Perception of Climate Change ad Soil Quality Sustainability in Oyo Metropolis

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Abstract

The study examined perception of climate change and soil quality sustainability in Oyo Metropolis. The study adopted descriptive survey design. The sample for the study considered eighty respondents. The researcher adopted stratified random sampling technique to draw out the sample for the study. Out of the eight (8) villages randomly selected 4 local government in Oyo, eighty (80) respondents were selected across the Local Governments for the study. The area randomly selected are Otefon and Olose village area from Atiba, Fasola-Soku and Iyabeji Village from Oyo West, Iware and Elepe from Oyo East and Imini and Fiditi from Afijio Local Governments respectively. Eighty (80) copies of questionnaire were distributed to the farmers and stakeholders in the areas randomly selected. The research questions raised were answered using descriptive statistics such as mean and standard deviation while the hypotheses rose were tested with Analysis of Variance (ANOVA). The result indicated that respondents generally disagreed with decreased soil fertility (2.31 ± 0.95). Since the p-value is less than 0.05, the null hypothesis is therefore rejected. The study concluded that awareness is increasing and that the severity of these impacts varies and many residents perceived climate change as a significant issue affecting soil fertility, erosion rates, and agricultural productivity. Adaptation strategies include altering agricultural practices and soil conservation, but their effectiveness is influenced by socioeconomic factors and emphasizes the need for improved education, targeted support, and proactive policy interventions. It therefore recommends among other that there should be a way of Integrating Pest Management (IPM) combined with climate-smart agricultural practices which can effectively

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address the increased incidence of pests and diseases, as well as other challenges posed by climate change and that based on the survey findings and recent empirical research, it is recommended to implement integrated soil management practices. There should be practices combine various strategies to enhance soil health and mitigate degradation caused by climatic factors.

Keywords: Adaptation strategies, Mitigation strategies, Perception of climate change, Soil quality, Sustainability

Introduction

In the past, agriculture happened to be the mainstay of Nigerian economy but this received huge blow during crude oil discovery in Nigeria. Extraction of these natural endowed mineral resources kicked the nation in the box of climate misbehaving and other anthropogenic activities called climate change issue. Climate change has emerged as one of the most pressing global environmental challenges of the 21st century, influencing various aspects of natural and human systems. Its effects are particularly pronounced in developing regions, where adaptive capacities are often limited. Oyo Metropolis, located in the south-western part of Nigeria, is no exception to this phenomenon. The metropolis, characterized by its diverse agricultural activities and rapidly growing urban areas, faces significant environmental changes due to climate variability. Climate change is increasingly recognized as a major threat to environmental stability and agricultural sustainability. The Intergovernmental Panel on Climate Change (IPCC) has documented the global rise in temperatures and the increasing frequency of extreme weather events, such as droughts, heavy rainfall, and storms (IPCC, 2021).

Climate change is a global phenomenon that has far-reaching impacts on various environmental and socio-economic aspects. One critical area of concern is its effect on soil quality, which is fundamental to agriculture, water management, and ecological balance. This research aims to investigate the relationship between climate change and soil quality sustainability in Oyo Metropolis, a rapidly developing urban area in Nigeria. Climate change is one of the most pressing challenges facing humanity today, with far-reaching impacts on various environmental, economic, and social

systems. Among its numerous effects, the alteration of soil quality is of particular concern, as soil is a critical resource that underpins agricultural productivity, water filtration, and overall ecosystem health. In many parts of the world, including Nigeria, the impacts of climate change on soil are becoming increasingly evident, manifesting through changes in precipitation patterns, temperature extremes, and the frequency of extreme weather events (IPCC, 2021).

Climate change and soil quality are interconnected, with each influencing the other (Lal, 2020). Soil quality sustainability is crucial for agricultural productivity, environmental health, and climate mitigation (FAO, 2022). Climate change impacts soil quality through increased rainfall intensity, storm events, soil moisture fluctuations, flooding, temperature changes, thermal stress, and reduced carbon sequestration capacity (IPCC, 2021). Sustainable soil management practices include conservation tillage, cover cropping, agroforestry, organic amendments, contour farming, and terracing (Pretty et al., 2018). Challenges to soil quality sustainability include lack of awareness and education among farmers, land ownership issues, inconsistent policy support, limited access to resources, and the need for on-going research to understand the complex interactions between climate change and soil health (Montanarella et al., 2016). Addressing these challenges can improve soil resilience and contribute to a more sustainable and productive agricultural system. In turn, this can generate employment opportunities for youths by creating jobs in soil conservation, sustainable farming, and environmental restoration programs (UNEP, 2021). Soil quality is a measure of the soil's ability to function effectively as a component of a healthy ecosystem. It encompasses various attributes such as nutrient content, organic matter levels, water retention capacity, and resistance to erosion (FAO, 2022). Maintaining soil quality is essential for food security, environmental health, and the overall sustainability of agricultural systems (FAO, 2022).

