

# Oil Spill: a Deterrence to Regional Development of the Niger Delta Region

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Regional development is a process of a regional system that is focused on building a dynamic parameters for quality life of the regional population, with sustainable, balanced and multi-factorial reproduction of social, economic resource and environmental potentials of the territory. It aims at utilizing the development potentials of the region to attract inward investment, improve human development and living conditions of the population. This noble aim of regional development has fallen short of its goals in the Niger delta region of Nigeria. This is largely because of unsustainable oil exploration and production activities in this region. *Nigeria economy depends on oil revenue for national income and foreign exchange earnings. The source of this wealth is the Niger Delta region of the country. One of the devastating effects of oil exploration and production in the Niger delta is oil spill.* Oil spills are recurrent problems with serious consequences both on the human life and ecosystem vitality. For decades, oil spills have devastated the environment of the fertile Niger-Delta. The resultant effect is the decline of agriculture – farming and fishing, forest resources and other money yielding natural resources. The constant pollution and contamination of underground water and other water bodies have resulted increase of health problems. Poverty and unemployment are on the high rate. *Oil spill has indeed remained an obstacle to development of this region.* The aim of this paper therefore is to highlight the development deterring and eco-destructive effects of oil spill on the Niger delta region with the aim to suggesting ways of improvement.

*Keywords:* oil, sustainable development, sustainability, ecological balance, destruction, Niger delta.

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**Introduction.** The term ‘development’ is very complex with many different and sometimes contentious definitions. According to Thomas Allan, the word ‘development’ could be defined as a:

- Vision or description of how desirable a society is
- Social change that takes place over long periods of time due to inevitable processes e.g example, arguments have been made that both capitalism and communism are unavoidable results of progress.
- Deliberate efforts to change things for the better. For example, providing food aid to alleviate hunger [1].

Development here could be seen as both the development of an area and human development. Thus, development could be defined as the act of making an area more productive of useful things which involves the development of the people who reside in such areas and is often associated with the idea that places and their inhabitants can pass from lower to higher stages of progress.

Regional development according to the Contracting Society is “a holistic process where different regional actors could participate in the definition, decision and implementation of the most convenient development for the current generations without affecting the economical investment capacity nor the social and the environmental stocks of the future generations” [2]. For Moldan & Dahl, It is the mode of operation of a regional system that is focused on the

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positive dynamic parameters of the level and quality of life of the population, sustainable, balanced and multi-factorial reproduction of social, economic, resource and environmental potentials of the territory [3]. Regional development in this sense can be seen as a general effort to improve lives in the regions by stimulating socio-economic development that will sustain ecological balance hence sustainable regional development.

The World Commission on Environment and Development (WCED), defined sustainable development as “development which meets the needs of the present without compromising the ability of future generations to meet their own needs” [4]. The UN conference in Johannesburg went ahead to identify the three pillars of sustainable development as economic development, social development and environmental protection and sustainability [5]. From the above definitions, it could be deduced that the concept of sustainable development involves three equivalent components: environmental, economic, and social development; as well as three dimensions of wellbeing, i.e. economic, ecological, and social, and their complex interrelations. This complex interaction and the overlapping zones are presented in figure below.

