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## Article

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# The Political Economy of Hydrocarbon Pollution: Assessing Socio-Ecological Sustainability of Nigeria's Niger Delta Region

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## ABSTRACT

The Niger Delta region, which is the hydrocarbon basket of Nigeria, appears to be sitting on an environmental time bomb due to degradation from widespread hydrocarbon pollution. The major sources of environmental degradation in the Niger Delta are oil spillage, gas flaring and improper disposal of wastes from oil drilling operations. Presently, it is estimated that there are over 5,000 massively polluted sites in the Niger Delta. Drawing data from secondary sources, this paper finds that despite the enormity of environmental pollution and its deleterious effects on the socio-economic wellbeing of the Niger Delta region, there is no implementable blueprint or policy for remediation. The paper links the economic cost of environmental pollution to the pervasive poverty and other socio-ecological crises that envelope the region in a smoke of underdevelopment. The paper therefore advocates a clear national remediation policy to sustainably deal with the degraded environment of the region.

**Keywords:** Environmental Degradation, Hydrocarbon Pollution, Remediation Policy

**JEL Classifications:** O13, P48, Q35, Q52, Q56

## 1. INTRODUCTION

Hydrocarbons are seemingly indispensable in maintaining and advancing contemporary civilization and industrialization. At the apex of the scale of importance and indispensability among hydrocarbons are oil and gas. As Kesler and Simon (2015, p. 144) have pointed out, "the list of products made from oil is virtually endless, and includes far more than fuel used for transportation." Oil production negativities such as gas flaring, oil spillage and toxic pollutants have combined to distort the Niger Delta ecosystem. The distortion manifests in ravaged swamps and mangroves, polluted creeks, rivers and rivulets and scorched farmlands. The resultant effect of this has been the erosion of people's means of livelihood in the region resulting in high incidence of poverty (UNDP, 2006; Amnesty International, 2009; Pegg and Zabbey, 2013; Elum et al., 2016). Many analysts might argue that the establishment of such specialized agencies as the Niger Delta Development Commission

(NDDC) and the Ministry of Niger Delta Affairs is a demonstration of the commitment of the government to address the challenges confronting the region. But the core tasks of these institutions seem to revolve around midwifing infrastructural development as well as resolving the backlog of infrastructural development deficits spawned by commercial oil exploitation since 1956. In other words, the preponderance of the attempts by the Nigerian state to address the Niger Delta crises had been more on physical development than on the sustainability of the ecosystem.

The greatest challenge in the Niger Delta is not just planting physical and social infrastructures or making its characteristically difficult and inaccessible terrains accessible but the repair of the ecological devastation wrought by oil production activities. Considering that about 5,284 oil wells are scattered all over the Niger Delta region with thousands of kilometres of oil and gas pipelines, it means that there are equivalent number of locations

from which oil spills, gas flaring and pollution from chemical and toxic wastes could occur to jeopardize the ecosystem (Evoh, 2002; Steiner, 2010; Eke, 2016).

There is the tendency in the Nigerian state to share the “national cake” that is, oil revenue, without any modicum of responsibility towards its baking and tending the environment (Ayu, 1994; Ikpeze et al., 2004). Although Nigeria's exact earning from crude oil since its discovery in commercial quantity in 1956 is a subject of speculation, it is estimated that between 1960 and 2009, the country netted over US\$600 billion (Amnesty International, 2009; Ndiribe, 2014). However, available data from the Nigeria's audited account showed that it generated US\$ 148.8 billion between 2006 and 2008 and US\$143.5 billion between 2009 and 2011 respectively (Udo, 2013). More recent estimates have put Nigeria's cumulative earnings since the 1970s in the neighbourhood of US\$1 trillion (). For every dollar that is earned from oil there is a calculable percentage of environmental damage associated with it, which can be worked out and deployed for its sustainability.