Soil quality is crucial for sustainable agriculture, environmental health, and ecosystem functionality. It includes physical properties like soil texture, structure, bulk density, water holding capacity, chemical properties like pH, nutrient content, cation exchange capacity, biological properties like organic matter

content, microbial activity, and biodiversity (Montanarella et al., 2016). Factors affecting soil quality include land management practices like tillage, crop rotation, cover cropping, and organic amendments. The perception of climate change and its effects on soil quality among residents of Oyo Metropolis varies widely. Awareness and understanding of these issues are influenced by factors such as education, access to information, and direct experiences with climate-related events. Studies have shown that higher awareness levels are correlated with better adaptation practices and support for sustainable soil management (Akinwande *et al.*, 2023). Environmental conditions like climate, topography, and parent material also impact soil quality. Human activities like deforestation, urbanization, and pollution can also degrade soil quality. Soil quality is a fundamental component of agricultural productivity and environmental health. It encompasses various attributes such as soil fertility, structure, water retention capacity, and resistance to erosion. Climate change poses numerous threats to soil quality, including nutrient depletion, increased erosion rates, and changes in moisture levels. These changes can have far-reaching impacts on food security, livelihoods, and ecological stability in Oyo Metropolis.

Statement of the Problem

Despite the critical importance of soil quality, there is limited research on how climate change specifically impacts soil properties in Oyo Metropolis. Oyo Metropolis, like many urban areas in Nigeria, is experiencing the impacts of climate change, which significantly affect soil quality and sustainability. Residents of Oyo Metropolis generally acknowledge climate change as a critical issue. Commonly observed changes include increased temperatures, irregular rainfall patterns, and more frequent extreme weather events. These changes are attributed to both global climate dynamics and local environmental mismanagement, such as deforestation and urban sprawl. It therefore, explores the local perceptions of climate change and its influence on soil health, as well as the strategies for promoting soil sustainability in the region. Understanding these impacts is essential for developing effective strategies to manage and mitigate the adverse effects of climate change on soil resources.

In response to these challenges, various sustainable practices are being adopted in the region to enhance soil quality and resilience to climate change. These practices include conservation agriculture, agroforestry, organic amendments, and improved water management techniques. Promoting and supporting these practices is crucial for mitigating the adverse effects of climate change on soil and ensuring long-term agricultural productivity (UNEP, 2022). This study, therefore, seeks to provide a comprehensive analysis of the perception of climate change and its impact on soil quality sustainability in Oyo Metropolis. By integrating quantitative surveys, qualitative interviews, and soil quality assessments, the research aims to offer insights into the current state of awareness, the perceived impacts of climate change, and the sustainability practices being adopted by the residents to produce employment for Nigerian youth.

Research Questions

The research put forward the following questions.

i. What are the public awareness and perception of climate change on soil quality in Oyo Metropolis?
ii. What are the impacts of climate change on soil quality?
iii. What is the primary climatic factors influencing soil degradation?

Objectives

The aim of this work is to examine the perception of climate change and soil quality Sustainability in Oyo Metropolis. Specific objectives are to:

i. assess the public awareness and perception of climate change on soil quality in Oyo Metropolis;
ii. evaluate the impacts of climate change on soil quality;
iii. identify the primary climatic factors influencing soil degradation and
iv. propose sustainable soil management practices to mitigate the negative effects of climate change.

Hypothesis

The level of education among residents of Oyo Metropolis is positively correlated with the adoption of sustainable soil management practices.

Literature Review

Climate change has significant localized impacts on environmental and agricultural systems, making public awareness and perception crucial for effective policy formulation and adaptive strategies. In Oyo Metropolis, Nigeria, there is a diverse range of awareness levels, with urban populations generally having a higher awareness due to better access to information and education. Rural communities, particularly those engaged in agriculture, are more likely to notice changes in weather patterns, which are often experiential. Olaniyi *et al.* (2013) found that in some rural areas, climate change is often attributed to supernatural causes rather than scientific factors. Urban areas, with better access to information and higher education levels, tend to have higher awareness and more accurate perceptions of climate change. Public perception of climate change impacts is critical in shaping responses and adaptation strategies. Globally, awareness and perception of climate change have been increasing, driven by extensive media coverage, educational initiatives, and the visible impacts of climate-related phenomena. The Intergovernmental Panel on Climate Change (IPCC) reports have been instrumental in raising awareness by providing comprehensive assessments of climate science and its implications (IPCC, 2021). Research indicates that higher levels of education and access to information are strongly associated with greater awareness and concern about climate change (Lee *et al.*, 2015).

