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Impacts of oil spillage on the socio-economic dynamics within the kula kingdom in the Akuku-Toru Local Government Area of Rivers State

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Abstract

This research investigates the socio-economic ramifications engendered by oil spills within the Kula Kingdom, situated in the Akuku-toru Local Government Area of Rivers State. The inquiry employs a dual evaluative approach: (1) qualitative analysis through interviews with 205 families, employing a 50% probability sample, and (2) quantitative assessment utilizing the Hazards and Effects Management Process developed by the SPDC. The findings from both evaluative methodologies converge, indicating a deleterious impact of oil spills on the community. The adverse effects manifest prominently in the depletion of local fauna and the disruption of traditional livelihoods, specifically in fishing, hunting, and sand mining. Proposed remedial measures include compensatory provisions, both in material and monetary forms, targeted at affected occupational groups. Nevertheless, the study underscores the transience of such mitigative efforts, elucidating the complex and enduring challenges posed by oil spillage.

Keywords: Oil Spillage; Socio-Economic Dynamics; Environmental impacts; Kula Kingdom; Akuku-Toru Local Government Area

1. Introduction

Nestled within the Akuku-toru Local Government Area of Rivers State, the Kula Kingdom epitomizes the intricate interplay between natural resource exploitation and the intricate fabric of societal existence. This region, long revered for its ecological richness and cultural heritage, faces a recurring and ominous challenge - the insidious encroachment of oil spillage. These spillages, emblematic of broader environmental hazards, have cast a foreboding shadow over the socio-economic vitality of this community.

The present inquiry undertakes a meticulous and comprehensive exploration of the manifold impacts arising from the recurring menace of oil spillage within the precincts of the Kula Kingdom. At the heart of this investigation lies a steadfast commitment to unraveling the intricate web of consequences that these environmental disruptions have wrought upon the socio-economic dynamics of the community.

This scholarly endeavor is propelled by a series of distinct yet interconnected objectives. Foremost among these aims is the discernment of the discernible socio-economic metamorphosis catalyzed by the recurrent oil spillage incidents within the Kula Kingdom. This pursuit of comprehension is fortified by the utilization of a robust methodological framework, blending qualitative inquiry, involving extensive interviews with a meticulously selected 50% probability sample encompassing 205 families, and quantitative analysis employing the Hazards and Effects Management Process developed by the SPDC.

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Furthermore, the research aspires to scrutinize the depth and breadth of these deleterious effects, undertaking a nuanced examination that traverses both subjective and objective assessment modalities. This multifaceted evaluative approach endeavors to dissect the intricate tapestry of impacts, deciphering the extent of disruption imposed upon traditional means of subsistence, including fishing, hunting, and sand mining, and delving into the erosion of the community's socio-economic resilience.

Moreover, this study seeks to unravel the differential impact thresholds experienced by various occupational strata within the Kula Kingdom. By discerning the nuanced vulnerabilities and adaptive capacities exhibited by distinct sub-groups, the research aims to delineate a comprehensive profile of the socio-economic adversities inflicted by oil spillage.

Ultimately, the overarching ambition of this scholarly undertaking transcends mere exploration. It aspires to serve as a beacon, illuminating a pathway towards sustainable development and environmental justice within resource-rich communities like the Kula Kingdom. Through insightful recommendations and informed mitigative strategies derived from empirical evidence, this research endeavors to offer pragmatic solutions aimed at fortifying the community against the pernicious impacts of oil spillage, fostering resilience, and engendering sustainable socio-economic growth.

2. Literature Review

The Kula Kingdom, nestled in the confines of the Akuku-toru Local Government Area in Rivers State, grapples with a profound conundrum—a confluence of environmental exigencies and socio-economic intricacies, accentuated by the recurring scourge of oil spillage. The extant literature pertaining to the impacts of oil spillage on the socio-economic fabric of communities akin to the Kula Kingdom encapsulates a rich tapestry of empirical findings, theoretical frameworks, and pragmatic insights.

