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Economic Evaluation of Crop Farms Acquired for Crude Oil Production Activities in Rivers State of Nigeria

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Abstract

This study focused on the economic evaluation of crop farms acquired for crude oil production activities in Rivers State, Nigeria. The objectives include estimating the areas of crop farms acquired and economic evaluation of crops lost due to the various crude oil production activities in the state. A multistage sampling technique was used to collect data from 169 crop farmers whose farmland were affected with different crude oil exploration activities via questionnaires. The results showed that a total of 682.91ha of crop farms were acquired for crude oil exploration purposes out of which pipelines laying (25.21%), flow stations (21.51%) and oil well sites (20.34%) topped the list. The results further showed that the total value of economic loss due to crude oil production activities was \$165,287.10 out of which pipelines laying accounted for \$43,741.25, flow stations (\$36,387.92), oil well sites (\$31,334.67), gas flaring sites (\$10,485.63). The study showed that large areas of crop farms in the state were acquired for crude oil production activities. Due to the small scale nature of farms in Nigeria, a lot of crop farmers in Rivers State were negatively affected which had resulted into

agitation for resource control, continuous violence, conflicts, protests and impoverishment.

Keywords: Crude oil production activities, crop farms, areas acquired, economic evaluation, Rivers State Nigeria.

Introduction

Land is an essential input in farming and as such land degradation and depletion of soil resources have profound economic implications for low-income countries and poor rural regions of the world. This is especially true of Africa, where agricultural production is crucial to development and the livelihoods of the rural population depend on the primary sectors (Maiangwa et al., 2007). The various activities of the oil industry affect the land and its environment. This is to be expected as man's activity alters the environment to some extent. The environmental impact of the oil industry essentially results from activities and processes necessary for the successful operation of the oil industry (Kharaka and Dorsey, 2005; Bader, 2006; Chovwen et al., 2009)

Crude oil pollution factors which have had some effects on the environment and generated reactions from individuals include in an increasing order of concern: [a] destruction of vegetation during exploration and for construction of oil fields sites and laying of pipelines (Fisher and Sublette, 2005; Ezeabasili, 2009). (b) The continuous presence of light, heat and in some cases sooty emissions from flares (Akeredolu et al., 2005; Nkwocha and Pat-Mbano, 2010). (c) Oil pollution of the environment through accident oil blow-outs, oil pipeline leaks, failure of storage tanks, and affluent from refinery operations (Marin et al., 2006; Osuji and Opiah, 2007)

The communities in Rivers State (farmers inclusive) are apparently the worst hit judging by the death of marine and terrestrial organisms often associated with oil spill incidents. Agricultural products have also been destroyed while the rivers which the inhabitants rely on for their drinking water have been rendered unwholesome (Benson et al., 2008; Udoetok and Osuji, 2008)

The aim of this study is to evaluate the economic losses incurred by the crop farmers due to crude oil exploration and production activities in Rivers State of Nigeria. These activities include the acquisition of crop farms for construction and drilling of flow stations, oil well sites, gas flaring sites, pipelines laying, borrow pits and other crude oil exploration, exploitation and production operations.

The Problem of the Study

There are two sides of the equation of exploration and refining of crude oil - the benefits and consequences (loss), which in this case is the environmental impact of the oil industry on agricultural production. The environmental dimensions of the Niger Delta people grievance (Rivers State inclusive) is derived from land alienation, disruption of the natural terrain from construction of oil industry infrastructure and installation, and pollution (Hutchful, 1986; Olayiwola and Adeleye, 2006; Ugbomeh and Atubi, 2010; Ekanem et al., 2010). It would be a better state of affairs therefore if it is taken for granted that the disturbance of the environment (as it affects agriculture) whether it be oil spillage, acquisition of farmland for oil well sites or pipelines laying, is a fact people in Rivers State must live with as long as Nigeria prospects for oil and gas and derive the benefits thereof. But the losses from the death of marine, terrestrial organisms and plants (including the crops) could be minimized by the oil companies by incorporating environmental impact assessment into their corporate strategy (Eweje, 2006; Ezeabasili, 2009).

