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Perceived Causes, Effects and Risks Associated with Climate Change Among Stakeholders in Public Secondary Schools in Obio Akpor Local Government Area, Rivers State

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Abstract— *This study assessed climate perception of stakeholders in public secondary schools in Obio-Akpor Local Government Area, Rivers State, Nigeria on the causes, effects and risk associated with climate change. A cross-sectional research design was adopted and 395 copies of questionnaire were administered to targeted stakeholders covering students, teachers, administrators, and non-teaching staff. The data was summarized with descriptive statistics such as frequencies, percentages, mean scores, and weighted means (WM), while Kruskal-Wallis H tests was employed to determine differences in perception of stakeholder groups on the causes, effects and risk associated with climate change. Perception of causes, effects, and risks was notably higher, with WM between 3.7 and 4.2. Human activities as drivers of climate change were strongly recognised by 81% of respondents (WM = 4.1, $\chi^2 = 20.84$, $p = 0.000$), while recognition of extreme weather events, rising temperatures, flooding, and erosion ranged from 73% to 77% agreement. Health risks were acknowledged by 73.4% (WM = 3.9, $\chi^2 = 23.88$, $p = 0.000$), and 81% agreed on the need for immediate action (WM = 4.2, $\chi^2 = 25.62$, $p = 0.000$). Stakeholders relied primarily on social media (WM = 3.3), television (WM = 3.2), and school-based instruction (WM = 3.2) for information, with significant group differences ($p \leq 0.001$). Awareness and perception strongly influenced preparedness and responses, including participation in environmental programmes (WM = 4.01), energy saving (WM = 3.86), waste management (WM = 4.03), disaster preparedness (WM = 3.85), and extreme weather planning (WM = 3.97). based on the findings, stakeholder-specific training, measures to strengthening access to climate change Information and institutionalisation of proactive climate practices to enhance resilience and climate-responsive behaviour in schools were recommended.*

Keywords— *Training, Health Risk, Participation, Preparedness, Climate Change.*

I. INTRODUCTION

Climate change refers to long-term alterations in temperature, precipitation, wind patterns, and other components of the earth's climate system (IPCC, 2021). It encompasses both natural variations and man-induced changes, though contemporary discourse emphasizes the dominant role of anthropogenic activities, particularly since the Industrial Revolution. According to Oresanya *et al*. (2018), climate change is characterized by shifts in climate patterns that extend beyond normal variability, resulting in extreme weather events, rising sea levels, and changes in ecosystem functioning. Climate change represents one of the most pressing environmental challenges of the 21st century, affecting ecosystems, human health, food security, socio-economic structures, and educational systems worldwide. Its impacts are particularly critical in developing countries such as Nigeria, where high population density, reliance on agriculture, and limited adaptive capacity exacerbate vulnerability to climate-related hazards. Climate change is widely recognized as one of the most critical environmental and developmental challenges confronting humanity in the contemporary era. It refers to long term alterations in temperature regimes, precipitation patterns and the frequency and intensity of extreme weather events, largely attributed to human activities such as fossil fuel combustion, industrialisation, land use change and deforestation (IPCC, 2021). Scientific consensus affirms that these changes pose serious threats to ecological stability, economic development and human wellbeing, particularly in developing regions where adaptive capacity is constrained (IPCC, 2022).

As climate impacts intensify, attention has increasingly shifted from purely natural scientific explanations to the social dimensions of climate change, including awareness, perception and behavioural responses among different population groups. Globally, climate change awareness has been identified as a critical prerequisite for effective mitigation and adaptation. Awareness influences how individuals and institutions perceive climate risks, interpret climate information and support policies aimed at addressing environmental challenges (Leiserowitz, Maibach, Roser Renouf, & Smith, 2010). Perception, in this context, goes beyond mere awareness to include beliefs, attitudes and subjective interpretations of climate change causes, impacts and responsibilities. Studies have shown that individuals who possess higher levels of climate change knowledge are more likely to engage in pro environmental behaviour and support climate responsive initiatives (Ajzen, 2011; Clayton *et al*., 2015). Consequently, assessing climate change awareness and perception among key societal stakeholders has become an important area of research across

disciplines. In sub Saharan Africa, climate change presents a particularly severe challenge due to high exposure to climate hazards, widespread poverty and dependence on climate sensitive sectors such as agriculture and fisheries (Niang *et al*., 2014). Nigeria, as the most populous country in Africa, is already experiencing significant climate related impacts including increased flooding, prolonged dry spells, coastal erosion, desertification and rising temperatures (Federal Ministry of Environment, 2021). These impacts threaten food security, infrastructure, public health and socio-economic stability. Research indicates that Nigeria's vulnerability to climate change is compounded by rapid population growth, urbanisation and weak environmental governance structures (Ozor, 2009; Abaje, Sawa, & Ati, 2014).