Scholars have extensively investigated the multifaceted impacts of oil spillage on communities, delineating a spectrum of adverse consequences that reverberate across various facets of socio-economic life. One of the primary areas of focus resides in the ecological degradation inflicted upon affected regions. Studies, such as those by Nwilo and Badejo (2001), emphasize the profound ecological imbalances engendered by oil spillage, elucidating the adverse effects on flora and fauna, leading to the degradation of local ecosystems and the disruption of critical biodiversity within affected areas.

Moreover, the socio-economic repercussions stemming from oil spillage have been comprehensively expounded upon in academic discourse. Investigations by Egunjobi (2012) and Okonta and Douglas (2001) shed light on the extensive disruption of traditional livelihoods, notably fishing and farming, wrought by oil spillage incidents. These disruptions destabilize the socio-economic equilibrium of communities, exacerbating poverty and compromising food security.

A critical facet of the impact landscape involves the intricate interplay between oil spillage and societal well-being. Scholars like Idemudia (2009) have underscored the deleterious effects on human health resulting from prolonged exposure to oil spillage, linking these incidents to increased morbidity rates and a decline in overall well-being within affected communities. Furthermore, the erosion of social cohesion and cultural fabric within these communities, as illuminated by works such as those by Watts (2004), underscores the profound and intangible toll exacted by oil spillage on the socio-cultural vitality of these regions.

However, the literature also showcases pockets of resilience and adaptive strategies exhibited by affected communities in the face of these adversities. Works by Akinbobola and Shuaib (2017) highlight the innovative coping mechanisms and community-driven initiatives aimed at mitigating the socio-economic impacts of oil spillage, underscoring the agency and resourcefulness of local inhabitants in navigating through these challenges.

As the present study delves into the specific nuances within the Kula Kingdom, it draws upon this diverse body of literature, amalgamating empirical findings and theoretical underpinnings to illuminate the intricate socio-economic dynamics interwoven with the repercussions of oil spillage within this distinct community context.

2.1. Focus of the Study

In fact, most studies in Nigeria have concentrated on the effects of spills on the biophysical environment, ignoring the need to demonstrate the effects of such spills on the Kula Kingdom in the Akuku-Toru Local Government Area of Rivers State.

2.2. Background Information on the Study Area

Kula Kingdom is made up of 19 villages and 54 small fishing settlements. It is about two hours' drive from Port Harcourt and one hour's drive from Abonnema, the headquarters of the local government area. Kula is a typical salt-water riverine community endowed with rich mangrove forest vegetation. The main occupation of this community of over 40, 000 people (Nigeria's 1991 census population) is fishing. Shell Petroleum Development Company (SPDC) of Nigeria discovered oil in commercial quantities at Kula in 1962, while Chevron discovered its oil in 1974. Today, Kula Kingdom hosts five oil flow stations, with 76 oil wells belonging to Spdc: Belema, Aiteo, Chevron, New Cross, and a gas plant belonging to Spdc. Crude oil production in the kingdom currently stands at 95,000 barrels per day.

