region are the main source of revenue for the Nigerian state, accounting for about 97% of the country's total export. Oil was first discovered in the region in 1958 and since the early 1970s, oil has dominated the Nigeria's economy.

There are several ethnic groups in the Niger Delta. The Ijaws seem to be the oldest settlers in the region and the largest group (about 8 million in number). They occupy the whole of Bayelsa State and are found in River, Delta, Edo, Ondo and Akwa States. Other ethnic groups occupying the region are the Ndoni, Degema, Egbema, Ogba, Ekpeye, Itsekiri, Urobo, Edo, Efik, Okpo, Growthia, and Ibibio. The Ilaje and Ikale of Ondo, the Ohaji and Oguta of Imo State and the Asa of Abia State make up the western and eastern Delta. From the 1991 census, about 25% of the entire Nigerian population lives in Niger Delta.

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.

### **Method of Study**

Methods used for the study include direct observation. This involves walk-through surveys to collect information Data were also collected with interviews with key informants. The key informants are heads of communities, community chiefs, the spokesmen, elders and other opinion leaders. These informants are privileged to know the communities very well. They were visited in their homes and then interviewed. Focused group discussions (FGD) were held separately with the various groups of the communities that were sampled. The groups include the elderly men, the women group and then the youths. This was used to seek the views of the different groups separately, as their needs and views may be different and opportunity was created for thorough discussion. The project team also relied on existing literature or documentation on the area to complement the information that was collect during the field work. Such information was sourced for from relevant government and academic institutions and from traditional institutions in the area.

## Climate Change and the Niger Delta

### Costal Erosion and Floods

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<sup>0</sup>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 (Table 1). 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.

Table 1: Ranking of Environmental issues in the Niger Delta by the World Bank

Category	High Priority	Moderate Priority	Lower Priority
Land Resource Degradation	Agricultural land degradation Flooding (Moderate high)	Coastal erosion Riverbank erosion	Sea level rise
Renewable Resource Degradation	Fisheries depletion. Deforestation Biodiversity loss Water hyacinth expansion	Fisheries habitat Degradation	Mangrove Degradation Nypa palm expansion
Environmental Pollution	Sewage Vehicular emissions Municipal solid wastes Toxic and hazardous substances	Oil pollution Industrial effluents Industrial air emissions Industrial solid wastes	Gas flaring

*Source: Agbola and Olurin (2003)*

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 km<sup>2</sup> 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 (Guardian, September 17, 2001 page 80).

Table 2: Total land loss (km<sup>2</sup>) due to coastal erosion and inundation estimated from different scenarios of sea level rise

	Low Estimate				High Estimate			
	0.2m	0.5m	1.0m	2.0m	0.2m	0.5m	1.0m	2.0m
Niger Delta	2,846	7,453	15,125	18,398	2,865	7,500	15,332	18,803

Source: Awosika et al, 1992

Table 3: Estimated number of people (in millions) displaced by sea level rise at different scenarios of sea level rise

Sea level rise	0.2m	0.5m	1.0m	2.0m
Niger Delta	0.10	0.25	0.47	0.21

Source: Awosika et al, 1992

Other adverse effect of sea level rise in the Niger Delta is increase in salinity of both surface and underground water due to the intrusion 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 intrusion 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.



Plate 1: Floods in Benin City

Floods paralyze economic activities in many towns and cities in the region. Major roads, some linking states are flooded causing hardship to motorists. When these roads were constructed, the flooding problem was not there, and the company that constructed the roads did not anticipate the problem, hence did not make provision to remedy the situation. One common consequence of flooding is increase in cost of transportation. Commercial drivers, to make up for the distance they drive to avoid a flooded road, usually increase their cost of transportation putting the burden on their passengers. This in turn will lead to the general increase in the cost of goods and services.

### **Change 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 Trobe, 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 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.

### **Change 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.



Plate 2: Vegetation in a community in River State

## **Other Causes of Environmental Degradation in the Niger Delta**

### Acid Rain

A major cause of climate change is the release of greenhouse gases (GHG) such as CO<sub>2</sub>, nitrous oxides, chlorofluorocarbon, hydrocarbons such as methane, ozone, Aldehydes and water vapour. Some of these gases especially CO<sub>2</sub> and the oxides of nitrogen are dissolved in rain water and fall to the earth as acid rain. Because of the high level of ionization of these acids, they erode metallic surfaces and destroy forests. Acid rains erode roofing sheets of houses at alarming rate, that the people are forced to change their roofing sheets every now and then.