Apart from the 13% derivation and the various bureaucratic institutions set up to drive and accelerate development in the Niger Delta region, there is no modality incorporating other parts of Nigeria in sharing the risks associated with oil production activities. The precariousness of the Niger Delta ecosystem is such that unless a systematic repair is embarked upon immediately, the combined effects of gas flares, oil spills, toxic and hazardous chemicals pollution and fallouts would undermine the economic potentials of Niger Delta and render its future generations environmental refugees. The first scientific study of the impact of oil production on Niger Delta carried out by the United Nation Environment Programme (UNEP) revealed that it would cost US\$1 billion and take up to 30 years to clean up only Ogoniland in the region (UNEP, 2011). Thus, if oil should cease to be an important international commodity, the Niger Delta, on account of its devastated ecosystem, would be a mere relic of a glorious past.

## 2. PROBLEMATIZING HYDROCARBON POLLUTION AND SOCIO-ECOLOGICAL FALLOUTS

With the continuous exploitation of oil in the Niger Delta region since 1956, its ecosystem has had to contend with distortions as a result of the negative effects of oil production. The Niger Delta is a rich ecosystem located in the southernmost part of Nigeria and covers an area that is approximately 70,000 km<sup>2</sup>. Apart from its reputation as Africa's largest wetland, it is also considered as one of the most important wetland and marine ecosystems in the world (Obi, 2010; Denedo et al., 2017). The rich ecosystem of the Niger Delta comprises mangrove forests, swamps, coastal ridges, and forests which provide a vast biodiversity that supports a wide array of flora and fauna as well as high population density of people (Obi, 2010; UNEP, 2011).

However, through man-made and system failures in the process of oil and gas production as well as “third party interference, mainly sabotage, theft of equipment or leaks caused by thieves drilling

into pipelines or opening up wellheads to steal oil”, the capacity of the Niger Delta environment to sustain farming, hunting and fishing which are the traditional economic mainstay of the region has been irretrievably impaired (Shell Petroleum Development Company, 2011. p. 1).

There appears to be an inverse relationship between the fortunes of the people and oil exploitation: The more oil is extracted (especially in deference to OPEC quota), the more the Niger Delta environment suffers degradation with the attendant pauperization of the people (UNDP, 2006; Ibeanu, 2008a). The Niger Delta paradox has been possible for a number of reasons: First, the injustice and insensitivity that characterize Nigeria's federal system as exemplified by skewed revenue distribution framework; second, the retrogressive laws which have denied the Niger Delta region a voice in oil production activities such as the Petroleum Act of 1968 and 1991, Exclusive Economic Zone Act of 1978; Associated Gas Re-injection Act of 1979; the National Waterways Decree of 1997 and the Land Use Act of 1978 and 1993; third, the loss of income-earning opportunities as a result of environmental degradation and pollution of land and rivers in the region (Ibeanu, 2008b; Ekpebu, 2008; Omagu, 2011; Edu, 2011; Elum et al., 2016). And fourth, the double standard in the operations of international oil corporations (IOCs) as exemplified by non-adoption of international best practices in their operations in Nigeria. Thus, the effect has been the destruction of the environment and exacerbation of misery and poverty among the people (Okonta and Douglas 2003; UNDP, 2006).

The distortion of the Niger Delta environment is located in the various forms of pollution associated with oil refining, spillage, gas flaring and pipeline explosions. Oil spills and gas flares spew out chemicals that negatively affect the integrity of the soil and the rivers thereby causing stunting of crops and destruction of aquatic life as well as constituting serious threat to human beings. Ibeanu (2008b) affirms that refinery effluents constantly discharged into fresh water and farmlands contain metals (such as cadmium, chromium, mercury and lead) which, at high concentrations, cause metabolic malfunctions in human beings. The Nigerian government was nonchalant about the ecological challenges in the Niger Delta until 1983 when the Nigerian National Petroleum Corporation (NNPC) recognized and accepted that environmental problems in the Niger Delta, such as stunted mangrove forest, arid and sterile land and corrosion from acid rain and other pollutants, were caused by the activities of oil companies operating in the area (ANEEJ, 2004; Omagu, 2011).

In addition to the direct threats to the ecosystem as a result of oil exploitation, there is also threat from oil pipelines. The Niger Delta region is a maze of pipes criss-crossing the entire region and which were designed to serve dual purposes: The lifting of crude oil and transportation of refined products to designated depots. From eleven kilometres of pipelines in 1955 to convey crude oil from Oloibiri oil field to Kugbo Bay, the network of pipelines in the Niger Delta has grown to cover several thousands of kilometres with Shell Petroleum Development Company (SPDC) alone maintaining a network of more than 6,000 kilometres of flowlines and pipelines in the Niger Delta (Kupolokun, 2004; Anifowose et al., 2014).

