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Environmental and Socio-Economic Impact of Oil Exploration on the Niger Delta Region: A Case Study of Ibeno, Nigeria

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Abstract
The impact an economic system has on the environment is by drawing upon raw materials to keep the system functioning and the left over waste must find their ways back to the natural environment. This paper studied environmental and socio-economic impact of oil exploration in the oil producing area of Niger Delta using data from household survey in Ibeno. The study used interviewer-administered questionnaires and participant observation method and found that there exist evidence of positive impact of multinational company on infrastructure development and socio-economic well-being and negative impact on the ecosystem of the host community. These finding, therefore have some policy implications as discussed in the work.
Keywords: Environment, socio-economic impact, exploration, Ibeno, ecosystem, Niger Delta

1. Introduction

The environment is considered as the global life support that encompasses the biosphere that all living organisms draws their existence, produce, distribute, consume and other economic activities exist within. It is the provider of all sorts of raw materials as well as inputs without which other factors (production and distribution) would be an illusion. The economy according to Field *et al.* (2009), is a collection of technological, legal and social arrangements through which individuals in society seek to increase their material and spiritual well-being.

One type of impact that an economic system has on the environment is by drawing upon raw materials to keep the system functioning. Production and consumption activities also produce left over waste and these waste must find their way back into the natural environment. Depending on how they are handled, these residuals may lead to pollution or the degradation of the natural environment.

The Niger Delta is made up of a number of distinct ecological zones, typified by a large river delta in a tropical region: coastal ridge barriers, mangroves, fresh water swamp forest and low land rainforests, covers an area of some 70,000km^2 (Isedu *et al.*, 2004). This has precipitated several changes to the environment in terms of modification in coastal zone, upstream dam construction and urban growth, industrial development, exploitation of natural resources and has led to increase in population pressure. According to Ukpong (1991), further events in the region has created an urgent need to reconcile industries, environment and community interest taking into account all factors that are relevant to managing development that is both sustainable and contributory to the achievement of industrial and community stability.

The existence of mineral in what is now known as Nigerian can be traced back to the year 1903 when the colonial mineral survey company pioneered the first mineralogical studies in Nigeria. Oil exploration started in 1908 when a German Bitumen Company known as the Nigeria Bitumen Corporation was granted license to exploit the bitumen deposits around Araromi in now Ondo State. Activities were suspended between 1914 and 1918 as a result of the 1st world war (Eba, 2002). Until 1946, shell returned to Nigeria in partnership with British petroleum. The company became known as Shell-BP and by 1956, Shell-BP discovered oil in large quantity in Oloibiri in the present Bayelsa State. As at 1961 not less than nine international companies from America, Europe and Japan were prospecting for oil in Nigeria. These include Shell-BP, American oversea petroleum company (Texaco), Mobil, Gulf, Elf (Safrap), Agip oil, Philips petroleum, Eso Exploration (Standard Oil of New Jersey) and the Nigeria National Petroleum Company (NNPC).

This exploration has contributed enormously to the country's foreign exchange earning and total revenue of the government. Even when serious efforts are being made at different quarters according to Achi (2003), to diversify the Nigeria economy, her dependency on oil is bound to continue for a long period of time. Petroleum exploration has triggered adverse environmental impacts in the Niger Delta region of Nigeria through incessant environmental, socio-economic and physical disasters that have accumulated over the years due to limited scrutiny and lack of assessment.

It is obvious that the debate on environmental and socio-economic impact on oil exploration in the Niger Delta region is far from being conclusive. The role of oil companies can be positive, negative or insignificant, depending on the economic, institutional and technological conditions in the host country. This article therefore

seeks to: (a) Investigate the extent at which the oil companies has assisted in the infrastructure development of the host community; (b) To determine the impact of oil exploration on the socio-economic well-being of the host community and; (c) To ascertain the adverse effect of oil exploration on the ecosystem of the host community.

2. Theoretical issues and literature review

The quality of the environment has become a major focus of public concern on the connection between environmental quality and the economic behavior of individuals and groups of people. There is the fundamental question on how the economic system shapes economic incentives in ways that lead to environmental degradation as well as improvement. According to Field *et al.* (2009), these are major problems in measuring the benefits and cost of environmental quality changes, and a set of complicated macroeconomic questions: for example, the connection between economic growth and environmental impacts and the feed-back effects of environmental laws on growth.