With distortions in the major livelihood activities of the people of Rivers State due to crude oil production operations, the question this article asks is: what value of economic losses had crop farmers suffered due to acquisition of farmland for wide spread crude oil and gas exploration and production activities in Rivers State, Nigeria?

Justification of the Study

There is scarcity of scientific data on evaluation of crop farmers' economic losses due to acquisition of farmland for crude oil production activities in Rivers State, Nigeria. Many literatures had examined the effects of crude oil pollution on Nigerian agriculture (Ekundayo and Obuekwe, 2000; Ekundayo et al., 2001; Achuba, 2006; Njoku et al., 2008). None of these studies cited above had studied the current topic of economic evaluation of crop farms acquired for crude oil production activities in Rivers State of Nigeria.

The Objectives of the Study

The main objective of this study was to estimate the economic value of crops lost due to crude oil production activities in Rivers State of Nigeria. The specific objectives were to:

- (i) Evaluate the areas of crop farms acquired by oil companies for various crude oil production activities in Rivers State.

- (ii) Estimate the economic values of crops lost due to the acquisition of crop farms for various crude oil production activities in Rivers State.

Literature Review

Ottom et al. (2005) investigated the impact of oil and gas productions on soils, groundwater, surface water and ecosystems in two oil well sites located in north eastern Oklahoma, USA with prominent production features of one of the sites (site A) as occupying 1.5ha of land and possessing oil field trench, pipelines, storage pits for both water produced and oil, etc.

Osuji and Adesiyani (2005) studied an oil spill polluted site at Ogbodo – Isioke in Ikwerre Local Government Area (LGA) of Rivers State, Nigeria, showing the total extractable hydrocarbon contents. Osuji et al. (2006) studied polluted soils from Eneka oil field in Obio - Akpor LGA, Rivers State, Nigeria, the results showed the total extractable hydrocarbon content (THC) of the polluted soils at surface and subsurface depths. Abii and Nwosu (2009) studied two oil spilled affected areas in Ogali and Agbonchia, while a geographically similar but unaffected area, Aleto, (all in Eleme LGA, Rivers State, Nigeria) served as control. The results indicated that there was a significant decrease in the soil nutrients, as well as a significant increase in the sand fraction and Na content of the oil spilled affected soils when compared with non-affected soils.

NDDC (2006) reported that the length of oil and gas pipelines constructed in the Niger Delta region of Nigeria alone was over 7,000km, spread over a land area of 31,000km² owned by over 1,500 fishing and farming communities inhabited mainly by peasants. Hutchful (1986) reported that land alienation has exacerbated demographic stress. Worse still, Nigerian law permits alienation of land by the oil industry without consultation with the indigenous owners. In support of the above argument on land alienation Olayiwola and Adeleye (2006) reported that several years of unsustainable exploitation of oil has devastated the local environment, thereby depriving the people of Niger Delta, of the optimum use of their land and water. The paper further stated that protest over the injustice of the Land Use Act by the Niger Delta people had been met with gross violation of human rights by the government. Several lives have been lost in clashes between protesters and government security agencies.

Ajibade and Awomuti (2009) examined the impact of petroleum exploitation on the environment of the Niger Delta oil production communities in Nigeria. The paper observed that there was need for the adoption of measures that would provide a reasonable degree of protection of ecological and human environment from the activities of the oil industry in Nigeria. Enemugwem (2009) in the study of how oil pollution damaged human ecology in eastern Obolo (Andoni LGA) in Rivers State observed that oil pollution had not only degraded the human values but had adverse effects on the flora and fauna, traditional economies and social practices of the people in the area, increased poverty, food contamination and lack of security of human life. This view was supported by Ogege and Ewhrudjakpor (2009) who said that the Niger Delta region of Nigeria had witnessed a remarkable up surge in environmental resource crisis as a result of the presence of oil multinationals in the region.

Ogege (2009) in its own contribution opined that the activities of the multinational oil companies have ushered in various manifestations of conflicts, resulting from intra/inter community feud; communities agitation for resource control and protests over the degradation of the Niger Delta environment. In support Nkwocha and Pat-Mbano (2010) stated that many communities in Obrikom and Omoku in Ogba/Egbema/Ndoni LGA of Rivers State have been exposed to the gas flaring due to the increased extraction of petroleum in the area.