These pipelines have contributed to the serious ecological crises in the Niger Delta owing essentially to compromised enforcement regime. In the first instance, environmental impact assessment (EIA) was not carried out prior to the installation of most of these pipelines to determine their long-term effects on the environment. In other words, there was no systematized guideline that undergirded their installation as EIA came into effect in 1992. The incessant spillages and pipeline explosions that have claimed thousands of lives attest to this arbitrariness. Secondly, the sizes of these pipelines which range from 6 to 24 inches in diameter and their networks which criss-cross the Niger Delta region have triple effect on the ecology: One, the embedment of these pipes three feet into the soil along a 3.5 m right of way further diminishes available land for agricultural and developmental purposes; two, there are bound to be seepages into the soil arising from both leaks in the pipes and corrosion. In 2016, cases of either ruptured or vandalized pipelines summed up to 2589 (NNPC, 2016). And three, these pipelines lead to deforestation and destruction of wildlife as a result of the constant need to access and keep them in proper working condition.

The socio-ecological realities of the Niger Delta are encapsulated in the paradox of scarcity in plenty. Despite enormous earnings from oil, the Niger Delta is mired in poverty, unemployment and conflicts principally because of the destruction of its environment. The destruction of the Niger Delta ecosystem created occupational dislocation that spawned feelings of deprivation and subsequent violence in the region (Nwajiaku-Dahou, 2012; Ezirim, 2018). These feelings were exacerbated by the absence of state-sponsored contingency programme to cushion the fallouts from the dislocation. This failure of the state taxed the region to the extreme and exposed the youth to certain interests who had other agenda outside their advertised goal of group or ethnic emancipation.

### 3. MANIFESTATIONS, TRENDS AND EFFECTS OF HYDROCARBON POLLUTION

Since the discovery of oil in commercial quantities at Oloibiri in 1956 and subsequent commencement of oil exploitation, the volume of oil production had risen astronomically from 5100 to 2.5 million barrels per day (bpd) (Steyn, 2009; Duru, 2014). Since 1999, except for the period between 2004 and 2009 when the Niger Delta militants disrupted oil production, Nigeria has produced an average of between 2.1 and 2.5 million barrels per day (mpd) (CBN, 2009; NNPC, 2012). However, oil and gas production has come at a great cost to the environment with multiplier effects on the people. The pollution of the Niger Delta environment, with its serious negative implications on its ecosystem, is a product of two interrelated failures: One, state failure rooted in lack of political will on the part of regulatory agencies to enthrone international best practices in oil production activities as well as corruption; and two, institutional failure manifesting in arbitrariness and double standard in the operations of the IOCs, Hydrocarbon pollution manifests in several forms, namely.

#### 3.1. Pollution from Oil Spillage and Pipeline Explosion

Oil spillage as a result of exploration, exploitation and transportation is a major source of environmental degradation in the Niger Delta. It does not matter whether the spill is of minor, medium, major

or disaster proportions, oil spills generally have serious negative effects on the environment. The cumulative effect of oil spill in the Niger Delta is essentially the degradation of its terrestrial and marine ecosystem with associated distortion of the environment as well as livelihood patterns of the people. Since the inception of oil exploitation in the Niger Delta, records of oil spill incidents are estimated at over 10,000 spills (Anejionu et al., 2015). It is estimated that between 5,724 and 6,800 spills occurred in the Niger Delta between 1976 and 2001 (Nwilo and Badejo, 2001; Amnesty International, 2009). Also, between 1998 and 2009, Shell reported that a total of 491,627 barrels of oil were spilled in its operations through a mix of sabotage and operational inefficiency. The Shell data translated to 250 spills a year with 1,966.51 barrels of oil in each spill. Many scholars considered the posted figures of oil spill as underreported (Steiner, 2010; Purefoy, 2010). Studies have contended that estimates of the quantities of oil spilled in the course of oil exploitation in the Niger Delta range between 9 and 13 million barrels (Nwilo and Badejo, 2007; Onuoha, 2008; Ibeanu, 2008b).

