Traditional Resilience Mechanisms to Environmental Degradation in Oil-Spilled Communities of Bayelsa Central Senatorial District

Benjamin Joffa and Elliot A. Sibiri
Department of Sociology, Niger Delta University, Bayelsa State, Nigeria
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Abstract
This study explores traditional resilience mechanisms to environmental degradation in oil-spilled communities of Bayelsa Central Senatorial District, Nigeria. It seeks to understand how oil exploration has contributed to environmental degradation and the culturally embedded coping strategies employed by local populations. Guided by the Cultural Resilience Theory, which highlights the role of cultural resources in community recovery from environmental crises, the study adopts a phenomenological-qualitative design to capture lived experiences across selected communities. Through in-depth interviews, key informant interviews, and focus group discussions with residents from Southern Ijaw and Yenagoa LGAs—areas most affected by oil spills—the study reveals a complex web of environmental, social, economic, and health-related consequences of oil exploration. Key findings indicate widespread degradation of farmlands, contamination of water bodies, decline in wildlife, and a rise in health complications, which have adversely affected livelihoods and social cohesion. Despite the severity of these challenges, traditional resilience mechanisms remain minimal and largely ineffective. Community responses often involve informal methods such as soil inversion and use of alum in water purification, but these approaches are insufficient for long-term recovery. The reliance on oil companies and NGOs for clean-up efforts underscores the inadequacy of indigenous strategies and the community's vulnerability. The study concludes that while cultural resilience exists, it has been overwhelmed by the scale of environmental degradation, necessitating more structured support and integration of local knowledge in policy interventions. The findings call for a collaborative approach that empowers communities while enhancing the effectiveness of environmental and public health responses in the Niger Delta.

Keywords: *Environmental Degradation. Oil spill, Traditional adaptation mechanism, Cultural resilience, Bayelsa Central*

Introduction

Human-made and natural disasters are globally known to contribute to livelihood disruptions, environmental damages, and human displacement (Motsholapheko *et al.,* 2011). Disasters such as oil spillage have undoubtedly led to significant economic losses, and societal and human damages in developed and developing countries (Udayangani, 2010). The incidents of environmental pollution from multinationals and the rise in climate change, global warming and different pollution ensued by human activities have thus, increased the quest for disaster studies (Karim & Mimura, 2008; Sibiri & Odubo, 2014).

As it has been pointed out, developing countries suffer more impact from natural and human-made hazards, due to economic strength and resources availability (Strobl, 2012; Sibiri & Ayinmoro, 2013). While countries with higher income, great openness, higher educational attainment, more complete financial systems and small government experience fewer human and economic losses (Benson & Clay, 2000).

Oil spill is among the most catastrophic environmental disasters, posing significant threats to marine ecosystems, coastal communities, and economies dependent on maritime and shoreline activities (Sibiri *et al*., 2012). The complexity and scale of oil spill incidents necessitate comprehensive response strategies to mitigate their adverse effects efficiently. The significance of these strategies cannot be overstated, as they encompass a range of actions, from immediate containment and clean-up efforts to long-term environmental recovery and policy reforms (Ogbu *et al.,* 2024; Satya, 2021).

The intricacies of oil spill response strategies are grounded in their ability to address the multifaceted impacts of spills. The immediate environmental consequences include severe damage to marine biodiversity, habitat destruction, and long-lasting pollution of water resources. Furthermore, the socio-economic repercussions extend to the disruption of livelihoods, particularly in communities reliant on fishing and tourism, underscoring the need for effective response frameworks (Akindipe, 2023; Sibiri, 2014).

The United States, with its advanced technological resources and stringent regulatory frameworks, represents a paradigm of comprehensive oil spill management. The evolution of its response strategies, particularly after significant incidents, highlights the critical role of governance, stakeholder collaboration, and technological innovation in enhancing resilience to oil spills. This approach illustrates how legislative support and investment in research and development can bolster a nation's ability to mitigate the impacts of oil spills effectively (Dalaklis *et al*., 2020).

Conversely, Nigeria's struggle with frequent oil spills, primarily in the Niger Delta region, reveals the complexities of managing environmental disasters in contexts marked by weak governance, limited technological capacity, and socioeconomic vulnerabilities (Sibiri, 2019). Despite possessing a legal and institutional framework for oil spill response, Nigeria faces challenges in enforcement, coordination, and community engagement, which exacerbate the environmental and human toll of spills. The Nigerian case underscores the necessity for strengthening regulatory regimes, fostering international partnerships, and embracing technological solutions to improve oil spill response outcomes (Ekperusi & Ekperusi, 2021; Sakib, 2021; Tamuno, 2021).

