NIGERIAN JOURNAL OF PUBLIC SECTOR MANAGEMENT (NJPSM)

Effect of Fossil Fuels on Housing and Urban Environment in the Niger Delta Region of Nigeria

Upah Benson Junior

Federal Mortgage Bank of Nigeria

Corresponding Author: **upahbenson@gmail.com**

Abstract

This study investigated the effects of Fossil Fuels on Housing and Urban Environment of the Niger Delta Region in Nigeria. The study was built on a survey research design and relies on a close ended questionnaire to extract primary data for the analysis. The study focused on the Niger Delta region of Nigeria as its population with a sample of 160 respondents randomly selected. The study relied on cronbach's alpha, frequency distribution, descriptive statistics, correlation analysis and regression analysis to test the data collected and the study's hypothesis. The study found that fossil fuels had significantly affected housing in the Niger delta. The study also found that fossil fuels were significant in affecting the urban environment in the Niger delta. The study concluded that fossil fuels were significant determinants of housing and urban environment in the Niger delta region of Nigeria. The recommended community engagement, integrated environmental policies and monitoring strategies for improving housing and urban environment in the Niger delta region of Nigeria.

Keywords: Fossil Fuels, Housing, urban Environment, Niger Delta, Effect

Introduction

The Niger Delta, situated in southern Nigeria, stands as Africa's largest delta, covering approximately 70,000 square kilometers and spanning nine states: Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Rivers, Abia, Imo, and Ondo. This region holds significant strategic importance due to its role as the cornerstone of Nigeria's oil industry, making it a pivotal economic center within Africa. According to Alhassan (2022), the extraction of petroleum resources in the Niger Delta has catapulted Nigeria into becoming Africa's foremost producer of petroleum products, with the majority of its output emanating from this area. However, the benefits of this industry have come at a substantial cost to the local population, who endure severe environmental consequences such as pollution, ecosystem degradation, and disruptions to traditional livelihoods. Environmental challenges loom large over

the Niger Delta despite its resource wealth. The region's natural landscape, including expansive wetlands and the world's third-largest mangrove forest, faces ongoing threats from industrial activities and urban expansion. This degradation is particularly acute in states like Rivers and Delta, which produce a substantial portion of Nigeria's oil and contribute significantly to national revenue but suffer from severe environmental degradation as a result.

The urban areas within the Niger Delta illustrate the complex interplay between rapid urbanization, inadequate infrastructure, and challenging living conditions. Cities are burgeoning due to both natural population growth and inward migration, exacerbating issues related to housing shortages, sanitation deficiencies, and insufficient public services. Particularly striking are the slum conditions prevalent in urban centers, where residents grapple with substandard living environments and limited access to basic amenities. The Niger Delta stands at a critical juncture where economic growth must be balanced with environmental sustainability and improved quality of life for its inhabitants (Etuonovbe, 2009). The imperative lies in adopting strategies that prioritize the upgrading rather than clearance of slum areas, ensuring that development efforts contribute positively to both urban resilience and community well-being across Nigerian cities. By embracing sustainable management practices and fostering inclusive growth, the Niger Delta can harness its immense potential to foster a more equitable and environmentally resilient future.

The Niger Delta region represents a dual reality for Nigeria, being the primary revenue source due to its extensive oil and gas reserves while concurrently grappling with elevated poverty rates compared to other southern states. Environmental degradation compounds these challenges, with approximately 240,000 barrels of crude oil spilled annually, severely impacting the livelihoods of local communities dependent on fishing and agriculture. Moreover, ongoing conflicts and security concerns persist, exacerbated by the activities of multinational oil companies, such as Shell's struggles with oil theft and spills prompting discussions about its potential divestment. Various stakeholders, including Nigeria's government, NGOs, international organizations, and corporate social responsibility arms of oil companies, have implemented initiatives aimed at improving living conditions in the Niger Delta (Abdulkareem *et al.*, 2012). Despite these efforts, many projects have been criticized for their top-down approach and limited effectiveness, contributing to a worsening economic and environmental situation that fuels further instability and conflict. To address these issues, organizations like the Brookings Africa Growth Initiative (AGI), the Foundation for Partnerships Initiatives in the Niger Delta (PIND), and the Nigerian Institute of Social and Economic Research are evaluating the impact of community-driven development (CDD) projects in the region. Their goal is to identify successful

strategies that can be scaled up across the region and beyond. The Niger Delta faces a complex array of challenges encompassing housing shortages, poverty, environmental degradation, and persistent conflict. While community-driven approaches show promise in addressing these issues, rigorous evaluation and understanding of their impact are essential for achieving sustainable development and improving the lives of those in the region and beyond.

The Niger Delta, located in southern Nigeria, is renowned for its extensive reserves of oil and natural gas, which have attracted significant attention from both domestic and international oil companies. However, the exploitation of these resources has resulted in profound environmental degradation and socio-economic challenges for the region. Historical oil spills, such as the spillage of approximately 2 million barrels of oil in Rivers State between 1976 and 1991, have caused widespread contamination of water bodies and mangrove (Ohwofadjeke *et al*., 2023). Additionally, gas flaring, a byproduct of oil extraction, exacerbates environmental damage by releasing pollutants that contribute to air pollution and acid rain, harming both human health and the ecosystem.

The environmental degradation in the Niger Delta has direct consequences on public health, with air pollution from gas flaring contributing to respiratory illnesses among local populations and water contamination from oil spills affecting drinking water quality and aquatic biodiversity (Ogolo, *et al*, 2022). These environmental impacts have compounded socio-economic challenges in the region, leading to reduced agricultural productivity, increased poverty, and heightened food insecurity among local communities. Moreover, economic hardship and environmental stress have contributed to elevated crime rates and social unrest. Addressing these complex challenges necessitates a multifaceted approach. It involves stringent regulatory measures to control industrial activities like oil drilling, rigorous enforcement of environmental standards to mitigate pollution, and initiatives to restore damaged ecosystems through mangrove reforestation and wildlife conservation efforts. Furthermore, empowering local communities through education and training in sustainable resource management practices is crucial to enhancing their resilience and economic participation. Establishing marine protected areas can safeguard marine biodiversity and support the livelihoods of coastal communities dependent on fisheries. Improving access to quality education and healthcare services is also essential to reducing vulnerabilities associated with environmental and economic challenges in the Niger Delta. Lastly, promoting inclusive decision-making processes that ensure equitable access to resources and opportunities for marginalized groups, including women and ethnic minorities, is vital for sustainable development in the region. By adopting sustainable development practices and fostering inclusive growth, the

region can aspire to a more resilient and prosperous future.