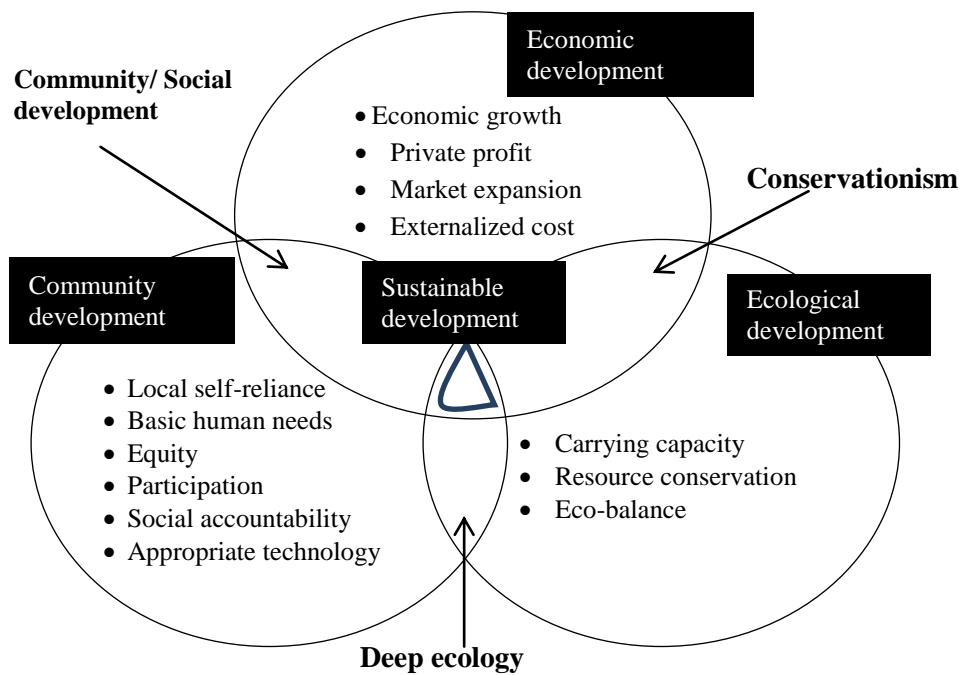


Figure 1. The overlapping zones of interest of sustainable development [6]

The figure 1 showed the 3 facets of development. The center where the 3 all got connected is the point where development could be sustained. The economic sustainability element aims to maximize income by saving essential wealth (capital) resources for the benefit of future generations. The ecological sustainability element concentrates on general vitality and health of ecosystems while Social-cultural sustainability dimension reflects the interface between development and dominating social norms and strives to maintain the stability of social systems. [7]

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Sustainable regional development therefore is a comprehensive strategy which addresses the broader regional environment that affects the performance of the economy, including the quality of human capital, innovation and the provision of patient investment funds.

The Niger delta region which is made up of 9 out of 36 constituent states of Nigeria is blessed with abundant natural resources. This incredibly well-endowed ecosystem contains one of the highest concentrations of biodiversity on the planet. This region is unique in the history of Nigeria because it is massively and naturally endowed with vast deposit of oil and gas with proven reserves [8]. Oil was discovered in this region 50 years ago and today Nigeria depends on oil revenue for 95 % of national income and foreign exchange earnings. Oil produced from this region currently placed Nigeria 12<sup>th</sup> among oil producing countries of the world. Nigeria in 2013 emerged the largest economy in Africa.

**Causes of oil spill.** One of the common occurrences in the Niger delta region as a result of oil production is oil spill. Oil spill according to Wikipedia is the release of a liquid petroleum hydrocarbon into the environment, especially marine areas, due to human activity. It is thus an accidental release of oil into a body of waters, from the tanker, offshore drilling rig, or underwater pipeline. The Nigerian National Petroleum Corporation (NNPC) estimated a yearly spill of oil into the Niger delta environment at 2,300 cubic meters with an average of 300 individual spills while Baird [9], contested that between 9 million to 13 million barrels have been spilled since oil drilling started in 1958 However, a UNDP report stated that there have been a total of 6,817 oil spills between 1976 and 2001, which account for a loss of three million barrels of oil, of which more than 70 % was not recovered. 69 % of these spills occurred off-shore, a quarter was in swamps and 6 % spilled on land.

Statistics of oil spill in Nigeria 1993–2013

Table 1

Year	Number of Spills (barrel)	Quantity spilled (barrels)	Quantity Recovered (barrels)	Quantity lost to the Environment (barrels)
1993	128	26157	7135	19022
1994	104	32879	1703	31177
1995	154	489295	391445	97850
1996	157	64117	63481	630636
1997	241	600511	42417	558094
1998	238	42723	5470	37252
1999	257	42841	2171	40670
2000	173	48351	6356	41995
2001	151	40209	1645	38564
2002	187	11876	1719	10157
2003	155	12905	552	12358
2004	129	31866	6109	25358
2005	108	9172	1955	7207
2006	118	5956	2153	3830
2007	166	14150	2093	12058
2008	258	108367	2786	105912
2009	378	51188	1477	49711
2010	453	8105	2937	6632
2011	495	35124	2336	32788
2012	417	63677	3110	60568
2013	158	399037	11838	387199
<b>Total</b>	<b>4,647</b>	<b>2,369,470</b>	<b>549,060</b>	<b>1,820,411</b>

Table reconstructed by author

Source of data: Dept of petroleum resources Nigeria [10]

About 50 % of the oil spill in this region is caused by pipeline and tanker accidents while sabotage and agitation account for 28 %. 21 % of spill is as a result of production process and operations with 1 % of the spills being accounted for by inadequate or non-functional production equipment. Corrosion of pipelines and tankers is the rupturing or leaking of old production infrastructures that often do not receive inspection and maintenance [11]. Expounding more on this, Ahmadu & Egbodion presented a table of arithmetical analysis of the causes of oil spill.