Subsequently, due to increased environmental degradation from toxic hydrocarbon elements emitted by multinationals, vulnerability have increased in most communities, societies and nations (Ndu, 2019). Nonetheless, other factors such as; poverty, armed conflicts, growing global population and underdevelopment issues, protest in calling for environmental justices, social and economic justices are increasingly influencing vulnerability (Malalgoda, 2015, p. 14; Sibiri, 2014). Also, influencing the threat to human capacity, especially at the local community level of developing nations where all most all necessities of life are lacking (Sobrasuaipiri, 2016). For example, Nigeria oil-producing communities (vulnerable to oil activities) lacks awareness of the long-term negative impacts of the toxic chemicals on their environment, lacks the mental and

emotional (capacity) preparedness mind-set towards disasters reduction as such, have struggled to withstand the impacts of such hazards when it strikes (Burgherr, 2007; Sobrasuaipiri, 2016). Furthermore, the vulnerability concept as widely accepted to be an extraordinarily elastic concept capable of being used at different situations, group of people and field (Carol, 2004), are increasingly linked to the livelihood of affected disasters victims. Given that, the capacity to recover from any disaster is reliant on the available livelihood structures and economic standards of a given society or nation. Thus, the next section discusses the sustainability of livelihood concepts.

As a result of the failure of Nigeria to adopt the international best practices in mitigating the effect of oil spill in the Niger Delta, communities have adopted resilience strategies to cope with the persisting gas flaring and oil pollution (Ite *et al*., 2013; Odubo, 2021). resilience strategies are adopted by households to enhance livelihood sustainability to survive the effects of oil pollution in the region. Adaptive strategy lowers the dangers of external alteration (Bhattarai, 2005). Adaptive strategy could be in the form of diversification of livelihood or change of livelihood. Sobrasuaipiri (2016), averred that the environmental impacts of oil spill in Bodo led to socio-economic impoverishment of traditional livelihood practitioners such as fishers and farmers who in turn, sought other livelihood strategies to cope. He explained that oil pollution had caused several persons to change from traditional livelihoods in the Niger Delta region to other livelihoods to survive. Lasisi, *et al.* (2015), hinged the depletion of forest resources in Bayelsa State and the entire Niger Delta region to women's dependence on firewood for domestic and commercial purposes to raise income. They averred that the increasing use of firewood causes loss of biodiversity, leading to environmental degradation. Odubo and Anele (2019), identified migration, sale of petroleum products, cut on household expenditure, social networking as some of the strategies adopted by farmers and fishermen to cope with oil pollution in the Niger Delta region. Fikru (2008), asserts that alternative livelihood activities adopted as adaptive strategies reduce poverty, create employment and reduce rural urban migration for job search. Ibaba, Sibiri and Barikor (2019), on their own part noted that communities adopt traditional systems of environmental protection to mitigate the challenges posed by the environment in Bayelsa state.

The use of available assets by households depends on livelihood strategies that are adopted at particular times. Adaptation could be a frequent or sudden unavoidable exercise that is influenced by external circumstances as the case of oil pollution in the Niger Delta region. Households engage in diverse livelihood activities according to their available capital assets. These livelihood activities generate income for the socio-economic survival of households. Incidentally, certain factors inhibit or affect the adaptive strategies adopted by households, thereby limiting the generation of income. Adger, *et al* (2003), adduced that every human society can be adaptive to external alterations or threats because a system can transform itself to withstand anticipated or existing external stresses. This implies resilience and efficient organisation of resources (Robeledo *et al*., 2012).

While adopting this resilience strategy, it has been noted that several factors inhibit adaptive capacity despite the availability of adaptive strategies. These constraints disrupt meaningful plans and restrict the various options of farmers, fishermen and others to achieve greater levels of adaptive capacity to vulnerabilities. For example, some scholars established that a lack of economic resources inhibits livelihood adaptive capacity (Sibiri *et al.,* 2021).

Consequently, the pervasive environmental degradation caused by oil pollution has led to significant socio-economic challenges for oil-spilled communities in the Niger Delta Region. The resilience mechanisms adopted by these communities in the region underscore a critical response to ongoing environmental threats, with adaptive strategies ranging from livelihood diversification to the reduction of household expenses. However, the effectiveness of these resilience strategies is often limited by a range of inhibiting factors, including economic constraints, limited technological access, and gaps in adaptive capacity. This complex reality highlights the need for comprehensive interventions that not only address immediate environmental impacts but also foster long-term sustainable development and enhanced adaptive capacities within affected communities. It is on this note this study has been designed to address the following questions;

1. How has oil exploration contributed to environmental degradation in Bayelsa Central's oil-spilled communities?
2. What traditional resilience mechanisms have been employed to address the challenges posed by environmental degradation in oil-spilled communities of Bayelsa Central Senatorial District?

Theoretical Framework: Cultural Resilience Theory

The Cultural Resilience Theory, propounded by Michael Kearney in the 2000s, addresses the role of cultural resources in enabling communities to withstand and recover from environmental and social crises. This theory suggests that cultural resilience—rooted in traditions, social networks, and adaptive practices—equips communities with the tools to face and adapt to adverse conditions (Kearney, 2004). Building upon earlier concepts of ecological and psychological resilience, Cultural Resilience Theory highlights the role of cultural continuity and community agency as critical factors for resilience. According to Kirmayer et al. (2021), cultural resilience is essential for sustaining identity, values, and social cohesion, especially in communities exposed to persistent environmental and socio-economic challenges. This theory posits that cultural elements such as rituals, traditional knowledge, and collective identity are not merely heritage artifacts but are dynamic resources that empower communities to mobilize in response to crises (Clark et al., 2022). This approach to resilience aligns with the broader recognition of culture as a form of social capital, providing both practical knowledge and emotional support systems during hardships.