The United Nations Educational, Scientific and Cultural Organization emphasises that climate change education is essential for equipping learners with the knowledge, skills and values required to respond effectively to climate challenges (UNESCO, 2017). Public secondary schools serve as important platforms for disseminating climate information and shaping environmental attitudes not only among students but also among teachers, administrators and surrounding communities. Rivers State, with its coastal and flood-prone areas, experiences notable manifestations of climate change, including erratic rainfall, flooding, coastal erosion, and temperature fluctuations, all of which influence the daily lives and livelihoods of residents (Ayanlade *et al*., 2017). In addition to climate induced stressors, the area faces severe environmental degradation arising from oil and gas exploration, gas flaring and industrial pollution, which further exacerbate climate risks (Ajaero, 2017; UNEP, 2011). Rivers State, and particularly Obio Akpor Local Government Area, has experienced recurrent flooding events, increasing heat stress and deteriorating environmental quality, all of which have implications for education, health and livelihoods. Understanding how climate change is perceived by key stakeholders, particularly within educational settings, is therefore essential, as schools are central hubs for knowledge dissemination and behavioural change. Secondary school students and teachers, as primary stakeholders in the education system, play a crucial role in shaping awareness and adaptation practices within communities. Furthermore, climate change encompasses multiple dimensions - physical, socio-economic, and ecological that intersect to produce complex outcomes. Physically, climate change leads to flooding, coastal erosion, and sea-level rise. Socio-economically, it affects livelihoods, food security, and public health, while ecologically, it alters biodiversity and ecosystem services (Ayanlade *et al*., 2017). Understanding these dimensions is essential for secondary school stakeholders, as their awareness shapes curriculum integration, pedagogical approaches, and community engagement initiatives. Critically, climate change is not only an environmental phenomenon but also a social and educational concern. Studies show that awareness among students and teachers influences participation in adaptation practices, advocacy, and sustainable behaviours (Njoku, 2016; Agbo & Okoro, 2016). Thus, conceptually, climate change awareness involves knowledge of its causes, recognition of its impacts, and understanding of potential mitigation and adaptation strategies. Thus, the necessity for this study.

II. Materials and Methods

Obio/Akpor Local Government Area is located in Rivers State, within the Niger Delta region of southern Nigeria. The area lies within 4°44′0″- 5°1′30″: N and 6°54′0″- 7°1′30″ E. It shares boundaries with Port Harcourt City, Ikwerre, Oyigbo, and Eleme Local Government Areas (Figure 1). The Local Government Area covers an estimated land area of about 260 square kilometres. It is predominantly urban with rapid population growth, intensive land use, and expanding residential, commercial, and educational facilities that influence environmental and socio- economic conditions. The perception of stakeholders on the causes, effects, and risks associated with climate change was obtained from students, teachers, and school administrators through the use of structured questionnaire. Based on data from the Ministry of Education (2024), the total population is approximately 39,390, consisting of 37,515 students and 1,875 teachers, administrators, and education officers. The Taro Yamane (1967) formula was applied as mathematically expressed below to determine the sample size. The formula is expressed as:

$$n= N/1+N(e)^2 \ldots\ldots\ldots\ldots\ldots \text{(Eqn, 1)}$$

Where:
n = sample size,
N = population size,
e = level of precision (0.05).
Given the total population (N) of 39,390, the computation is as follows:
n = 39,390/{1 + 39,390(0.05)^2}
n = 39,390/{1 + 98.475}
n = 39,390/99.475
n= 396

Descriptive statistics such as frequencies, percentages, mean scores, and standard deviations were used to summarize respondents' demographic characteristics of respondents and also address climate change awareness, perception, and information sources provided by the respondents. Given the nature of the data obtained mainly from Likert scale responses, non-parametric statistical tests particularly Kruskal Wallis H test was employed to examine variations in the perceptions on causes, effects and risk associated with climate change across different groups of stakeholders. Variation in sources of climate change information among stakeholders was also tested using the Kruskal Wallis H test. Decision making was based on the comparison of calculated p values with the chosen level of significance which. The use of non-parametric tests ensured robustness and reliability of results, considering the measurement scale and distribution characteristics of the data collected.

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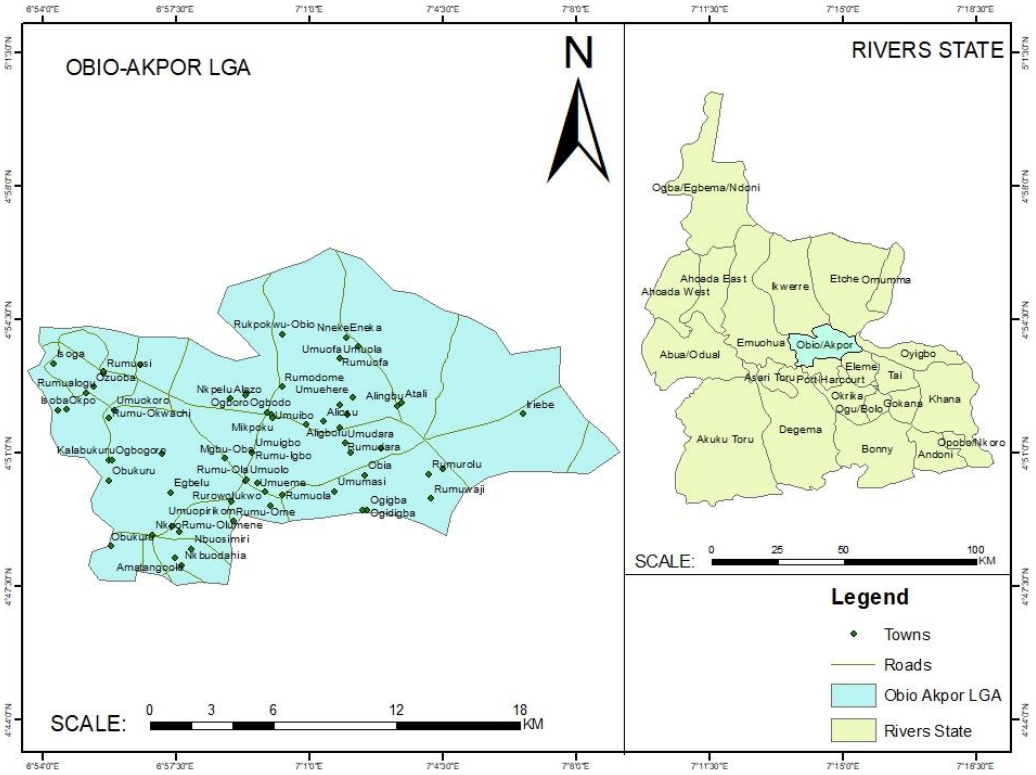