Barros and Johnson (1974), emphasized the human activity element in pollution as man is generally acclaimed to be the worst polluters of his environment. Most environmental pollution in the Niger Delta region occurs during production and distribution or transportation of petroleum products. For instance, according to Akpofure *et al.*(2002), when oil spills on water, spreading immediately take place. The gaseous and liquid components evaporate, some get dissolved in water and even oxidize, and yet some undergo bacterial changes and eventually sink to the bottom by gravitational action. The soil is then contaminated with a gross effect upon the terrestrial life. As the evaporation of the volatile lower molecular weight components effect aerial life, so the dissolution of the less volatile components with the resulting emulsified water, effects aquatic life.

This does not undermine other environmental pollutions such as gas flaring, toxic disposals and the balkanization of land by heirs. According to Isedu *et al.* (2004), before the Nigerian Liquiefied Natural Gas (NLNG) plant went into production in October 1999, 95% of all gas produced along with oil, known as associated gas, was flared after separation from oil. The cost in terms of degradation of environment and to the health of the people of the oil producing communities was incalculable. Study shows that Nigeria is the worst hit in terms of gas flaring in the world with flaring or venting 10-20bcm of associated gas annually (World Bank, 2004). Flaring gas has a global impact on climate change by adding about 390 million tons of CO_2 in annual emissions. This is more than the potential yearly emission reductions from projects currently submitted under the Kyoto mechanisms. Gas flaring wastes resources and harms the environment according to World Bank (2006), it also deprives consumers of an energy source that is cleaner and often cheaper than others available and reduces potential tax revenue and trade opportunities.

The impact of multinational investment (oil) in enhancing and stimulating economic growth and development has been given prominence in economic literature. The classical economist gave prominence to the extension of market as a key element that would encourage economic growth and development. With the extension of market, economies prosperity would emerge as a result of increased specialization and trade. Marx like other classicists shared the same view on the extension of market as a catalyst for economic growth. But Marx analysis was based on historical stages of a society. His historical underpinning was that social, political, cultural and spiritual aspect of life are conditioned by the mode of production. The mode of production was seen as the sum of the material and productive forces of society. These productive forces include climatic and geography as well as existing technology.

Caves (1996) opined that avoidance of oligopolistic uncertainty and erection of barriers to the entry of new rivals are the factors underpinning the investment decision in less developed countries. This observation was further enhanced by the deficiencies of capital, technology and expertise to exploit and enhance the natural resources that abound in the less developed countries.

Multinational companies can transfer technology either directly (internally) to their foreign own enterprises (FOE) or indirectly (externally) to domestically owned and controlled firms in the host country (Blomstrom *et al.*, 2000; UNCTAD, 2000). Spillovers of advanced technology from foreign owned enterprises to domestically owned enterprises can take any of four ways: vertical linkages between affiliates and domestic suppliers and consumers; horizontal linkages between the affiliates and firms in the same industry in the host country (Lim, 2001; Smarzynska, 2002); labour turnover from affiliates to domestics firm; and internalization of Research and Development (R & D) (Hanson, 2001; Blomstrom and Kokko, 1998). The pace of technological change in the economy as a whole will depend on the innovation and social capabilities of the host country, together with the absorptive capacity of other enterprises in the country (Carkovic and Levine, 2002).

Other benefits might also accrue from multinational companies such as the creation or rather expansion of local industries to supply inputs to the newly established plant; a rise in the overall level of domestic demand to boast incomes and through taxation, state revenues, and the transference of labour (human capital), skills and technology.

3. Methodology

The study population (Ibeno Local Government Area (L.G.A.) is situated at the extreme south of Akwa Ibom State, just at the bank of the Atlantic ocean. Covering an area of about 16,000 square kilometers and the population census figure for 2006 is 74,840 people of which 53.46% are male and 46.54% are female (NBS, 2007).

The choice of Ibeno, among other oil producing community, purposive, is based on its relative population size, location as well as the extent to which the researchers are familiar with the area.

3.1 The data

Data is drawn from interviewer-administered questionnaires conducted to implement an adapted version of the survey modules and participant observation method enables the researcher to make on-the-spot assessment of issues under study. To have adequate representation, all the twenty-five villages were clustered into five groups and represented with letter 1, 2, 3, 4 and 5.