Most houses in the region are roofed with zinc-plated galvanized sheets. These sheets are susceptible to rusting when they come in contact with water. The rate at which they rust is increased when acidified water fall on them. The life span of zinc-plated roofing sheets is greatly reduced when bitten by acid rains. Owners of houses are made to change their roofing sheets more often than usual. People are often forced to spend enormous resources replacing their roofing sheets. Money that would have been spent on other areas of the home that will improve the standard of living of the people is used for changing the roofs of houses. This further impoverishes many, especially those in the rural communities.

An alternative to zinc-plated roofing sheets is the use of aluminum roofing sheets. Aluminum sheets are highly resistant to corrosion by acid rain. However, they are much more expensive than the zinc plated sheets. To roof a bungalow measuring 29ft by 72ft with aluminum roofing sheets will cost about Seven Hundred and Fifty Thousand Naira (US \$5905.50), while to roof a house of the same dimension with zinc-plated sheets will cost about Twenty-one Thousand Naira (\$165). Zinc-plated sheets have life span of about 10 year; this is however reduced due to acid rain. Many cannot afford aluminum roofing sheets. One of the community chiefs said they change their roofing sheets every now and then.

Acid rain leads to loss of biodiversity. Forests and economic crops are destroyed by acid rain. The dominance of grasses in the region is an indication of loss of natural forest. This may be mainly due to acid rain, although there are other factors such as agricultural activities and exploration and exploitation activities of multinational oil companies. Some respondents opined that their farm land has been destroyed and is no longer fertile for cultivation of crops, hence they can no longer involve in farming.

### Gas Flaring

The flaring of gas has been practiced in the Niger Delta region for over four decades. Today there are about 123 flaring sites in the region (Energetic Solution Conference, 2004), making Nigeria one of the highest emitter of green house gases in Africa. Carbon dioxide emissions in the area are among the highest in the world (Iyayi, 2004). Some 45.8 billion kilowatts of heat are discharged into the atmosphere of the Niger Delta from flaring 1.8 billion cubic feet of gas every day (Agbola and Olurin, 2003). Gas flaring has raised temperatures and rendered large areas uninhabitable. Between 1970 and 1986, a total of about 125.5 cubic meters of gas was produced in the Niger Delta region, about 102.3 (81.7%) million cubic meters were flared while only 2.6 million cubic meters were used as fuel by oil producing companies and about 14.6 million cubic meters were sold to other consumers (Awosika, 1995).

Gas flaring and other oil exploration and exploitation activities have contributed significantly to the degradation of the environment in the region. Acid rain is caused by the flaring of gas. The concentration of acid in rain water appears to be higher in the Niger Delta region and decreases further away from the region, although there is need to do more research on this. It has altered the vegetation of the area, replacing local vegetation with “stubborn” elephant grasses, as it is called locally, a grass plant that can grow in very harsh environment.

The location of gas flaring sites close to inhabited areas is an important environmental anomaly that was observed. In one of communities visited, Rumuekpe Community in Emuwa Local Government Area, the community hosting ELF collection centre, AGIP collection centre and Shell Petroleum flow station and Booster Station, a flaring site was located about 250 meters from inhabited houses in the community. The community members complained of high ambient temperature resulting from the flaring site. The farm lands of local people have been taken from them to flare gas. Vertical gas flaring was previously practiced by the oil companies. This method involved raising the flaring nozzle high up into the sky, making it very conspicuous. Due to opposition to the practice in the region, the oil companies now use the horizontal flaring method to obscure the practice.

### Oil Spill

The Niger Delta environment is continually degraded by frequent oil spills, blow-outs, seismic blasts and discharge of untreated effluents directly into bodies of water, some of which serve as the only source of water for the people. Water bodies polluted with oil affects the amount of dissolved oxygen in the water, which consequently impacts the lives of aquatic plants and animals. Oil spreads over the water surface preventing contact with atmospheric oxygen. Oil spills occur with high frequency in the region. Records revealed that between 1976 to 1990, the region experienced 2676 cases of oil spills (Civil Liberties Organization report, 1996) and an annual average spills in Rivers, Bayelsa and Delta States are 300 cases. The devastating impact of these incidents resulting from the activities of the oil industry on the farmlands, crops, economic trees, creeks, lakes, fishing equipment is such that the people can no longer engage in productive farming and fishing.