Ekanem et al. (2010) stated that the major factor of the crisis in the Niger Delta is the prevalence of disaffected youths in the area who are involved in militant activism to redress perceived injustice done to them, their environment and continuous destruction of their sources of livelihood, which include crop farms acquired for oil and gas construction and installations. Ugbomeh and Atubi (2010) observed that unfortunately oil has not brought prosperity and better living conditions to the people of Niger Delta (Rivers State inclusive). Rather, it has been accomplished by instability, insecurity, conflicts, violence, crimes, and social tension.

Methodology

This study was conducted between 2002 and 2003 in Rivers State, Nigeria. The state which is located in the Niger Delta region of Nigeria lies approximately between latitudes 4^{ON} and 6^{ON}, and longitudes 6^{OE} and 7^{OE}. Collection of data was from both primary and secondary sources. The primary data were collected, through personal interviews and observations

with the farmers, and structured questionnaires distributed among crop farmers whose farmland were acquired for various crude oil production activities. A multistage sampling procedure was used to obtain data for this study. The first stage involved the selection of seventeen (17) local government areas (LGAs), out of the existing 23 LGAs in Rivers State, based on the fact that they were more crop farming inclined than the others. These 17 LGAs are: Abua/Odual, Ahoada East, Ahoada West, Asaritoru, Degema, Eleme, Emohua, Etche, Gokana, Ikwerre, Khana, Obio-Akpor, Ogba/Egbema/Ndoni, Omuma, Oyigbo and Tai LGAs.

The second stage involved the stratification of farmland acquired in an affected LGA into sampling units namely flow station sites, oil well sites, gas flaring sites, pipelines laying, borrow pits and others (which were specified accordingly). The third stage involved the random sampling of ten (10) farmers whose crop farms were affected by different crude oil production activities mentioned above. Therefore, a total of 170 questionnaires were distributed, out of which 169 questionnaires were retrieved and retained as suitable for analysis. Data were analyzed using descriptive statistics.

Result and Discussion

Areas of Crop Farms Acquired for Crude Oil Production

The area of crop farms acquired for crude oil production activities such as flow stations, oil well sites, gas flaring sites, borrow pits dug during crude oil sites constructions and installations, pipelines laying and other activities are shown on Table 1. The overall hectares (ha) of crop farms acquired (measured in ha) was obtained by summing up the number of hectares acquired from each respondents. Average size of crop farm acquired (measured in hectares) was obtained by dividing the overall hectares by the number of respondents per crude oil construction and/or installation operation. Minimum and maximum values (measured in ha) were the minimum and maximum hectares of land acquired from each crop farmer interviewed. The heading (C.V., %) stands for the coefficient of variations of the standard deviations, expressed in percentage.

The results on Table 1 showed that a total of 682.91ha of crop farms were acquired by the multinational oil companies from the respondents during the period of survey (2002 – 2003) for crude oil production purposes. Out of this total figure of 682.91ha, pipelines laying occupied the highest area of crop farms acquired from crop farmers (172.14ha) with a share of 25.21%. It was closely followed by flow station sites, 146.92 ha (21.51%), oil well sites,

138.89ha (20.34%), borrow pits, 102.98ha (15.08%), gas flaring, 48.10ha (7.04%) and others, 73.88ha (10.82%). With the average peasant (small-scale) farm size in Nigeria reported as 0.01 – 1.50ha (Ekunwe and Orewa, 2007) and supported by the results from Table 1 (minimum values of hectares owned by crop farmers in the state), these areas of crop farms acquired belong to many crop farmers who are peasants. Therefore, it could be said that a lot of crop farmers had been similarly affected across the state. The results of large areas of crop farms acquired for crude oil construction and installations, coupled with large number of farmers involved as analyzed in this study, supported the results of and are similar to the reports of Bader (2006) and N DDC (2006). These results also go to support the findings of Olayiwola and Adeleye (2006), Ogege (2009), Ekanem et al. (2010), Ugbomeh and Atubi (2010) on land alienation and grievances of the Niger Delta people which had led to insistence violence, conflicts, protests and agitations for resources control.