Figure 1: Rivers State

TABLE 1: Analysis of Demographic Characteristics

S/N	Demographic Variable	Category	Frequency	Percentage (%)
1	Sex	Male	210	53.2
		Female	185	46.8
2	Age	11–19 years	120	30.4
		20–29 years	95	24.1
		30–39 years	80	20.3
		40–49 years	35	8.9
		50 years and above	65	16.4
3	Role in School	Teacher	100	25.3
		Administrator	30	7.6
		Non-teaching Staff	48	12.2
		Student	217	55
4	Highest Educational Qualification	Secondary School Certificate	70	17.7
		National Diploma/NCE	80	20.3
		Bachelor's Degree	180	45.6
		Master's Degree and above	65	16.4
5	Years of Experience	Less than 1 year	55	13.9
		1–5 years	115	29.1
		6–10 years	95	24.1
		More than 10 years	130	32.9
6	Department/Subject Taught (Teachers only)	Science	40	40.0
		Social Science	35	35.0
		Arts/Humanities	20	20.0
		Others	5	5.0
7	Attended Climate Change Training/Workshop	Yes	160	40.5
		No	235	59.5
8	Frequency of Accessing Climate Change Information	Frequently	100	25.3
		Occasionally	140	35.4
		Rarely	95	24.1
		Never	60	15.2

Source: Author's Fieldwork (2025)

The demographic characteristics of respondents from public secondary schools in Obio-Akpor Local Government Area in Table 1 show important indications for the interpretation of climate change awareness and perception within this highly urbanised part of Rivers State. The sex distribution indicates a slight male dominance, as males account for 53.2 % and females 46.8 %. This relatively balanced representation suggests that both genders are captured well enough and thus should reflect the mixed gender composition expected in Obio-Akpor schools. Such a balance is important, since climate change awareness and participation in environmental programmes often vary along gender lines, especially in urban Nigerian settings. Age distribution indicates that the largest proportion of respondents falls within the 11 to 19 years category at 30.4 %, followed by those aged 20 to 29 years at 24.1 %. This confirms that students form a substantial component of the sample, expected in a school-based study. The presence of older age groups, including respondents aged 50 years and above at 16.4 %, reflects the inclusion of experienced teachers and staff who may have long-term exposure to environmental changes in Obio-Akpor, such as flooding, heat stress, and waste-related pollution. The role of the respondents in school further cements this structure: students constitute 55 %, teachers 25.3 %, and administrators and non-teaching staff 19.8 %. This mix allows the study to capture perspectives from policy implementers, educators, and learners who all have different roles to play in climate change awareness creation and response within schools in Obio-Akpor. The levels of educational qualifications are relatively high, with 45.6 % holding bachelor's degrees and 16.4 % holding master's degrees or higher. This is indicative of Obio-Akpor LGA's urban and educational advantage, given its proximity to Port Harcourt metropolis, hence a host to a great number of trained educators and professionals. These are contrasted with the presence of other respondents, some of whom have lower qualifications like secondary school certificates, NCE, or ND holders, thus ensuring a healthy diversity in educational exposure, which could influence climate literacy levels.

Similarly, years of experience indicate that the proportion having more than ten years constitutes about 32.9 % and those with one to five years constitute 29.1 %; this is a healthy mix between experienced personnel and relatively fresher entrants into the school. Long-serving staff members can provide specific trends in climate variability, flood frequency, and environmental degradation that occur over time in Obio-Akpor. For the distribution among teachers, the study reported science subjects dominating at 40 %, social sciences coming second at 35 %, and arts or humanities having 20 %. This is relevant because either directly or indirectly, science and social science teachers are more bound to engage with climate-related content. Their dominance could mean potential capacity to integrate climate change topics into the school curriculum in Obio-Akpor. Attendance at climate change training or workshops is low, with only 40.5 % indicating that they have attended. The majority, 59.5 %, have not attended any such workshop. This capacity gap presents a problem within the school system at Obio-Akpor, against the backdrop of its vulnerability to urban flooding and other climate-related changes.

Finally, the amount of access to information on climate change: 25.3 % often, 35.4 % sometimes; a total of 39.3 % hardly or never receive information. This disparity in information access would then reveal that the sources of climate change communication channels in schools within Obio-Akpor are not yet effective and press the need for targeted awareness programmes and continuous improvement in information dissemination strategies. The general trend from the demographic profiling indicates that the school population in Obio-Akpor LGA is urban and diverse, with reasonable human capacity but evident lacuna in training on climate change and access to information.