Several major rivers are heavily polluted and also farmlands are under acid rain and oil spills. Oil canals and network of pipelines is making it impossible and dangerous for people to undertake economic activities on it. It is estimated that between 1976 and 1996 a total of 2,369,470.40 barrels of crude oil was spilled into the rivers and lands of the Niger Delta (Table 4).

Table 4: Time Series Analysis of Oil Spill in the Niger Delta

S/No	Year	No of Spill	Quantity Spilled (barrels)	Quantity Recovered (barrels)	Net volume lost to the Environment (barrels)
1	1976	128	26,157.00	7,135.00	19,021.50
2	1977	104	32,879.25	1,703.01	31,176.75
3	1978	154	489,294.75	391,445.00	97,849.75
4	1979	157	94,117.13	63,481.20	630,635.93
5	1980	241	600,511.02	42,416.83	558,094.19
6	1981	238	42,722.50	5,470.20	37,252.30
7	1982	257	42,841.00	2,171.40	40,669.60

8	1983	173	48,351.30	6,355.90	41,995.40
9	1984	151	40,209.00	1,644.80	38,564.20
10	1985	187	11,876.60	1,719.30	10,157.30
11	1986	155	12,905.00	552.00	12,358.00
12	1987	129	31,866.00	25,757.00	25,757.00
13	1988	208	9,172.00	1,955.00	7,207.00
14	1989	228	5,956.00	2,153.00	3,803.00
15	1990	166	14,150.35	2,785.96	12,057.80
16	1991	258	108,367.01	2,785.96	105,912.05
17	1992	378	51,187.90	1,476.70	49,711.20
18	1993	453	8,105.32	2,937.08	6,632.11
19	1994	495	35,123.71	2,335.93	32,787.78
20	1995	417	63,677.17	3,110.02	60,568.15
21	1996	158	39,903.667	1,183,807	38,716.860
<b>Total</b>		<b>4,647</b>	<b>2,369,470.04</b>	<b>549,060.38</b>	<b>1,820,410.50</b>

Source: Agbola and Olurin (2003)

From the Table 4, between 1976 and 1996, 4,647 cases of oil spills were recorded. Iyayi (2004) opined that the figures are bound to be much higher if taken into account what he described as official lying index. According to him, the official lying index indicates the degree to which official figures are deliberately falsified to vary from the real facts on the ground. The official lying index is proportional to the level corruption of a regime and the emotional involvement of its leaders in maintaining their version of reality as the truth. Thus, official figures therefore need to be multiplied by a certain factor in order to arrive at the correct estimate of the level at which the situation actually exists. By suggesting an official lying index of 1.5 and multiplying it by the official figure, Iyayi (2004) calculated the actual number of oil spills during the period to be in the neighbourhood of 6, 971 with a total volume of 3,554,205.6 barrels of crude oil spilled.

#### Pipeline Vandalization and Communal Conflicts

Pipeline vandalization is caused by youth restlessness resulting from the economic hardship in the Niger Delta. Several cases of pipeline vandalization have been reported. In 1993, seven cases were reported, in 1996, 33 cases were reported and in 1998, 57 cases were reported. The number of cases of pipeline vandalization rose astronomically to 497 in 1999 and over 600 cases in 2000 (Fig. 1). The dramatic increase of cases of pipeline vandalization from the 1990s to 2000 is suggestive that the more the people are deprived of their means of livelihood, the more restless they become. Hence the poorer the people become, the more the cases of pipeline vandalization. Other reasons youths in the Niger Delta are involved in the vandalization of pipeline may be to express their grievances over the destruction of their environment by multinational oil companies without adequate compensation from these companies.