The results on Table 1 also showed that an oil well site location acquired an average size of 2.83ha of crop farms. Among all the crude oil production activities the oil well locations occupied the largest area. This was followed by the area of crop farms used for construction of a flow station (2.80ha), gas flaring site (2.19ha), pipelines laying (2.03ha), borrow pit (1.94ha) and other activities (2.00ha). The mean value of crop farms acquired by the multinational oil companies for crude oil production activities in Rivers State was 2.30ha. All the results of average sizes of crop farms acquired by the multinational oil companies in Rivers State for the various crude oil production activities listed in Table 1, were significantly higher than the average figure given by Otton et al. (2005) for the average area acquired for an oil well site (1.5ha) in Oklahoma, USA. This means that oil companies in Oklahoma, USA used land more economically for the same crude oil production operations as compared to the oil companies operating in Rivers State, Nigeria. This may be due to the Nigerian land Use Act of 1978, which purported that the Federal Government of Nigeria takes over the ownership and control of land in the country (Olayiwola and Adeleye, 2006). This result is in support of the findings of Hutchful (1986) on land alienation by the multinational oil companies operating in Rivers State, Nigeria. This pattern of land acquisition and alienation could impoverish the crop farmers, considering the fact that they are peasant farmers who depend solely on primary sectors of production (Enemugwem, 2009) for their livelihood.

Economic Evaluation of Crops Lost Due to Crude Oil Production Activities

The estimated economic values of crops lost by crop farmers due to crude oil exploration, exploitation and production activities in Rivers State were shown on Table 2. These estimates were made based on values of crops lost by respondent crop farmers whose farm plots were acquired for the various crude oil production operations. The Nigerian naira (local currency) value obtained during the field survey in 2003 were converted into USA dollars (\$) equivalent using an exchange rate of ₦120 to USA \$1.00, which was the average exchange rate as at the period of data collection.

The table showed that the largest estimated economic loss incurred by crop farmers in Rivers State during the survey occurred as a result of pipelines laying (\$43,741.25) accounting for 26.46% of the total estimated economic loss of \$165,287.10. Other estimated crops value lost due to the acquisition of crop farms for flow station sites was \$36,387.92 (22.02%), oil well sites, \$31,334.67 (18.96%); borrow pits, \$26,531.63 (16.05%), gas flaring sites, \$10,485.63 (6.34%) and other activities, \$16,806.00 (10.67%). The mean total value of the estimated economic lost per crude oil production activity was \$27,547.85. The ranking on Table 2 was done based on the figures of the total estimated value lost per activity.

Table 2 also showed that the mean value of estimated economic losses per ha of crop farm acquired for a crude oil production activity was \$239.90. The highest mean value lost per ha of crop farm acquired was in pipelines laying, \$256.52, followed by borrow pits (\$253.26), other activities (\$240.09), flow stations (\$236.29), oil well sites (\$235.58) and gas flaring sites (\$217.63). Also presented in the table were data for mean estimated value of economic loss per crude oil production activity. Oil well sites had the highest mean value of estimated economic loss (\$666.70), followed by flow station sites (\$661.60), pipelines laying (\$520.73), borrow pits (\$491.33), other activities (\$480.17) and gas flaring (\$476.62). The mean value lost per crude oil production activity in the state was \$549.53. These estimated economic losses by crop farmers obtained in 2003, were significant to their economy considering the fact that most of these farmers lived on less than \$1.00 per person per day as was popularly the case in sub-Saharan Africa (Lin and Lin, 2003; Adams and Page, 2005).

Conclusion

This study found out that the acquisition of crop farms from the peasant farmers in Rivers State for crude oil exploration, exploitation and production activities had deprived the crop farmers of tangible areas of farmland (682.91ha) which had caused loss of farm income and output value at \$165,287.10, hence impoverishing these peasant crop farmers. This result is in support of the findings of and similar to the results of Enemugwem (2009); Ogege and Ewhrudjakpor (2009), Nkwocha and Pat-Mbano (2010). The inadequate pattern of handling oil pollution issues by the multinational oil companies in Rivers State, Nigeria had caused more hardship on the crop farmers than blessing. This opinion is similar and supports the opinion of Ogege (2009), Ekanem et al. (2010), Ugbomeh and Atubi (2010).