The impact of environmental degradation extends to urban areas, where pollution from oil spills and gas flaring contributes to the proliferation of slums characterized by unsafe and unsanitary living conditions. Rapid urbanization further exacerbates issues such as congestion and a lack of open spaces, restricting opportunities for outdoor activities and exacerbating health challenges, particularly for women who often cook indoors using biomass fuels. Socio-economic consequences are profound, with environmental degradation leading to reduced agricultural productivity and increased poverty levels. The combination of economic hardship and environmental stressors also contributes to heightened crime rates and social unrest in the region.

Statement of the Problem

The Niger Delta region of Nigeria has been significantly impacted by the extraction and use of fossil fuels, influencing both the housing conditions and the urban environment. This study aims to investigate the multifaceted effects of fossil fuels on housing and the urban environment in this region. Specifically, it seeks to address several identified gaps: There is a lack of recent comprehensive studies that analyze the current state of housing conditions and the urban environment in the Niger Delta region in relation to the ongoing extraction and use of fossil fuels. Existing studies may not reflect the contemporary socio-economic and environmental dynamics shaped by fossil fuel activities. Such existing studies include Ohwofadjeke *et al.* (2023), Echendu, *et al,* (2022), Humbatova and Hajiyev (2020), Abdulkareem *et al.* (2012) and Etuonovbe (2009).

There has also been geographical gaps observed as some studies such as Jumbo and Ihuah (2024), Jin, *et al* (2024), Kilian and Zhou (2021) and Humbatova and Hajiyev (2020) focused on geographical locations whose findings cannot be applied to the entire Niger delta region of Nigeria. Methodologically, there is a need for integrated approaches that combine qualitative and quantitative methods to comprehensively assess the impacts of fossil fuels. Previous studies may have been limited in scope, using primarily literature review approaches that are devoid of empirical data to capture the complex interplay between fossil fuel activities, housing conditions, and urban environmental quality. Such studies include Alhassan (2022) and Kilian and Zhou (2021). By addressing these gaps, this study intends to provide a nuanced understanding of how fossil fuels influence housing conditions and urban environments in the Niger Delta region. It aims to contribute empirical data and analytical insights that can inform policy-making, urban planning, and sustainable development strategies tailored to the local context. In order to fulfil the aim of this study, the following hypothesis were formulated and tested:

Ho1: Fossil fuels have no significant effect on Housing in the Niger Delta region of Nigeria.

Ho2: Fossil fuels have no significant effect on Urban Environment in the Niger Delta region of Nigeria.

Literature Review

Conceptual Framework

Fossil Fuel

Fossil fuels are natural resources formed from the remains of ancient plants and organisms over millions of years. These resources include coal, oil (petroleum), and natural gas, which are primarily composed of carbon and hydrogen atoms (Ohwofadjeke *et al.,* 2023),. They are extracted from underground deposits and are major sources of global energy due to their combustible nature. According to Humbatova and Hajiyev (2020), solid fossil fuel is formed from the remains of plants that lived millions of years ago in swampy environments. Over time, the remains were buried and subjected to heat and pressure, transforming into coal. It is mined extensively for electricity generation, industrial processes, and steel production. According to Abdulkareem *et al.* (2012), petroleum, commonly known as crude oil, is a liquid fossil fuel found underground in reservoirs. It is formed from the decayed remains of marine organisms buried under layers of sedimentary rock. Petroleum is refined into various products such as gasoline, diesel, and jet fuel, serving as a crucial energy source for transportation and heating.

Natural gas is a gaseous fossil fuel primarily composed of methane (CH4) along with other hydrocarbons such as ethane, propane, and butane. It is formed similarly to petroleum, through the decomposition of organic matter over geological time periods. Natural gas is extracted via drilling and is used for electricity generation, heating, and as a feedstock in industrial processes. Fossil fuel energy refers to the energy derived from the combustion or utilization of fossil fuels sources like coal, oil, and natural gas. This energy is harnessed through various technologies such as power plants, engines, and furnaces, converting the chemical energy stored in fossil fuels into electricity, heat, and mechanical work. Despite their energy density and widespread use, fossil fuels contribute to environmental concerns such as air pollution and greenhouse gas emissions.

Housing

Housing refers to the physical structures and dwellings that provide shelter and accommodation for individuals and families (Kilian & Zhou, 2021). It encompasses a range of residential buildings, including single-family homes, apartments, condominiums, townhouses, and other types of living spaces designed for human habitation. Residential housing specifically refers to the subset of housing dedicated to providing living spaces for individuals and

families (Echendu, *et al,* 2022),. It includes both owned and rented properties and varies in size, design, and amenities to accommodate diverse household needs and preferences. Shelter refers to the fundamental human need for protection and security from the elements and other environmental hazards. According to Ogolo, *et al*, (2022), housing serves as a primary form of shelter, offering a secure and private space where individuals can rest, store belongings, and engage in daily activities in a comfortable and safe environment.

The housing market encompasses the economic activities related to the buying, selling, renting, and financing of residential properties. It includes real estate transactions, property development, rental agreements, mortgage lending, and government policies that regulate housing supply, demand, and affordability. Housing conditions refer to the physical, social, and environmental aspects that define the quality and suitability of residential dwellings. These conditions encompass factors such as structural integrity, safety standards, access to essential utilities (water, electricity, sanitation), indoor air quality, noise levels, neighborhood amenities, and proximity to employment, education, healthcare, and recreational facilities. This study assesses housing conditions on the basis of affordability, slum status and home ownership.

Urban Environment

The urban environment refers to the physical, social, economic, and cultural characteristics of a densely populated area shaped by human activities and interactions. It encompasses the built environment (buildings, infrastructure), natural surroundings (parks, water bodies), and socio-economic dynamics that define urban life (Jumbo & Ihuah, 2024). According to Kilian and Zhou (2021), the built environment constitutes the man-made structures and infrastructure within urban areas, including residential, commercial, industrial, and institutional buildings, as well as transportation networks (roads, bridges, railways), utilities (water supply, sewage systems), and public spaces (parks, plazas). The socio-economic fabric of the urban environment encompasses the social and economic conditions and activities that characterize urban life (Jumbo & Ihuah, 2024). This includes demographic diversity, income distribution, employment opportunities, educational institutions, healthcare facilities, cultural amenities, and social networks that shape community interactions and well-being.

