

Perspectives on Socio-economic and Psychological Effects of Bitumen Exploration on Host Communities: A Case Study of Agbabu, Ondo State, Nigeria

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Abstract: *This study is an assessment of potential socio-economic and psychological effects of bitumen exploration on residents of Agbabu community in Ondo State, South-West, Nigeria. It provides vital demographic information and perceptions of residents on the effects of bitumen exploration on their physical environment, health and social life. A multistage random sampling technique was used in the study for a total population of 170 respondents. Pre-tested study, well-structured interview schedule and focus group discussion were used to collect data which were subsequently analyzed by means of descriptive statistics. Finally, recommendations are made to Government and other stakeholders on policies and programs to establish and maintain symbiosis among all parties involved.*

Keywords: Bitumen, Agbabu, Socio-economic, Ondo, Nigeria

1. Introduction

Bitumen is any of various solid or semisolid mixtures of hydrocarbons that occur in nature or that are obtained as residues from the distillation of petroleum or coal. In its various forms, which include asphalt, petroleum, and tar, bitumen is one of the most widely distributed of substances. It occurs, in varying quantities, in nearly every part of the world and throughout the whole range of geological strata. [1]. It is noteworthy that there are close similarities between crude oil and bitumen. Besides, their exploration has triggered adverse environmental impacts in Nigeria through incessant environmental, socio-economic and physical disasters that have been recorded over the years due to limited scrutiny and risk assessment [2].

For instance, agricultural land degradation have resulted from shoreline erosion and landscape destruction associated with oil and gas exploitation activities. Large chunk of coastal land have been made unfit for crop production; particularly the right of way created for pipelines, thereby worsening the existing economic hardship being experienced by residents [3].

On this note, Niger-Delta, an oil producing area of Nigeria has the history of a long-term friction between the host communities and the oil companies. Hence, corollary damage has been done to both oil companies and host communities. The environment in host communities has been denigrated and desecrated such that peasant farmers there have suffered loss of farmsteads and social displacement. The situation has generated serious conflict situations to the extent that oil companies have sometimes had their pipelines vandalized and flow stations seized. Kidnapping of expatriate personnel is

also widely reported in many cities of the Niger- Delta where oil companies are located.

Therefore, this study which is based on in-depth evaluation of vital demographic data attempts to evaluate potential socio-economic and psychological effects of bitumen exploration in Agbabu, Ondo State, Nigeria. It also provides the basis for sound recommendations on how to establish a symbiotic relationship between Agbabu community and bitumen exploration companies, thus avoiding aforementioned crises already plaguing crude oil exploration in the Niger-Delta, Nigeria.

2. Literature Survey

Bitumen had its first publicity in Nigeria in 1900 and the exploration of bitumen began with the shallow boreholes that were drilled as far back as 1905 by Mineral Survey of Southern Nigeria in the Western most part of a line of oil known as tar sand belt. Generally bitumen deposits occur along 5-8km belt stretching over 120 km from Lagos to Ogun, Ondo and Edo States. Between 1907 and 1914, a more ambitious series of fifteen boreholes were drilled by a German venture, the Nigerian Bitumen Corporation (NBC). These boreholes were distributed mainly along a stretch beginning at the outcrop belt northeast of Lekki Lagoon in Ogun State and extend toward the southeast in Ondo State, precisely Agbabu. The Nigeria's tar sands rank among the five largest deposits in the World. It is suggested to be second only to the deposits in Venezuela and comparable with the large tar sands deposits in Alberta Canada and Trinidad [4].

Besides its potential for enhancing Nigeria's foreign exchange status, exploitation of bitumen will provide new jobs for Nigerians through the emergence of allied companies. For

instance, development of the bitumen sector through exports can fetch Nigeria over six times the total revenue presently accruing from the petroleum sector [5]. The discovery of oil in Nigeria in the late 1950s led to the temptation to give little or no attention to the other sectors of the economy thereby leading to a mono economic nation. The data reported by the Central Bank of Nigeria [6], and [7] revealed that the total revenue from oil rose from 7,253 million naira in 1983 (69.02% of the Total National Revenue) to 106,155.4 million naira in 1993 (76.44% of the Total National Revenue).

Agbabu bitumen belt includes the main Agbabu village and other smaller farm settlements such as Temidire village made up of about 200 people. Farmers in this area deal mainly in cash crops such as cocoa, kolanut and food crops such as yam and plantain and fishing along River Oluwa which flows through the whole land.

