Ecological Changes and Emerging Patterns of Consumption in Oil-bearing Communities in Southern Ijaw Local Government Area of Bayelsa State

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Abstract
While existing studies have examined how anthropogenic activities have engendered environmental changes, relatively little scholarly energy has gone into understanding how these changes are reshaping emerging consumption patterns in oil-bearing communities, which were once characterised by traditional adaptation strategies. This study examines ecological changes and emerging patterns of consumption in oil-bearing communities within Southern Ijaw Local Government Area (LGA), Bayelsa State. The study is anchored on the *Ecological Modernisation Theory* and the *Social-Ecological Systems* (SES) framework. A phenomenological qualitative design was employed, using a purposive sample of participants in five selected clans in the study area. 10 key informant interviews (2 from each community) were conducted with community leaders. 10 in-depth interviews (2 from each community) were conducted with farmers and fishermen. Furthermore, hunters and farmer groups participated in focus group discussions (1 for each community). The data gathered were analysed through thematic and content analysis techniques. The results of the study show that ecological changes have led to the contamination of several water resources and reduced soil productivity. This has resulted in the loss of numerous animal species and massive alterations to the environment. Additionally, the study indicates that new consumption patterns have emerged due to these ecological changes. Consequently, most communities now rely on imported goods for their daily survival as a coping mechanism. The study recommends reparations for years of neglect and pollution by both the government and oil companies, to provide broader and more sustainable support to community members.

Keywords: Ecological Changes, Consumption, Oil-bearing communities, Ecological Modernisation, Social-Ecological Systems.

Introduction
Despite extensive legislative and academic engagement with environmental change governance at both national and international levels, the social consequences of ecological transformation and the persistent lack of policy responses have remained marginal concerns in scholarly research (Ebegbulem et al., 2013). Although landmark initiatives such as the *Brundtland Report* (1987), the *Millennium Development Goals* (2001), the *Johannesburg Declaration on Sustainable Development* (2002), alongside scholarly contributions (Sibiri, Ayinmoro and Ogiriki, 2012; Jack, 2020; Odubo, 2021), have underscored the critical link between environmental sustainability and development, these concerns are still marginal in explaining clusters of localised ecological, social, and cultural behaviours with broader sustainable development discourses. This study, therefore, address this gap in knowledge by foregrounding the social dimensions of environmental change in the Niger Delta, with a particular focus on oil-bearing communities.

To achieve its objectives, this study goes beyond the traditional research emphasis on ecological damage or economic losses to interrogate the lived experiences and adaptive strategies of communities directly affected by ecological disturbances, using the *Ecological Modernisation Theory and Socio-Ecological Systems (SES)* framework. These ecological disturbances—both man- and natural—such as population growth, dredging, pollution, oil spills, coastal erosion, and flooding, have increasingly destabilised Nigeria's coastal socio-ecological systems, particularly in the Niger Delta. The SES framework allows for a nuanced, integrative, and participatory analysis of resilience, placing community adaptation and social continuity at the centre of the enquiry (Millennium Ecosystem Assessment, 2005; Ibaba, Sibiri, and Barikor, 2019).

Environmental degradation in the region, largely driven by the operations of the petroleum industry, has had devastating effects for community welfare. These adverse effects include destruction of traditional livelihood systems, leading to food insecurity, disease outbreaks, and long-term socio-political instability (Ebegbulem et al., 2013; Boroh and Okodudu, 2021; Bello and Amadi, 2019). For example, in 2021 alone, the National Oil Spill Detection and Response Agency (NOSDRA) reported 312 oil spills, amounting to an estimated 11,209.091 barrels (1,771,036.424 litres) of crude oil. Alarmingly, in many cases, no official investigations or assessments were conducted (NOSDRA, 2021), further undermining the health of residents and broadening environmental decline. Studies in the Niger Delta, such as the United Nations Environmental Programme (UNEP, 2011), revealed evidence of petroleum hydrocarbon exposure in drinking water and air in affected communities. Similarly, Sibiri (2019), drawing on data from the Nigeria Demographic and Health Survey (NDHS), linked air pollution to under-five mortality. The environmental instability caused by such degradation has disrupted traditional patterns of life, leading to new socio-economic adaptations. Communities in the Niger Delta, like many others in Africa, are increasingly compelled to adapt to a new ecological and social realities (Thornton et al., 2006). These adaptive strategies range from institutional interventions to informal community-led initiatives (Benhin, 2006), yet the long-term efficacy and appropriateness of these responses remain contested and understudied.