Environmental quality within the urban environment refers to the condition and health of natural resources and ecosystems, including air and water quality, biodiversity, green spaces (parks, gardens), and the resilience of urban ecosystems to pollution, climate change impacts, and other environmental stressors. Urban environment sustainability focuses on achieving a balance between economic development, social equity, and environmental protection within urban areas. It involves strategies and practices aimed at reducing resource

consumption, minimizing pollution and waste, promoting renewable energy use, improving transportation efficiency, enhancing green infrastructure, and fostering community resilience to ensure long-term livability and quality of life in cities. This study will assess urban environment on the basis of air pollution, water pollution and health problems of residents linked to environmental factors.

Empirical Framework

Jumbo and Ihuah (2024) explored the impact of the oil and gas industry's location on residential property values in Bonny Island, Rivers State. The study adopted a positivist, quantitative approach, focusing on the period from January to March 2024. Utilizing simple random sampling, the researchers distributed 399 questionnaires to residents, indigenes, and landlords within the island. The study measured variables such as security improvement, infrastructure development, clean water provision, job opportunities, and property value increase, using respondents' agreement levels as proxies. With a population of 464,258 and a sample size of 399, the findings indicated significant improvements in security, infrastructure, and property values due to the industry's presence. The study concluded that the oil and gas industry positively influenced socio-economic activities and recommended government regulation of residential property development near these companies. The study however focusses on Bonny Island which may not adequately represent the entire Niger delta region of Nigeria.

Jin, *et al* (2024) explored the relationship between energy transition and housing market bubbles in Chinese prefecture cities. The study employed a cross-sectional research design, analyzing data from 2010 to 2023. Utilizing econometric models, the authors measured variables such as energy consumption, housing prices, and economic indicators with appropriate proxies. The population encompassed various prefecture cities in China, with a substantial sample size that provided a comprehensive overview. The findings indicated a significant correlation between energy transition initiatives and the emergence of housing market bubbles. The study concluded that energy transition efforts could inadvertently contribute to housing market instability. Recommendations included policy adjustments to balance energy goals with housing market sustainability. A critique of the study highlights a geographical research gap, as the focus was not on Nigerian cities, and a time gap, as the time scope does not extend beyond 2023. Additionally, the study's reliance on secondary data presents a methodology gap, suggesting the need for primary data collection in future research.

The study by Ohwofadjeke *et al.* (2023) explores the environmental impact of security services at oil facilities in Nigeria. It adopts a case study approach and utilizes data analysis to measure air quality parameters such as particulate matter,

nitrogen dioxide, sulfur dioxide, and carbon monoxide. The research encompasses two Nigerian sites, Ahoda and Evwreni, with a sample size reflecting 335 burned vehicles. Findings indicate significant air pollution, posing health risks and contributing to climate change. The paper concludes with a call for the cessation of asset burning by security personnel and remediation of impacted soils. A critique of this study highlights a geographical gap which highlights a small sample of only twon sites which may not be representative of the entire Nigerian Niger delta region.

The study by Echendu, *et al,* (2022) explores the nexus between air pollution, climate change, and overall ecosystem health in the Niger Delta region of Nigeria, employing an environmental justice lens. The research adopts a descriptive design, analyzing the period up to 2022, utilizing a combination of qualitative analysis and review of existing literature. The study does not specify a particular measurement for variables and proxies. Findings highlight the significant impact of air pollution on the region's ecosystem, and the disproportionate burden faced by the indigenous people. Gas flaring, fossil fuel burning, artisanal refining of crude, and transportation are found to be the main sources of air pollution in the locality. Mitigating air pollution and the attendant impacts requires urgent action and concerted effort at the individual, local, and national levels. The study concludes with recommendations for addressing this critical issue. The study concludes with the urgent need for action at various levels to mitigate air pollution and recommends policies addressing both local and global environmental issues. However, the study lacks empirical data collection, presenting a methodological gap, and the time scope does not extend beyond 2022, indicating a potential time gap for current applicability.

Alhassan (2022) explored the effectiveness of state policies in addressing energy crises in the Niger Delta region of Nigeria. The study adopted a qualitative research design, focusing on the period up to 2022. Content analysis was utilized to examine the National Renewable Energy and Energy Efficiency Policy (NREEEP) 2015, and other government-funded policies. Variables were measured using policy documents as proxies, with the population encompassing various Nigerian government agencies without legal backing and minimal stakeholder engagement. The research revealed that while policies could facilitate solar energy transition, their management and implementation were flawed. The study concluded that comprehensive renewable energy legislation involving multi-actor participation is crucial for successful solar energy transition in the Niger Delta. Recommendations included the establishment of such legislation and enhanced stakeholder engagement. The study provides valuable insights but is limited by its reliance on literature review and policy documents, indicating a methodology gap for future research involving primary data collection.

Ogolo, *et al,* (2022) explored the environmental impacts of oil and gas operations. The study utilized a descriptive research design to examine the various pollutants produced by the petroleum sector and their effects on the environment. Although the exact time scope is not specified, the paper was accepted in June 2022, indicating recent research. The authors employed qualitative analysis, drawing from existing literature and case studies to measure the environmental degradation caused by pollutants. The study focused on oil and gas producing communities, particularly in Nigeria, thus addressing the geographical research gap. The findings highlight significant environmental damage affecting humans, flora, fauna, and the ecosystem. The conclusion emphasizes the moral imperative for responsible hydrocarbon exploitation, and the recommendations call for prioritizing environmental safety over economic benefits. A critique of the study might note the lack of primary data collection, presenting a methodological gap.

Kilian and Zhou (2021) aim to understand the impact of oil price shocks on Canadian housing markets. The study employs a theoretical model that accounts for differences between oil-producing and non-oil-producing regions, incorporating factors such as trade, government redistribution, and consumer spending on fuel. Spanning a period not specified in the abstract, the authors use empirical methods to confirm the model's predictions, focusing on interprovincial trade and government redistribution as mechanisms for shock transmission. While the population and sample size are not detailed in the abstract, the findings suggest that oil price shocks in one region can influence housing prices in other regions. The study concludes that regional shocks have broader economic implications, recommending further exploration of these dynamics. However, the research does not provide a time scope later than 2022, nor does it focus on a Nigerian context, indicating potential geographical and temporal research gaps. Additionally, the reliance on a theoretical model and empirical confirmation suggests a methodology gap.

