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Assessment of Impacts of Climate Change on Oil Producing Communities in Ahoada West

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Abstract

This study examined the impact of climate change on oil-producing communities in Ahoada West, located in Nigeria's Niger Delta region. It explored the causes of climate change in Ahoada West and assessed the response of multinational oil and gas companies to the resulting issues. A total of 260 participants were randomly chosen for the study. The Impacts of Climate Change on Oil Producing Communities in Ahoada West Structured Questionnaire (ICCOPCAWSQ) was given to all participants and successfully collected without any invalid responses. The data was analyzed using simple percentages. The findings showed that burning fossil fuels, industrial activities by oil and gas companies (like exploration and extraction), agricultural practices (such as livestock farming and rice growing), and emissions from transportation (including cars and planes) all significantly contribute to climate change. Additionally, burning bushes, clothes, and papers, as well as methane emissions from natural sources like wetlands and termites, were also identified as contributing factors. The study concluded that human activities are the main cause of increased atmospheric carbon dioxide levels. Based on these results, it was recommended that oil and gas companies should stop gas flaring to reduce environmental damage. Instead, the flared gas should be converted into cooking gas for household use.

Keywords: Climate Change, long-term shifts, Chemistry Students' Attitude, and climatic conditions

Introduction

Climate change refers to long-term changes in weather patterns and temperatures, leading to significant and lasting alterations in the Earth's climate system (Russell, 2007). It involves shifts

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in various climate conditions, such as temperature and rainfall, humidity, and wind, in a specific region or on a global scale (Zudonu and Ekpa, 2012). In fact, it describes the long-time shifts of the average weather conditions, and this predominantly talks about the untoward variations that happen or occur over time on the average temperature Earth.

Climate change which is already understood as the gradual alteration of earth's climate patterns or arrangement over a long period of time is a basic culprit in the degradation of the environment (Odu, 1981). Human activities, such as those of international oil and gas companies, burning fossil fuels (like coal, oil, and gas), and deforestation, are the main causes of climate change (Nwafor, 2007). These activities release greenhouse gases into the atmosphere, such as carbon dioxide, which trap heat from the sun. This creates a warming effect known as the "greenhouse effect." As a result, the earth's average temperature is increasing, leading to various effects such as melting ice caps, rising sea levels, and extreme weather events (like strange precursor of huge or mild rainfall, hurricanes, and heat waves), and shifts in ecosystems. According to Likens, Driscoll and Buso (1996) climate change affect all spheres of life, including agriculture, water resources, culture, social-economic, health, and biodiversity (the variety of living organisms, plants, animals, and microorganisms not precluded, as well as the ecosystems in which they exist). To mitigate climate change, it is crucial to reduce greenhouse gas emissions, transition to renewable energy sources, protect and restore natural habitats, and adapt to the changes already occurring (Smit, 2001). By working together, we can aim for a sustainable future and reduce the harmful effects of climate change on our planet.

The negative effects of climate change are complex and affect many aspects of life on Earth. One of the most obvious effects is the increase in global temperatures, leading to more extreme weather events such as heavy rainfall, severe storms, heatwaves, droughts, and hurricanes. These events can cause significant damage, including floods, crop failures, destruction of homes, water shortages, new diseases, higher death rates, and a greater risk of other natural disasters (Zudonu, Ezegbirika, and Nnaobi). Another major impact of climate change is the melting of polar ice caps and glaciers. As temperatures rise, ice sheets in Antarctica and Greenland are melting quickly, causing sea levels to rise. This threatens coastal communities and low-lying areas with increased risks of flooding and erosion.

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Climate change is a global issue with serious consequences for both the environment and human societies. However, there is limited research on how climate change affects students' attitudes toward environmental issues and their motivation to learn chemistry. Understanding students' attitudes and perceptions can help educators create effective strategies to raise environmental awareness and foster a sense of responsibility towards the environment.

Statement of the Study

There is a severe lack of scientific research on climate change; the few existing studies are not thorough and lack detail (Zudonu and Ekpa, 2012). This study aims to explore the impact of climate change on the attitudes of secondary school chemistry students in the Niger Delta region. According to Zudonu and Ekpa (2012) and Keohane and Raustiala (2008), the effects of climate change are catastrophic and causing significant destruction in the area. This raises several important questions, such as: What causes climate change? What can be done to address the harmful and life-threatening effects of this issue?