This study is therefore distinctive in its analytical scope and focus. Rather than concentrating solely on the biophysical impacts of environmental change, it interrogates the resulting transformations in social structure, consumption patterns, and adaptive behaviour. Guided by the SES paradigm, the paper addresses two core objectives:

i. To identify the major ecological changes that have taken place in oil-bearing communities in Southern Ijaw Local Government Area of Bayelsa State, and
ii. To determine the new patterns of consumption that have emerged as a result of these ecological changes.

Review of Related Literature

Existing studies on the oil–environment nexus have extensively explored the ecological consequences of oil exploration, particularly in the Niger Delta, including pollution, habitat destruction, and socio-ecological imbalance (Ebegbulem, Ekpe and Adejumo, 2013; UNEP, 2011). A growing body of work also addresses how these environmental disruptions affect livelihoods, health, and sustainability practices within affected communities (Sibiri, 2019; Jack, 2020; Odubo, 2021). However, relatively few studies delineate the changing patterns of everyday consumption as a socio-cultural response to ecological stress, nor have they sufficiently contextualised these within the specific experiences of oil-bearing communities. This study seeks to address this gap by mapping the link between identifiable ecological changes and emerging consumption behaviours, thereby expanding the analytical focus from environmental degradation to everyday social adaptation.

Chiaka, Zhen, and Xiao (2022) offer a useful typology of five potential shifts in consumption arising from oil-induced environmental change, including changes in food sources, energy and water usage, reliance on tourism, and the adoption of sustainable practices. While these themes provide a valuable foundation, this study builds upon their framework by empirically investigating how these patterns manifest in specific localities—namely, oil-bearing communities in Southern Ijaw Local Government Area of Bayelsa State—and by identifying new or hybrid consumption responses that may not yet be captured in existing models. In doing so, it seeks to enrich our understanding of community resilience through consumption behaviour in degraded ecological settings. As observed by Partearroyo et al. (2019) and Song and Cho (2017), environmental pollution may drive communities to adopt more eco-conscious lifestyles, including preferences for renewable energy, organic food, and sustainable living practices. Similarly, Streeter (2017) notes that infrastructural adaptation, such as green architecture and rainwater harvesting, often arises in response to intensified flooding and erosion. While these studies point to general behavioural shifts in response to environmental degradation, they are not specific to the sociocultural, economic, and ecological realities of Nigeria's oil-producing coastal communities.

Moreover, earlier research tends to aggregate environmental change as a broad category, without isolating the specific ecological processes, such as saltwater intrusion, mangrove loss, soil acidification, or groundwater contamination, that precipitate particular shifts in consumption. By contrast, this study aims to clearly identify and categorise the dominant ecological changes in the study area and link these to new consumption strategies, such as altered diets, new energy sources, or changes in water sourcing and usage patterns. For example, where aquatic ecosystems have collapsed due to oil pollution, affected populations may shift from fishing-based diets to imported alternatives, introducing both economic strain and nutritional change (Chiaka et al., 2022). This research also seeks to uncover the localised meanings attached to such changes. It will explore how residents interpret these ecological and consumption transformations, whether as temporary adjustments, permanent transitions, or culturally embedded strategies of resilience. In so doing, it

extends beyond existing studies that simply list behavioural changes by contextualising these behaviours within local lived experiences and adaptive logics.

Building upon previous works that sketched the contours of environmentally driven consumption changes (Chiaka et al., 2022; Streeter, 2017), this study offers a more grounded empirical analysis by investigating not only the consumption patterns that have shifted, but also why and how these shifts are taking place in response to specific ecological stressors. The study thus contributes to the growing literature on socio-ecological adaptation by focusing on consumption as both an indicator and instrument of resilience in environmentally distressed oil-bearing communities. It assumes that the patterns of consumption in oil-bearing communities are likely to shift as a result of environmental changes. While these changes may present challenges, they also offer opportunities for residents to adopt more sustainable practices and adapt to a changing environment.