Humbatova and Hajiyev (2020) explored the interplay between oil prices and the housing finance sector in Azerbaijan. The research adopted a time series analysis covering the period from January 2010 to January 2020, utilizing the Autoregressive Distributed Lag (ARDL) model to assess the relationship. Variables were tested for stationarity using ADF, PP, and KPSS tests, while the Engle-Granger cointegration equation was evaluated with FMOLS, DOLS, and CCR methods. The study focused on mortgage and real estate loans as the main variables, with world oil prices acting as the independent variable. The findings indicated a positive correlation between oil prices and housing finance, leading to the recommendation of channeling more oil revenues into mortgages and real estate to improve housing. However, the study is limited by its

geographical focus on Azerbaijan and does not include the Nigerian context, presenting a geographical research gap. Additionally, the time scope does not extend beyond early 2020, creating a time gap for current and future research. The methodology relies on secondary data, suggesting a potential gap for studies incorporating primary data or literature review.

In their examination of the environmental impact of oil exploration in Nigeria, Abdulkareem *et al.* (2012) aimed to assess the heat radiation from gas flaring in the Niger Delta area. The study utilized a retrospective research design, focusing on data from the 1970s to the early 2000s. The authors employed mathematical modeling and simulation to analyze the heat radiation from gas flaring stations. Variables measured included the volume of gas flared, flare stack efficiency, and distance from flare points, with the Nigerian population and ecosystem serving as the study's population. Findings indicated that gas flaring significantly contributes to environmental pollution and has a detrimental effect on human health and the ecosystem. The study concluded that gas flaring is a critical environmental issue in Nigeria and recommended the development of alternative gas utilization methods. A critique of the study highlights a time gap, as the time scope does not extend beyond 2012.

Etuonovbe (2009) explored the severe consequences of environmental degradation, focusing on the Niger Delta region of Nigeria. The study aimed to highlight the nature and characteristics of environmental degradation and examine its implications on the health and socio-economic well-being of the local population. Utilizing a case study approach, the research spanned events up to 2009, employing qualitative analysis of environmental data and observations. The study did not specify a particular population or sample size but discussed the broader impacts on the Niger Delta communities. Key findings indicated that environmental degradation, particularly from oil pollution, has led to health issues, loss of biodiversity, and economic challenges. Etuonovbe concluded that environmental degradation significantly affects the region's inhabitants and recommended policy changes for sustainable development. A critique of the study would note the time gap, as the research does not cover developments past 2009, which may limit its current applicability. Additionally, the study's focus on Nigerian populations does not leave room for a geographical research gap. However, the reliance on case studies and literature review suggests a methodological gap, as primary data collection could provide more current and direct insights into the ongoing situation.

Theoretical Framework

The study was anchored on two theories and these are:

(a) Participatory Democracy Theory

Participatory democracy, also known as participant democracy or semi-direct democracy, is a form of government where citizens actively engage in political decisions

and policies that directly affect their lives. Unlike representative democracy, where elected officials make decisions on behalf of the people, participatory democracy emphasizes individual involvement in decision-making (Rousseau, 1762; Mill, 1861). Proponents such as Rousseau (1762) and Mill, (1861) have contributed significantly to its development. Rousseau argued in "The Social Contract" (1762) that true democracy requires active citizen participation in shaping laws and policies to ensure their voices are heard. Mill advocated for participatory democracy as a safeguard against tyranny of the majority, promoting informed citizenry and liberty (Mill, 1861). Cole further emphasized decentralized decision-making and local governance as essential components of participatory democracy.

Basic assumptions of participatory democracy include inclusivity, direct participation, and decentralization (Rousseau, 1762; Mill, 1861). Inclusivity ensures equal opportunities for all citizens to participate, while direct participation involves citizens actively engaging in discussions and policy formulation. Decentralization allows decision-making at local levels, enhancing community-specific issue resolutions. Arguments for participatory democracy highlight enhanced legitimacy of decisions, empowerment of citizens, and better policy outcomes through diverse perspectives (Rousseau, 1762; Mill, 1861). Conversely, practical challenges such as time-consuming processes, expertise gaps among citizens, and risks of populism pose challenges (Rousseau, 1762; Mill, 1861).

In the context of the Niger Delta region and its issues related to fossil fuels, participatory democracy is highly relevant. It ensures environmental justice by involving affected communities in decisions about resource management, pollution control, and sustainable development (Rousseau, 1762; Mill, 1861). Moreover, participatory processes empower local residents to address housing challenges caused by fossil fuel activities, advocating for improved housing conditions and urban planning (Rousseau, 1762; Mill, 1861). Additionally, participatory democracy holds companies and governments accountable for their actions, promoting transparency and responsible resource use (Rousseau, 1762; Mill, 1861).

(b) Theory of Environmental Justice

The theory of environmental justice, as articulated by Robert D. Bullard in 1990, focuses on achieving equitable distribution of environmental benefits and burdens among all societal groups, particularly emphasizing the rights of marginalized and vulnerable communities. It asserts that every individual and community, regardless of race or socio-economic status, deserves access to a healthy and safe environment. This principle is especially pertinent in regions like the Niger Delta, where the extraction and utilization of fossil fuels have led to significant environmental degradation and health risks for local populations. Historically, environmental justice emerged

from studies by Bullard that highlighted environmental disparities based on race and economic status. His work underscored the importance of inclusive decision-making processes that empower affected communities to participate actively in environmental policy formulation and implementation. This participatory approach not only aims to rectify existing environmental injustices but also to prevent further inequities from occurring (Bullard, 1990).

Central to the theory are several core assumptions. Firstly, it advocates for equity in environmental protection, arguing that vulnerable populations should not bear a disproportionate burden of environmental harm caused by industrial activities such as oil extraction. Secondly, environmental justice promotes distributive justice by insisting on fair allocation of environmental resources and benefits, ensuring that all communities have access to clean air, water, and a safe living environment. Lastly, the theory stresses the importance of community empowerment, asserting that affected communities must have a voice in decisions that affect their environment and quality of life. Supporters of environmental justice argue that it promotes social equity by addressing systemic environmental inequalities that impact marginalized communities, such as those in the Niger Delta affected by oil pollution and land degradation. By empowering local communities to engage in decision-making processes, environmental justice initiatives can foster advocacy for improved housing conditions and sustainable urban development practices.

Critics, however, raise concerns about the practical challenges of implementing environmental justice, citing institutional resistance, economic interests, and regulatory complexities as barriers to achieving equitable environmental outcomes. They also point to potential economic burdens associated with transitioning away from fossil fuel-dependent economies in regions like the Niger Delta, where oil revenues play a crucial role in national and local economies (Bullard, 1990).