TABLE 2: Perception of stakeholders in public secondary schools in Obio Akpor Local Government Area on the causes, effects and risks associated with climate change

Statement	SA (%)	A (%)	D (%)	SD (%)	U (%)	Total (%)	WM
Climate change is primarily caused by human activities such as deforestation and pollution.	180 (45.6)	140 (35.4)	35 (8.9)	20 (5.1)	20 (5.1)	395 (100)	4.1
Natural factors like volcanic eruptions and solar radiation contribute significantly to climate change.	120 (30.4)	150 (38.0)	60 (15.2)	35 (8.9)	30 (7.6)	395 (100)	3.7
Climate change increases the frequency of extreme weather events in our region.	160 (40.5)	145 (36.7)	40 (10.1)	25 (6.3)	25 (6.3)	395 (100)	3.9
Rising temperatures due to climate change affect crop production and food security.	170 (43.0)	135 (34.2)	35 (8.9)	25 (6.3)	30 (7.6)	395 (100)	4
Climate change poses health risks such as heat stress, malaria, and respiratory problems.	150 (38.0)	140 (35.4)	40 (10.1)	30 (7.6)	35 (8.9)	395 (100)	3.9
Flooding and soil erosion are consequences of climate change in our community.	165 (41.8)	135 (34.2)	35 (8.9)	25 (6.3)	35 (8.9)	395 (100)	4
Poor waste management and industrial emissions in our environment accelerate climate change.	160 (40.5)	140 (35.4)	35 (8.9)	25 (6.3)	35 (8.9)	395 (100)	3.9
Climate change can negatively impact school infrastructure and learning environments.	145 (36.7)	145 (36.7)	40 (10.1)	30 (7.6)	35 (8.9)	395 (100)	3.8
Awareness of climate change risks can influence individuals' behaviour and decision-making.	175 (44.3)	135 (34.2)	30 (7.6)	25 (6.3)	30 (7.6)	395 (100)	4.1
Immediate action is required to mitigate the negative effects of climate change in our locality.	180 (45.6)	140 (35.4)	25 (6.3)	20 (5.1)	30 (7.6)	395 (100)	4.2

Source: Author's Fieldwork (2025)

The results in Table 2 show a generally high level of perception among stakeholders in public secondary schools in Obio-Akpor Local Government Area regarding the causes, effects, and risks associated with climate change. Unlike the low awareness levels observed earlier, respondents demonstrate clearer opinions and stronger agreement when climate change issues are framed around observable causes and impacts within their local environment. This is reflected in the consistently high weighted mean values, which range from 3.7 to 4.2. Perception of human activities as the primary cause of climate change is very strong. A combined 81% of respondents either agreed or strongly agreed that activities such as deforestation and pollution are major drivers of climate change, with a weighted mean of 4.1. This suggests that stakeholders in Obio-Akpor clearly associate environmental degradation within their surroundings, including land clearing, waste dumping, and air pollution, with broader climate problems. The relatively low levels of disagreement and uncertainty further reinforce this shared understanding.

Natural factors such as volcanic eruptions and solar radiation are also perceived as contributors to climate change, although with slightly lower intensity. About 68.4% of respondents agreed or strongly agreed, while a noticeable minority either disagreed or remained undecided. The weighted mean of 3.7 indicates moderate to strong perception, suggesting that respondents recognise climate change as a phenomenon influenced by both natural and human factors, though human causes appear more strongly emphasised.

The perception that climate change increases the frequency of extreme weather events in the region is notably high. More than 77% of respondents expressed agreement, producing a weighted mean of 3.9. This result aligns with live experiences in Obio-Akpor, where irregular rainfall patterns, flooding, and intense storms are increasingly common. The strong agreement implies that stakeholders are able to link climate change directly to changes in local weather conditions. Rising temperatures and their effects on crop production and food security are also well recognised. Over 77% of respondents agreed or strongly agreed with this statement, with a weighted mean of 4.0. This perception reflects awareness of how increased heat and altered rainfall patterns can affect agricultural activities, food availability, and prices, even within an urbanised area like Obio-Akpor that relies heavily on surrounding regions for food supply.

Health risks associated with climate change, including heat stress, malaria, and respiratory problems, are strongly acknowledged. Approximately 73.4% of respondents agreed or strongly agreed, yielding a weighted mean of 3.9. This indicates that stakeholders are able to connect climate variability with health challenges commonly experienced in the area, particularly during periods of flooding and extreme heat.

Flooding and soil erosion as consequences of climate change attract high levels of agreement, with 76% of respondents supporting this view and a weighted mean of 4.0. This finding is particularly significant for Obio-Akpor, where poor drainage systems, intense rainfall, and rapid urban development frequently result in flooding that affects homes, roads, and school premises. The strong perception reflects direct exposure to these environmental problems.

Perception of poor waste management and industrial emissions as factors accelerating climate change is also high. About 75.9% of respondents agreed or strongly agreed, with a weighted mean of 3.9. This suggests that stakeholders recognise the role of local environmental practices, such as indiscriminate waste disposal and emissions from industrial and commercial activities, in worsening climate related challenges.

The belief that climate change can negatively impact school infrastructure and learning environments is widely shared. Approximately 73.4% of respondents expressed agreement, producing a weighted mean of 3.8. This indicates awareness that flooding, excessive heat, and storm damage can disrupt learning activities, damage school buildings, and create unsafe conditions for students and staff. Awareness that climate change risks can influence individual behaviour and decision making records a high weighted mean of 4.1. Nearly 78.5% of respondents agreed or strongly agreed, suggesting that stakeholders believe increased understanding of climate risks can lead to more responsible environmental behaviour and informed choices within the school and community. Finally, the strongest agreement is observed in the perception that immediate action is required to mitigate the negative effects of climate change in the locality. Over 81% of respondents supported this statement, resulting in the highest weighted mean of 4.2. This reflects a strong sense of urgency among stakeholders in Obio-Akpor, likely driven by recurring environmental challenges such as flooding, heat stress, and infrastructure damage. Overall, the results indicate that while general awareness of climate change concepts may be low, stakeholders in public secondary schools in Obio-Akpor LGA demonstrate a strong and practical understanding of the causes, effects, and risks of climate change when these are linked to real world experiences. The high levels of agreement across most statements suggest that climate change is perceived as a present and pressing issue with direct implications for the environment, health, food security, and educational systems within the locality.