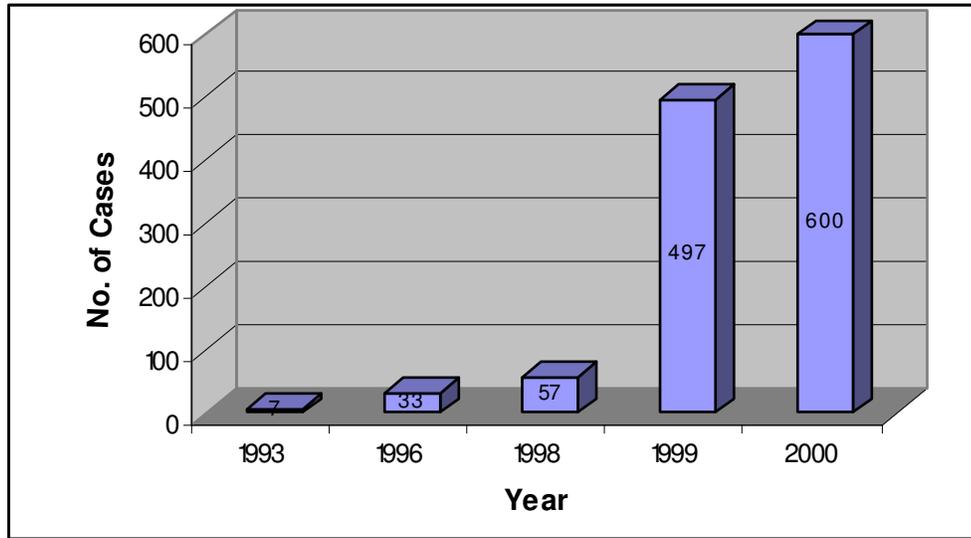


Fig. 1: Number of cases of pipeline vandalization reported between 1993 and 2000  
*Source: Okecha, 2003*

Pipeline vandalization, in many cases, is associated with fire outbreak and leading to the loss of lives and properties. In 1998, about 1000 people lost their lives in Jesse Village in an inferno resulting from the vandalization of petroleum pipeline. The year after, over 12 people lost their lives in Ekakpamre in Ughelli Local Government Area in Delta State. In 2000, over 50 people lost their lives at Nngiji and Umuegbede in Abia State, 300 persons lose their lives in Egborode village in Okpe local government Area of Delta State (Okecha, 2003). Other impacts of pipeline vandalization are deforestation, destruction of vegetation, pollution and loss of revenue. Nigeria lost an estimate 4.4 Billion Naira (34.6 million Dollars) in 400 pipeline damages in oil-producing states between January and August 2000 (ANEEJ, 2004). Apart from the vandalization of pipelines, forest and vegetation are also destroyed when pipelines are being laid.

Communal clashes seem to have also increased with time in the Niger Delta. Conflicts may occur between one ethnic group and another (inter-ethnic), or within ethnic group (intra-ethnic) or between communities and state and multinationals companies. Inter-ethnic and intra-ethnic clashes are caused by the struggle for the ownership of resource, usually land. Youth restiveness is also a major cause of communal clashes. Iyayi (2004) attributed conflicts in the region to the divide and rule policies of the Nigerian state and the oil companies operating in the area. According to him, the inter-ethnic war between the Ijaws and the Itsekiri which started in 1997 was due to the double standard used by the Federal Government in sitting a local government headquarters. Between 8th and 18th of July, 2002 some Itsekiri women from Ugborodo community in Delta State protested and occupied the Chevron-Texaco oil terminal at Escravos. The occupation ended when the company met the demands by the women which included hiring of their youths, building of schools and provision of electricity. A new dimension to the conflicts between communities and multinational companies is the formation of militant groups whose mode of operation is hostage taking of staff of oil companies operating in the area.

The communities of the Niger Delta are still involved in several forms of resistance: demonstrations and protests, petition writing, legal action, hostage taking, armed uprising and community mobilization. It should be noted that various forms of resistance and protest are different from the intra- and inter-ethnic conflicts. Protests and resistance are directed against the Nigerian state and its collaborators in the Niger Delta and have had the objective of drawing attention to and reversing the situation of exploitation and underdevelopment. These protests began well before flag independence in 1960. For example, the Willink Commission of 1957/1958 was set up by the colonial government following petitions from the Ijaw and Itsekiri communities, which presented the 'special problems' of the area and the fears of the people about marginalization. By 1966, Isaac Adaka Boro had raised the Niger Delta Volunteer Force, which organised an armed uprising against the Nigerian state (Iyayi, 2004).

### **Poverty in the Niger Delta**

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. The cost of goods and services are quite high compared to other parts of the country. For example, the cost of table water (popularly called "pure water") is Ten Naira (₦10) in Portharcourt while in other parts of the country it is sold for Five Naira (₦5). The high cost of living in the Niger Delta is caused by the presence of the multinational companies; their workers earn huge sum of money and can afford the high cost of goods and services. But this is at the detriment of the local people, causing them much poverty. The more costly the prices of goods and services the more the local people are impoverished. Most painful to the people is the fact that indigenes are not employed by the companies operating in the area; the few that are employed are given appointment at the lower cadre of the companies.