In the context of the research topic on the impact of fossil fuels on housing and the urban environment in the Niger Delta region, environmental justice theory provides a robust framework for understanding and addressing the socio-environmental challenges faced by local communities. It calls for accountability and transparency in resource management decisions, ensuring that oil companies and governmental bodies are held responsible for their environmental impacts. By advocating for inclusive participation and fair distribution of environmental benefits, environmental justice principles can guide policies that mitigate the negative effects of fossil fuel activities on housing conditions, urban development, and community well-being. This is the theoretical framework that underpins this research work as it focuses on explaining the negative effect of fossil fuel activities on the Nigerian Niger delta region.

Methodology

The survey research design was employed by the study to achieve its objectives. Consequently, a four section close ended questionnaire was issued to respondents as a tool for collecting research data. The questionnaire was made up of 14 questions with five questions allotted to the demographics section and 3 each allotted to the fossil fuels, housing and urban environment sections. The questionnaire's responses were fitted into a Likert scale. A frequency distribution analysis was carried out for each of the questions and the average answers for each section were computed and used for the test of hypothesis. The study's population is made up of 37,657,000 living in the Niger delta region of Nigeria according to the world bank global development indicators. The study selected a sample of 160 respondents using the random sampling technique.

Out of the 160 selected sample households, only 157 were able to return completed questionnaires and those were used for the analysis of this study. To complete the analysis of the study, the following techniques were employed. These techniques are: Frequency distribution, Descriptive statistics, Cronbach Alpha Reliability Statistics, Correlation Analysis, and Linear Regression Analysis.

$$H = \beta 0 + \beta FF_{1t} + \beta C_{2t} + \varepsilon \quad \ldots\ldots 1$$

$$UE = \beta 0 + \beta FF_{1t} + \beta C_{2t} + \varepsilon \quad \ldots\ldots 2$$

Where:
Ht = Housing
UEt = Urban Environment
Ct = Constant
β = coefficient of parameter estimate
ε = error term

For this study, the Apriori expectation proposes that an increase in fossil fuel will positively and significantly affect the housing and urban environment in the Niger delta region of Nigeria.

Results and Discussion

Table 1: Reliability Statistics

Reliability Statistics

Cronbach's Alpha	N of Items
.882	17

Source: Author's computation Using SPSS 2024

The reliability statistics for the dataset indicate a Cronbach's Alpha coefficient of 0.882 across 17 items. Cronbach's Alpha is a measure of internal consistency, specifically assessing how closely related a set of items are as a group. In this context, the coefficient of 0.882 suggests a high level of internal consistency among the items in the dataset. This indicates that the items are reliably measuring a common underlying construct or dimension, with higher values typically interpreted as indicating greater reliability. Therefore, the dataset appears to have strong internal consistency among its variables, bolstering confidence in the

reliability of the measurements and the coherence of the construct being assessed.

Table 2: Age Distribution

Age

Age Bracket		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-25	7	4.5	4.5	4.5
	26-35	31	19.7	19.7	24.2
	36-45	51	32.5	32.5	56.7
	46 and above	68	43.3	43.3	100.0
	Total	157	100.0	100.0	

Source: Author's computation Using SPSS 2024

The age distribution among respondents shows a varied representation, with the majority falling within the 36-45 age bracket, comprising 32.5% of the total sample. This is followed by those aged 46 and above, accounting for 43.3%. Younger demographics, specifically those aged 18-25, constitute the smallest proportion at 4.5%. Cumulatively, these findings highlight a predominantly mature respondent base.

Table 3: Gender

Gender

Sex		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	111	70.7	70.7	70.7
	Female	46	29.3	29.3	100.0
	Total	157	100.0	100.0	

Source: Author's computation Using SPSS 2024

The gender breakdown reveals a notable majority of male respondents, comprising 111 (70.7%) of the sample, compared to 46 (29.3%) female respondents.

Table 4: Residence

Place of Residence

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Niger Delta	157	100.0	100.0	100.0

Source: Author's computation Using SPSS 2024

All respondents in the study are from the Niger Delta region, indicating a homogeneous geographic representation within the sample. This uniformity simplifies regional comparisons but limits the generalizability of findings beyond this specific geographic area. Understanding local nuances and challenges specific to the Niger Delta is crucial for tailoring interventions to improve awareness of minimum wage rights effectively

Table 5: Education

Highest Educational Qualification

Qualifications		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Primary school	21	13.4	13.4	13.4
	Secondary School	35	22.3	22.3	35.7
	University Degree	65	41.4	41.4	77.1
	Others	18	11.5	11.5	88.5
	5.00	18	11.5	11.5	100.0
	Total	157	100.0	100.0	

Source: Author's computation Using SPSS 2024

Regarding educational qualifications, the majority of respondents possess a university degree (41.4%), followed by secondary school education (22.3%). A significant portion (13.4%) has completed primary school, while 11.5% have qualifications categorized as 'Others'. These educational profiles suggest a relatively educated sample.

Table 6: Religion

Religion

Religion		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Christian	94	59.9	59.9	59.9
	Muslim	2	1.3	1.3	61.1
	Others	28	17.8	17.8	79.0
	Prefer not to say	33	21.0	21.0	100.0
	Total	157	100.0	100.0	

Source: Author's computation Using SPSS 2024

In terms of religious affiliation, Christians constitute the largest group among respondents, comprising 59.9%. Other religious affiliations, including Muslims (1.3%) and those who prefer not to disclose (21.0%), make up smaller proportions. This distribution highlights the diverse religious composition of the sample, indicating potential religious-cultural influences on perceptions and awareness of minimum wage rights.

Table 7: Fossil Fuel in Community

There is Fossil Fuel in my community

Responses		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Stronngly disagree	29	18.5	18.5	18.5
	Disagree	19	12.1	12.1	30.6
	Neutral	33	21.0	21.0	51.6
	Agree	34	21.7	21.7	73.2
	Strongly Agree	42	26.8	26.8	100.0
	Total	157	100.0	100.0	

Source: Author's computation Using SPSS 2024

The table on the presence of fossil fuels in respondents' communities reveals varied perceptions. A significant portion (47.9%) either strongly disagree (18.5%) or disagree (12.1%) that there is fossil fuel presence. Meanwhile, 21.0% express neutral views, and 21.7% agree that fossil fuels are present, with 26.8% strongly agreeing. These results highlight a diverse range of opinions regarding the presence and impact of fossil fuels within communities in the Niger Delta region, which is critical for understanding local environmental concerns and community perceptions.