Purpose of the Study

This study aimed to:

1. identify the causes of climate change in Ahoada West.
2. assess how multinational oil and gas companies are addressing the impacts of climate change in Ahoada West.

Significance of the Study

The findings of this study will greatly benefit the Nigerian government, local communities, oil and gas companies, the Ministry of Education, curriculum planners, and teachers.

Scope of the Study

This study focused on the impacts of climate change on the attitudes of chemistry students in senior secondary schools in Ahoada West.

Research Questions

The study was guided by the following questions.

1. What are the causes of climate change in Ahoada West?
2. How are multinational oil and gas companies addressing the impacts of climate change in Ahoada West?

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Research Design

A descriptive survey design was used for this study.

Area of the Study

The study took place in Ahoada West Local Government Area.

Population of the Study

The population included all oil-producing communities in Ahoada West.

Sample and Sampling Technique

The study's sample consisted of 260 participants who were randomly selected from oil-producing communities in Ahoada West Local Government Area in Rivers State.

Research Instrument

The instrument used was the Impacts of Climate Change on Oil Producing Communities in Ahoada West Structured Questionnaire (ICCOPCAWSQ).

Validity of the Instrument

The ICCOPCAWSQ was validated by two experts in environmental chemistry and geography.

The Impacts of Climate Change on Oil Producing Communities in Ahoada West Structured Questionnaire (ICCOPCAWSQ) was face validated by two experts in environmental chemistry and geography.

Reliability of the Instrument

The test-retest method was used to assess reliability. Questionnaires were first administered and collected from the participants. After two hours, a modified version of the questionnaire with the same questions rearranged was given to the same participants. The reliability coefficient calculated using Cronbach's Alpha was 0.81, indicating good reliability.

Data Collection

The researchers administered the ICCOPCAWSQ to participants and collected the completed questionnaires.

Method of Data Analysis

Responses to the ICCOPCAWSQ were analyzed using simple percentages.

Research Question 1

What are the causes of climate change in Ahoada West?

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S/N	Item	Respondents	Yes	%	No	%	Total %
1.	Do burning fossil fuels significantly contribute to climate change?	260	250	96	10	4	100
2.	Deforestation and land-use changes affect the Earth's climate.	260	160	62	100	38	100
3.	Industrial activities by oil and gas multinational companies, such as oil exploration and exploitation, contribute to climate change.	260	260	100	0	0	100
4.	Agricultural practices, such as livestock farming and rice cultivation, contribute to climate change.	260	210	81	50	19	100
5.	Emissions from transportation, such as cars and airplanes, contribute to climate change.	260	185	71	75	29	100
6.	Burning of bushes, clothes and papers contributes to climate change.	260	200	77	60	23	100
7.	Methane emissions from natural sources, such as wetlands and termites, contribute to climate change.	260	205	79	55	21	100
8.	Increased atmospheric carbon (IV) oxide levels are primarily caused by human activities.	260	195	75	65	25	100
9.	Is solar radiation the main driver of climate change?	260	20	8	240	92	100
10.	Are changes in Earth's orbital parameters responsible for climate change?	260	8	3	252	97	100

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11.	Increased volcanic activity significantly contributes to climate change.	260	34	13	226	87	100
12.	Changes in ocean currents and circulation patterns affect global climate.	260	135	52	125	48	100
13.	The release of chlorofluorocarbons (CFCs) and other ozone-depleting substances contributes to climate change.	260	186	72	74	28	100
14.	Do landfills and waste management practices contribute to greenhouse gas emissions and climate change?	260	103	40	157	60	100
15.	Changes in the Earth's albedo, such as from melting ice and snow, contribute to climate change.	260	155	60	105	40	100

From Table 1, item 1 shows that 96% of respondents agreed that burning fossil fuels significantly contributes to climate change, while 4% disagreed. Item 2 indicates that 62% agreed that deforestation and land-use changes affect the Earth's climate, while 38% disagreed. Item 3 highlights that 100% of respondents agreed that industrial activities by oil and gas multinational companies, such as oil exploration and exploitation, contribute to climate change.

Item 4 shows that 81% agreed that agricultural practices, like livestock farming and rice cultivation, contribute to climate change, while 19% disagreed. Item 5 indicates that 71% agreed that emissions from transportation, such as cars and airplanes, contribute to climate change, while 29% disagreed. Item 6 shows that 77% agreed that burning bushes, clothes, and papers contributes to climate change, while 23% disagreed.