The problem associated with available data on oil spill is two-fold: Underreporting, and the tendency of the NNPC to rely on data presented by the IOCs. Such data often blame third party interference for oil spills. For instance, Shell claimed that 75% of oil spill incidents and more than 70% of all oil spilled, especially between 2006 and 2010 were traceable to third party interference (SPDC, 2011). This is despite the evidence that such factors as mechanical failure, corrosion, operational error, natural hazard and unknown causes constitute major sources of oil spill (Ordinioha and Brisibe, 2013). Table 1 presents pipeline incidences between 2012 and 2016 showing fluctuating trends in the vandalization of pipelines. The tendency of IOCs to blame third party activities for oil spills is challenged by two interrelated factors: One, most of the oil pipes are, by international standards, obsolete, having been in continuous usage for 20–25 years contrary to internationally stipulated 15–20 years life span for oil pipes. Two, some of these pipes are not only corroded but were laid above ground level without adequate surveillance, thus exposing them to wear and tear and other dangers (Oyem cited in Badejo and Nwilo, 2004). Flowing from this, Nwilo and Badejo (2007) contend that only 28% of oil spill could actually be attributed to sabotage. Recently, Shell accepted culpability for the 2008 and 2009 oil spills in Bodo community in Rivers State and agreed to compensate the community with £55 million in the ratio of £35 million for individual members of Bodo community and £20 million for the community as an entity (Vidal, 2015). Nigeria's national oil spill detection and response agency (NOSDRA) asserted that between 2014 and 2015, the Niger delta region witnessed about 1,879 cases of oil spills only 64 of the spill cases cleaned up (Kalejaye, 2015). Thus, the region has over 5,000 massively polluted sites (Chukwu, 2018).

**Table 1: 5-year pipeline incidences**

Year	Vandalization	Rupture
2012	2,230	26
2013	3,505	65
2014	3,700	32
2015	2,783	49
2016	2,534	55

Source: NNPC, 2016. p. 24



### 3.2. Pollution from Hazardous Chemicals and Toxic Waste Disposal

The Niger Delta environment is saturated with hazardous and toxic chemicals that have far-reaching effects on humans and the environment. Ibeanu (2008b, p. 104) observes that high concentrations of metals in refining effluents known to cause metabolic malfunction in human beings, such as cadmium, chromium, mercury and lead, are constantly discharged into fresh water or farmland.

The weak supervisory capability of environmental agencies as a result of corruption has exacerbated the environmental degradation dilemma. The IOCs have capitalized on this lapse to shroud their operations in secrecy. The effects of hazardous and toxic chemicals on the Niger Delta environment are enormous considering that “the very root of the primary economic base of the region such as farmlands, swamps, rivers and ponds have been destroyed” leading to resource scarcities (Ikelegbe, 2008, p. 122).

### 3.3. The Challenge of Gas Flaring and Climate Change

As at 2016, Nigeria's proven natural gas reserves stood at 5,475.2 billion standard cubic meter which place it among the top 10 in the world (OPEC, 2017). But so far, the country has demonstrated acute inefficiency in the exploitation of its gas endowments. Even with its low level of gas exploitation, Nigeria is known among the world's most notorious gas flarers (Yar'Adua 2007; Elvidge et al., 2009). According to OPEC sources, Nigeria cumulatively marketed natural gas to the tune of 88,312.4 million standard cubic meter between 1970 and 2016 (OPEC, 2017).