The Cultural Resilience Theory emphasizes several core components. Cultural traditions and practices are fundamental, providing a framework for shared identity and continuity, which reinforce social cohesion under stress (Rudolph & Gould, 2021). For instance, practices tied to land and resource management can anchor community members to a sense of place, reminding them of their collective values and history even amid external pressures (Kirmayer & Minas, 2022). Social networks and relationships are also integral, as kinship ties and community solidarity create informal support systems that ease the burden of environmental or social adversities (Moffa et al., 2020). These connections enhance psychological resilience, helping individuals and families cope with stress through mutual support and trust. The theory also emphasizes adaptive capacity, which allows communities to creatively integrate new practices into traditional frameworks, maintaining cultural integrity while responding to changing conditions (Berardi et al., 2021). Finally, agency and self-determination are crucial; Cultural Resilience Theory views communities as active participants who draw upon cultural resources to make decisions that affect their survival

and future (Clark et al., 2022). In this way, cultural resilience supports community-led adaptation, empowering groups to leverage their traditions in a way that preserves identity while navigating challenges.

In oil-producing regions, such as the Niger Delta, Cultural Resilience Theory offers insights into how communities can address the environmental degradation associated with oil extraction. The Niger Delta, which has faced severe environmental damage due to oil spills, gas flaring, and water contamination, exemplifies the complex social and environmental issues that Cultural Resilience Theory addresses (Okon et al., 2022). Traditional ecological knowledge, which encompasses sustainable practices in fishing, agriculture, and land use, can provide a framework for environmental management. For instance, indigenous practices such as controlled fishing cycles or seasonal crop rotations not only support biodiversity but also foster resilience by ensuring sustainable resource use. This form of resilience, grounded in cultural knowledge, allows communities to maintain their livelihoods without depending solely on oil-related industries, thereby reducing vulnerability to environmental degradation (Bates et al., 2020).

Moreover, strengthening community solidarity through cultural practices such as festivals, communal gatherings, and rites of passage plays a critical role in preserving resilience. These gatherings reinforce a shared sense of belonging, which is especially important in contexts where environmental destruction disrupts the social fabric. Research by Rudolph and Gould (2021) indicates that communal rituals provide psychological resilience, as they offer spaces for individuals to collectively process trauma and reaffirm their connection to the land. In oil-producing communities, such rituals and gatherings may also serve as platforms for advocacy, raising awareness of environmental issues and mobilizing collective action (Bates et al., 2020). By fostering solidarity, these practices help communities resist social fragmentation and maintain unity in the face of external pressures.

Empowering local agency is another critical application of Cultural Resilience Theory in oil-producing communities. The theory advocates for community-led approaches to environmental management, where traditional leadership structures and community organizations play active roles in negotiating with oil companies and government bodies. For example, by drawing upon customary laws and community governance, local leaders can hold corporations accountable, ensuring that oil extraction complies with environmental standards that protect local resources (Moffa et al., 2020). Empowered by cultural resilience, these communities can advocate for fair compensation, pollution cleanup, and sustainable development practices, framing these demands within the context of cultural rights and environmental justice (Clark et al., 2022).

Lastly, building social capital for collective action enhances community resilience by providing a foundation for coordinated responses to environmental injustices. In culturally cohesive communities, shared values and networks of trust can mobilize individuals and groups to take collective action. In oil-producing regions, such collective action might include organizing protests, engaging in legal advocacy, or collaborating with environmental NGOs to address pollution and habitat loss (Okon et al., 2022). Cultural Resilience Theory emphasizes that these efforts are not simply reactions to crises but are rooted in deep-seated cultural principles of reciprocity, stewardship, and social responsibility. Communities can resist external threats by

leveraging cultural resilience while fostering sustainable environmental practices that align with their cultural values and identities (Berardi et al., 2021).

Materials and Methods

This study conducted in Bayelsa Central Senatorial District, adopted the phenomenological-qualitative study design focuses on understanding and describing the lived experiences and perspectives of individuals regarding a specific phenomenon. Applying a phenomenological-qualitative design allowed the study to deeply explore the firsthand accounts of community members about how oil exploration has contributed to environmental degradation. By engaging with participants' personal experiences, the study uncovered their perceptions of the direct and indirect impacts of oil activities on their environment. The phenomenological approach also allowed the research to access and document the culturally rooted practices that communities have historically employed to adapt to environmental challenges. By collecting stories and descriptions from community members, the study revealed traditional methods such as local environmental management practices.

The population for this study comprises residents of oil-spilled communities within Bayelsa Central Senatorial District, specifically those residing in areas directly impacted by oil exploration activities. This population includes individuals who have experienced oil spills' environmental and social effects and those who may have developed resilience mechanisms to address these impacts. This population scope is essential for providing firsthand insights into the lived experiences, adaptive strategies, and perspectives on environmental degradation and community resilience in these oil-producing regions.

This study adopted a multi-stage sampling technique. In the first stage, the cluster sampling technique was used to cluster Bayelsa Central Senatorial District into three LGAs namely; Kolokuma/Opokuma, Southern Ijaw, and Yenagoa LGAs. In the second stage, the purposive sampling technique was used to select Southern Ijaw and Yenagoa LGAs. This is because from the records of the National Oil Spill Detection and Response Agency (NOSDRA), communities in the two LGAs are the ones that have witnessed a significant oil spill in the last five years.