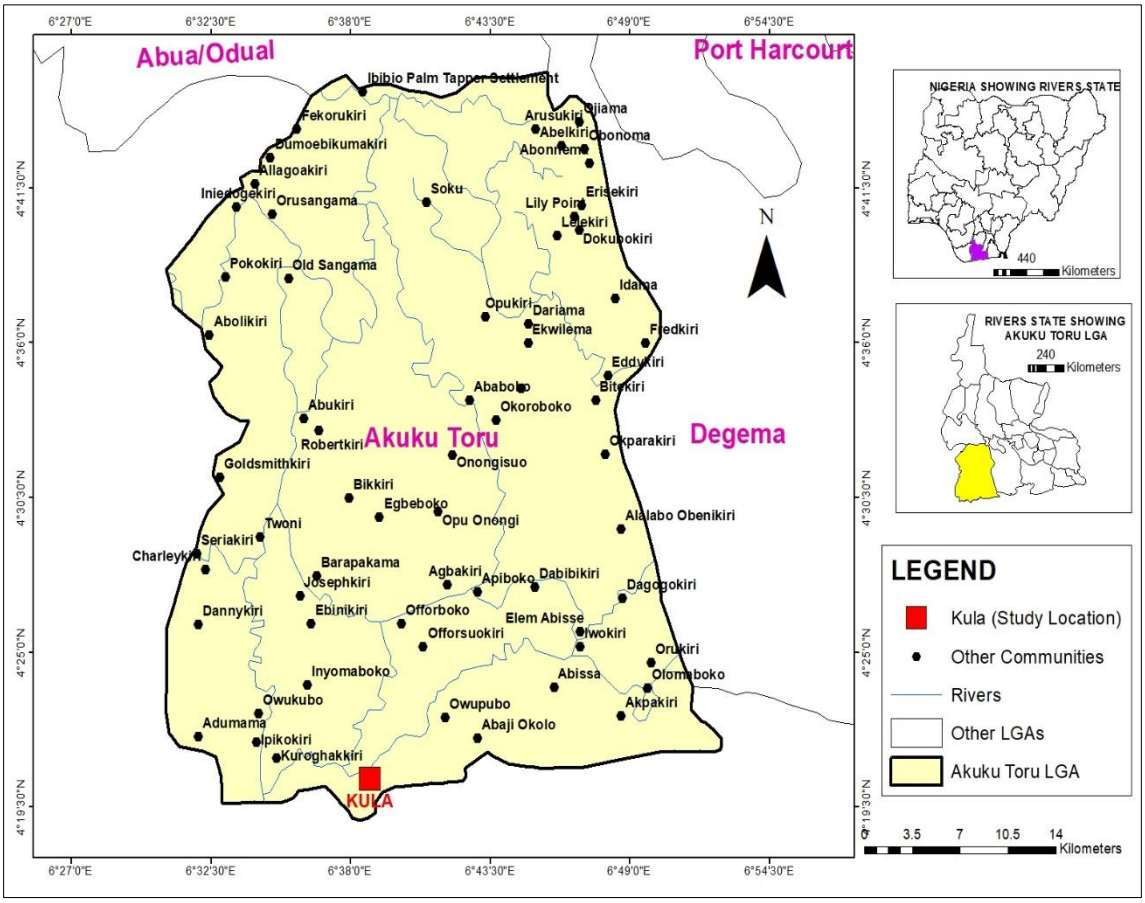


Figure 1 Map of Akuku-Toru LGA showing the Study Area (Kula)

2.3. Major Oil Spills in the Kula Kingdom

Kula Kingdom can be said to be one of the most spill-prone areas in Rivers State. It is the most pronounced host to oil facilities in Rivers State. As a result of the existence of a network of flow stations, flow lines, and pipelines in the kingdom, crude oil spill incidents have occurred in the area during the past ten years, most recently the AITEO massive oil spill at Owuanga, a satellite community in the Kula Kingdom, on March 5, 2022, due to illegal activities.

2.4. Goals and objectives

The goal of the study is to assess the impacts (effects) of oil spills on the socio-economic environment in Kula Kingdom. The objectives were to ascertain from the people the effects of these oil spills on the local economy and livelihoods, objectively assess the socio-economic impacts of these spills, and possibly propose measures to mitigate the severe impacts.

3. Research Methods

The target population of the study was made up of the total number of households in the study locations (521). This was determined by listing households with trained assistants. A subjective socio-economic impact assessment was carried out by:

Questioning respondents in a 50% probability sample of the households (205) selected using a systematic sampling approach (Kalton, 1983); training assistants interviewed heads of the chosen households (or their spouses) face-to-face using a large pre-existing questionnaire over a three-month' period; and

Interviewing focus groups drawn from the occupational sub-groups (fisher's folk, farmers, exploiters of timber and non-timber forest products, artisans, and small-scale business owners).