Theoretical Framework

Ecological Modernisation Theory (EMT)

The Ecological Modernisation Theory (EMT), as articulated by Spaargaren and Mol (1992) and further developed by Mol (2009), explores the intersection between environmental change and socio-economic transformation. It posits that ecological degradation, rather than only posing challenges, can serve as a stimulus for the reorganisation of industrial practices, consumer behaviour, and institutional responses. For this study, where oil exploration has resulted in widespread ecological degradation—such as contamination of rivers, destruction of farmlands, and deforestation, EMT provides a lens for interpreting how these environmental disruptions may spur changes in community consumption patterns. For instance, the pollution of traditional fishing waters may lead residents to reduce their dependence on locally sourced seafood and instead increase their reliance on processed or imported food products.

According to EMT, one key avenue through which ecological change affects consumption is through the innovation and adoption of eco-friendly technologies. In response to environmental damage and the depletion of natural resources, communities may begin to embrace alternatives such as solar-powered energy systems or sustainable agricultural techniques (Mol, 2009; Spaargaren and Mol, 1992). Such technological transitions reflect an adaptive shift in consumption patterns influenced by ecological concerns. Moreover, EMT highlights the role of heightened environmental awareness and policy interventions in reshaping consumption behaviours. As residents of Southern Ijaw become increasingly aware of the environmental and health risks associated with oil pollution, they may show a growing preference for eco-conscious goods, such as organic food or biodegradable packaging. Similarly, government-imposed regulations—such as emission controls or pollution taxes—can serve as incentives for both businesses and individuals to adopt more environmentally responsible practices (Spaargaren and Mol, 1992).

Social-Ecological Systems (SES) Framework

The *Social-Ecological Systems (SES) Framework*, as proposed by Ostrom (2009), offers a holistic approach for analysing the reciprocal interactions between human societies and their ecological environments. It recognises that human and ecological systems are interdependent, and that changes in one inevitably influence the other. In applying this theory to our study, it becomes evident that ecological changes—such as the depletion of fish stocks, pollution of drinking water sources, and habitat destruction—are not just environmental issues but are directly shaping local consumption behaviours and livelihood strategies. For example, as traditional food sources become scarce due to oil pollution, residents may diversify their diets or rely more on market-based alternatives (Cinner and McClanahan, 2006).

The SES framework also underscores how ecological change can influence consumer preferences and decisions. As environmental degradation increases awareness of ecological risks, individuals may consciously opt for environmentally friendly goods and services. Furthermore, the SES framework emphasises the importance of policy responses in shaping consumption. In many contexts, including potentially that of Southern Ijaw, governments and civil society may respond to ecological challenges with targeted interventions—such as bans on single-use plastics or subsidies for eco-friendly products—which subsequently alter consumption patterns. As illustrated in Kumar et al. (2020), policy initiatives aimed at curbing plastic use in European countries significantly reduced plastic consumption, highlighting how formal regulations can lead to meaningful behavioural change.

Methodology

For the purpose of this study, the phenomenological-qualitative study design was adopted. The study area is Southern Ijaw Local Government Area of Bayelsa State, Nigeria. Southern was created out of the old Yenagoa Local Government Area of old Rivers State in 1991. Southern Ijaw is the largest Local Government in Bayelsa State. Based on the National Population Commission (2006) figure, Southern Ijaw has an area of 2,682km2 (1.0355m2) with a population of 319,413 persons. The people and their language are known as Izon. While an initial 30 participants were sampled as suggested by Adler and Adler (2012), data saturation was reached at 25 participants. A total of 10 In-depth Interviews (IDI), 10 Key Informant Interviews (KIIs), and 5 Focused Group Discussions (FGDs) were conducted. This study adopted a multi-stage sampling technique. In the first stage, the cluster sampling technique was used to cluster communities in southern Ijaw LGA into seven clans namely; Apoi, Bassan, Bomo, Ogboin, Olodiama, Oporoma, and Tarakiri. The second stage then utilised the purposive sampling technique to select five oil-bearing clans namely; Apoi, Bassan, Bomo, Olodiama, and Oporoma. At the third stage, one oil-bearing community was selected from each clan. In clans with more than one oil-bearing community, the simple random sampling technique was used to select only one community. Lastly, the purposive sampling technique was used to select the participants for KII and FGD, while a combination of stratified and purposive techniques was used to select IDI participants. A total of 20 interviews (IDI and KII)

and 5 FGDs were conducted in all the communities visited. The IDI was conducted with people in different occupational groups namely; Fishermen/Women, Farmers, hunters etc. The KII was conducted with community leaders such as the traditional rulers/chiefs/CDC Chairmen or their representatives. Focus Group Discussions (FGDs) were held with different occupational groups. Data analysis for this study was done using the six-steps process of thematic content analysis outlined by Braun and Clarke (2006): Familiarization, coding, generating themes, reviewing themes, defining and naming themes, and writing up. The analysis was done using the Atlas.ti software.