*Table 2*  
Analysis of the causes of oil spill the Niger delta

Causes	Mean	Standard deviation
Drilling of wells	3.53	0.60
Explosion of oil wells/terminals/stations	2.30	0.70
Spills from vandalized oil pipelines	2.72	1.03
Leakages from oil tanks	2.70	0.60
Corrosion of oil pipelines	3.73	0.44
Spills from loading of oil vessels	2.12	0.50
Maintenance activities of oil companies	2.30	0.80
Sabotage	3.60	0.70

*\*Significant(mean ≥ 2.5)*

*Source of data: Ahmadu & Egbodion [12]*

The table 2 presents the mean and standard deviation of the different causes of oil spill in the Niger delta region.

**The socio-economic and environmental effects of oil spill.** The effects of oil spill on Niger delta has been a focal point of research for many social scientist. This is because the deprivations and damages oil exploitation has caused the people in the region are enormous and affect all the 3 facets of development – economic, social and environmental. The Niger-delta economy is predominantly an agro-centered economy with farming and fishing as the main source of livelihood. This is because the ecosystem of the area is highly diverse, rich in biodiversity with arable and cultivable land that is supportive of numerous species of terrestrial and aquatic flora and fauna [13]. Mangrove swamps, freshwater swamps and lowland rain forest are all natural features of this region. Being massively endowed with natural resources, a larger number of the population is dependent on these resources and the environment for means of livelihood and economic sustenance. Put it differently, majority of the working population of this region are employed by nature [14] unfortunately, oil spill degrades and pollutes this natural environment through the contamination of groundwater and the soil leading to low agricultural yield and extermination of crops and species, destruction of aquaculture. Again, large tracts of the mangrove forests, which are especially susceptible to oil, have been destroyed. An estimated 5–10 % of Nigerian mangrove ecosystems have been wiped out [15]. There are visible traces of oil in local water bodies hence drinking water are contaminated leading to different health issues among the populace. The decline of local fishing production in this region is the direct effect of oil contamination of the water bodies. Mangrove forest are part of the natural endowment of this region hence forest and forest resources remain very important to the indigenous people of this region as well as the various organisms that inhabit these ecosystems. These floral communities rely on nutrient cycling, clean water, and sunlight for proper substrates. With ideal conditions they offer habitat structure, and input of energy via photosynthesis to the organisms they interact with [16]. But oil spill which often result in wide fire outbreaks especially in ramp sites, have not only

disrupted the natural circle of the ecosystem but have affected the human lives too. Forests in this region are estimated to cover approximately 8,580 km<sup>2</sup> of land [17] but today it is much more less to this figure hence the effect of oil spill acidify the soils halt cellular respiration and starve roots of vital oxygen.

One of the resultant effects of oil spill in this region is the loss of means of livelihood and sustenance. This is simply because greater portion of the population are engaged in agriculture – farming, fishing and forest resources as their means of making a living. The destruction of these natural resources means the loss of employment and source of livelihood for these local people. The attending consequence is poverty. This explains why there is high rate of unemployment and poverty in this region. The oil corporations operating in this region are not implementing reforms aimed at remediating the unsustainable environmental degradation. While they are focused on driving economic gains, they have significantly increased environmental risk and ecological scarcity and this has inadvertently affected the human well-being and social equity.

**Eco-economical loss due to oil spill.** Ecological and economic loss due to oil spill is expressed in the form of actual cost and possible damages caused to the regional economy and ecology including societal necessary lost and damages. It includes additional costs to compensate for these losses. For the purpose of clarity, damages in this sense are counted as losses which are as a result of destruction, harm or injuries caused hence losses due to oil spills are socio-economic and environmental damages, harm/destruction inflicted in the Niger-delta region through the oil trend. The figure 2 below is a model for the determination of these losses.