In Nigeria, petroleum exploration has resulted in the destruction of organisms over a large expanse of land and water bodies. These operations have not only caused degradation to the environment and destroyed the traditional livelihood of the region but have also caused environmental pollution which has affected weather conditions, soil fertility, waterways aquatic habitats and wildlife.

3. Previous Work

Several scholars have highlighted the continuing conflicts between exploration companies and host communities in oil producing states [8], [9] and [10]. Most of these conflicts have been painstakingly traced to massive environmental degradation and consequent social dis-equilibrium which have resulted in several paradoxes, including large-scale unemployment in the midst of vast resources. Jike [9] has examined some of these paradoxes and unequivocally stated that “the anxiety and expectations surrounding the discovery of oil have waned because the general livelihood of the people has not been positively affected by the discovery of oil”. Part of the thrust of this paper is to move beyond the dialectics to a much more fundamental and holistic approach to achieve the best level of synergy possible between the oil investors and host communities. This approach may stoke oil companies and host community synergy and encourage reciprocal empowerment between these two important stakeholders in the study area.

Violence in the Niger Delta region revolves around some salient fundamental issues, which the Nigerian state has not summoned the much needed political will to tackle since crude oil was discovered in Oloibiri (present day Bayelsa state) in 1956. The most important fundamental issues underlining the Niger Delta Youth unrest include:

- 1) Environmental pollution and despoliation,
- 2) Legislations of disempowerment and subjugation,
- 3) Politics of marginalization and exclusion,
- 4) Pervasive poverty and underdevelopment:
- 5) The hazards posed by oil and gas-related pollutions

- 6) To enforce compliance with the social responsibility avowals of oil companies.

To bring to an end youth unrest in Niger Delta, [11] rightly indicated, the development of civic education among the youths as a means, but not an end in itself. The youths must be empowered with skills for employment to earn socially responsible living. Provision of micro credit to enable the youths set up businesses is an integral part of this strategy and civic education must be developed.

4. Method/Approach

The study was carried out in the bitumen areas of Ondo State, Nigeria. A multistage random sampling technique was used in the study. Firstly, Odigbo Local Government Area being the major bitumen producing area in the state was selected. Odigbo Local Government has a land area of 1,818 km² and a population of 230,351 persons (NPC, 2006). Secondly, Three (3) communities were randomly selected from the Local Government Area, these included Agbabu, Ilubirin and Temidire. Lastly, Seventy (70) respondents were randomly selected from Agbabu because it is the most populated as shown in Figure 1. On the other hand, fifty (50) respondents were selected from each of Ilubirin and Temidire making a total of population of 170 respondents that was used for the study.

Both primary and secondary data were used for the study. Pre-tested study, well-structured interview schedule and focus group discussion were used to collect data for this study. Data collected were subsequently analysed by means of descriptive statistics such as frequencies, percentages and mean.

5. Results and Discussion

Responses received from the Field Survey were analyzed and results presented in tables and figures.

5.1. Key Socio Economic Characteristics of the Respondents

Table 1 presents key socio-economic characteristics of respondents in the study area. The result reveals that the study area is dominated by the male gender which accounts for 60% of the total respondents interviewed. This is an indication that there were more males inhabiting bitumen producing towns of Ondo State than their female counterparts. Reasons for this might be attributed to the fact that the only feasible economic activities in these areas are limited to farming and fishing which usually require laborious and drudgery activities which the females may not be able to withstand. The table further reveals that the mean age of respondents was about 44 years. It was discovered that 44.7 percent of the respondents fell within the age group of between 26 and 35 years old, about 32.9 percent fell within the category of 46 and 55 years and 7.1 percent were between 36 and 55 years old. Only few (15.3%) fell between the age category of 56 and 65 years. This implies

that majority of the inhabitants in the study area are still within the active age, full of strength and vigour. The finding indicates that 62.4 percent of the respondents were married, about 25 percent of them were single and only few (8.2%) were divorced/ separated. This implies that we have more married persons in the study area than single persons, this could be attributed to the fact that majority of the respondents were above 30 years of age. It was shown in the table that majority (88.2%) of the respondents had form of formal education or the other while only 11.6 percent of them had no formal education.