Since there was no experimental manipulation, the study belongs to the class of research design referred to as "passive observational" (Cook and Campbell, 1979).

An objective impact assessment was carried out in accordance with the Hazards and Effects Management Process (HEMP) (SHELL, 2005), which followed the following steps:

Identifying "hazards and sensitivities" A hazard (source of effect) has been defined as "an aspect of the activities or facilities of a project during all of its phases that has the potential to cause harm to the environment," while sensitivity is "a specific characteristic of the (social) environment that, once disturbed, leads to the disturbance of the stability or integrity of the environment" (SHELL, 2005). To identify impacts, an interaction matrix of hazards (on the y axis) and sensitivities (on the x axis) was utilized (see Table 1). Each number shown in Table 1 yields one or more impacts (positive and negative) resulting from the interaction of the hazard and associated sensitivity at that point.

Table 1 Interaction of Hazards (Sources of Effects) and Social sensitivities of Multiple Flyover Construction and Road Expansion

Hazard / Sensitivity	Patterns of traditional occupations	Levels of income/financial flows	Cost of living/inflation rate	Access to housing	Access to transport	Access to roads/waterways	Safety and security of living environment	Balance in gender	Poverty	Religious/traditional structures and customs	Access to educational facilities	Access to recreational facilities	Religious balance	Access to sanitation and waste management
Soil Remediation	**1**	**2**	**3**	**4**	**5**	**6**	**7**		**8**	**9**	**10**	**11**	**12**	**13**
Clean-up		**2**	**3**		**5**		**7**		**8**	**9**	**10**	**11**	**12**	
Waste disposal	**1**	**2**	**3**	**4**			**7**				**10**	**11**	**12**	
Pollution		**2**	**3**				**7**		**8**			**11**	**12**	
Influx of labour		**2**	**3**		**5**									

Source: Author's Assessment, December 2023

Qualifying impacts. This was done with reference to the following attributes: (a) positive or negative; (b) direct or indirect; (c) short-term, temporary, long-term, or permanent; (d) reversible or irreversible; (e) phase of occurrence (mobilisation, construction, operations, or decommissioning and abandonment); (f) local and/or regional, and/or national and/or global; and (g) incremental or non-incremental.

Ratings of impacts are carried out with reference to the probability or likelihood of their occurrences and their consequences. The estimation of the probability (likelihood) of occurrence is a qualitative issue. high probability (80–100%) refers to a very likely or very frequent impact (e.g., continuous or hourly); medium-high probability (60–79%) refers to a likely or frequent impact (e.g., daily or weekly); medium probability (40–59%) refers to a possible or occasion impact (e.g., monthly); medium-low probability (20–39%) refers to an unlikely impact (e.g., one that occurs every 1–10 years); and low probability (1–19%) refers to a very unlikely or rare impact (e.g., one that will take over 10 years to occur). The potential impact of an impact depends on two things: the degree of potential change in the (social) environment caused by the hazard and the sensitivity of the environment to which it is subjected. The difference between the magnitude of the change and receptor sensitivity will yield a level of effect, as shown in Table 2. Levels of effect translate to potential consequences, as shown in Table 3.