Gas flaring connotes the burning off of gas associated with oil extraction. When crude oil is extracted from the ground, it is often accompanied by large volumes of gas trapped with it. The process of separating and purifying crude oil entails that these gases be separated from it. The easiest and cheapest way to achieve this is by burning it off (Elvidge et al., 2009). Even though this process is cheap in the short run, it has proved to be overly expensive in the long run as the environment is destroyed. According to the World Bank, “flaring gas wastes a valuable energy resource that could be used to support economic growth and progress. It also contributes to climate change by releasing millions of tons of CO<sub>2</sub> to the atmosphere.”<sup>1</sup> Evoh (2002); Agbonifo (2016) have attributed gas flaring to unsustainable exploration practices and lack of gas utilization infrastructure in Nigeria. Gas flaring is a major environmental challenge in the Niger Delta, especially in terms of the volume of greenhouse gases it emits into the atmosphere. The extensiveness of gas flaring is mirrored by the fact that there are 178 sites from where about 755 to 800 million standard cubic feet of gas are flared daily (Yusuf, 2017). In fact, between 1999 and 2009, Nigeria emitted 457 million metric tons of greenhouse gases, leading the World Bank to accuse the country of contributing “more greenhouse gases to the earth's atmosphere than other sources in sub-Saharan African” (Anomohanran, 2012, p. 666). Table 2 provides data on gas flare trends between 2011 and 2015. From the data, there has been consistent downward trend in gas flared as percentage of gas produced.

The politics associated with gas flaring has been played to the detriment of the Niger Delta with potential disastrous consequences. Nigeria first outlawed gas flaring in 1969 and set target for 1979. This target failed as those subsequently set for 1984 and 2003 respectively. The other targets set for 2008, 2009 and 2010 respectively, by the Nigerian Senate, to end gas flaring all failed, which prompted the Senate in 2011 to fix a new date of 2015 as the terminal date for gas flaring in Nigeria (Omagu, 2011). This date was also not realized. Five major reasons could be distilled from the failed attempts to achieve zero-flare in the Niger Delta. The first reason could be attributed to institutional incapacity and lack of political will on the part of regulatory agencies (Oloruntoba, 2011). The second reason was the unwillingness and non-commitment of the major oil companies especially SPDC, ExxonMobil, TotalFinaElf and ChevronTexaco to see to the end of gas flare. The third reason was the nonchalance of the Nigerian state as demonstrated by its underfunding of joint venture agreements. The fourth was the ridiculously low penalties imposed on IOCs for gas flaring as well as the corruption that underlies the perfunctory implementation of these penalties. In contrast to US\$ 10 which oil companies are fined in developed countries for 1000 ft<sup>3</sup> of gas flared, the same companies are fined N10/Mscf (equivalent to US\$0.03 cents) for the same offence in Nigeria (Leadership, 2018). Undoubtedly, this ridiculous penalty motorizes the culture of impunity that characterizes the operation of IOCs in the Niger Delta as it is cost-effective for them to pay the fine than invest in expensive gas-gathering technology. Fifth, and of more importance was Nigeria's economic dependence and mortgaged sovereignty as exemplified by the dominance of its oil industry by IOCs whose overriding motive is not patriotism but profit (SPDC, 2004; Aghalino, 2009). There are many issues at stake with regards to gas flaring, namely the economic loss to the country, threats to of the ecosystem; effects on public health and the sustainability of the environment generally. The IOCs have tended to blame everyone else but themselves for the non- realization of zero-flare in the Niger Delta, often hiding behind such excuses as unavailability of appropriate technologies, lack of security in the Niger Delta to enable the completion of gas gathering projects and the inability of the state-owned NNPC, which owns 55% of the joint ventures, to pay its share of the costs (Omagu, 2011; Oloruntoba, 2011).

## 4. ECONOMIC COST OF POLLUTION: TOWARDS ENVIRONMENTAL SUSTAINABILITY IN OIL PRODUCING AREAS

If oil dries up today or loses its global economic relevance, how would the Niger Delta survive in the face of its damaged environment? This

**Table 2: Gas flaring data in percentage**

Years	Gas utilised as % of gas produced	Gas flared as % of gas produced
2011	80.4	19.6
2012	77.2	22.8
2013	82.4	17.6
2014	88.5	11.5
2015	88.3	11.7

Source: CBN, 2015. p. 264

1 <http://www.worldbank.org/en/programs/gasflaringreduction#>[Last accessed on 2018 Jul]

hypothetical question may appear a little far-fetched but it is an attempt to profile a post-oil Niger Delta region. We provide two compasses as a guide to answering this hypothetical question: First, the destruction of the Niger Delta ecosystem which has undermined its capacity for sustainable livelihood. And second, the nonchalance attitude of successive administrations to deal in any systematic manner, the plight of the Niger Delta region as well as the unwillingness of the majoritarian ethnic groups to enthrone equitable revenue sharing arrangement to compensate for hydrocarbon pollution.