In the third stage, the purposive sampling technique was used to select communities in the two LGAs that have experienced significant oil spills in the last five years. From NOSDRA records, in Southern Ijaw, the following communities were identified; Apoi, Benikrukru, Ikeinghenbiri, Oporoma, Ikebiri, Seibou, Lasukugbene, Onyoma, Eniwari, Aguobiri, Peremabiri, and Igbematoru. Communities in Yenagoa LGA identified include; Ikarama, Kalama, Agbura, and Akumoni.

In the fourth stage, the simple random sampling technique was used to select six communities in Southern Ijaw LGA namely; Ikebiri, Igbematoru, Eniwari, Seibou, Oporoma, and Aguobiri. While in Yenagoa LGA, the four communities were selected. In the fifth stage which involves the selection of participants, the purposive sampling technique was used to select the participants for KII, while participants for IDI were selected through a stratified sampling technique where people of different occupational groups were allowed to participate in the study. Participants for FGD were recruited through a purposive sampling technique where people of the same occupational group were the target for each FGD. Adler and Adler (2012) suggested a minimum of 30 in

qualitative studies. Thus, for this study, 40 KII and IDI were conducted (i.e. 4 in each community – 2 IDI and 2 KII in each community), while one FGD was conducted in each community making it a total of 10 FGDs. Also, three KII were conducted with two government agencies (Ministry of Environment and National Oil Spill Detection and Response Agency), and one NGO (Stakeholders Alliance for Credible Accountability - SACA). Thus, the total sample for this study was 83 participants.

The study extensively utilized secondary relevant textual materials from published and unpublished sources. A major source of data collection was from published data relating to the topic of discussion. Other sources explored included; archival and historical documents, relevant articles from the internet, books, journal articles, seminar papers, and workshop proceedings, columns from national and international Newspapers and Magazines.

Primary data was collected through qualitative instruments. These instruments included In-depth Interview (IDI), Key Informant Interview (KII), and Focus Group Discussion (FGD). For the primary data, a total of 40 interviews (IDI and KII), 10 FGDs were conducted in all the communities to be visited, and three KII with Government and non-governmental Agencies. The IDI was conducted with people in different occupational groups namely; Fishermen/Women, Farmers, traders etc. The KII was conducted with community leaders such as the traditional rulers/chiefs/CDC chairmen or their representatives, and Government and Non-Governmental Agencies. The Focus Group Discussion (FGD) was conducted with different occupational groups. The criteria for inclusion in the study were the length of residence, membership of the community and experience in relating to different occupations.
Data analysis for this study was done using the six steps and processes (Familiarization; coding; generating themes; reviewing themes; defining and naming themes; and writing up) of doing thematic content analysis as outlined by Braun and Clarke (2006). The Atlas. ti software was used to manage collected data for the thematic content analysis. The choice of the use of thematic content analysis is to enable the researcher to closely examine the collected data to identify common themes i.e., topics, ideas and patterns of meaning that come up repeatedly from the interview.
Transcripts from the interview were studied repeatedly by the researcher to generate comprehensive meanings of participants' narrations. Transcripts from individuals were given codes (e.g. IDI 1, IDI 2; KII 1, KII 2; FGD 1, FGD 2 etc). Codes were grouped to form sub-themes while sub-themes on the other hand, were re-grouped to form major themes.

All ethical issues were evaluated and addressed before and during the study. First and foremost, the researcher approached the necessary gatekeepers of each community to obtain permission before conducting the study in their communities. Also, each participant in the study was intimated about the importance of the research and its objectives. Then, their consent was formally sought by appending their signature to the consent form that was provided by the researcher. Issues relating to confidentiality and anonymity was explained to them before the commencement of the research.

Results

Socio-demographic characteristics of the respondents

The socio-demographic data of the participants reveals a diverse group of individuals categorised into Focus Group Discussions (FGDs), In-Depth Interviews (IDIs), and Key Informant Interviews (KIIs). A total of 83 participants were involved, with ages ranging from 25 to 64 years. Both genders were represented, with males and females participating in varying capacities. Occupations included farmers, fishermen, hunters, traders, teachers, civil servants, businessmen, and painters. Educational levels ranged from no formal education to tertiary qualifications, including BSc, HND, NCE, and MSc degrees. Many participants had secondary education, with farmers predominantly falling into this category. The duration of residence in their respective communities varied widely, from as short as 5 years to over 60 years, highlighting both recent settlers and long-term residents.

Among the participants, positions of responsibility included roles such as CDC Chairman, Women Chief, Youth Leader, Youth President, Paramount Ruler, and Youth Secretary, indicating significant community leadership involvement. Some key informants represented organizations such as the Ministry of Environment, the National Oil Spill Detection and Response Agency, and the Stakeholders Alliance for Credible Accountability (SACA), holding positions such as Director of Petroleum Pollution Control, Principal Environmental Scientist, and Community Relations/Environmental Manager. This diverse mix of ages, genders, educational backgrounds, occupations, and community positions provides a broad spectrum of perspectives relevant to the study's focus.