Table 2 Interaction Matrix of Receptor Sensitivity and Magnitude of Change, Showing Resultant Effects

Receptor Sensitivity	**Level of Change**		
	Low	Medium	High
Low	Trivial Effect	Slight Effect	Substantial Effect
Medium	Slight Effect	Substantial Effect	Big Effect
High	Significant Effect	Immense Effect	Massive Effect

Source: Shell, 2005

Table 3 Levels of Effect and Potential Consequences

Levels of Effect	**Potential Consequences**
Massive	Extreme
Big	Great
Substantial	Considerable
Slight	Little
Trivial	Hardly Any

Source: Shell, 2005

The potential consequences of social impacts can be described in the following manner:

- *Hardly any* A trivial effect on the social environment is one that causes almost no nuisance or damage in the community. The local culture and lifestyle, as well as the social infrastructure, are somewhat negatively affected, but the effect is only temporary. The impact may perhaps result in some divergence of opinion among stakeholder groups, but relationships will probably remain strong.
- *little-to-slight* effect or impact on the social environment, which causes momentary changes in the way of life of the inhabitants of the community. The local traditions and societal structure are negatively affected. There appears to be disagreement with stakeholder groups, but the relationship remains fairly strong.
- *Great:* A big effect on the social environment. There is a stable disruption to communal lifestyles. The local traditions and the societal structure suffer greatly. There exists a fundamental disagreement between the communities and their stakeholders that destabilizes the relationships. This may affect the speed and effectiveness of future decision-making processes.
- *Extreme:* A huge effect on the social environment. There is sustained large-scale interference with and changes to the lifestyle of a community, leading to a reduction in the quality of life of people in the area. Impacts have turned out to be a concern for all stakeholder groups. There is irreparable damage to social structure, traditional culture, and social amenities, as well as a total breakdown of stakeholder relationships.

The rating or risk assessment of potential impacts may be done numerically or qualitatively. Table 4 shows a qualitative impact assessment matrix.

This matrix is employed with likelihood plotted on the y-axis and consequences on the x-axis. The cells of the matrix, representing possible combinations of likelihood and consequence, give the levels of impact significance as judged by

experts. For instance, an impact adjudged to have a low likelihood of occurrence but of great potential consequence will have a minor significance rating.

Table 4 Qualitative Impact Assesment Matrix

Likelihood	**Potential Consequences**					
	Positive	Negative				
		Hardly any	Little	Considerable	Great	Extreme
High		Moderate	Moderate	Major	Major	Major
Medium High		Minor	Moderate	Moderate	Major	Major
Medium		Minor	Minor	Moderate	Moderate	Major
Medium Low		Negligible	Minor	Minor	Moderate	Moderate
Low		Negligible	Negligible	Minor	Minor	Moderate

Source: Shell, 2005.

4. Results

4.1. Basic Socio-economic Attributes of Residents of Study Communities.

Table 5: The age-sex distribution of the sample of households in the study area.

Table 5 Age-Sex Distribution for the Study Location

Age Cohort	**Male**		**Female**		**Total**	
	N	%	N	%	N	%
0 – 4	24	4.1	18	3.1	42	7.2
5 – 9	24	4.1	28	4.8	52	8.9
10 – 14	18	3.1	24	4.1	42	7.2
15 – 19	26	4.5	22	3.8	48	8.3
20 – 24	32	5.5	28	4.8	60	10.3
25 – 29	34	5.9	32	5.5	66	11.4
30 – 34	28	4.8	26	4.5	54	9.3
35 – 39	35	6.0	36	6.2	74	12.2
40 – 44	21	3.6	28	4.8	49	8.4
45 – 49	12	2.1	14	2.4	26	4.5
50 – 54	10	1.7	11	2.0	21	3.7
55 – 59	8	1.4	12	2.1	20	3.5
60 – 64	5	0.9	4	0.7	9	1.6
65 – 69	6	1.0	4	0.7	10	1.7
70 +	3	0.5	7	1.2	10	1.7
Total	286	49.2	294	50.7	580	100

(Source: Author's Field Survey, December, 2023)

4.2. Subjective Assessment of the effects of the Implementation MP

Subjective assessment of the socio-economic impacts was carried out by (a) questioning household respondents, and (b) interviewing focus groups drawn from the main occupational groups, in order to gauge the distributional impacts of the oil spills in Kula Kingdom at the same time.