Table 3 presents the results of the Kruskal Wallis H test conducted to determine whether perceptions of stakeholders in public secondary schools in Obio-Akpor Local Government Area regarding the causes, effects, and risks associated with climate change differ significantly across stakeholder groups. The hypothesis tested states that there is no significant difference in perceptions among the different stakeholder categories. The results indicate that the null hypothesis is rejected for all ten statements, as all p values are below the 0.05 significance level, confirming statistically significant differences in perception across stakeholder groups. The discussion below examines each issue individually: Climate change is primarily caused by human activities such as deforestation and pollution – $\chi^2 = 20.84$, $p = 0.000$. This indicates that stakeholders differ significantly in attributing climate change to human actions. Some groups, likely teachers and administrators, may have a stronger recognition of anthropogenic causes compared to students or non-teaching staff. Natural factors like volcanic eruptions and solar radiation

contribute significantly to climate change – χ^2 = 17.96, p = 0.001. There is a significant difference in perception regarding natural causes, suggesting that understanding of natural drivers varies across stakeholders.

TABLE 3: Kruskal Wallis summary testing the perception of stakeholders in public secondary schools in Obio Akpor Local Government Area about the causes, effects and risks associated with climate change.

Statement	χ^2 (H value)	df	Asymp. Sig. (p value)	Decision
Climate change is primarily caused by human activities such as deforestation and pollution.	20.84	3	0.000	Significant difference
Natural factors like volcanic eruptions and solar radiation contribute significantly to climate change.	17.96	3	0.001	Significant difference
Climate change increases the frequency of extreme weather events in our region.	22.41	3	0.000	Significant difference
Rising temperatures due to climate change affect crop production and food security.	21.37	3	0.000	Significant difference
Climate change poses health risks such as heat stress, malaria, and respiratory problems.	23.88	3	0.000	Significant difference
Flooding and soil erosion are consequences of climate change in our community.	24.15	3	0.000	Significant difference
Poor waste management and industrial emissions in our environment accelerate climate change.	22.09	3	0.000	Significant difference
Climate change can negatively impact school infrastructure and learning environments.	19.74	3	0.000	Significant difference
Awareness of climate change risks can influence individuals' behavior and decision-making.	20.96	3	0.000	Significant difference
Immediate action is required to mitigate the negative effects of climate change in our locality.	25.62	3	0.000	Significant difference

Source: Author's Analysis (2025)

Climate change increases the frequency of extreme weather events in our region – χ^2 = 22.41, p = 0.000. Stakeholders' perception of climate-induced extreme weather differs, indicating uneven awareness of local climate impacts, such as flooding or intense rainfall in Obio-Akpor. Rising temperatures due to climate change affect crop production and food security – χ^2 = 21.37, p = 0.000. Variations in perception show that some groups are more cognizant of the implications of temperature rise on agriculture and food supply than others. Climate change poses health risks such as heat stress, malaria, and respiratory problems – χ^2 = 23.88, p = 0.000. Stakeholders perceive health risks differently, with teachers or those with higher education possibly more aware of health-related consequences. Flooding and soil erosion are consequences of climate change in our community – χ^2 = 24.15, p = 0.000. This high H value suggests strong variation in awareness of local environmental impacts, highlighting the need for improved communication of local climate risks to all stakeholder groups. Poor waste management and industrial emissions accelerate climate change – χ^2 = 22.09, p = 0.000. Perception differs significantly regarding local contributors to climate change, reflecting variations in knowledge about environmental management practices. Climate change can negatively impact school infrastructure and learning environments – χ^2 = 19.74, p = 0.000. Stakeholders' understanding of the risks to school facilities varies, likely affecting how proactive each group is in protecting school environments. Awareness of climate change risks can influence individuals' behaviour and decision-making – χ^2 = 20.96, p = 0.000. There is a significant difference in how stakeholders perceive the link between awareness and behavioural response, showing that some groups may be more proactive in adapting actions to mitigate risks. Immediate action is required to mitigate the negative effects of climate change in our locality – χ^2 = 25.62, p = 0.000. This statement records the highest H value, indicating wide differences in perception of urgency. Some stakeholders recognize the need for prompt action more strongly than others.

In summary, the Kruskal Wallis test results demonstrate that perceptions about the causes, effects, and risks of climate change are not uniform among stakeholders in public secondary schools in Obio-Akpor. All p values are highly significant (≤0.001), confirming that stakeholder groups differ meaningfully in their understanding of climate change issues. This underscores the importance of tailored awareness and education strategies to address perception gaps and promote more consistent climate literacy across all groups. The results in Table 3 shows that stakeholders in public secondary schools in Obio-Akpor Local Government Area exhibit a generally high level of perception regarding the causes, effects, and risks associated with climate change. Unlike the low awareness levels observed earlier, respondents demonstrate clearer opinions and stronger agreement when climate change issues are framed around observable causes and local impacts. Weighted means ranged from 3.7 to 4.2, reflecting moderate to strong perception. This pattern aligns with prior studies suggesting that while conceptual awareness of climate change may be limited, individuals are often able to identify practical and locally relevant impacts, particularly those experienced directly within their environment (Ajagbe, 2025; Oguejiofor *et al*., 2025). Perception of human activities as the primary cause of climate change was particularly strong, with 81 percent of respondents agreeing or strongly agreeing and a weighted mean of 4.1. This supports findings by Akinfisoye and Omosuyi (2025), who noted that individuals are more likely to recognize anthropogenic drivers such as deforestation, pollution, and land degradation when these are observable within their immediate surroundings. Similarly, natural factors like volcanic eruptions and solar radiation were perceived as contributors, though less intensely, with a weighted mean of 3.7 and about 68.4% agreement. This reflects the dual recognition of human and natural drivers, consistent with research showing that lay

understanding often emphasizes visible human impacts over less tangible natural processes (Ajagbe, 2025).