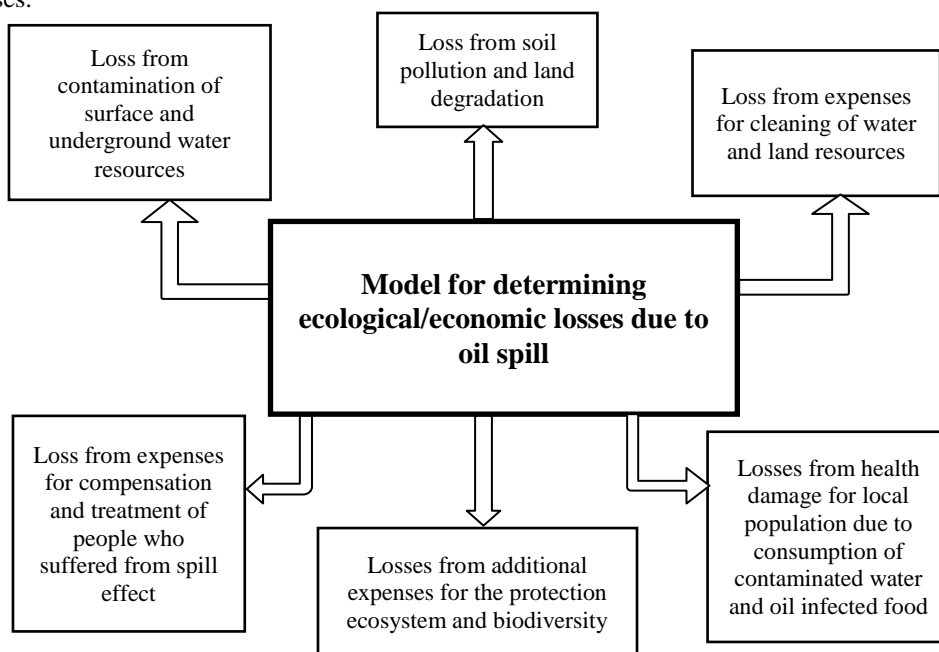


Figure 2. Model for Environmental and Economic Loss due to Oil Spills in the Niger delta [Source of data: Author]

This model is given to set the direction of how eco-economical losses could be determined and calculated. These include losses from contamination of surface and underground water resources, losses from soil contamination and land degradation, loss from expenses for cleaning of water and land resources, loss from expenses for compensation and treatment of people who suffered from spill effect, loss from additional expenses for the protection of ecosystem and biodiversity, losses from health damage of the local population due to consumption of contaminated water and oil infected food.

Table 3 is the estimated cost of the socio-economic and environmental damage/loss in the Niger delta due to oil spill.

*Table 3*

Estimated Cost of Oil Spills in The Niger-Delta Region 2000–2013 [18]

Year	Estimated cost (million Naira)		
	Socio-economic loss	Environmental damage	Total
2000	6,527,818.8	3,263,909.4	9,791,728.2
2001	2,971,082.3	1,485,541.2	4,456,623.5
2002	4,417,703.6	2,208,851.8	6,626,555.5
2003	5,479,995.6	2,739,997.8	8,219,993.4
2004	6,419,272.0	3,209,636.0	9,628,908.0
2005	20,619,996.8	10,309,998.4	30,926,995.2
2006	17,383,809.3	8,691,904.7	26,075,714.0
2007	19,606,050.0	9,803,025.0	29,409,075.0
2008	14,796,403.2	7,398,201.6	22,194,604.8
2009	13,599,831.6	6,799,915.8	20,399,747.4
2010	12,161,822.8	6,080,911.4	18,242,734.2
2011	4,902,285.2	2,451,142.6	7,353,427.8
2012	3,909,344.4	1,954,672.2	5,864,016.6
2013	1,487,686.8	743,843.4	2,231,530.2

The formulae for the determination of this table is given as:

$$D = D_1 + D_2 + D_3 + D_4 + D_n, \quad (1)$$

$$D = \sum_{i=1}^n D_i, \quad (2)$$

where:  $D_1$  – damage caused to natural resources (water, Land, soil, flora & fauna);  $D_2$  – damage to agricultural output as a result of pollution and contamination of water and soil;  $D_3$  – damage cause to the health of the population;  $D_4$  – expenses for cleaning and protection of ecosystem;  $D_n$  – other kinds of damage.

The table 3 is a compilation of the conversion of socio-economic and environmental damage/losses into monetary terms from 2000 to 2013.