Recommendations

The study made some recommendations on how to ameliorate the adverse effects of crude oil production activities and they are as follows:

- (i) That adequate patterns of handling crude oil production activities be established to minimize the areas of crop farms acquired for oil and gas exploration and exploitation purposes. This suggestion was based on the fact that in Oklahoma USA, an average of 1.5ha (Otton et al; 2005) was used for such crude oil production activities whereas in Rivers State, Nigeria the average was 2.30 ha. This will help the crop farmers to retain a larger portion of their farmland for the sustainability of their livelihood (Olayiwola and Adeleye, 2006; Enemugwem, 2009).
- (ii) That since crop farmers in Rivers State of Nigeria have no options than to continue to live with the problems of crude oil exploration and production activities because the country derives more benefits from the oil industry than is obtainable from agriculture, there is the need for a comprehensive scientific rehabilitation programme, such as the remediation techniques for soil cleaning suggested by Abii and Nwosu (2009) for unavoidably polluted crop farms to be established in Rivers State.
- (iii) That those farmers in crude oil production prone areas could seek additional means of livelihood by diversifying their sources of income that is, not relying solely on farm income, thereby relying more on non farm income (Zhu and Luo, 2010) or quit crop farming

altogether for other more beneficial economic activities that are less prone to crude oil pollution. This will allow land to be allocated for its best alternative uses (in this case crude oil exploration and production). This will reduce the tensions, conflicts, violence, protests and several agitation of resource control between the crude oil production host communities, the multinational oil companies and the government (Ajibade and Awomuti, 2009; Ezeabasili, 2009; Chovwen et al., 2009).

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Table 1: Area of crop farms acquired for crude oil production activities in Rivers State of Nigeria

Crude oil production activities	Overall hectares of crop farms acquired (ha)	Percentage	Average size of crop farms acquired (ha)	Standard Deviation (S.D) (ha)	Minimum value (ha)	Maximum value (ha)	C.V. (%)	Ranking
Flow station sites	146.92	21.51	2.80	1.51	0.30	10.00	53.93	2 nd
Oil well sites	138.89	20.34	2.83	1.64	0.50	16.00	57.95	3 rd
Gas flaring sites	48.10	7.04	2.19	0.75	1.00	7.00	34.25	6 th
Borrow pit	102.98	15.08	1.94	1.01	0.30	8.00	52.06	4 th
Pipelines laying	172.14	25.21	2.03	1.25	0.10	8.00	61.58	1 st
Others	73.88	10.82	2.00	1.01	0.20	11.00	50.50	5 th
Total	682.91	100	-	-	-	-	-	-
Mean	113.82	-	2.30	1.20	0.40	10.00	51.71	

Source: Field survey, 2003

Table 2: Estimated economic value of crops lost in USA (\$) due to crude oil production activities in Rivers State.

Crude oil production activities	Total economic value lost per activity (\$)	Percentage	Mean economic value lost per activity (\$)	Standard deviation (S.D.)\$	Mean economic value lost per ha of crop farm acquired	C.V. (%)	Ranking
Flow station sites	36,387.92	22.02	661.60	402.86	236.29	60.89	2 nd
Oil well sites	31,334.67	18.96	666.70	420.66	235.58	63.10	3 rd
Gas flaring sites	10,485.63	6.34	476.62	174.82	217.63	36.68	6 th
Borrow pits	26,531.63	16.05	491.33	295.47	253.26	60.14	4 th
Pipelines laying	43,741.23	26.46	520.73	411.80	256.52	79.08	1 st
Other activities.	16,806.00	10.17	480.17	256.42	240.09	53.40	5 th
Total	165,287.10	100	-	-	-	-	-
Mean	27,547.85	-	549.53	327.01	239.90	59.51	

Source: Field Survey, 2003