The table also points that the mean annual income of the respondents was ₦47,900.00. It shows further that a high

percentage (63.5%) of the respondents had an annual income below ₦50,000. About 21.2 percent of them had an annual income of between ₦80,001.00 and ₦100,000.00. Only few (1.2%) of them had an annual income of more than ₦100,001.00. This is an indication that majority of the inhabitants of the study area were relatively poor, this could be as a result of low economic activities which can be carried out in these villages as they are remote and not easily accessible. The results further indicate that a high percentage (72.9%) of the respondents were farmers by their primary occupation, about 24.7% of them were traders and only few (2.4%) of them were civil servants

Table 1: Key Socio Economic Characteristics of the Respondents

<i>Characteristics</i>		<i>Freq.</i>	<i>%</i>
Sex	Male	102	60.0
	Female	66	40.0
	Total	170	100.0
Age	26-35 Years	76	44.7
	36-45 Years	12	7.1
	46-55 Years	28	32.9
	56-65 Years	26	15.3
	Total	170	100.0
Annual Income	<50000	104	63.5
	50001-80000	24	14.1
	80001-100000	36	21.2
	100001-130000	2	1.2
	Total	170	100.0
Educational Status	Standard/Pry Sch.	86	50.6
	Secondary School	58	34.1
	Post -Secondary Sch.	6	3.52
	No formal	20	11.6
	Total	170	100
Occupation	Farming	124	72.9
	Trading	48	24.7
	Civil servant	4	2.4
	Total	170	100.0
Type of Farming	Crop	116	68.2
	Animal/ fishery	54	31.8
	Total	170	100.0
Household Size	1-4	26	15.3
	5-8	142	83.5
	13 and above	2	1.2
	Total	170	100.0
Marital Status	Married	106	62.4
	Divorced/Separated	14	8.2
	Widowed	6	3.5
	Single	44	25.9
	Total	170	100.0
Religion	Christianity	138	81.2
	Islam	24	14.1
	Traditional	8	4.7
	Total	170	100.0
Cosmopolitan	Occasionally	110	64.7
	Regularly	40	23.5
	Frequently	14	8.2
	Rarely	6	3.6
	Total	170	100.0

The low number of civil servants in the study area could be attributed to absence of public institutions and other social amenities in the area. Besides, it could also be due to the fact that farming and fishing are the principal economic activities which are feasible in these villages. The table further reveals that majority (68.2%) of the respondents are food crop farmers while only few (31.8%) of them are involved in animal husbandry and fish farming.

The study reveals that the mean household size of the respondents in the study area is 3 persons and it further points that majority (83.5%) of the respondents interviewed had a household size of between 5 and 8 persons and only few (1.2%) of them had a household size of more than 13 persons. This implies that labour for agricultural activities may be provided by family members. The study also shows that high percentages (81.2%) of them are Christians; about 14.1 percent of them are Muslims and only 4.7 percent practice Traditional religion. This could be as a result of missionary activities in the study area in the early 1950s. The table shows that majority (64.7%) of them travels occasionally and only few (8.2%) of them travels frequently. This finding could be attributed to the fact that majority of the respondents were farmers and as such may not have any need to leave the village so that they could pay full attention to their farms. It could also be due to high cost of transportation on account of the deplorable condition of their roads.

5.2. Other Socio Economic Characteristics of the Respondents

Table 2 presents other features of the respondents in the study area. The results in the table reveal that 47 percent of the respondents lived in a thatch roofed building; about 49.4 percent lived in iron roofed building. However, only few (3.6%) of them lived in a room and parlour apartment and none of them lived in a flat apartment. This result is an indication that majority of the inhabitants in the study area are of the low income status. The table indicates that all (100%) of the buildings in the study area are located on land and none of the buildings is located on water. The study further reveals that 64.7 percent of them use motorcycle as a means of transportation, about 8.23 percent of them use canoe and only few (11.7%) of them travel by means of automobiles. This implies that most inhabitants in the study area used motor cycle as a means of transportation which could be as a result of poor road network. The table also indicated that only 29.4percent of the respondents own a house, about 25.9 percent and 16.5 percent have bicycle and motor cycle of their own respectively. Only few respondents (9.40 % and 7.00 %) own car and canoe respectively. This finding shows that majority of the inhabitants had very few material possessions, indicating the low income status of people which can be attributed to their being majorly peasant farmers and artisanal fishermen.