Results

Major Ecological Changes

Participants were asked about the ecological changes in their communities, and four themes emerged from their responses: water resource contamination, depletion (loss of soil fertility), wildlife extinction, and alteration of atmospheric conditions.

i. Water Resource Contamination

It is essential to note that the release of chemical substances into water bodies, particularly through oil spills, inevitably contaminates water resources. In view of this, during conversations with the research participants, some noted that oil spill had contaminated their water. Additionally, one participant pointed out that 'due to oil spillage the rivers are polluted and contaminated.' This was further echoed by another interviewee who stated, 'yes, all our rivers are contaminated. They are no longer good for consumption, even fishermen find it difficult to fish. They spend extra time in the river for fishing and still find it difficult to get food for household use' (Women Leader, Olodiama 2022, personal communication, 2 March).

In support of the above assertion, another participant revealed that it is true that rivers are contaminated as a result of oil spills and other human activities. According to the interviewee:

> It is true that rivers are contaminated due to human activities such as oil spillage and the use of chemicals for fishing. These rivers serve as our main sources of water, yet we carried out these activities and they in turn endanger our health. Although we can overcome that in due time (Chairman/Apoi 2022, personal communication, 4 March).

ii. Depletion of Soil Fertility

Participants also clarified that several ecological change factors lead to soil fertility loss, which has an impact on agricultural yields. In particular, a woman community leader at Oporoma noted that, due to oil spills and other human activities, plants and crops can no longer grow well, resulting in low yields. According to her:

> Yes, the environment has degraded because as we plant some crops, they don't grow well anymore. Some of the crops that we also plant before now and they yield fantastic produce, we don't plant them again any more, largely due to the depletion

> of soil in our surroundings (Women Leader, Ezetu 2022, personal communication, 6 April).

From a fisher's perspective, another participant explained that due to human activities, especially that of oil companies and the use of chemicals for fishing, there is a depletion in soil fertility. The interviewee noted that:

> Because of the oil companies' activities and the use of chemicals for fishing in most of our communities, even the crops we plant and consume have all gone extinct. Even some of the species of fish we had before now are no longer available (Chairman, Ezetu 2022, personal communication, 6 April).

The foregoing narratives suggest that the various factors contributing to ecological change have not only reduced soil fertility but also led to low agricultural yields. This further suggests that the release of various chemicals into the soil compromises its nutrients, thereby reducing its fertility, a necessary requirement for crop growth and food production. If steps are not taken to mitigate the effects of the loss of soil fertility, the likely outcome will be increased food insecurity.

iii. Wildlife Extinction

During the FGDs, participants noted that wildlife extinction has become a common phenomenon in their communities. For instance, participants in Onyoma noted that some aquatic species have gone extinct due to contamination of water resources, while some terrestrial animals are no longer present in the forest. They also note that some crops have gone extinct as a result of declining soil fertility and poor agricultural yield. The following represents some the discussants' views:

> We today experience cold weather, contamination of water resources. The soil is no longer productive like before. Some animals are no longer in our forest. Yes, some crops have even gone on extinction as a result of these activities. Our water resources are destroyed as a result of these activities (Farmer, Onyoma 2022, personal communication, 11 April).

Some of the fisherwomen also shared the view that many of the fish species in their rivers and some crops have become extinct. One of them shared the view that:

> The changes we experienced as a result of these activities include; shortage of food supply, lack of fish supply. The activities have destroyed the fertility of our farmlands. Yes, I also agree with my friend that the activities have destroyed our farmlands. Yes, some crops have even gone on extinction as a result of these activities. Our water resources are destroyed as a result of these activities (Fisher, Onyoma 2022, personal communication, 16 April).