Item 7 indicates that 79% agreed that methane emissions from natural sources, such as wetlands and termites, contribute to climate change, while 21% disagreed. Item 8 shows that 75% agreed that increased atmospheric carbon dioxide levels are primarily caused by human activities, while 25% disagreed. Item 9 indicates that only 8% agreed that changes in solar radiation are the main driver of climate change, while 92% disagreed.

Item 10 shows that 3% agreed that changes in Earth's orbital parameters are responsible for climate change, while 97% disagreed. Item 11 shows that 13% agreed that increased volcanic activity

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significantly contributes to climate change, while 87% disagreed. Item 12 indicates that 52% agreed that changes in ocean currents and circulation patterns affect global climate, while 48% disagreed.

Item 13 shows that 72% agreed that the release of chlorofluorocarbons (CFCs) and other ozone-depleting substances contributes to climate change, while 28% disagreed. Item 14 shows that 40% agreed that landfills and waste management practices contribute to greenhouse gas emissions and climate change, while 60% disagreed. Item 15 shows that 60% agreed that changes in the Earth's albedo, such as from melting ice and snow, contribute to climate change, while 40% disagreed. These results imply that human activities, especially oil and gas exploration and exploitation, are the main drivers of climate change in Ahoada West.

Research Question 2

How are multinational oil and gas companies addressing the impacts of climate change in Ahoada West?

S/N	Item	Respondents	Yes	%	No	%	Total %
16.	Energy efficiency measures have been successfully adopted to reduce energy consumption.	260	68	26	192	74	100
17.	Environmental remediation efforts have effectively reduced the impacts of oil spills on the environment.	260	5	2	255	98	100
18.	Sustainable agriculture practices have been successfully promoted to reduce greenhouse gas emissions.	260	1	0	259	100	100
19.	Do agricultural practices like livestock farming and rice cultivation contribute to climate change?	260	17	7	243	93	100
20.	Environmental remediation programs have effectively restored mangrove ecosystems.	260	5	2	255	98	100

@2024 International Council for Education Research and Training 2024, Vol. 02, Issue 03, 195-207
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21.	Green building practices have been successfully adopted to reduce energy consumption and greenhouse gas emissions.	260	20	8	240	92	100
22.	Sustainable water management practices have been successfully implemented to conserve water resources.	260	2	1	258	99	100
23.	Environmental remediation programs have effectively restored coral reefs.	260	12	5	248	95	100
24.	Sustainable fishing practices have been successfully promoted to reduce the impacts of overfishing and protect marine ecosystems.	260	10	4	250	96	100
25.	Environmental remediation efforts have effectively reduced the impacts of industrial pollution on the environment.	260	0	0	260	100	100
26.	Sustainable tourism practices have been successfully promoted to minimize the environmental impacts of tourism.	260	3	1	257	99	100
27.	Environmental remediation programs have effectively restored wetland ecosystems.	260	5	2	255	98	100
28.	Sustainable urban planning initiatives have been successfully implemented to reduce greenhouse gas emissions.	260	4	2	256	98	100
29.	Environmental remediation efforts have effectively reduced the impacts of deforestation.	260	0	0	260	100	100

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30.	Have sustainable mining practices been successfully promoted to minimize the environmental impacts of mining activities	260	5	2	255	98	100

Based on Table 2, item 16 shows that 26% of respondents agreed, while 74% disagreed. Respondents indicated that energy efficiency measures have not been successfully adopted to reduce energy consumption. Item 17 reveals that 2% said yes, while 98% said no, indicating that environmental remediation efforts have not effectively reduced the impacts of oil spills. For item 18, 0% agreed, while 100% disagreed, showing that sustainable agriculture practices have not been promoted successfully to reduce greenhouse gas emissions. Item 19 indicates that 7% agreed, while 93% disagreed, suggesting that agricultural practices like livestock farming and rice cultivation contribute to climate change?

Item 20 shows that 2% agreed, while 98% disagreed, indicating that environmental remediation programs have not effectively restored mangrove ecosystems. Item 21 shows that 8% agreed, while 92% disagreed, indicating that green building practices have not been successfully adopted to reduce energy consumption and greenhouse gas emissions. For item 22, 1% agreed, while 99% disagreed, showing that sustainable water management practices have not been implemented successfully. Item 23 indicates that 5% agreed, while 95% disagreed, showing that environmental remediation programs have not effectively restored coral reefs.