Oil Exploration and Environmental Degradation

The findings reveal that oil exploration in Bayelsa State has profoundly affected the environment, disrupting both ecological balance and community livelihoods. Participants expressed deep concerns about the detrimental effects on agriculture, water bodies, wildlife, and human health. According to respondents, oil exploration and spills have significantly damaged farmlands, rendering them infertile and unproductive. Crops fail to yield as they used to, and many farmers report losses so severe that, in some cases, nearly all planted produce is lost. One participant noted that rubber plantations, which had been productive for decades, became unusable due to oil contamination. This has forced community members to seek alternative means of livelihood, as farming is no longer sustainable. The stand of the participants is captured in the statements below;

> "Once the oil touches the soil that land becomes useless. A rubber plantation that has been in my family for decades was made useless overnight due to oil spills, now the trees have died and there's nothing we can do on the farm for now. This is the reality of many other farmers in this community. Now people are even trying to do other things to support themselves as farming and fishing are no longer bringing enough food to the table. (**IDI/Farmer/Kalama)**"
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> "The exploration of oil in our environment has caused significant negative impacts. Our crops are heavily affected and no longer yield good produce. When oil comes into contact with them, it destroys them. For example, this year, approximately 80% of farmers were unable to harvest anything **(KII/CDC Chairman/Akumoni)."**
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> "Farming, which was our primary means of livelihood, has suffered greatly. Many people relied on the income from their farm produce to support their families and educate their children. However, due to the oil spillage, we are no longer able to catch

fish from the river, and our crops have diminished in both size and quantity **(IDI/Youth Secretary/Ikarama)**

"In places like Ikarama, Biseni, and Kalaba, oil spills occur regularly. When the environment is threatened in this way, it leads to public nuisance, which poses a serious risk to public health. In such cases, while we may not experience these issues, the people living in the communities I mentioned face new diseases, and the environment becomes increasingly damaged. Additionally, in farming, when crude oil is introduced into the soil, the crops begin to deteriorate, and microorganisms naturally die, resulting in a loss of soil fertility. No amount of remediation can restore the soil to its original state. As a result, the daily lives of those in these communities are severely impacted **(KII/Director of Petroleum, Pollution, and Control/Ministry of Environment)**."

The responses also highlight the severe pollution of water bodies, which has impacted fishing activities, a vital source of sustenance and income for many. Fish populations in rivers have dwindled, with some species disappearing entirely or moving farther into the sea. Participants reported frequently seeing dead fish floating on the river's surface, and in some cases, fish caught from the polluted rivers emit a crude oil taste. This contamination has made the water unsafe for bathing, drinking, or cooking, further compounding the challenges faced by the community. A participant noted thus;

"The impact has been overwhelmingly negative in every aspect. Our plants no longer yield good harvests as they used to. Fish have also been severely affected; for instance, when crossing the bridge, you can often see dead fish floating in the river. It is difficult to determine which area is most affected, as the land, water, and air are all significantly impacted. The water we drink often has a crude oil taste, and fish caught from the river also taste of crude oil when consumed. Fish are scarce in our rivers, making it very difficult to find fish to buy. Even when fish is available, it is often very small and extremely expensive, contributing to the high cost of living. Secondly, it has negatively impacted our income. With poor farm and river yields, we no longer have sufficient produce to sell in the market, further worsening our financial situation. The dry season, in particular, worsens air quality, making it the most challenging period for the community **(KII/Women Chief/ Apoi)**."

Yes, there has been a significant impact. The fish species we used to see have gone extinct, and it is now common to find dead fish in the river **(KII/Paramount Ruler/Ikarama)**.

"The fish population in the river is nearly extinct. Some fish have become so weak that we can catch them with our bare hands, and at times, we even see them floating lifelessly on the water's surface **(KII/CDC Chairman/Kalama)**."

The findings also emphasize the significant harm to wildlife in the region. Participants recalled times when hunting was easy, with animals like monkeys, porcupines, and squirrels abundant in the vicinity. However, oil exploration activities have driven wildlife away, with animals migrating to less polluted areas. Gas flaring was mentioned as a major factor contributing to the displacement of nocturnal animals, as the intense light and heat disturb their natural habitats. When the consequences of oil exploration and spills were asked during the Focus Group Discussion amongst hunters, participants reported that:

FGD 1: Hunting was a good profession in this community because bush meats were everywhere, in fact if you set a trap in the afternoon, by evening the trap would catch a big porcupine or squirrel or any other bush meat, but now, one can set a trap for

days and it will not catch anything, so now people do not even bother with setting traps for animals anymore.

FGD 2: Animals on the farm have been affected mainly because the smell of this oil is repulsive, so most of them can no longer be seen within the community, especially monkeys.

FGD 3: True, before now, if I stood in my backyard, I could see monkeys jumping on the trees here, but now, we have to go farther into the forest to hunt and most times still come back with nothing.

FGD 4: In the past, there was no need to venture far from home to hunt bush animals. You could set traps around the house, and within two hours, you would have meat to prepare a meal. However, all the animals have fled due to the deteriorating environment. They avoid areas where fires are set, and the smell of oil drives them away.