**Conclusion and recommendation.** It is no doubt that oil production has brought a big boost to the Nigerian economy. Thus, it has accelerated the economic growth of the nation and

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today Nigeria is ranked as one of the fastest growing economy in the world. However, the socio-economic and environmental problems due to oil spill analysed above have for long retarded development and economic emancipation of the Niger delta region as there is prevalence of high rate of poverty, unemployment and low human development. The management of the Niger Delta's economic, social and natural capita leaves doubt to its sustainability. As noted earlier, development would only be sustained when there is a cord of balance among the economic, social and environmental facets. That is to say, the economic and social development must be contained within the carrying capacity of the environment, ecosystem and ecosystem services hence eco-balance.

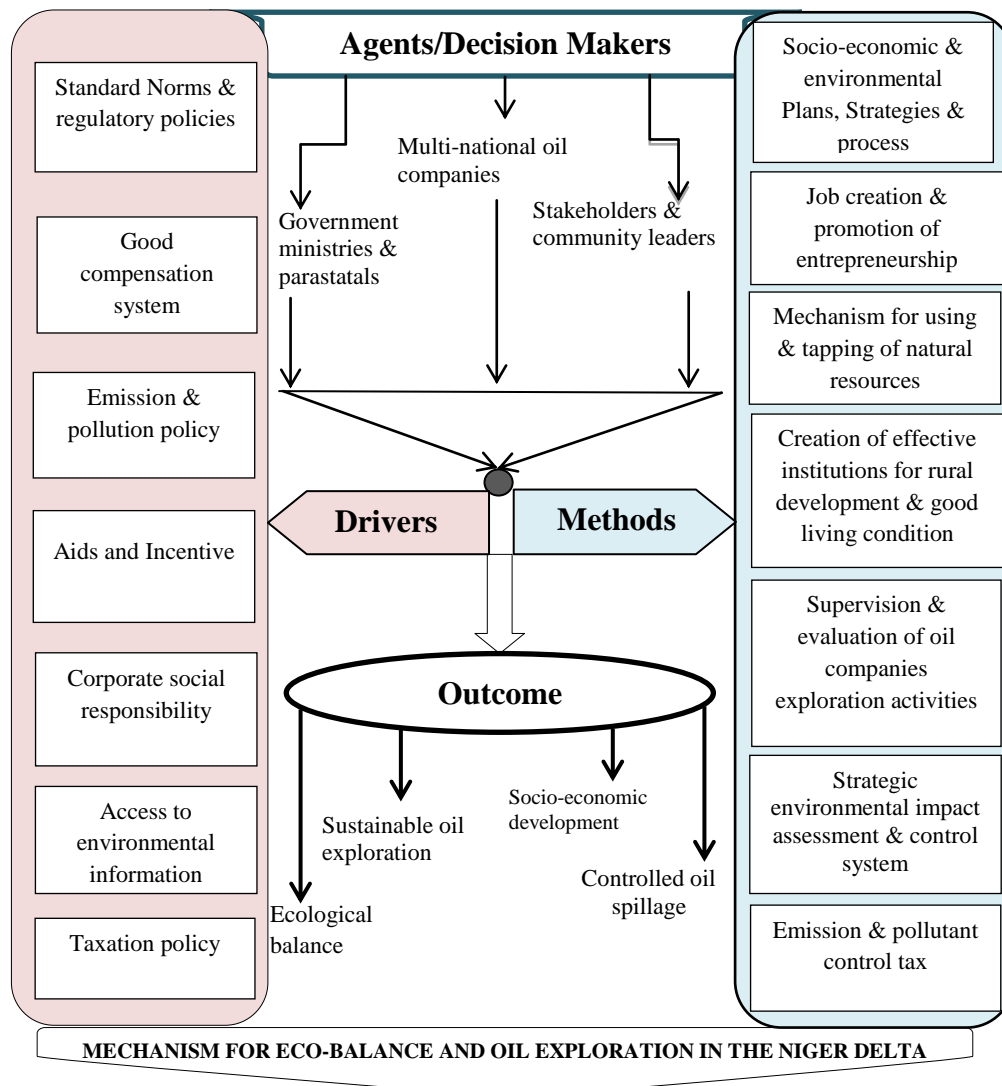


Figure 3. Mechanism of support for eco-balance and oil exploration

The problems due to oil spill and of course development of the Niger delta region can be resolved if these structural constraints underpinning their economic vulnerability are addressed. To this end, mechanism through which ecological balance would be maintained thereby sustaining development in the region is proposed.