Item 24 reveals that 4% agreed, while 96% disagreed, indicating that sustainable fishing practices have not been promoted successfully to reduce overfishing and protect marine ecosystems. Item 25 shows that 0% agreed, while 100% disagreed, indicating that environmental remediation efforts have not effectively reduced industrial pollution. For item 26, 1% agreed, while 99% disagreed, showing that sustainable tourism practices have not been promoted to minimize environmental impacts.

Item 27 reveals that 2% agreed, while 98% disagreed, indicating that environmental remediation programs have not effectively restored wetland ecosystems. Item 28 shows that 2% agreed, while 98% disagreed, indicating that sustainable urban planning initiatives have not been implemented successfully to reduce greenhouse gas emissions. For item 29, 0% agreed, while 100% disagreed, showing that environmental remediation efforts have not effectively reduced deforestation. Item 30 indicates that 2% agreed, while 98% disagreed, suggesting that sustainable mining practices

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have not been promoted effectively to minimize environmental impacts. These findings imply that multinational oil and gas companies in the region are not making significant efforts to address the effects of climate change in Ahoada West.

Discussion of findings

Table 1: Items 1 through 15 highlight the causes of climate change in Ahoada West of Rivers State. According to Russell (2007) and Zudonu & Ekpa (2012), climate change is a major factor in the region's environmental crises. They identify various activities contributing to climate change, including the burning of fossil fuels, vegetation, clothing, plastics, and paper, along with rising atmospheric carbon dioxide levels. Agricultural practices like livestock farming and rice cultivation also play a role. Likens, Driscoll, and Buso (1996) note that climate change affects many aspects of life, such as agriculture, water resources, culture, socio-economic conditions, health, and biodiversity. Zudonu (2015) further points out that industrial activities by multinational oil and gas companies, particularly oil exploration and exploitation, contribute to acid rain. Zudonu (2015) emphasizes that human activities are the main sources of pollution in the Niger Delta region.

Table 2: Items 16 through 30 show that multinational and transnational oil and gas companies in Ahoada West are not adequately addressing the severe environmental problems, including those related to climate change, in their host communities. Kadafa (2012), Zudonu & Ekpa (2012), and Osuji (1998) agree that the activities of these companies result in high oil concentrations in the soil, adversely affecting crop performance. Moreover, these companies demonstrate a lack of commitment to environmental remediation. Zudonu (2015) asserts that the degradation has rendered the land unsuitable for farming and fishing, for instance in Edagberi-Betterland communities housing Adibawa Oil field and a mega Gas Station.

Conclusion

In conclusion, the study highlights several key contributors to climate change. Burning fossil fuels, industrial activities by oil and gas companies, certain agricultural practices like livestock farming and rice cultivation, and emissions from cars and airplanes all play significant roles. Additionally, burning bushes, clothes, and papers, as well as methane emissions from natural sources like wetlands and termites, contribute to climate change. Human activities are the primary cause of increased atmospheric carbon dioxide levels.

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Despite efforts, environmental remediation has not effectively reduced the impact of oil spills. Sustainable agriculture practices to lower greenhouse gas emissions have not been widely adopted. Renewable energy use has not significantly mitigated climate change, and green building practices have not been widely implemented to cut energy use and emissions. Remediation programs have not successfully restored wetland ecosystems, and sustainable urban planning initiatives to reduce emissions have not been effectively implemented. Although there have been successful efforts to promote sustainable mining practices to lessen environmental impacts, overall environmental remediation has not sufficiently addressed the effects of deforestation or industrial pollution.

Recommendations

Based on the study's findings, several recommendations are proposed.

1. The Ministry of Education should include lessons on climate change in the chemistry curriculum of secondary schools in the Niger Delta region.
2. The government should work on raising awareness about climate change and promoting positive attitudes toward environmental issues.
3. Oil and gas companies should be required to provide scholarships to individuals from their host communities.
4. Companies should prioritize employing locals from their host communities rather than bringing in outsiders, following the examples set by other companies in similar regions.
5. Essential social amenities should be provided in oil-producing communities to alleviate the hardships faced due to the extraction of resources.
6. Oil and gas companies should construct and furnish secondary schools for their host communities.
7. Companies should undertake remediation projects in their host communities to mitigate the environmental damage caused by their operations.
8. Oil and gas companies should cease gas flaring to reduce environmental degradation. Instead, they should convert the flared gases into usable cooking gas.

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