Health concerns were another recurring theme among participants. They observed a rise in illnesses such as chronic coughing, skin rashes, eye irritation, diarrhoea, and even more severe conditions like miscarriages, asthma, and malnutrition. Respondents linked these health problems to exposure to polluted water, air, and soil. Children, with their weaker immune systems and greater likelihood of engaging in activities like swimming in contaminated rivers, were reported to be particularly vulnerable. One participant remarked that a significant number of middle-aged individuals now suffer from eye problems, a condition they associate with the worsening environmental conditions. A participant noted thus;

> "Oil spills have caused severe damage to the aquatic life in these communities, destroying the livelihood of the Niger Deltans. Fish are no longer found in the rivers, and agricultural activities have been greatly affected. Crops fail to grow properly due to the acid rain in these areas, which has significantly reduced the income of the people. Additionally, oil spills have led to numerous health issues. For example, during an oil spill in Ikarama, the air was so polluted that we could barely breathe or open our eyes, and tragically, a child died, although we couldn't definitively link the death to the spill. The immediate symptoms of oil spills often include eye irritation, nasal discomfort, and diarrhoea. However, the long-term effects are far more severe, with chronic conditions such as cancer, miscarriages, congenital disabilities, heart disease, lung cancer, malnutrition, and male infertility becoming increasingly prevalent. Wildlife is no longer present in these communities. However, I would not attribute this entirely to crude oil, as other human activities have also played a role. That said, gas flaring has significantly contributed to the problem. Since animals are mostly active at night, the bright lights from gas flaring often scare them, causing them to hide or migrate to safer and more conducive environments **(KII/Community Relation Manager, Environmental Manager/ SACA)**."

Another participant averred that;

> "The effects oil spill has had on the environment in this community is much oh. See my eyes, see how red they are. If you go round this village, you will see most middle-aged people with glasses. Eye problems, skin diseases and diarrhoea are now the illnesses often suffered here especially by children because of their weak immune systems and the fact that they are the ones who often swim in these contaminated rivers **(IDI/Community Member/Eniwari)**

Economic and social impacts were also highlighted in the responses. Participants noted that the loss of fertile land and dwindling fish stocks have greatly reduced income levels, making it difficult for families to sustain themselves or afford necessities like education for their children. Furthermore, environmental degradation has led to conflicts and crises within the community, disrupting its social harmony.

> "From a political perspective, it has caused crises and conflicts within the community, destroying the peace that once existed. Both politically and economically, the community has been significantly affected. Farming, which was our primary means of livelihood, has suffered greatly. Many people relied on the income from their farm produce to support their families and educate their children. However, due to the oil spillage, we are no longer able to catch fish from the river, and our crops have diminished in both size and quantity **(KII/Youth Leader/Ikarama)**."

Overall, the perspectives provided by participants paint a grim picture of the consequences of oil exploration in Bayelsa State. The damage is seen as far-reaching, affecting every aspect of life, from health and livelihoods to social stability and the environment's ability to sustain future generations.

Traditional Resilience Mechanisms

Findings reveal that traditional resilience mechanisms in communities affected by oil spills are limited and largely dependent on external support from oil companies and other organizations. According to participants, community leaders typically approach the oil companies responsible for the pipelines to address the spills. When the spills are attributed to the companies, they sometimes hire contractors, often from the community, to clean up the affected areas. However, if the spill is deemed an act of sabotage, the companies often refuse to take responsibility, leaving the community to cope with the consequences on their own. A participant noted thus;

> When an oil spill occurs, the community leaders reach out to the oil companies that own the pipeline that caused the oil spill. They hold meetings with them and look for a way forward. If the spill was caused by the company, they would hire a contractor from the community to clean up the affected areas. But if it was caused by sabotage, the company will assume we are the ones that burst the pipelines so they will not pay to clean the environment **(KII/ Youth leader/ Seibou)**.

Some participants noted that rudimentary methods are occasionally employed to mitigate the immediate effects of spills. For instance, a practice mentioned involves turning the contaminated soil upside down, with the belief that burying the polluted layer will protect crops or make the land usable. This method is used informally by some farmers, though it is acknowledged as insufficient for addressing large-scale contamination as noted by the farmers from Kalama during the focus group discussion. They stated thus;

> **FGD 1:** It is common knowledge that crude oil renders any soil it touches infertile and as a community, it is one of the things we struggle with because farming is one of our major economic activities.
>
> **FGD 2:** Yes, so over time we watched the contractors doing their clean up and saw how they did it and tried to copy. Especially the one where they turn the soil upside down so the contaminated part goes is.

FGD 3: True, I do that too sometimes. Especially when there is no other land left to farm. I turn the soil inside out and plant on the soil. But this method is not effective.
FGD 4: I was just about to say that. Since we are not properly trained and we just learned this by observing, it is not effective for us.

Additionally, there are reports of using alum and antiseptics to treat water before use, though this is limited to those who can afford these measures. People are also advised to avoid spill sites and contaminated rivers for a period after an incident. This is noted in the comment below;

> I personally do not know about any traditional mechanisms used to cope with the effects of oil spills. However, I know we use alum on the water and antiseptic for those who can afford it before we bathe. Also, we try to avoid fetching water from the river for some time after the spill. We are also advised not to go near spill sites **(KII/ Community member/ Aguobiri)**.