Some of the hunters interviewed also shared similar concerns, noting that ecological or environmental changes have led to a significant decline in bush meat availability, as many of the species that would have reproduced are now extinct. These views are shared below:

> The changes we experience are numerous; our lands are destroyed. There is shortage of fish and bush meat supply in my community. Some of our crops and even some animals have gone extinct, we no longer see them in our environment (Hunters, Igbomatoru 2022, personal communication, 18 March).

iv. Alteration of Atmospheric Conditions

Changes in atmospheric conditions are another consequence, as ongoing gas flares and oil spills distort the natural gaseous balance in the atmosphere. According to the FGD participants at Onyoma, the atmosphere has changed as a result of oil spills and gas flares. As one participant shared, 'I think even the atmospheric condition is destroyed because before now the atmosphere was very cool, but today that is not the case.' This view was also corroborated by one FGD participant at Oporoma, who noted that 'even our atmospheric condition is not like before again'.

Additionally, one of the male fishermen in Oporoma who was interviewed remarked, 'the climate has changed the atmospheric conditions and makes it unhealthy for plants and crops due to gas flaring, as it becomes so hot, which was never what it used to be.' This means that all elements of the ecosystem interact; but as they do so, normal human behaviours and unhealthy outcomes coexist. The implication is that all living things in the area, including people, will suffer from poor health. This finding implies that even though the environment is impacted by the factors causing ecological change, the human habitat will still be severely affected by the consequences. These effects include a lack of food supply, disease outbreaks, a rise in child mortality, and general morbidity. This makes it clear that people's general well-being will suffer from living in such an environment.

The New Patterns of Consumption as a Result of Ecological Changes

In this section, the study addresses the sources of food consumed prior to the onset of environmental changes, with particular reference to protein sources. This helps to unearth the emerging patterns of consumption, especially in communities where fishing was the primary source of livelihood.

Sources of Food Prior to Ecological Changes

When participants were asked about their sources of food prior to the onset of ecological changes, nearly all of those in the focus group discussions indicated that they sourced their food locally, as they previously engaged in large-scale planting and harvesting within their communities. During a focused group discussion with farmers in Onyoma, participants shared the view that 'we got all our food products from the community. We planted and harvested in abundance before these environmental changes.' Supporting this view, a group of fishermen from the same community added, 'until now, the rate of consumption was such that everybody ate to his or her satisfaction because food supply was surplus, but that is no longer the case.'

In support of the previous assertion, one participant from the Igbomatoru community shared the view that, prior to the occurrence of ecological change, there was an abundance of food to the point where everyone could eat three square meals per day. However, as a result of the ecological change, the food supply has significantly declined. As she noted:

> Before now, food was available to everyone in the community, so at least we eat thrice (3) per day. Indeed, we eat the way we want because we plant these crops and harvest them ourselves. Therefore, I can say that we used to get all our food items from the community. Both fish and meat are sourced in their quantities within our community here. But it is no longer the same again (Farmer, Igbomatoru 2022, personal communication, 18 March).

Another participant, described how the environmental change has damaged sources of livelihood to the point where they now buy food from outside the community. He shared the view that:

> Before we started experiencing the change in our environment, all the food items we consumed, we got them within the village. Then, we had rice, beans, pepper, maize, okro, plantain, cassava, and others in our village, but now even mana coco that was food for households is now difficult to get (Farmer, Onyoma 2022, personal communication, 16 April).

One other interviewee agreed that environmental alterations have caused not just a change in the quantity of food available for consumption within their community, but also a change in the quality. In his own words, ‘consumption before now was in a standard form that everybody was able get over 80% of the food items within the community’ (Farmer, Apoi 2022, personal communication, 4 March).

Sources of Protein Prior to Ecological Changes

The majority of participants who were asked about their previous sources of protein reported that meat and fish were their primary sources. The hunters, in particular, reaffirmed that meat and fish were their main sources of protein because these were naturally abundant in the area they lived. As shared by some of the participants during the FGD held at Onyoma, ‘even meat and fish—we ate the way we wanted because they were everywhere and easy to hunt.’ Similarly, a male farmer and fisherman interviewed in Ezetu corroborated this, affirming that both fish and meat were constantly available in their area, serving as ample protein sources for households. Drawing from the conversation, the interviewee expressed the view that ‘...both fish and meat, we used to get them from the village. Back then, there was a lot of bush meat, which was made available for all our households. We also used to fish, so fish was not a problem’ (Fisherman, Ezetu 2022, personal communication, 6 April). This also aligned with the views of a woman leader from the same community, who noted that ‘both meat and fish production were done within the community. We used to get meat from the hunters and fish from the fishermen, and the farmers also sold their farm produce within the community (Women Leader, Onyoma 2022, personal communication, 11 April).