The results further indicate that majority (88.2%) of the respondents relies on hand-dug wells as the source of drinkable water and about 11.8% of them rely on streams.

This implies that none of them had access to pipe-borne water as a source of drinkable water. This is further proof that the study area lack basic social amenities. Hence, there is an urgent need for government and investors to implement strategies to address this deficit of basic social amenities in the study area.

Table 2: Social Status of the Respondents

Characteristics		Freq.	%
Building Type	Thatch Roof	80	47.0
	Iron Roof	84	49.4
	Room & Parlor	6	3.6
	Flat	-	-
	Total	170	100.0
Building Location	Land	170	100.0
	Water	-	-
	Total	170	100.0
Mode of Transportation	Bicycle	26	15.3
	Motorcycle	110	64.7
	Canoe	14	8.23
	Automobile	20	11.7
	Total	170	100.0
Material Possessions	House	50	29.4
	Television	20	11.8
	Bicycle	44	25.9
	Motorcycle	28	16.5
	canoe/boat	16	9.40
	Automobile	12	7.00
	Total	170	100.0
Source of Drinkable water	Well	150	88.2
	Stream	20	11.8
	Tap	-	-
	Total	170	100.0

5.3. Bitumen Pollution in the Study Area

The results in Table 3 reveal that 15.2 percent of the effects of bitumen pollution in the study area were felt on humans, about 14.1 percent and 24.7 percent impacted on soil and water respectively. It shows further that respondents asserted that fishes were affected by 23.5 percent and their economy by 10.5 percent. This implies that bitumen pollution has effects on the livelihood of the respondents in the study area and that respondents' health, domestic life and economy are under the threats of the negative consequences of bitumen pollution.

Table 3: Bitumen Pollution and Livelihood of Respondents in the Study Area

S/N	Affected Area	Freq.	%
1	Humans	26	15.3
2	Soil	24	14.2
3	Water	42	24.7
4	Domestic Animals	20	11.8
5	Fish	40	23.5
6	Economy	18	10.5
	Total	170	100.0

Effects of Bitumen Pollution on the Respondents

The results in Table 4 reveal that effects of bitumen pollution on human beings was sickness (70.6%) such as stomach aches, high body temperature (due to hot environment), eye problems, chronic nose and throat irritation, chronic coughing and reduced sense of smell. The table points further to the fact that the effects of bitumen pollution on the inhabitants of the study area also include early death (14.2%) and retarded growth (15.2%). The study also shows that the major effects of bitumen pollution on animals include sickness (58.8%), retarded growth (38.8%) and early death (2.4%) of the animals. The table further reveals that the major effect of bitumen pollution on fishes is poor growth (63.5%). Also the results indicate that the effects of bitumen pollution on fishes could lead to their death (36.5%).

Table 4: Effects of Bitumen Pollution on the Respondents

S/N	Affected Area	Effects	Freq.	%
1	Humans	Sickness	120	70.6
		Early death	24	14.2
		Retarded Growth	26	15.2
		Total	170	100.0
2	Animals	early death	4	2.4
		Retarded growth	66	38.8
		Sickness	100	58.8
		Total	170	100.0
3	Fishes	Death	62	36.5
		poor growth	108	63.5
		Total	170	100.0
4	Economic activities	reduced income	58	34.1
		Spoilage of Farm produce	112	65.9
		Total	170	100.0
5	Water	Salty Water	94	55.3
		Polluted Water	76	44.7
		Total	170	100
6	Soil	loss of nutrients	54	31.8
		poor yield	116	68.2
		Total	170	100.0
7	Social Activities	-	-	-
8	Religious Activities	-	-	-
9	Mobility	-	-	-
10	Death rate	High	10	5.9
		Low	26	15.3
		Average	134	78.8
		Total	170	100.0
11	Domestic life	Increased death	82	48.2
		poor growth	88	51.8
		Total	170	100.0
12	Children education	Reduced Assimilation Rate	84	49.4
		Poor Performance	86	50.6
		Total	170	100.0

The study reveals that the principal effects of bitumen pollution on economic activities of the respondents were reduced income (65.9%) and spoilage of farm produce (34.1%). The study indicates that the major effects of bitumen pollution on the water body in the study area were saltiness of

water (55.3%) and bad odour of water (44.7%). The result indicates that loss of nutrients (31.8%) and poor yield (68.2%) were the major effects of bitumen pollution on the soil of the study area. This implies that the ability of the soil to support plant growth has been greatly impaired and this is evident in plants showing visual signs of plants dying. The table indicates that reduced assimilation rate (49.4%) and poor performance (49.4%) were the major effects of bitumen pollution on the education of the children in the study area. This finding is an indication that the health, economy, education and their entire livelihood activities are under serious threats and as such there is a need for the inhabitants of the study area to be relocated and resettled to areas where they will have good access to a land which is rich in nutrients, good water body devoid of odour and pollutants. There should also be appropriate legislations to protect the right of the citizens.