The World Bank reported that despite the vast oil resources in the Niger Delta, the region remains poor. GNP per capita is below the national average of US\$280. Unemployment in Port Harcourt, the capital of Rivers State, is 30 percent and is believed to be equally high in the rural areas. The rural population commonly fish or practice subsistence agriculture, and supplement their diet and income with a wide variety of forest products. Education levels are below the national average and are particularly low for women. While 76% of Nigerian children attend primary school, this level drops to 30-40 percent in some parts of the Niger Delta. The poverty level in the Niger Delta is

exacerbated by the high cost of living. In the urban areas of Rivers State, the cost of living index is the highest in Nigeria (Iyayi 2004).

Table 5: Poverty Levels by Geo-political Zones

Geopolitical Zone	Percentage		
	1985/6	1992/3	1997
North East	53.2	N/A	68.0
North West	48.4	N/A	62.0
Middle Belt	48.4	N/A	53.0
South East	30.9	N/A	79.5
South West	42.0	N/A	74.1
South – South	38.0	N/A	78.6
Nationwide	43.0	34.10	69.2

**Source:** National Policy on Poverty Eradication

Informal sector jobs such as fishing, farming, trading and artisanship dominate in the communities. Apparently, income levels in many of the communities are low because of the dominance of informal sector jobs over the formal sector jobs (formal sector job includes employment by companies and civil service). In a particular community where a survey was carried out, it was found that about 22% of the respondents earn ₦5,000 (\$39.4) or less per month. According to the World Bank, anybody living on less than US\$1.00 a day must be considered poor. The most popular occupation in the many communities is fishing. In some rural communities especially those located in the riverine areas, about 100% of the population are fishermen.

Generally in the Niger Delta region, those involved in informal sector job was estimated to be about 70% while those involved in formal sector jobs was estimated to be about 15%, with only about 2% employed in companies. The dominance of the informal sector jobs has implications for income levels in the communities. This is because the informal sector is plagued by low productivity and incomes. Recent studies in Nigeria and other parts of sub-Saharan Africa show that whereas the informal sector accounts for as high as around 75% of the employment, the sector accounts for only 25% of the income.

### **Coping with the Changes**

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.

This will have impacts on the agricultural resources produced from the region. An estimated 50% of the fish consumed in Nigeria once come from the Niger Delta. With more people changing their means of livelihood from natural sources to non-natural source will lead to the decrease in agricultural and fishery products. Thus the decrease in agricultural and fishery products is due to both the effect of environmental degradation and the fact that many people in the region no longer rely on climate-sensitive sectors. Change in occupation appears to be the only way many can cope with the changes affecting their environment. The major reason while they change their occupation is to raise enough income to meet at least their primary needs. The high cost of living in the region seems to have defeated this objective. Many of the inhabitants still live below the poverty line of less than One Dollar per day.

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 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 construct 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. The money that would have been spent to improve the standard of living in the home is spent by families to relocate, helping to further impoverish the people. Shelter is one of the basic needs of man. In some other instances where the affected people can not relocate, they are forced to live with the

flood. This makes them vulnerable to various water-borne diseases such as malaria, diarrhea, cholera and typhoid fever. Trauma resulting from the circumstance can also cause non-pathogenic diseases such as high blood pressure and diabetes.

#### 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 problem 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 rain, they 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 government authorities in charge of climate data need detailed record of rainfall data from year to year and pre-inform 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.

#### Coping with the Impacts Acid Rain

As we saw earlier, acid rain impacts livelihood in two ways; loss of biodiversity through the destruction of vegetation and corrosion of metallic surfaces such as zinc-plated roofing sheets. This is being overcome by painting the surface of metallic roofing sheets vulnerable to corrosion by acid rain with gloss paint. The paint will prevent the roofing sheets from having contact with acid rain, thus reducing the rate of corrosion.