The heads of households (or their spouses) were asked to rate the effects of oil spills in Kula Kingdom at the same time (with respect to several dimensions of the socio-economic environment, namely: marketing, c, partying, social gathering and cost of living, etc)

Table 6 Respondents 'Rating of the Effects of Oil Spills on the Socio-economic Environment Dimensions

S/No	Socio-economic Environmental Dimensions	1 Very Severe	2 Severe	3 Don't Know/Uncertain	4 Slight	5 Very Slight
1	Depletion of basic eco elements	79.0	15.3	0	5.7	0
2	Destruction of flora and fauna	74.3	0	5.7	15.2	4.8
3	Devastation of ecological and aquatic life	34.3	60.0	5.7	0	0
4	Destruction of non-timber forest products	53.3	24.8	11.4	10.5	0
5	Fishing	80.0	13.5	0	6.5	0
6	Sand Mining	13.9	0	12.1	56.0	18.0
7	Hunting	69.0	2.0	8.9	6.1	14,0
8	Cost of Living	62.4	32.6	5.0	0	0

Source: Author's Recommendation, December, 2023

The table above shows that families rated the impacts of hunting, fishing, destruction of flora and fauna, destruction of basic ecological components, and cost of living as "very severe", with mode ratings of 62.4%, 80.0%, and 74.3%.,showingthatitis79.0%..or69.0%.Loss of non-timber forest products and sand mining received a moderate rating of 49.5% and 56.0%, respectively, while destruction of ecosystems and aquatic life received a severe rating (60.0%).

The impact of the oil spill on their lives was reported by representatives of specialized subgroups. After each oil spill, fishermen reported increased fish mortality and migration rates. Sand miners say the oil spill has made it dangerous to dig into the sand to extract sand, and their activities have been severely disrupted due to the contamination. Additionally, local wildlife enthusiasts and conservationists have observed a significant decline in the populations of various shorebirds and marine mammals, directly linked to the spill's aftermath. The spill's repercussions have rippled through multiple facets of the ecosystem, impacting not just livelihoods but also the delicate balance of the coastal environment.

4.3. Objective assessment of the effects of implementation

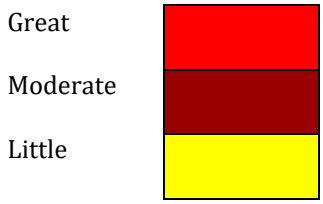
Steps in the Hazards and Effects Management Process (HEMP), which was used in the objective impact assessment, have been stated under Methodology.

The impacts described below are those that were qualified as negative and rated as having high significance (see Table 7). Excluded here are the impacts qualified as negative but rated as being of low significance.

Table 7 Impacts Qualification and Rating

Int. Code	Hazard (source of effect)	Sensitivity	Impact Description	Qualification	Likelihood	Consequence	Impact Rating
1.		Pattern of traditional occupations	1. Hindrance of traditional occupations	Negative	High	Great	
2.		Reduction in Level of Income/financial flows	2. Reduction in level of income/financial flows	Negative	Medium	Great	
3		Cost of Living /Inflation	3. Increase in Cost of Living/inflation	Negative	Medium Low	Little	
4		Environmental Degradation and loss of Aquatic life	4. Decrease in access to housing	Medium Low	Medium	Moderate	
5		Safety and security of living environment		Negative	High	Great	
6		Poverty	Rise in poverty	Negative	Low	Great	

Legend



As the table above shows, there are six (6) negative impacts of either high or moderate significance, there were also possible impacts, as listed below.

- Community indigenes gain temporary or short time employment during the period of spills clean-up.
- Short time businesses such as food vendors, during the period of clean-up.
- Community personnel sometimes gain opportunity for contracting for procurement.
- Increase in cash due to community personnel engagement during remediation work.
- Increase in cash flow to engagement of community personnel or indigenes during clean-up activities.