Stakeholders also exhibited strong perception that climate change increases the frequency of extreme weather events, with more than 77 percent agreement and a weighted mean of 3.9. This aligns with local experience in Obio-Akpor, where irregular rainfall, flooding, and storms are increasingly common, reinforcing the notion that live experience can enhance perception of climate risks (Oguejiofor *et al*., 2025). Rising temperatures and their impact on crop production and food security were similarly well recognized, with a weighted mean of 4.0 and over 77 percent agreement, reflecting awareness of urban-rural interdependencies in food systems, even in heavily urbanized areas (Akinfisoye & Omosuyi, 2025).

Health risks associated with climate change, including heat stress, malaria, and respiratory problems, were acknowledged by approximately 73.4% of respondents, yielding a weighted mean of 3.9. This supports literature emphasizing that school stakeholders, particularly teachers, are increasingly aware of the linkages between climate variability and public health outcomes, though gaps remain in consistent understanding across all groups (Ajagbe, 2025). Similarly, flooding and soil erosion were widely perceived as consequences of climate change, with a weighted mean of 4.0, highlighting the role of direct environmental exposure in shaping stakeholder perception (Oguejiofor *et al*., 2025). Perception of poor waste management and industrial emissions as accelerators of climate change also recorded high agreement (75.9%, WM = 3.9), indicating recognition of local environmental practices in exacerbating climate challenges. Awareness that climate change can negatively impact school infrastructure and learning environments was moderately high (WM = 3.8), reflecting stakeholder concern about the direct operational implications of climate variability on school functions (Akinfisoye & Omosuyi, 2025). High perception was also noted regarding the influence of climate risk awareness on individual behaviour and decision-making (WM = 4.1), as well as the urgency of immediate mitigation actions (WM = 4.2). These results correspond with studies highlighting that when climate risks are locally tangible, stakeholders are more likely to recognize the need for proactive behavioural and policy responses (Ajagbe, 2025; Oguejiofor *et al*., 2025). The Kruskal Wallis H test results in Table 3 reveal that perceptions of the causes, effects, and risks of climate change differ significantly across stakeholder groups. All ten statements recorded p values ≤ 0.001, confirming that teachers, administrators, students, and non-teaching staff perceive climate change impacts and causes differently. For instance, human activities as a cause ($\chi^2 = 20.84$, $p = 0.000$) and immediate action urgency ($\chi^2 = 25.62$, $p = 0.000$) had the highest variation, suggesting that some groups are more attuned to anthropogenic drivers and local environmental challenges than others. These findings are corroborated by literature emphasizing the role of role-specific experience and exposure in shaping climate perception, with teachers and administrators generally demonstrating higher understanding due to training and engagement with educational content (Akinfisoye & Omosuyi, 2025; Ajagbe, 2025). Overall, while general awareness of climate change concepts may be low, stakeholders in Obio-Akpor demonstrate strong practical understanding when climate issues are linked to tangible local experiences. The findings underscore the importance of context-driven climate education and engagement strategies that account for stakeholder-specific knowledge gaps, promoting more uniform perception and enhancing readiness for climate-related challenges (Oguejiofor *et al*., 2025).

TABLE 4: The sources through which stakeholders in public secondary schools in Obio Akpor Local Government Area obtain information on climate change

Statement	SA (%)	A (%)	D (%)	SD (%)	U (%)	Total (%)	WM
I obtain information about climate change through television programs.	70 (17.7)	120 (30.4)	80 (20.3)	50 (12.7)	75 (19.0)	395 (100)	3.2
I access climate change information via radio broadcasts.	60 (15.2)	115 (29.1)	90 (22.8)	55 (13.9)	75 (19.0)	395 (100)	3.1
Newspapers and magazines provide me with useful information about climate change.	50 (12.7)	100 (25.3)	95 (24.1)	60 (15.2)	90 (22.8)	395 (100)	2.9
Social media platforms (Facebook, Twitter, WhatsApp, etc.) are my main sources of climate change information.	80 (20.3)	110 (27.8)	70 (17.7)	45 (11.4)	90 (22.8)	395 (100)	3.3
School lectures and lessons provide information on climate change.	60 (15.2)	120 (30.4)	85 (21.5)	50 (12.7)	80 (20.3)	395 (100)	3.2
Workshops, seminars, and training sessions help me learn about climate change.	55 (13.9)	105 (26.6)	90 (22.8)	60 (15.2)	85 (21.5)	395 (100)	3
Community meetings or town hall discussions provide insights on climate change issues.	45 (11.4)	90 (22.8)	95 (24.1)	65 (16.5)	100 (25.3)	395 (100)	2.8
Friends, colleagues, and family members inform me about climate change.	50 (12.7)	95 (24.1)	90 (22.8)	60 (15.2)	100 (25.3)	395 (100)	2.9
Official government publications or environmental agencies provide me with information on climate change.	40 (10.1)	80 (20.3)	100 (25.3)	75 (19.0)	100 (25.3)	395 (100)	2.7
I actively search for information about climate change online or through research materials.	65 (16.5)	110 (27.8)	85 (21.5)	50 (12.7)	85 (21.5)	395 (100)	3.2