Current Sources of Food Consumed

After examining the sources of food and protein prior to the environmental changes, it is critical to look at the current sources of food crops and protein. Findings show a shift in the pattern of consumption, with many of the households now sourcing their food from outside the community. This shows a departure from previous reliance on locally grown foods and readily available protein sources within the communities. One participant expressed the view that 'today the pattern of consumption has changed from general welfare to individual welfare. We only consumed cassava and plantain more than other crops, but now, almost all of the farm produces are gotten from outside this community' (Farmer, Onyoma 2022, personal communication, 11 April).

Based on the views expressed by some of the discussants in Onyoma, the pattern of consumption shifted from a communal to a family-based or individual pattern. According to one participant:

> The pattern of consumption, as of today, is centered on the family line as a result of the ecological changes, because most of the crops we consumed are no longer available. The sources of protein are very limited and this has brought about a new pattern of consumption, making everyone more conscious of them and dependent on their immediate family for provision (Fishermen, Onyoma 2022, personal communication, 6 April).

In a similar vein, the group of hunters categorically stated that the changes they had experienced were best characterised as a shift from good to bad. As a result, daily consumption can no longer adequately sustain community members. In the opinion of some of the hunters, 'as a result of the environmental changes members of my community experience, our pattern of consumption has shifted from good to bad. The sources of food crops we need for our daily consumption are no longer sufficient' (Hunters, Apoi 2022, personal communication, 3 May).

In Ezetu community, an interviewee also highlighted the impact of environmental change on their consumption practices, stating that due to the lack of local food supply, most food items are now purchased from Yenagoa, the state capital, where the main markets are located. As expressed by the participant, '…food items, we get them from the market in Yenagoa — like rice, beans, etc. — because we used to get all of these from the community before, as there were rice farmers and some persons who also planted beans' (Farmer, Ezetu 2022, personal communication, 6 April). It is believed that roughly 40% of the food consumed by the community is now purchased from Yenagoa, instead of being produced locally. To corroborate this, one of the participants noted:

> Before the experience of environmental change, almost 90% of the foods were gotten from the community, except for a few food items that we didn't produce locally. We got those from other areas through exchange or purchase. We traveled by canoe to places like Brass to exchange our crop items for food and fish, which were not common in our area; we did that seasonally. Since the experience of

> environmental change, we now get food and most of the things we use for cooking from the market (urban areas), like pepper, rice, beans, and meat, which we can now access more easily in the urban areas, unlike before. Also, most of our relatives who reside in urban areas send food like rice, beans, etc., to people in the village, unlike before. We still get most of the food within the community—just that getting fish these days is difficult—so we get fish from the nearby communities. (Chairman, Onyoma 2022, personal communication, 11 April)

Current Sources of Protein

The majority of participants noted that they obtain their fish, as a source of protein, from urban centers, while a minority still obtain it locally. As one of the participants in Apoi stated, 'now, over 50% of the food items we get are from outside the community, particularly meat.' Another participant shared this view:

> We still get fish from the river, but not as before, because not every household engages in fishing these days. Some households even buy fish from the few fishermen in the village; but if the village fishermen don't have fish, we get them from the next village (Fisherman, Apoi 2022, personal communication, 3 May).

One of the participants corroborated the opinions of the other respondents and emphasised that, with the exception of the few meats they do get from the communities, including fish, most are gotten from elsewhere. As she stated, 'the meats are mostly gotten from the cities, except for a few occasions when we get meat within the community. We still get some fish from the few fishermen within the village and from other communities' (Women Leader, Igbomatoru 2022, personal communication, 4 May).

Hence, food crops and protein that were previously obtained within the community are now largely sourced from outside. This suggests that oil spills have adversely affected soil fertility, thereby reducing agricultural yield. Furthermore, oil spills and other human activities associated with oil exploration have disrupted fish habitats, leading to a decline in fish productivity. Consequently, sourcing fish from outside the community has become unavoidable. If this trend is not urgently addressed, a food crisis may emerge within the affected communities.