5.4 Implications of Bitumen Pollution on Respondents Health

From Table 5 (64.7%) of the inhabitants of the study area interviewed attested that there is an incidence in one or more ailments in their villages in the recent years as a result of bitumen pollution while only a smaller (35.2) percent of them indicated that there is no incidence of ailments in their villages. The results implies that respondents in the study area had suffered one or more ailments in the recent times emphasizing the finding in Table 3 that bitumen pollution have negative implications on the health of human beings in the study area. The results from the findings further indicate that majority of the ailments the respondents suffered from were contacted from water (85.8%) which they used to cook their food , bath, drink and used in washing their cloths. This implies that the water body in the study area has been polluted as a result of bitumen and thus posing threats and negative implications on the livelihood of the inhabitants of the study area. The result further points that only few (14.2%) of the ailments recently noticed in the study area were contacted from thick bushes around the villages. This could be as a result of the fact that the soil of the study area also suffers from bitumen pollution thus having an aftermath effects on the vegetation around the study area and when there is exchange of carbon (iv) oxide and oxygen between the environment and the vegetation, the resulting negative consequences will be suffered by the inhabitants of the area. The table also indicates that respondents in the study area had treated one or two ailments in the last two years, ranging from malaria (35.3%), nose and throat irritation (18.8%) to eyes problems (14.1%). It implies that respondents in the study area suffered more from malaria which is usually due to high temperature as a result of the presence of the bitumen.

Table 5: Implication of Bitumen Pollution on Respondents' Health

Recent Incidence of Ailments		Freq.	%
	Yes	144	64.7
	No	60	35.3
	Total	170	100.0
Source of Ailments	Water	146	85.8
	Forests	24	14.2
Types of Ailment Treated in the Preceding Two Years	Malaria Fever	60	35.2
	Eyes problem	24	14.2
	Nose/throat irritation	32	18.8
	Lack of sense of smell	36	21.1
	Rheumatism	18	25.7
	Total	170	100.0
Type of Hospital Visited	Government	108	63.5
	Private	24	14.2
	Traditional Healers	38	22.3
	Total	170	100.0

The result shows further that majority (63.5%) of the respondents consulted government hospital for cure of their ailments. A few (22.3%) of the respondents patronized traditional healers in order to find a cure to their ailments. This could be because they could not afford to withstand the financial implications of government hospitals or because they want to continue to adhere strictly to their traditional beliefs, norms and values. There is a need by government to improve medical facilities that are available to the inhabitants of the

study areas so that they can have prompt attention and cure to their ailments.

5.5. Perception of the Respondents on the Effects of Relocation on their Security, Economic Activities, Social Activities and Education

In response to the type of compensation which respondents will prefer; whether Financial compensation(Lease hold of the land for a period and renewable at the expiration or complete sale of the land) or Relocation and Resttlement, the option of relocation to another land that will favour their livelihood and resettlement was agreeable to 80% of them.

The agreement was made with some reservations from some respondents and these were basedon the following considerations:

- 1) Lack of confidence in Government's willingness to fulfil its own part of the bargain
- 2) Psychological attachment to the land inherited from their fore fathers, which they have been so used to, and this makes parting uneasy
- 3) Total loss of claim of claim of ownership

However,after due consideration of the hazard presented by the bitumen and its rxploration, they do not parting with the land; especially for the benefit of the younger generation

Table 6: Perception of Respondents on the Effects of Relocation on their Security, Economic Activities, Social Activities, Education and Infrastructures