The respondent is an adult member (at least 18 years) in the household. Each group is classified as an Enumeration Area (EA). The information includes: Education/Literacy, health and health care, employment and employment quality, security/violence, occupation, scholarships, empowerment and income. Out of the three hundred (300) respondents 165 representing (55%) were male while 135 representing (45%) were female.

4. Discussion of findings

Table 4.1 shows the summary data of the study variables and was reorganized and used testing the objective of the study. However, the data analysis are enhanced by the statistical package for social sciences (SPSS version 11.0).

From table 4.2, on the impact of multinational companies on infrastructural development, the information shows that the presence of multinational oil companies is perceived to exert a significant impact on the infrastructural development of the host community (t=28.85; P=0.00).

From table 4.3, on the population t-test analysis of the impact of oil exploration on the socio-economic wellbeing of the host community, the information shows that oil exploration is perceived to exert a significant impact on the socio-economic wellbeing of the host community (t=28.94; P=0.000).

From table 4.4, the perceived impact of oil exploration on the ecosystem of oil producing community was compared to the expected impact as expressed on 10 items in a 4-point liken scale. The result shows that oil exploration is perceived to exert a significant impact on the ecosystem of host community (t=32.27; P=0.000).

5. Policy Recommendation

The following recommendations are the implications of our findings and if applied would not only improve the environmental quality but also the socio-economic and infrastructural development in the host community.

Irrespective of the infrastructural development from the multinational companies, the government should provide conducive environment for the host community by building good road network to the villages to justify huge taxes received since oil constitute the main fiscal basis and source of capital accumulation for the government. Fuel stations should be erected at different location and should be managed by appointed members of the host community.

Multinational company should increase the royalty or sort of entitlement to the community, rate of scholarship, build cottage industries, increase health care facilities and invaluably bring in tourism attractions to improve their socio-economic activities.

Gas flare and oil spills reduction requires effort by both government, oil industry and local community. It may be more successful where there is buy-in high level support and effective local partnership between government and industry. Since the host community's sources of livelihood that includes farming, fishing and hunting have been destroyed, compensations at some times should be given to avoid restiveness. Flaring can also be reduced by recycling or reinjecting associated gas into the field and infrastructure can be developed to supply to the market as strategy of reducing flare into the ecosystem. The multinational companies should be compelled to stick to environmental guideline as ensured by the National Environmental Policy.

6. Conclusion

The important conclusion from this study is that there are some evidence of positive impact of multinational companies on infrastructure development and socio-economic wellbeing and negative impact on the ecosystem of the host community. This is consistence with some of the discussions in the literature. In all, multinational company are important for the smooth functioning of the economy due to their role in employment generation and capital accumulation to the government but has caused destructions to aquatic or marine species, farmlands and extinction of wild-lives.

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Table 4.1: Summary data of the study variables (n = 300)

Variable	$\underline{X}$	SD
Impact of multinational company on infrastructural development	28.91	2.62
Impact of oil exploration on socio-economic well-being	28.84	2.30
Impact of oil exploration on ecosystem	30.75	3.08

Table 4.2:Population t-test analysis of the impact of multinational oil companies on infrastructural development of host community (n=300)

Impact of multinational company on infrastructural development	$\bar{X}$	SD	t	Sig. of t
Observed	28.91	2.62		
			25.85*	0.00
Expected	25.00	2.62		

*significant at the 0.05 level of significance

Table 4.3:Population t-test analysis of the impact of oil exploration on the socio-economic well-being of the host community (n=300)

Impact of oil exploration on the socio-economic well-being of host community	$\bar{X}$	SD	t	Sig. of t
Observed	28.84	2.30	28.94*	0.000
Expected	25.00	2.30		

*significant at the 0.05 level of significance

Table 4.4:Population t-test analysis of the impact of oil exploration on the ecosystem of oil producing area (n=300)

Impact of oil exploration on the ecosystem of oil producing area	$\bar{X}$	SD	t	Sig. of t
Observed	30.75	3.08	32.37*	0.000
Expected	25.00	3.08		

*significant at the 0.05 level of significance

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
AGE*SEX	300	100.0%	0	.0%	300	100.0%
MARITALS*SEX	300	100.0%	0	.0%	300	100.0%
HIGHEDU*SEX	300	100.0%	0	.0%	300	100.0%
OCCU*SEX	300	100.0%	0	.0%	300	100.0%
MONINCOM*	300	100.0%	0	.0%	300	100.0%
SEX	300	100.0%	0	.0%	300	100.0%
OILEXPLO*SEX	300	100.0%	0	.0%	300	100.0%