The effect of over sixty years of oil production activities in the Niger Delta is the effective underdevelopment of the region. No matter how development is conceived, whether as quantitative and qualitative improvement in the life of a man or the society or as economic progress measured by the growth in per capita income and gross national product or as a continuous upward movement or improvement in the capacity of the individual and society to control and manipulate the forces of nature, available evidence raise doubts about development in the Niger Delta. The concept of development which this study adopts is the one that recognizes man as the epicentre of development. Oni and Bello identified four indicators of such development: Ability to satisfy the basic needs of man as a result of more income from one's occupation, availability or provision of infrastructural facilities like roads, water, electricity; ability to live longer life as a result of improvement in health and medical facilities and prevention of diseases; ability to read and write and; ability to participate meaningfully in political activities and in policymaking at government level (cited in Onah 2005. p. 133).

Sustainable development appears a major challenge in the Niger Delta because of the piecemeal destruction of the environment and the state-regulation of development. UNDP (2006. p. 10) conceives sustainable development from people-centric perspective and thus, defines it in terms of development "that not only generates economic growth but distributes its benefits equitably; that regenerates the environment rather than destroys it; that empowers people rather than marginalizing them.... [that] gives priority to the poor, enlarging their choices and opportunities." Successive regimes have tended to regulate development in the Niger Delta by creating ad hoc and interventionist institutions to address the multi-variegated complaints of the region (Oluwaniyi, 2008). Until recently, with the setting up of the Ministry of Niger Delta Affairs, the most popular strategy of the Nigerian state in addressing the Niger Delta problem was the setting up of ad hoc institutions hence the Niger Delta Development Board (NDDDB) (1960/61); the Niger Delta Basin and Rural Development Authority (NDBRDA) (1976); the Oil Mineral Producing Areas Development Commission (OMPADEC) (1992) and NDDC (2000). The verdict on these institutions as demonstrated by the lingering development crisis in the Niger Delta is that no significant milestones in terms of concrete achievements in the area of restoring and renewing the Niger Delta environment or stopping further degradation have been recorded (Omotola, 2007; Aaron and George, 2010). The Achilles heel of these institutions was their relative lack of autonomy and complete dependence on the government for funding. All the institutions preceding the NDDC failed because corruption, cash crunch and politics characterized their operations.

The predilection of the Nigerian state to subscribe to ad hoc institutions to address legitimate structural imbalances is antithetical to genuine development in a truly federal state. Due to the fact that more emphasis is placed on national cake-sharing than its baking, the environmental challenges of the Niger Delta never attracted as much policy intervention as it should except when oil production is under threat. In other words, the strategy of government with respect to environmental protection has been patently reactive and "post-mortem."

Nigeria's Ecological Fund is inadequate to tackle the environmental challenges in the Niger Delta. Indeed, the Niger Delta is far from the contemplation of the Ecological Fund. In the 35<sup>th</sup> Meeting of stakeholders on Ecological Fund held in Abuja in 2009, the federal government unveiled new guidelines for the distribution of the fund, thus: Drought and desertification control receives 60 per cent; Soil Erosion, Flood/Gully control receives 25%; Pollution control gets 5 per cent while Administration of Ecological Fund Office/National Committee on Ecological Problems and other emergencies will gulp 10% which will be disbursed at the discretion of the President (Suleiman, 2009). No mention was made of the ecological disasters caused by oil production and exacerbated by the silence and inaction of the Nigerian state.

The economic cost of hydrocarbon pollution in the Niger Delta extends to both the state and the people. The state loses enormous revenues as a result of pollution both directly and indirectly. It is already established that Nigeria flares about 800 mscf of gas daily which amounts to a loss of N868 million daily and over N633.64 billion annually (Yusuf, 2018). In its environmental assessment of Ogoniland, the United Nations Environment Programme (UNEP) projected that it would take between 25 and 30 years to clean up Ogoniland but was noncommittal on the overall costs of fully restoring the environment. However, UNEP recommended a takeoff amount of US\$1 billion, while drawing attention to the fact that overall restorative costs would depend on the remediation standards settled for (UNEP, 2011). The enormity of the cost implications of restoring the polluted environment of the Niger Delta is underscored by the revelations from NDDC sources that Ogoniland harbours about 25% of the over 5,000 massively polluted sites across the Niger Delta (Chukwu, 2018).