Table 8 shows impact mitigation and enhancement measures for the afore-stated negative and positive impacts. Following standard practice, mitigation measures are applied only on impacts adjudged to have gross (or initial) high or moderate significance, such that net ratings drop to Low significance after mitigation. Impacts initially adjudged to be positive of course remain positive after enhancement measures have been applied.

Table 8 Social Impacts Mitigation and Enhancement Framework

S/No.	Impact Description	Gross Rating	Mitigation /Enhancement	Net Rating
Mitigation Measures				
1.	Change in patterns of traditional occupation	Major	M1. Payment of adequate compensation for land take to enable the natives adjust to the present change in occupation	Minor
2.	Reduction in level of income and financial flow	Major	M2. Improvement in the available sources of livelihood through provision of grants and subsidies to natives.	Minor
3.	Rise in the cost of living/inflation rate	Major	M3. Creation of jobs and improvement in the sources of income	Minor
4.	Access to Housing	Moderate	M5. Provision of affordable housing units and mortgage financing.	Minor
5	Change in safety and security of living environment	Major	M8. Provision of additional security personnel to preserve and protect the living environment of the study area.	Minor
6.	Increase in level of poverty	Major	M4. Reduction in poverty level through the provision of employment opportunities and empowerment schemes.	Minor
7	Change in Religious/ traditional structure and custom	Major	M9. Respect for religion, tradition and custom of the area	Minor
Enhancement Measures				
1.	Rise in levels of income and Financial Flows.		E.1 Pay adequate compensation to local for land take.	
2.	Opportunities for contracting and procurement		E.2 Locals should be encouraged/ empowered to undertake all levels of procurement and contracting	
3.	Increase in job opportunities for locals and nationals		E.3 All low-skill jobs should go to locals and agreed quota of high-skill jobs. Nationals should be allowed to participate in the latter.	

Source: Author's Recommendation, December, 2023

5. Discussion

The evident harmony between residents' subjective assessments and researchers' objective evaluations regarding the impact of oil spills on the socio-economic environment is striking. It remains undeniable that a majority of residents have deemed the effects of these spills as "very severe," attributing disruptions to their livelihoods, including the loss of work hours, alterations in socio-economic activities, heightened travel time, and increased cost of living. This sentiment resonates strongly within specific occupational sub-groups, notably market women and commercial drivers, who articulate the profound negative impacts of oil spills on the Kula Kingdom.

The corroborating objective assessments confirm the substantial and adverse effects of oil spills on the socio-economic life of the area, also influencing traditional livelihoods within the community. Moreover, the study's outcomes align with referenced findings, affirming a consistent narrative regarding the detrimental repercussions of oil spills on affected regions.

Furthermore, the study's results serve to reinforce and align with observations made by others, adding weight to the collective understanding of the deleterious effects of oil spills on communities

6. Conclusion

The focus of the study has primarily centered on the adverse consequences of oil spills in the Kula Kingdom. While the findings of this study align with previous claims, it's crucial to acknowledge several positive aspects. Kula Kingdom, the second largest city after Rivers State, thrives as a rapidly expanding urban center, with the oil industry forming the backbone of its economy. According to CBN's 2021 report, a substantial 70-80% of government revenue originates from petroleum products. Undeniably, host communities derive various benefits from the social packages provided by oil and gas companies and other entities operating in the region.

Recommendation

This proposal advocates for research to devise a methodology assessing the socio-economic impacts of oil spills and other observable exploration and production activities. It is suggested that oil and gas companies operating in the Kula Kingdom offer pipeline monitoring contracts to host villages to facilitate early detection and swift response to oil spills. Collaboratively, governments and oil/gas companies should determine the significance of providing basic facilities, akin to those available at production sites, to host cities. Additionally, fostering collaboration among oil and gas companies, local residents, governments, and regulatory bodies is imperative to formulate community development plans that serve as the cornerstone for sustainable growth in the Kula Kingdom.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed. Both authors agreed to publish this paper with you.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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