The figure 3 above shows that the decision makers which include government agencies and parastatals, multinational companies, stake holders and community leader map out the methods through strategic plans and processes that involves the steps as seen in the figure. There are also drivers which are the indices that ought to be in place for the realization of the whole plan framework. When all these are put together, the outcome becomes possible. Sustainable development, eco-balance and controlled oil spill in the Niger delta is achievable but it will involve targeted and appropriate national policies and incentives on the part of government and concerted effort and commitment on the part of multi-national companies and stakeholder to build a pollution and degradation free regional environment where development will thrive.

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Регіональний розвиток є процесом регіональної системи, зосередженим на створенні динамічних параметрів якості життя населення регіону, зі сталим, збалансованим і багатофакторним відтворенням соціальних, економічних ресурсів і екологічного потенціалу території. Він спрямований на використанні потенціалу розвитку регіону для залучення іноземних інвестицій, поліпшення умов розвитку і життя населення. Ця мета регіонального розвитку не виправдала своїх завдань в регіоні дельти річки Нігер у Нігерії. Причина тому значною мірою полягає у діяльності з розвідки і видобутку нафти в цьому регіоні, яка не відповідає принципам сталого розвитку. Нігерійська економіка залежить від доходів від продажу нафти для національного доходу і валютних надходжень. Джерелом цього багатства є дельта річки Нігер. Одним з руйнівних наслідків розвідки й видобутку нафти в дельті річки Нігер є розлив нафти. Розливи нафти є постійно повторюваними проблемами з серйозними наслідками для життя людини і життєздатності екосистеми. Протягом багатьох десятиліть розливи нафти спустошили довкілля родючої дельта річки Нігер. Отриманий ефект – занепад сільського господарства, рибальства, лісових ресурсів та інших ресурсів, що приносять доходи. Постійне забруднення і виснаження підземних вод та інших водних об'єктів призвели до зростання проблем зі здоров'ям. Бідність і безробіття перебувають на високому рівні. Розлив нафти дійсно залишається серйозною перешкодою для розвитку цього регіону. Таким чином, метою даної роботи є виокремлення стримуючих і екологодеструктивних ефектів розливу нафти в регіоні дельти річки Нігер з метою розробки заходів щодо поліпшення ситуації.

*Ключові слова:* нафта, сталий розвиток, сталість, екологічний баланс, руйнування, дельта річки Нігер.

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Региональное развитие является процессом региональной системы, сосредоточенным на создании динамических параметров качества жизни населения региона, с устойчивым, сбалансированным и многофакторным воспроизводством социальных, экономических ресурсов и экологического потенциала территории. Оно направлено на использовании потенциала развития региона для привлечения иностранных инвестиций, улучшение условий развития и жизни населения. Эта цель регионального развития не оправдала своих задач в регионе дельты реки

Нигер в Нигерии. Причина тому в значительной степени заключается в деятельности по разведке и добыче нефти в этом регионе, которая не соответствует принципам устойчивого развития. Нигерийская экономика зависит от доходов от продажи нефти для национального дохода и валютных поступлений. Источником этого богатства является дельта реки Нигер. Одним из разрушительных последствий разведки и добычи нефти в дельте реки Нигер является разлив нефти. Разливы нефти являются постоянно повторяющимися проблемами с серьёзными последствиями для жизни человека и жизнеспособности экосистемы. В течение многих десятилетий разливы нефти опустошили окружающую среду плодородной дельта реки Нигер. Полученный эффект – упадок сельского хозяйства, рыболовства, лесных ресурсов и других ресурсов, приносящих доходы. Постоянное загрязнение и истощение подземных вод и других водных объектов привели к росту проблем со здоровьем. Бедность и безработица находятся на высоком уровне. Разлив нефти действительно остаётся серьёзным препятствием для развития этого региона. Таким образом, целью данной работы является выделение сдерживающих и экологодеструктивных эффектов разлива нефти в регионе дельты реки Нигер с целью разработки мероприятий по улучшению ситуации.

*Ключевые слова:* нефть, устойчивое развитие, устойчивость, экологический баланс, разрушение, дельта реки Нигер.

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