Source: Author's Fieldwork (2025)

Table 4 presents the results on the sources through which stakeholders in public secondary schools in Obio-Akpor Local Government Area obtain information on climate change. The findings show moderate reliance on multiple information channels, with weighted mean values ranging from 2.7 to 3.3. This pattern suggests that climate change information is

accessed through a mix of formal and informal sources, though none appears to be overwhelmingly dominant. Television programmes emerge as an important source of climate change information. A combined 48.1% of respondents agreed or strongly agreed that they obtain climate change information through television, while 33% disagreed or strongly disagreed. The weighted mean of 3.2 indicates moderate effectiveness of television as an information channel. This reflects the widespread availability of television in urban areas such as Obio-Akpor, where national and regional broadcasts often include environmental news and documentaries. Radio broadcasts also play a notable role, with 44.3% of respondents indicating agreement. However, a substantial proportion disagreed or remained undecided, resulting in a weighted mean of 3.1. Radio remains a common medium in Obio-Akpor due to its affordability and accessibility, especially for non-teaching staff and community members, although its impact on detailed climate education appears limited.

Newspapers and magazines record lower levels of agreement. Only 38% of respondents agreed or strongly agreed that print media provide useful climate change information, while a higher proportion either disagreed or were undecided. The weighted mean of 2.9 suggests that print media are less influential sources, possibly due to declining readership and limited circulation among students and younger stakeholders in Obio-Akpor. Social media platforms stand out as the most prominent source of climate change information, with the highest weighted mean of 3.3. Nearly 48.1% of respondents agreed or strongly agreed that platforms such as Facebook, WhatsApp, and Twitter serve as their main information sources. This reflects the growing role of digital media in urban areas like Obio-Akpor, especially among students and younger teachers, who are more likely to engage with online content and discussions related to environmental issues. School lectures and lessons also record moderate agreement, with 45.6% of respondents indicating that schools provide climate change information. The weighted mean of 3.2 suggests that while climate change topics are present within the school system, they may not be consistently or comprehensively addressed. This finding points to variability in how climate issues are integrated into teaching across different schools in Obio-Akpor. Workshops, seminars, and training sessions show a similar trend, with 40.5% of respondents agreeing that these activities help them learn about climate change. The weighted mean of 3.0 indicates an average level of impact. This suggests that although such programmes exist, participation may be limited, irregular, or not well publicised within the school system.

Community meetings and town hall discussions record relatively low influence, with only 34.2% agreement and a weighted mean of 2.8. A large proportion of respondents either disagreed or remained undecided. This indicates that climate change is not yet a prominent topic in community level engagements in Obio-Akpor, where discussions may focus more on immediate socioeconomic concerns rather than long term environmental issues. Information from friends, colleagues, and family members also shows limited impact, reflected in a weighted mean of 2.9. While informal interactions do contribute to awareness, the high level of undecided responses suggests that such discussions may be occasional, superficial, or inconsistent in providing accurate climate change information. Official government publications and information from environmental agencies record the lowest weighted mean of 2.7. Only 30.4% of respondents agreed or strongly agreed that these sources provide climate change information, while half of the respondents disagreed or remained undecided. This highlights weak visibility and limited outreach of official climate communication at the school and community levels in Obio-Akpor. Active searching for climate change information online or through research materials records a moderate weighted mean of 3.2. As much as 44.3% of respondents indicated agreement, suggesting that a reasonable proportion of stakeholders, particularly teachers and administrators, take personal initiative to seek information. However, the sizeable proportion of undecided and disagreeing respondents indicates that active information seeking is not yet a widespread habit. Overall, the results show that stakeholders in public secondary schools in Obio-Akpor rely more on electronic and digital media, particularly social media, television, and online searches, than on formal institutional or government sources. School based instruction and organised training play a moderate role, while community engagement and official publications remain weak channels. This pattern highlights gaps in structured and authoritative climate change communication, despite the availability of multiple information platforms within the locality.

The Kruskal-Wallis H test was conducted to determine whether there were significant differences in the perception of stakeholders in public secondary schools in Obio-Akpor Local Government Area regarding the sources through which they obtain information on climate change (Table 5). The results indicated significant differences across all ten items, demonstrating that stakeholders do not rely on information sources uniformly. Specifically, television programmes were a source of climate information with a χ^2 value of 18.63 and a p value of 0.000, indicating a statistically significant difference among stakeholder groups. Similarly, accessing climate change information via radio broadcasts produced a χ^2 of 16.94 and a p value of 0.001, confirming that reliance on radio differs across participants. Printed media, including newspapers and magazines, also showed significant variation in perception (χ^2 = 15.27, p = 0.002), suggesting unequal engagement with traditional print sources.