AGE*SEX crosstabulation

			SEX		Total
			Male	Female	
AGE	Below 30yrs	Count	41	27	68
		% of Total	13.7%	9.0%	22.7%
	30-39yrs	Count	15	60	75
		% of Total	5.0%	20.0%	25.0%
	40-49yrs	Count	56	30	86
		% of Total	18.7%	10.0%	28.7%
	50-59yrs	Count	18	12	30
		% of Total	6.0%	4.0%	10.0%
	60 and above	Count	35	6	41
		% of Total	11.7%	2.0%	13.7%
Total		Count	165	135	300
		% of Total	55.0%	45.0%	100.0%

MARITAL*SEX crosstabulation

			SEX		Total
			Male	Female	
MARITALS	Single	Count	41	24	65
		% of Total	13.7%	8.0%	21.7%
	Married	Count	103	108	211
		% of Total	34.3%	36.0%	7.3%
	Separated/ divorced	Count	3	3	6
		% of Total	1.0%	1.0%	2.0%
	Widower/ Widow	Count	18		18
		% of Total	6.0%		6.0%
Total		Count	165	135	300
		% of Total	55.0%	45.0%	100.0%

HIGHEDU*SEX crosstabulation

			SEX		Total
			Male	Female	
HIGHEDU	No. education	Count	35	6	41
		% of Total	11.7%	2.0%	13.7%
	Primary education	Count	6	3	9
		% of Total	2.0%	1.0%	3.0%
	Secondary education	Count	97	96	193
		% of Total	32.3%	32.0%	64.3%
	Tertiary	Count	27	30	57
		% of Total	9.0%	10.0%	19.0%
Total		Count	165	135	300
		% of Total	55.0%	45.0%	100.0%

OCCU*SEX crosstabulation

			SEX		Total
			Male	Female	
OCCU	Farming	Count	6	6	12
		% of Total	2.0%	2.0%	4.0%
	Trading	Count	55	48	103
		% of Total	18.3%	16.0%	34.3%
	Fishing	Count	9	3	12
		% of Total	3.0%	1.0%	4.0%
	Civil service	Count	18	36	54
		% of Total	6.0%	12.0%	18.0%
	Student	Count	24	24	48
		% of Total	8.0%	8.0%	16.0%
	Business	Count	32		32
		% of Total	10.7%		10.7%
	Oil coy worker	Count	21	18	39
		% of Total	7.0%	6.0%	13.0%
Total		Count	165	135	300
		% of Total	55.0%	45.0%	100.0%

MONINCOM*SEX Crosstabulation

			SEX		Total
			Male	Female	
MONINCOM	Below N35,000	Count	47	47	94
		% of Total	15.7%	15.7%	31.3%
	35,000-45,000	Count	82	46	128
		% of Total	27.3%	15.3%	42.7%
	45,000-65,000	Count	6		6
		% of Total	2.0%		2.0%
	65,000 and above	Count	6	18	24
		% of Total	2.0%	6.0%	8.0%
	No. fixed income	Count	24	24	48
		% of Total	8.0%	8.0%	16.0%
Total		Count	165	135	300
		% of Total	55.0%	45.0%	100.0%

OILEXPLO*SEX Crosstabulation

Position since oil exploration			SEX		Total
			Male	Female	
OILEXPLO	Very favourable	Count	44	10	54
		% of Total	14.7%	3.3%	18.0%
	Favourable	Count	97	32	129
		% of Total	32.3%	10.7%	43.0%
	No change	Count	21	78	99
		% of Total	7.0%	26.0%	33.0%
	Not favourable	Count	3	3	6
		% of Total	1.0%	1.0%	2.0%
	No response	Count		12	12
		% of Total		4.0%	4.0%
Total		Count	165	135	300
		% of Total	55.0%	45.0%	100.0%

T-Test

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
INFRASTR	300	28.9133	2.62210	.15139
SOCIOECO	300	28.8367	2.29657	.13259
ECOSSTE	300	30.7500	3.07664	.17763

One-Sample Test

	Test value = 25					
	t	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
INFRASTR	28.850	299	.000	3.9133	3.6154	4.2113
SOCIOECO	28.936	299	.000	3.8367	3.5757	4.0976
ECOSYSTE	32.371	299	.000	5.7500	5.4004	6.0996