However, the people bear a disproportionate portion of the economic cost of hydrocarbon pollution. The cost borne by the people is squarely linked to the distortions caused to the environment and the untoward reduction in their quality of life and general social well-being (UNDP 2006). Thus, the people are alienated from their traditional means of livelihoods which imposes restrictions on their capacity for wealth creation outside the oil economy. Traditionally, the key occupations in the Niger Delta range from fishing, hunting, agriculture to forestry. Hydrocarbon pollution has undermined these occupations, thus creating and exacerbating poverty. As UNDP (2006. p. 7) has observed, there are "many intricate links between the environment and sustainable livelihoods, demonstrating that environmental degradation and poverty are mutually reinforcing."

Several studies have linked hydrocarbon pollution and attendant environmental degradation to the worsening socio-economic

conditions of the people. In other words, it exacts and imposes very high economic cost on the people. A key part of the economic costs is poverty. Although poverty in Nigeria is a national malaise which is a reflection of the failure of leadership to leverage on the immense wealth generated from oil to chart a sustainable development agenda, its manifestation and pervasiveness in the Niger Delta is as a result of the exclusion of majority of Niger Delta people from the oil wealth generated therein as well as the destruction of their environment which robs them of the opportunity to generate non-oil wealth. While Nigeria's 2010 poverty profile put the proportion of Niger Delta population described as 'food poor' at 35.5%, current anecdotal evidence suggest higher percentage. This is in line with recent data from the world poverty clock which put the number of Nigerians living in the bracket of extreme poverty at 87 million<sup>2</sup>.

Beyond poverty, there is also health cost. Various studies have linked various ailments to exposure to certain chemicals and volatile organic compounds (UNEP, 2011 and UNDP 2006). Hydrocarbon pollution in the Niger Delta has contaminated water sources and crops, thus exposing the people to various health challenges. Ite et al. (2018) have itemized such health challenges to include among others genotoxicity, deoxyribonucleic acid damage, various forms of cancer, birth defects, leukemia, infertility and miscarriages. The worrisome aspect of the health cost is the absence of health facilities to deal with health complications.

## 5. CONCLUSION

The extent of damage to the ecosystem of the Niger Delta is such that the traditional means of livelihood have been destabilized. Oil production activities have systematically altered the ecological make-up of the region through gas flaring, oil spillage, discharge of effluents, toxic and hazardous chemicals into the water body and attendant environmental pollution. In actuality, years of operations of IOCs in the Niger Delta have spilled some nine to thirteen million barrels of oil into the environment with millions of tons of emissions into the atmosphere. Steiner (2010, p. 4) sums up the effect on the Niger Delta environment thus, "throughout 50 years of oil production, this ecologically productive region has suffered extensive habitat degradation, forest clearing, toxic discharges, dredging and filling, and significant alteration by extensive road and pipeline construction from the petroleum industry."

Thus, the Niger Delta environment is no longer sustainable: Future generations might not have a fraction of the biodiversity which the present generation is enjoying. Therefore there is urgent need to embark on a reclamation and remediation task. This task is made more urgent by the unfolding socio-economic and demographic realities in the region. One, as a result of the development of new oil wells, there is a continual contraction in its habitable area, thus undermining the possibility creating non-oil wealth. In other words, there is a serious contention for space in its 70,000 km<sup>2</sup> layout. Secondly, there is a serious challenge to occupational stability and continuity as the ecosystem finds it increasingly impossible to sustain fishing, farming and hunting,

which are the mainstay of the local population. Thirdly, all these challenges are in the face of the burgeoning population, which rose from approximately 22.0 million in 1991 to 31.3 million in 2006 and projected to hit 46 million in 2020 (National Bureau of Statistics, 2009; SPDC, 2011). Thus, what is needed for the remediation of the Niger Delta environment is the establishment of a novel futuristic ecological war chest.

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