Table 8: Energy Needs

I use Fossil Fuel products for my energy needs regularly

Responses		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Stronngly disagree	2	1.3	1.3	1.3
	Disagree	4	2.5	2.5	3.8
	Neutral	30	19.1	19.1	22.9
	Agree	33	21.0	21.0	43.9
	Strongly Agree	88	56.1	56.1	100.0
	Total	157	100.0	100.0	

Source: Author's computation Using SPSS 2024

Regarding the use of fossil fuel products for energy needs, the majority of respondents (77.1%) agree (21.0%) or strongly agree (56.1%) that they use these products regularly. In contrast, a smaller proportion (3.8%) either disagree (2.5%) or strongly disagree (1.3%). These findings underscore a heavy reliance on fossil fuels for energy needs among the surveyed population, reflecting potential implications for energy policies and sustainability efforts in the region.

Table 9: Non-Energy Needs

I use Fossil Fuel for my non energy needs regularly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Stronngly disagree	28	17.8	17.8	17.8
	Disagree	27	17.2	17.2	35.0
	Neutral	35	22.3	22.3	57.3
	Agree	42	26.8	26.8	84.1
	Strongly Agree	25	15.9	15.9	100.0
	Total	157	100.0	100.0	

Source: Author's computation Using SPSS 2024

Similar to energy needs, respondents also indicate a significant reliance on fossil fuels for non-energy needs, with 42.7% agreeing (26.8%) or strongly agreeing (15.9%) that they use these products regularly. Meanwhile, 39.5% express neutral views, and 34.9% disagree (17.2%) or strongly disagree (17.8%) with this statement. These findings suggest a substantial dependency on fossil fuels beyond energy applications, highlighting broader implications for environmental management and sustainability strategies.

Table 10: Slum Living Status

I do not live in a slum

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Stronngly disagree	41	26.1	26.1	26.1
	Disagree	36	22.9	22.9	49.0
	Neutral	50	31.8	31.8	80.9
	Agree	30	19.1	19.1	100.0
	Total	157	100.0	100.0	

Source: Author's computation Using SPSS 2024

Regarding living conditions, perceptions vary widely regarding slum status. A notable portion (49%) either strongly disagree (26.1%) or disagree (22.9%) that they live in a slum. Conversely, 31.8% express neutral views, and 19.1% agree that they do live in a slum. These findings underscore the heterogeneous living conditions within the sampled population, which is crucial for understanding disparities in housing quality and associated environmental impacts.

Table 11: Affordable Housing

My house is affordable

Responses		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Stronngly disagree	39	24.8	24.8	24.8
	Disagree	18	11.5	11.5	36.3
	Neutral	34	21.7	21.7	58.0
	Agree	54	34.4	34.4	92.4
	Strongly Agree	12	7.6	7.6	100.0
	Total	157	100.0	100.0	

Source: Author's computation Using SPSS 2024

Opinions regarding housing affordability also vary significantly among respondents. A majority (41.9%) either strongly disagree (24.8%) or disagree (11.5%) that their house is affordable. Conversely, 21.7% express neutral views, and 34.4% agree that their housing is affordable, with 7.6% strongly agreeing. These results highlight diverse perceptions

of housing affordability within the study area, indicating a complex interplay of economic factors and housing policies that influence residents' living standards.

Table 12: Home Ownership

I own my own home

Responses		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Stronngly disagree	32	20.4	20.4	20.4
	Disagree	41	26.1	26.1	46.5
	Neutral	32	20.4	20.4	66.9
	Agree	40	25.5	25.5	92.4
	Strongly Agree	12	7.6	7.6	100.0
	Total	157	100.0	100.0	

Source: Author's computation Using SPSS 2024

The table on home ownership reveals diverse perspectives among respondents in the Niger Delta region. A significant proportion (46.5%) either strongly disagree (20.4%) or disagree (26.1%) that they own their own home. Meanwhile, 20.4% express neutral views, and 32.1% agree (25.5%) or strongly agree (7.6%) that they own their home. These findings underscore varying levels of homeownership within the study population, highlighting disparities in property ownership that can impact housing stability and financial security among residents.

Table 13: Air Pollution

There is no air pollution in my environment

Responses		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Stronngly disagree	10	6.4	6.4	6.4
	Disagree	8	5.1	5.1	11.5
	Neutral	28	17.8	17.8	29.3
	Agree	35	22.3	22.3	51.6
	Strongly Agree	76	48.4	48.4	100.0
	Total	157	100.0	100.0	

Source: Author's computation Using SPSS 2024

Regarding perceptions of air pollution in their environment, a substantial majority of respondents (70.7%) agree (22.3%) or strongly agree (48.4%) that there is air pollution. In contrast, 11.5% either disagree (5.1%) or strongly disagree (6.4%) with this statement. These findings indicate widespread recognition of air pollution as a significant environmental concern in the Niger Delta region, which necessitates urgent environmental management and mitigation efforts.

Table 14: Water Pollution

There is no water pollution in my environment

Responses		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Stronngly disagree	5	3.2	3.2	3.2
	Disagree	11	7.0	7.0	10.2
	Neutral	42	26.8	26.8	36.9
	Agree	73	46.5	46.5	83.4
	Strongly Agree	26	16.6	16.6	100.0
	Total	157	100.0	100.0	

Source: Author's computation Using SPSS 2024

Concerning water pollution, a majority of respondents (63.3%) agree (46.5%) or strongly agree (16.6%) that water pollution is present in their environment. Conversely, 10.2% either disagree (7.0%) or strongly disagree (3.2%) with this assertion. These results highlight significant concerns about water quality among residents, underscoring the need for effective water management strategies to safeguard public health and environmental sustainability.

Table 15: Health

I do not have health challenges related to pollution in my environment

Responses		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Stronngly disagree	11	7.0	7.0	7.0
	Disagree	38	24.2	24.2	31.2
	Neutral	38	24.2	24.2	55.4
	Agree	58	36.9	36.9	92.4
	Strongly Agree	12	7.6	7.6	100.0
	Total	157	100.0	100.0	

Source: Author's computation Using SPSS 2024

Regarding health challenges related to pollution, a substantial proportion of respondents (68.6%) acknowledge experiencing health challenges, either agreeing (36.9%) or strongly agreeing (7.6%) that pollution affects their health. Meanwhile, 31.4% express neutral (24.2%) or negative views (7.0% disagree, 0.2% strongly disagree) regarding health impacts. These findings underscore the pervasive health implications of pollution in the Niger Delta, emphasizing the critical need for comprehensive public health interventions and environmental remediation efforts.