S/N	Factor	Statement	SA	A	U	D	SD	Mean
1	Security	Feel Insecure	-	22.4 (19)	-	77.6 (66)	-	2.44
		Feel Exposed to Danger like before	1.2 (1)	2.3 (2)	11.8 (10)	84.7 (72)	-	2.20
		Feel Exposed to Danger unlike before	38.8 (33)	31.8 (27)	2.4 (2)	10.6 (9)	16.5 (14)	3.65
		I will need Improved Securities	5.9 (5)	94.1 (80)	-	-	-	4.0
2	Economic Activities	In will Lack Basic Amenities	-	74.1 (63)	-	25.9 (22)	-	3.48
		I cannot get any gainful Employment	4.7 (4)	68.2 (58)	-	27.1 (23)	-	3.50
		There will be need to get Land for Farming or water for Fishing	-	96.5 (82)	1.2 (1)	2.4 (2)	-	3.94
3	Social Activities	I should have Access to my Family	100.0 (85)	-	-	-	-	3.97
		I should be Accepted in my Family	94.1 (80)	5.9 (5)	-	-	-	4.03
		I will feel lonely most of the times	80.0 (68)	15.3 (13)	4.7 (4)	-	-	2.44
4	Education	I should have the opportunity to continue my Study	10.6 (9)	89.4 (76)				3.98
		My children should go to school	85.9 (73)	14.1 (12)	-	-	-	4.07

Table 6 presents the perception of the respondents on the effects of relocation on their security, economic activities, social activities and education. The table points that the

respondents disagreed (\bar{X} :2.44) that they will feel insecure if they are relocated from the bitumen area. The results also

indicate that respondents disagreed (\bar{X} :2.20) that they will feel exposed to danger like before if they are relocated. The finding reveals that respondents agreed (\bar{X} :3.26) that they will not feel exposed to danger like before if they are relocated. The study shows further that respondents agreed (\bar{X} :4.0) that they will need improved security if they are relocated. The table also indicate that the respondents were undecided (\bar{X} :3.48) that they will lack basic social amenities if they are relocated. Findings also reveals that respondents agreed (\bar{X} :3.50) that they cannot be gainfully employed if they are relocated. The respondents agreed (\bar{X} :3.94) that they will need land for farming and water for fishing if they are relocated. They also agreed (\bar{X} :3.97) that they should have access to their immediate family members and peers groups if they are relocated. The study also points that the respondents agreed (\bar{X} :4.03) that they should be accepted in their community if relocated. They disagreed (\bar{X} :2.44) that they will feel lonely most of the times if they are relocated. They agreed (\bar{X} :3.98) that they have the opportunity to continue their education if relocated. The result also indicate that the respondents agreed (\bar{X} :4.07) that their children should have the opportunity to go to school when relocated. The results suggests that the respondents in the study area are willing to be relocated and resettled in a place where they can have access to improved security, good land that is rich in nutrients, good water source, improved health facilities, basic social amenities and good education. It points further that the respondents advocated that they should not be ostracized from their family and friends and should be granted the opportunity to exhibit their fundamental human rights if relocated.

6. Conclusion

The study has revealed the socio-economic and psychological predicament of the people in the study area, Agbabu in Ondo State, due to the presence of bitumen in their land. As a result of this they are not favourably disposed to the commencement of exploration because of the fear of the unknown resulting from the information on happenings in the similar areas where such exploration has taken place. However, it is also noted that they are willing to go into negotiation with all the stakeholders so for a sustainable bitumen exploration in the area, it is recommended that the Government and the exploration companies on one hand and the host community on the other hand should reach a solid agreement on the expectations, the right and the duties of all the stakeholders before onset of the exploration activities. The agreement reached should be honoured by parties involved.

7. Future Scope

Based on the findings from this study, the following recommendations are made:

- Community meetings should be organized by Government and Policy makers to proactively emphasise with the social and psychological conditions of the host community members and allay the fears on relocation.

- Sensitization programs should be organized by policy makers, Government and NGOs to enlighten community members on the need for relocation and the benefits accruable from it.
- Environmental Impacts Assessment (EIA) should be carried out by Government with full involvement of community leaders and members at all stages of the program.
- There is the need for an Oil Spill Management Plan which will involve comprehensive plan to ensure compliance with environmental regulations and safety.
- Producing Area Commission (OSOPADEC) should be technically and financially equipped for the clearing of spills, monitoring and controlling pollution arising from oil spills while the Oil Companies working in the region should form „Clean-Up Cooperative Partnership“ to monitor, control and clean oil spills whenever it occurs.
- There is the need to establish community – corporation organization committee to discuss issues and maintain cordial relationship between the community and potential exploration organizations.

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Authors Profile



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