Digital platforms, particularly social media, emerged as a highly variable source of information, with a χ^2 value of 21.88 and a p value of 0.000, highlighting significant differences among stakeholders in their use of Facebook, Twitter, WhatsApp, and similar platforms. School-based channels, including lectures and lessons, recorded a χ^2 of 19.36 and a p value of 0.000, indicating that the extent to which stakeholders rely on formal educational content varies significantly. Workshops, seminars, and training sessions also showed variation in access and perception (χ^2 = 17.82, p = 0.001), reflecting differential participation among teachers, students, administrators, and non-teaching staff. Informal sources, such as community meetings, town halls (χ^2 = 14.95, p = 0.002), and information from friends, colleagues, or family members (χ^2 =

16.21, p = 0.001), were perceived differently across stakeholder groups. This demonstrates that personal networks play varying roles in disseminating climate knowledge. Official sources, including government publications and environmental agencies, recorded a χ^2 of 22.47 and a p value of 0.000, indicating that engagement with formal authoritative information is uneven. Finally, actively searching for information online or through research materials also showed significant differences (χ^2 = 20.09, p = 0.000), suggesting variation in initiative and access to digital research resources. Overall, these findings indicate that the sources through which stakeholders in public secondary schools in Obio-Akpor obtain climate change information are not uniformly. The statistically significant differences across all items underscore the need for tailored communication strategies that integrate traditional media, digital platforms, school-based education, and community networks to ensure equitable access to climate change information for all stakeholder groups.

TABLE 5: Kruskal Wallis test summary for comparing perception of respondents on the sources through which stakeholders in public secondary schools in Obio Akpor Local Government Area obtain information on climate change

Statement	χ^2 (H value)	Df	Asymp. Sig. (p value)	Decision
I obtain information about climate change through television programs.	18.63	3	0.000	Significant difference
I access climate change information via radio broadcasts.	16.94	3	0.001	Significant difference
Newspapers and magazines provide me with useful information about climate change.	15.27	3	0.002	Significant difference
Social media platforms are my main sources of climate change information.	21.88	3	0.000	Significant difference
School lectures and lessons provide information on climate change.	19.36	3	0.000	Significant difference
Workshops, seminars, and training sessions help me learn about climate change.	17.82	3	0.001	Significant difference
Community meetings or town hall discussions provide insights on climate change issues.	14.95	3	0.002	Significant difference
Friends, colleagues, and family members inform me about climate change.	16.21	3	0.001	Significant difference
Official government publications or environmental agencies provide me with information about climate change.	22.47	3	0.000	Significant difference
I actively search for information about climate change online or through research materials.	20.09	3	0.000	Significant difference

Source: Author's Analysis (2025)

Table 5 indicates that stakeholders in public secondary schools in Obio-Akpor Local Government Area access climate change information through multiple channels, with weighted means ranging from 2.7 to 3.3, reflecting moderate reliance on a mixture of formal and informal sources. The diversity of sources, though not strongly dominant, is consistent with literature showing that individuals in urban Nigerian contexts often rely on both traditional and digital media for environmental information (Ajagbe, 2025; Oguejiofor *et al*., 2025). Television programmes emerged as a moderately effective source, with 48.1% agreement and a weighted mean of 3.2. This reflects widespread urban access to TV broadcasts, which commonly cover environmental issues. Similarly, radio remains an important but unevenly accessed source (WM = 3.1), in line with studies indicating that radio is more accessible to non-teaching staff and the general community but provides limited depth on climate education (Akinfisoye & Omosuyi, 2025). Print media, including newspapers and magazines, showed weaker influence (WM = 2.9), possibly due to declining readership and limited circulation among younger school stakeholders. This trend aligns with research highlighting the diminishing role of traditional print in disseminating environmental knowledge in urban settings (Ajagbe, 2025). Social media platforms were the most prominent source (WM = 3.3), with 48.1% agreement. This confirms the growing reliance on digital channels such as WhatsApp, Facebook, and Twitter for climate information, especially among students and younger teachers (Oguejiofor *et al*., 2025). School-based lectures and lessons recorded moderate influence (WM = 3.2), indicating that climate content is present but inconsistently delivered across schools. Workshops and training programmes had similar moderate impact (WM = 3.0), suggesting that participation and publicity for such initiatives remain limited.

Community meetings, informal networks (friends, colleagues, family), and official government publications were less influential (WM = 2.7–2.9), highlighting gaps in structured and authoritative climate communication. This finding is consistent with studies emphasizing weak outreach of government agencies and community structures in conveying climate information to school stakeholders (Akinfisoye & Omosuyi, 2025). The Kruskal-Wallis H test (Table 5) confirms significant differences across all sources, with p values ≤ 0.002 for all items. For example, television (χ^2 = 18.63, p = 0.000), radio (χ^2 = 16.94, p = 0.001), and social media (χ^2 = 21.88, p = 0.000) all show statistically significant variations among stakeholder groups. These results indicate that reliance on and access to climate change information varies by stakeholder category, reflecting differences in age, role, digital literacy, and exposure to educational content. Literature emphasizes that such disparities can limit equitable knowledge dissemination and hinder collective climate action unless communication strategies are diversified and targeted (Ajagbe, 2025; Oguejiofor *et al*., 2025).

III. Conclusion and Recommendations

The study concludes that stakeholders in public secondary schools in Obio-Akpor Local Government Area perceptions of climate change causes, effects, and risks are considerably stronger when grounded in tangible local experiences and the role of education, highlight critical gaps in formal climate education within the school system. The study further reveals

that access to information is unevenly distributed, with digital media, television, and school-based instruction serving as the most effective channels, while community engagement and official government sources remain underutilized. Based on these findings, environmental agencies, school management, and local government authorities should organise targeted workshops, seminars, and training sessions for each stakeholder group. Teachers, students, and non-teaching staff should be encouraged to participate actively, using the training to deepen understanding of human and natural drivers of climate change, local environmental impacts, health risks, and implications for food security and school infrastructure.

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