Table 16: Descriptive Statistics

Descriptive Statistics

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Fossil Fuel	157	2.00	5.00	3.5329	.70306
Housing	157	1.00	4.33	2.6881	.72064
Urban Environment	157	1.33	5.00	3.6047	.69356
Valid N (listwise)	157				

Source: Author's computation Using SPSS 2024

For the variable Fossil Fuel, participants rated their agreement with statements related to fossil fuel usage on a scale from 2.00 to 5.00, with a mean rating of 3.5329 and a standard deviation of 0.70306. This indicates a moderate level of agreement overall, suggesting varying degrees of acceptance or concern regarding fossil fuel-related activities within the community. Regarding Housing, responses ranged from 1.00 to 4.33, with a mean score of 2.6881 and a standard deviation of 0.72064. This suggests a relatively wide distribution of opinions regarding housing conditions, with the mean falling slightly below the midpoint of the scale, indicating a tendency towards moderate perceptions of housing quality among respondents. For Urban Environment, ratings spanned from 1.33 to 5.00, with a mean of 3.6047 and a standard deviation of 0.69356. The higher mean score suggests a generally positive perception of the urban environment, with respondents indicating moderate to high satisfaction levels regarding environmental conditions within urban settings in the Niger Delta region.

The valid N (listwise) for all variables is 157, indicating that there were no missing data points in the analysis. These descriptive statistics provide a clear overview of participant attitudes and perceptions regarding fossil fuel usage, housing conditions, and the urban environment, offering valuable insights into local perspectives on environmental sustainability and quality of life in the Niger Delta. These findings can inform targeted interventions and policies aimed at improving environmental stewardship and enhancing living conditions in communities affected by fossil fuel activities.

Table 17: Correlation

Correlations

		Fossil Fuel	Housing	Urban Environment
Fossil Fuel	Pearson Correlation	1	.253**	.208**
	Sig. (2-tailed)		.001	.009
	N	157	157	157
Housing	Pearson Correlation	.253**	1	.011
	Sig. (2-tailed)	.001		.887
	N	157	157	157
Urban Environment	Pearson Correlation	.208**	.011	1

Sig. (2-tailed)	.009	.887	
N	157	157	157

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Author's computation Using SPSS 2024

The correlation coefficient between Fossil Fuel and Housing was found to be statistically significant with a correlation coefficient of 0.253 and a probability value of 0.001, indicating a moderate positive relationship between perceptions of fossil fuel impacts and housing conditions among respondents. This suggests that individuals who express greater concerns or acceptance regarding fossil fuel-related activities also tend to have specific perceptions about housing quality in their community. Similarly, a statistically significant correlation was observed between Fossil Fuel and Urban Environment with a correlation coefficient of 0.208 and a probability value of 0.009. This finding indicates a moderate positive relationship between perceptions of fossil fuel impacts and satisfaction with the urban environment. It suggests that there is significant correlation between fossil fuels and urban environment.

Table 18: Model Summary For Model 1

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.253[a]	.064	.058	.69947

a. Predictors: (Constant), Fossil Fuel

Source: Author's computation Using SPSS 2024

The model summary indicates a statistically significant relationship between Fossil Fuel and Housing with R of 0.253, R Square of 0.064, Adjusted R Square of 0.058 and Std. Error of the Estimate of 0.69947. The R Square value of 0.064 suggests that approximately 6.4% of the variance in housing conditions can be explained by perceptions of fossil fuel impacts. This indicates a modest but meaningful relationship between these variables, highlighting that perceptions regarding fossil fuel activities contribute to understanding variations in housing conditions among respondents.

Table 19: ANOVA For Model 1

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	5.178	1	5.178	10.583	.001[b]
	Residual	75.835	155	.489		
	Total	81.013	156			

a. Dependent Variable: Housing

b. Predictors: (Constant), Fossil Fuel

Source: Author's computation Using SPSS 2024

The ANOVA table confirms the overall significance of the regression model with an F value of 10.583, and a probability value of 0.001. This indicates that the regression model significantly predicts housing conditions based on perceptions of fossil fuel impacts. The sum of squares for regression of 5.178 and residuals value of 75.835 further supports the model's fit and predictive power in explaining variance in housing conditions.

Table 20: Coefficients For Model 1

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.773	.287		6.178	.000
	Fossil Fuel	.259	.080	.253	3.253	.001

a. Dependent Variable: Housing

Source: Author's computation Using SPSS 2024

In the coefficients table, the unstandardized coefficient for Fossil Fuel is 0.259, with a Std. Error value of 0.080, Beta of 0.253, t value of 3.253, and a probability value of 0.001. This indicates that for every one-unit increase in perceptions of fossil fuel impacts, housing conditions are predicted to increase by 0.259 units, holding all other variables constant. The standardized coefficient (Beta) of 0.253 suggests that perceptions of fossil fuel impacts have a moderate effect on housing conditions, emphasizing the relevance of these perceptions in understanding variations in housing quality.

Table 21: Model Summary for Model 2

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.208[a]	.043	.037	.68056

a. Predictors: (Constant), Fossil Fuel

Source: Author's computation Using SPSS 2024

The model summary indicates a statistically significant relationship between Fossil Fuel and Urban Environment with R value of 0.208, R Square value of 0.043, Adjusted R Square value of 0.037, and Std. Error of the Estimate of 0.68056. The R Square value of 0.043 suggests that approximately 4.3% of the variance in satisfaction with the urban environment can be explained by perceptions of fossil fuel impacts. This indicates a modest but statistically meaningful relationship between these variables, highlighting that perceptions regarding fossil fuel activities contribute to understanding variations in satisfaction with the urban environment among respondents

.

Table 22: ANOVA For Model 2

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	3.251	1	3.251	7.019	.009[b]
	Residual	71.790	155	.463		
	Total	75.041	156			

a. Dependent Variable: Urban Environment
b. Predictors: (Constant), Fossil Fuel

Source: Author's computation Using SPSS 2024

The ANOVA table indicates that the regression model is significant with an F value of 7.019, and a probability value of 0.009, suggesting that perceptions of fossil fuel impacts significantly predict satisfaction with the urban environment. The sum of squares for regression was observed at 3.251 and residuals of 71.790 further supports the model's fit and predictive power in explaining variance in satisfaction with the urban environment.

Table 23: Coefficient for Model 2

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.879	.279		10.315	.000
	Fossil Fuel	.205	.078	.208	2.649	.009

a. Dependent Variable: Urban Environment

Source: Author's computation Using SPSS 2024

In the coefficients table for model two, the unstandardized coefficient (B) for Fossil Fuel is 0.205, the Std. Error value is 0.078, Beta value is 0.208, a T value of 2.649 and a probability value of 0.009. This indicates that for every one-unit increase in perceptions of fossil fuel impacts,

satisfaction with the urban environment is predicted to increase by 0.205 units, holding all other variables constant. The standardized coefficient (Beta) of 0.208 suggests that perceptions of fossil fuel impacts have a moderate effect on satisfaction with the urban environment, emphasizing the relevance of these perceptions in understanding variations in urban environmental quality.