#### **The Nigerian Constitution and Development in the Niger Delta**

The weakness in the Nigerian constitution to administer environmental justice and bestow the control of resources from the region to the local people is a major limiting factor to development in the Niger Delta. There is no provision in the constitution that enable the inhabitants of the area of have even an iota of control over the resources from their land. Thus the Nigerian constitution allows the Nigerian state and the oil companies to have total control of the oil resources from the Niger Delta. This privilege bestowed on the Nigerian state by the law of the land has been greatly abused by the state or rather by government officials. It has become a case of 'scavenging' from the region and diverting the proceeds to other region or for other trivial issues compared to the livelihoods of people in the region whose livelihood has been taken from them. More severely is the mismanagement of these resources by government officials.

The laws governing the ownership and control of oil mineral resources of the Niger Delta region is the same with the laws governing ownership and control of natural resources in Nigeria. Nigerian law vested in the state (Federal Government of Nigeria) the ownership and control of natural resources. This is contained in section 1 of the Petroleum Decree of 1969 now enacted as Petroleum Act, Cap 350 Laws of Federation of 1990. Also, the Territorial Water Act, Cap 428, Laws of the Federation of 1990 as amended by Act No. 1 of 1998 and the Exclusive Economic Zone Act Cap 116 of the Federation Laws of 1990 as amended by the Act No. 42 of 1998 vest ownership and right of exploitation of minerals and natural resources in the territorial waters and exclusive economic zone of Nigeria in the Federal Government of Nigeria. Similarly, the Land Use Act, Cap 202 of the Nigeria, 1990 appropriates the petroleum resources of Niger Delta region in favour of the Nigerian Federation. The Land Use Act has been incorporated into the 1999 constitution and can only be repealed or amended through a cumbersome constitutional amendment procedure.

The definition of the term 'environment' is absent from the 1999 constitution of the Federal republic of Nigeria. Although the term has been defined in other legislations such as the Federal Environmental Protection Agency Act, these legislations are inconsistent with the Nigerian constitution. The environmental commitments provided in the Nigerian constitution are not justiceable. The only hope for the protection of environmental rights seems to lie in the implementation of environmental treaties. However, the provision in the constitution states that '*No treaty between the Federation and any other country shall have the force of law except to the extent to which any such treaty had been enacted into law by the National Assembly*'. This is still dependent on legislation by the National Assembly. Nigeria is currently a signatory to many of these treaties. One of them is the African Charter on Human and Peoples' Right and Article 24 states that '*All people shall have the right to a general satisfactory environment favourable to their development*'.

Pertaining to the right of fair hearing in respect to the environmental rights, the constitution is silent. The question as to who can prosecute when there is a breach in environmental rights is unresolved in the constitution. The tradition has been that it is the responsibility of the state. When there is a breach in environmental rights, individuals, groups and communities are the ones affected. Therefore the constitution should allow agencies, individuals, communities, and groups to sue for environmental rights. The words of Uche Onyeagucha of environmental Rights Action/Friends of the Earth, Nigeria:

*"There can not be enjoyment of environmental rights if people do not control their resources in order to determine how it is exploited.*

*.....only people who will directly suffer the negative impact of the activities, should reserve the power to make the environmental laws guiding those activities"*

### **Need Assessment**

In a need assessment conducted in the Niger Delta, the people listed several items as their needs. They however rated access to clean water, health facilities, roads, education, employment and sand filling as very high priorities. Other items listed by the people are micro credit, public toilet, modern market, scholarship, skill acquisition, contracts,

transportation, fishing gears, drainage system, resettlement and canalization. Any development strategy that will be sustainable in the region must consider the needs of the people.

### **Conclusion and Recommendations**

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.

Moreover, an integrated approach must x-ray the needs of the local people and design an all-encompassing strategy to address these needs. The needs of the local people vary among the different groups in the society – the men, women and youths. And integrated approach will specifically target the different groups. An integrated approach must also seek to understand the existing coping strategies of the local people to changes in their environment and build on them through policy formulation with adequate participation of the local people. An effective coping strategy will reduce vulnerability to climate change and other changes in the environment.

In other to achieve sustainability in the Niger Delta, we recommend that:

1. Development agencies such as the World Bank, UN and others should works more closely with grassroots organization in the region that are privileged to have good knowledge of the communities.
2. Multinational oil companies should develop new technologies that will minimize the impact of their activities on the environment.
3. Adequate provision should be given in the constitution to allow individuals, communities and agencies to sue for enforcement of environmental rights. Also, provision should be made in the constitution to allow the local people gain control of the resources from their land.

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