Despite these efforts, participants frequently emphasized the absence of comprehensive traditional practices to cope with oil spills. They described the situation as overwhelming, with the community relying on the intervention of oil companies, non-governmental organizations, or divine providence. Some respondents mentioned efforts by NGOs, such as SACA, which have provided some level of support. However, many felt that these measures were insufficient to address the larger environmental and social impacts. The stand of the participants is captured in the comments below;

> We do not have any traditional methods to address the situation; we are simply living by the grace of God because there is nothing we can do. Occasionally, we reach out to the relevant organizations such as Shell, but we have yet to see any significant response from them. We have also contacted some NGOs, such as SACA, and they have made commendable efforts to support the community. We try to make do with whatever we can harvest from our produce at the end of the day. What can the traditional leaders do other than wait for the responsible organizations to address the situation? We all wait for Shell and the responsible organisations to remedy the situation **(KII/CDC Chairman/ Ikarama)**.
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> There are no traditional methods for dealing with oil spills. When spills occur, we discourage people from approaching the sites due to the harmful components they contain. Instead, we create dikes and dig around the affected areas to prevent the oil from spreading, ensuring that no matter how much rain falls, it won't escape to other areas **(KII/ Youth Leader/ Ikarama)**.

Participants also highlighted the role of community leaders in managing conflicts and maintaining order. For example, some leaders enforce laws to discourage actions that might exacerbate environmental degradation, while others focus on mitigating unrest among the youth. However, these efforts are seen as more reactive than proactive in addressing the root causes or effects of oil spills. A participant averred that;

> There are no traditional methods available. We were supposed to handle it ourselves, but since we lack the necessary resources, we rely on the companies responsible to manage and contain the oil. We have reverted to old practices, such as trade by barter, to sustain ourselves. The primary focus of the leaders is conflict

> management, as they work to prevent the youth from causing further unrest **(IDI/Community Member/Aguobiri)**.

Survival strategies within the community reflect a shift toward informal coping mechanisms. According to respondents, trade by barter has re-emerged as a means of subsistence, and there is increased reliance on small-scale fish farming as other livelihoods, such as farming and traditional fishing, become less viable. In some cases, the youth have resorted to illegal activities, including oil bunkering, as a desperate response to the economic challenges posed by the environmental degradation.

A few respondents mentioned limited knowledge of traditional methods, such as the use of water hyacinths, which are believed to have natural water-purifying properties. Others mentioned burning crude oil on water, though this was acknowledged as harmful and counterproductive. Herbal medicines are sometimes prepared when illness rates rise, and youth occasionally organize sanitation exercises, though these efforts reportedly have minimal impact on improving the overall situation. This is captured in the comments of the participants below;

> At times, we prepare herbal medicines when we notice a high rate of illnesses in the community. Additionally, the youth organize sanitation exercises to clean the environment, but these efforts have little to no impact on improving the situation. We occasionally hold meetings among ourselves, but there is not much the community leaders can do, as the effects of the oil spill are beyond their control. Therefore, I wouldn't say we have any traditional methods to address the issue. Instead, we rely on companies like Shell or Oando to come and carry out remediation efforts on the environment. By the grace of God, we strive to support one another. At times, we lend each other food items, and occasionally, we engage in trade by barter. Although it is quite challenging, we do our best to survive. The leaders are trying their best, they sometimes pass laws for members of the community to prevent any havoc that will affect the environment **(IDI/ Community Member/Oporoma)**.
>
> There are no traditional methods available. We were supposed to handle it ourselves, but since we lack the necessary resources, we rely on the companies responsible to manage and contain the oil. We have reverted to old practices, such as trade by barter, to sustain ourselves. The primary focus of the leaders is conflict management, as they work to prevent the youth from causing further unrest. Our main means of survival now is through fish farming. One of the most significant impacts is on the youth, who are becoming increasingly unruly and turning to illegal activities, such as involvement in the oil bunkering business **(IDI/ Community Member/ Eniwari)**.

Overall, participants expressed frustration and a sense of helplessness, emphasizing that the community lacks the resources and expertise to manage the effects of oil spills independently. Instead, reliance on external intervention strategies appears to dominate their response to the environmental and socioeconomic challenges caused by oil spills.

Discussions of Findings

The findings reveal a multifaceted impact of oil exploration on the environment and communities of Bayelsa Central Senatorial District, with far-reaching implications for livelihoods, health, and social cohesion. Oil spills have devastated farmlands, rendering them infertile and disrupting agricultural productivity. Rubber plantations and other crops have been significantly affected,