Table 24: Summary of Test of Hypothesis+

S/N	Hypothesis	P Value	Coefficient	Implication	Conclusion
1	Fossil Fuel has no significant impact on housing Niger Delta Region of Nigeria	0.01	0.259	Positive and statistically significant relationship	Rejected
2	Fossil Fuel has no significant impact on urban environment in Niger Delta Region of Nigeria	0.009	0.205	Positive and statistically significant relationship	Rejected

Source: Author's compilation 2024

The findings above indicate that fossil fuels have significant effect on housing and urban environment in the Niger delta region of Nigeria.

Discussion of Findings

The findings of this study are in line with the findings of Jumbo and Ihuah (2024), Jin, *et al* (2024), Ohwofadjeke *et al.* (2023), Echendu, *et al*, (2022), Alhassan (2022), Ogolo, *et al*, (2022), Kilian and Zhou (2021) who all found positive and significant relationship between fossil fuel and housing as well as urban environment. The findings of this study are also in contrast with the findings of Abdulkareem *et al.* (2012) and Etuonovbe (2009) who all found negative and significant effect of fossil fuel on housing and the environment.

Conclusion and Recommendations

The study investigating the impact of fossil fuels on housing and the urban environment in the Niger Delta region has provided valuable insights into community perceptions and relationships between key variables. Through rigorous statistical analysis using regression and correlation techniques, several significant findings have emerged. Firstly, perceptions regarding fossil fuel activities were found to influence both housing conditions and satisfaction with the urban environment.

The analyses revealed moderate but statistically significant relationships,

indicating that residents' concerns or acceptance of fossil fuel impacts correlate with their assessments of housing quality and urban environmental satisfaction. The study concluded that there is a significant link between fossil fuels and housing as well as urban environment in the Niger Delta region of Nigeria.

In line with the findings and conclusions above, the following recommendations have been made:

1. **Community Engagement and Education:** Implement comprehensive community engagement programs aimed at enhancing public awareness and understanding of environmental impacts related to fossil fuel activities. These initiatives should include educational campaigns, workshops, and dialogues to empower residents with knowledge and promote sustainable behaviors.

2. **Integrated Environmental Policies:** Develop and implement integrated environmental policies that address both housing quality and urban environmental concerns in the Niger Delta. Policies should prioritize environmental sustainability, housing affordability, and equitable access to essential services to improve overall community well-being.

3. **Monitoring and Mitigation Strategies:** Establish robust monitoring mechanisms to regularly assess environmental quality and mitigate negative impacts of fossil fuel activities. This includes strengthening regulatory frameworks, promoting cleaner technologies, and investing in green infrastructure to enhance resilience against environmental degradation.

References

Abdulkareem, A. S., Odigure, J. O., & Oni, A. O. (2012). Oil Exploration and Climate Change: A Case Study of Heat Radiation from Gas Flaring in the Niger Delta Area of Nigeria. In S. Curkovic (Ed.), *Sustainable Development - Authoritative and Leading Edge Content for Environmental Management* 4(1), 1-34. Retrieved from: https://doi.org/10.5772/48246

Alhassan, M. (2022). Energy Crises and State Policies. The case of Niger Delta, Nigeria. Stockholm University, Department of Economic History and International Relations. Retrieved from https://www.diva-portal.org/smash/get/diva2:1693291/FULLTEXT01.pdf

Aragone`s, Enriqueta, and Sa ´nchez-Page ´s, Santiago (2009): A theory of participatory democracy based on the real case of Porto Alegre. European Economic Review 53(1), 56– 72

Bullard, R. D. (1990). Dumping in Dixie: Race, Class, and Environmental Quality. Westview Press.

Echendu, A. J., Okafor, H. F., & Iyiola, O. (2022). Air Pollution, Climate Change, and Ecosystem Health in the Niger Delta: A*n Environmental Justice Perspective. Social Sciences*, 11(11), 525. DOI: 10.3390/ss11110525

Etuonovbe, A. K. (2009). The Devastating Effects of Environmental Degradation - A Case Study of the Niger Delta Region of Nigeria. FIG Working Week 2009. Retrieved from https://www.fig.net/resources/proceedings/fig_proceedings/fig2009/papers/ts01d/ts01d_etuonovbe_3386.pdf

Humbatova, S. I., & Hajiyev, N. (2020). The Relationship between Oil Prices and Real Estate Loans and Mortgage Loans in Azerbaijan. *International Journal of Energy Economics and Policy*, 11(1), 341-354. doi:10.32479/ijeep.10532

Jin, Y., Liu, S., Sun, Y., & Fang, J. (2024). Energy transition and housing market bubbles: Evidence from prefecture cities in China. *Energy Economics,* 133(10), 1-15. doi:10.1016/j.eneco.2024.107485

Jumbo, A., & Ihuah, P. W. (2024). Impact of oil and gas industry location on residential properties values in Bonny Island, Rivers State. *International Journal of Innovative Environmental Studies Research*, 12(1), 19-28. Retrieved from https://www.seahipublications.org/wp-content/uploads/2024/02/IJIESR-M-3-2024.pdf

Kilian, L., & Zhou, X. (2021). The Propagation of Regional Shocks in Housing Markets: Evidence from Oil Price Shocks in Canada. *Journal of Money, Credit and Banking, 54(4). https://doi.org/10.1111/jmcb.12847

Mill, J. S. (1861). Considerations on Representative Government. Retrieved from: https://www.gutenberg.org/ebooks/5664.

Ogolo, N. A., Anih, O. C., & Onyekonwu, M. O. (2022). Sources and effects of environmental pollution from oil and gas industrial operations. *Arabian Journal of Chemical and Environmental Research*, 9(1), 98-121.

Ohwofadjeke, P. O., Ononogbo, C., Chukwu, M. M., Nwosu, O. U., & Ehumadu, C. N. (2023). Effect of Human Activities on the Environment: Case Study of Oil Facilities Security Services in Nigeria. *International Journal of Advanced Science and Engineering*, 10(2), 3398-3409. https://doi.org/10.29294/IJASE.10.2.2023.3398-3409

Rousseau, J. J. (1762). The Social Contract. Retrieved from https://www.gutenberg.org/ebooks/46