Specific Changes Experienced in the Community

In the course of ascertain the specific changes experienced in the respective communities, it was revealed that community members' food consumption had declined relative to the period prior to environmental degradation. As a result, the available food is no longer enough to meet the needs of community members. Collectively, the hunters' group in Onyoma community shared the view that:

> The specific change in the pattern of consumption is that, since the food is not enough to go around the growing population, it has become difficult to feed household members. This is mostly due to environmental changes in the

> community, as the local food supply can no longer meet the increasing needs of the population (Hunters, Onyoma 2022, personal communication, 6 April).

One of the participants who was interviewed elaborated on this point by stating that 'the changes I have experienced in the environment are very drastic. As a farmer, I am supposed to harvest well during harvesting period, but due to these changes, produce from my farmlands is yielding very low relative to food production' (Farmer, Ezetu 2022, personal communication, 6 April). The changes in the environment are widely believed to have led to food insecurity, largely because of the low productivity recorded by most farmers and fishermen. In the opinion of one of the participants:

> You know that most of us are either into farming or fishing. Of course, the environmental changes have brought about food insecurity in the sense that most of our yields, both from the farm and from the rivers, are consistently low. The pressing question now is: if we continue to experience low yields in our communities, how are we expected to feed? (Farmer, Olugbobiri 2022, personal communication, 6 May).

Additionally, a male farmer from Ezetu community corroborated the above opinion by noting that:

> Over time, I have experienced low outcome of farm products due to these activities from oil companies. Even as a hunter, I don't hunt again because there is no animal in our forests. It means these activities have pushed away the animals or caused them to go extinct (Farmer, Ezetu 2022, personal communication, 6 April).

Discussion of Findings

The findings of this study show that ecological changes have engendered the contamination of several water sources and reduced soil productivity, leading to the loss of a vast amount of animal species and the distortion of their natural habitat. This is corroborated by the Millennium Ecosystem Assessment's (2005) findings, which showed that approximately 20% of the world's coral reefs were lost and another 20% severely degraded in the latter part of the twentieth century. This also supports the findings of Obioha (2005) and Claude (2018), who collectively emphasised that anthropogenic activities have continued to contribute to these changes with varying implications for social vulnerability. These changes have also altered the character of local and regional weather patterns around the world, which in some cases have led to resource depletion and conflicts.

On the new consumption patterns that have emerged as a result of environmental changes, the study found that prior to these ecological disruptions, sources of food were mostly local. A good number of the participants emphasised that they mostly relied on food produced within their communities, largely due the availability and productivity of local agricultural resources. Members of the communities were able to meet their food needs without relying on imported goods. In

essence, our findings show that households could afford three square meals daily prior to these changes.

The findings also show that prior to ecological changes, the major sources of protein for households in the Niger Delta came from both aquatic resources and terrestrial animals, including meat and fish. These were largely obtained through local hunting and fishing activities, prior to environmental distortions and livelihood destruction resulting from oil exploration and exploitation.

Furthermore, the study found that as a result of oil spills, dredging, and other environmental changes, the environment is no longer safe and beneficial for the survival of both biotic and aquatic life. For instance, it was discovered that the pattern of consumption had changed, with food crops now being sourced from outside the community rather than locally. This shows that, as consumption patterns shift, so do exchange patterns. The study also identified specific alterations in consumption patterns, due to a lower-than-normal harvest of farm output, as both terrestrial and aquatic life forms continue to diminish.

Conclusion

This study concludes that ecological changes have led to water resource contamination, depletion of soil fertility, wildlife extinction, and alteration of atmospheric conditions resulting in air pollution. Consequently, ecological changes in Southern Ijaw LGA have led to new patterns of consumption, with fish and meat no longer serving as the primary sources of proteins in oil-bearing communities. Other sources of protein, such as milk and egg, are now being sourced from outside the communities, mostly from nearby cities. Moreover, there is a general decline in the quantity of food production when compared to the period before the unset of environmental alterations, leading to increased food scarcity.

Recommendations

i. The roles of social networks in oil-bearing communities should be further strengthened and supported through relevant legislation, to enable them to secure more farm lands as a means of mitigating the challenges brought about by ecological changes.
ii. The media should to direct its focus to the strengths of local communities, so as to project the people as a resilient group that has developed localised means of adapting to their ecological situation.
iii. Reparation for years of neglect and pollution needs to made by both government and oil companies, to ensure broad and sustained relief to community members.

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