forcing many farmers to abandon traditional farming. Fishing activities, another vital livelihood, have also suffered due to the contamination of rivers and water bodies. Declining fish populations, instances of dead fish floating, and the crude oil taste in caught fish show the severity of water pollution. This finding correlate with that of Chijioke et al (2018) who noted that, oil spillage significantly impacts residents of the oil-producing states in Nigeria, causing unmeasurable and dehumanizing pains and anguish to the inhabitants of the area, as the individuals can no longer invest in their traditional fishing, agricultural production, and hunting activities (Chijioke et al., 2018). He also stated that, the previously economically and environmentally productive Niger Delta region (comprising of the nine oil producing States of Nigeria) has been subjected to substantial soil pollution, deforestation, toxic discharges into available water sources, biodiversity loss, as well as recurring and extensive oil spills (Chijioke et al., 2018; Akinpelu, 2021). As a result, it has been globally designated as one of the highest viciously crude oil-impacted environments. The resultant devastating ecological damages caused by oil spillage in these oil-producing communities have made most of the farmlands uncultivable. Chijioke et al. (2018) in a review opined that farmers have been compelled to evacuate their properties due to increasing soil sterility caused by the depletion of soil microbes and diminishing crop yields, in search of unavailable sources of living. Aside from the loss of arable land, food insecurity and poverty have been worsened due to the widespread pollution of traditional fishing areas, which has decimated fish populations (Chijioke et al. 2018). Similarly, Akinpelu (2021) reported that, the air in the region is also affected with an increased incidence of respiratory ailment among residents at a pooled prevalence of 43%. The health and well-being of the residents of these oil-polluted environments are also directly affected according to Akinpelu, (2021), with residents of the oil producing communities in Niger Delta having higher prevalence of respiratory illness when compare to non-oil-producing communities in Nigeria.

Also, participants noted that, wildlife in the region has been displaced, with animals migrating to less polluted habitats. Gas flaring contributes to the disturbance of nocturnal animals, further disrupting the ecological balance. Health challenges such as chronic coughing, skin irritations, eye problems, miscarriages, and malnutrition are prevalent, with children being particularly vulnerable due to their exposure to polluted environments. In the same vein, Miles (2015) reported that, Oil spills have adverse impacts on vegetation and wildlife, such as seabirds. Impacts are mostly due to the physical characteristics of the oil, including decreased mobility and dissolution of natural fats and waxes on body surfaces, feathers, etc., as a result of the adhesive properties of the oil. Due to these challenges, participants noted that economic hardships have intensified, as diminished agricultural and fishing outputs have lowered incomes, making it difficult for families to meet basic needs. The environmental degradation has also triggered social conflicts within communities, undermining social stability and cohesion.

Traditional resilience mechanisms are largely inadequate for addressing the environmental challenges posed by oil spills. Community leaders often appeal to oil companies for cleanup and remediation efforts, but when spills are attributed to sabotage, these appeals are frequently dismissed. Informal practices, such as flipping contaminated soil or treating water with alum and antiseptics, are employed but have limited efficacy. Reliance on NGOs and divine intervention dominates the response, as communities lack the resources and expertise to manage oil spills independently. Small-scale fish farming, barter trade, and occasional use of herbal medicines are some of the adaptive strategies, but they fail to address the root causes of environmental degradation. However, our findings contradict the findings of Clarke and Mayer (2016) who stated

that the communities in Imo state and most Niger delta states has the history of mutual understanding and assistance, so in events of disaster, members flock to the victims to help them in various ways including providing first-aid assistance, traditional medicals and clothing materials, if the disaster affected the neighbours building they offer alternative shelter, the communities goes to the extent of contributing money and food stuffs to assist victims. They also revealed that this old standing communal living standard has helped them to adjust to all disasters including oil spill. This contradiction may be due to differences in the location where the research was conducted as this study solely focused on Bayelsa Central and Clarke and Mayer's 2016 study covered several states in the Niger Delta and Imo state.

Conclusion and Recommendations

This study has provided significant insights into the multifaceted challenges of oil spills in Bayelsa Central's oil-producing communities. It has explored the intricate relationship between environmental degradation and community resilience mechanisms. The study concluded that oil exploration activities in the region have severely degraded the environment, with frequent oil spills contaminating soil and water. These incidents have disrupted agricultural and fishing activities, reduced soil fertility, and diminished access to clean water, leaving communities heavily impacted despite ongoing cleanup efforts.

Thus, communities in Bayelsa Central have employed various traditional resilience strategies to mitigate the effects of environmental degradation. These include leveraging local knowledge, raising awareness, reporting spills, and organizing communal efforts to protect natural resources. Notable examples include actions taken in Ikarama and Biseni to guard against pipeline vandalism. However, these traditional practices are constrained by limited technical expertise and inadequate resources, making it difficult to achieve long-term environmental recovery.

Based on the findings in the study, it is recommended that community members, in collaboration with NGOs such as the Environmental Rights Action/Friends of the Earth Nigeria (ERA/FoEN) and the Niger Delta Environmental Rescue Initiative (NDERI), lead efforts in land remediation. Through capacity-building workshops, communities can learn bioremediation techniques, such as using oil-degrading microbes and organic materials like water hyacinths, to rehabilitate polluted soil and land. Oil companies should provide technical support and resources, while NGOs can assist in securing funding and expertise. Additionally, alternative farming methods such as hydroponics and greenhouse agriculture should be introduced to help farmers maintain sustainable food production despite land degradation.

Secondly, it is recommended that a Community Environmental Taskforce (CET) should be established, consisting of trained local volunteers, farmers, and fishermen. In collaboration with organisations like Clean-Up Nigeria Initiative (CUNI) and Stakeholder Democracy Network (SDN), this task force should receive training on oil spill response and bioremediation techniques. By equipping community members with practical knowledge, this programme will reduce dependency on oil companies for remediation, enhance self-sufficiency, and empower local farmers and fishermen to effectively cope with the challenges posed by environmental degradation. Oil companies should provide funding for training, while NGOs oversee implementation and monitoring.

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