In south-western Nigeria, farmers are particularly sensitive to changes in climate due to its direct impact on crop yields and soil conditions. Understanding how the public perceives the link between climate change and soil quality is essential for developing effective adaptation strategies. Factors influencing awareness and perception include education, media and communication, and cultural and socioeconomic factors. Understanding public perception is vital for promoting sustainable soil management practices that mitigate

climate change impacts. Adoption of sustainable practices, such as conservation agriculture, organic amendments, and erosion control, can be enhanced through awareness campaigns and training programs tailored to local conditions. Effective policies should incorporate local knowledge and perceptions, ensuring that strategies are context-specific and culturally appropriate. Olaniyi *et al.* (2013) found that in some rural areas, climate change is often attributed to supernatural causes rather than scientific factors. Urban areas, with better access to information and higher education levels, tend to have higher awareness and more accurate perceptions of climate change.

Climate change, characterized by alterations in temperature, precipitation patterns, and extreme weather events, poses significant threats to soil quality globally. Soil quality, which includes physical, chemical, and biological properties, is crucial for agricultural productivity and ecosystem health. Climate change can lead to increased temperatures, which accelerate organic matter decomposition, reducing soil organic carbon (SOC), which is essential for soil fertility, structure, and water retention. Additionally, climate change can alter precipitation patterns, leading to more frequent and intense rainfall events and prolonged dry periods, impacting soil moisture content and water infiltration rates. Waterlogging, a result of increased rainfall, can reduce soil aeration and anaerobic conditions, affecting plant growth and resilience to drought (Bai *et al.*, 2018). Drought, on the other hand, can lead to soil compaction and reduced infiltration capacity, further exacerbating soil degradation. Changes in temperature and moisture can also alter soil structure, impacting water retention, root penetration, and microbial activity. Climate change influences soil nutrient dynamics through various mechanisms, including changes in temperature, moisture, and microbial activity. Soil microorganisms play a crucial role in nutrient cycling, organic matter decomposition, and overall soil health. Understanding these impacts is essential for developing adaptive soil management practices that can mitigate climate change's adverse effects and ensure sustainable soil health and agricultural productivity (Lal, 2020).

Soil degradation is a global environmental issue affecting agricultural productivity and ecosystem health. It is influenced by

various physical, chemical, and biological factors, including erosion, compaction, salinization, and nutrient depletion. Climate factors play a crucial role in soil degradation, affecting soil quality and productivity. Temperature, precipitation, drought, and wind are the primary climatic factors affecting soil degradation. Temperature accelerates organic matter decomposition, leading to reduced soil organic carbon levels. High temperatures can enhance microbial activity, hastening the breakdown of organic matter and depleting soil nutrients (Pretty *et al.*, 2018). Drought conditions exacerbate soil degradation by reducing soil moisture content and affecting soil cohesion. Wind erosion, particularly in arid and semi-arid regions, can remove topsoil, reducing soil fertility and organic matter content. Climate variability, including extreme weather events like storms, floods, and heat-waves, plays a crucial role in soil degradation. Extreme weather events, such as storms, floods, and heat-waves, can cause sudden and severe soil erosion, nutrient leaching, and disruption of soil structure. Regional studies have highlighted the impact of climatic factors on soil degradation, with examples in the Sahel region of Africa, Australia, and the Loess Plateau of China. Understanding these factors is crucial for developing effective soil conservation and management strategies. Addressing the impacts of climatic factors on soil degradation is increasingly important for ensuring sustainable land use and agricultural productivity (Ayanlade *et al.*, 2017).

Climate change poses significant threats to soil quality and agricultural productivity globally, including in Oyo Metropolis, Nigeria. Sustainable soil management practices are essential to mitigate these impacts and ensure long-term soil health and agricultural sustainability. In Oyo Metropolis, conservation agriculture (CA) practices, agroforestry, organic amendments, soil erosion control measures, and water management practices can help improve soil structure, fertility, and resilience to climate impacts. In Oyo Metropolis, agroforestry practices like alley cropping and boundary planting can protect soils from erosion and improve nutrient cycling (Udoh *et al.*, 2019). Organic amendments like compost, manure, and biochar can enhance soil fertility and structure. Soil erosion control measures like contour ploughing, terracing, and

vegetative barriers can help stabilize soils and maintain agricultural productivity. Efficient water management practices like rainwater harvesting, drip irrigation, and mulching can enhance water use efficiency and improve soil moisture retention. Successful implementation requires consideration of local socio-economic and environmental conditions, including land tenure, farmer education, and access to resources. Participatory approaches and financial support are crucial for successful implementation (Fasona & Omojola, 2019).

Study Area

This study adopted descriptive survey design and it was carried out in Oyo metropolis, Specifically, Oyo Town has four Local Governments: Atiba, Afijio, Oyo West and Oyo East Local Governments. Oyo is one of the prominent Yoruba towns in the south western part of Nigeria. It lies between latitudes 7^0 46' N and 3^0 53' N of the equator and longitudes 3^0 54' E and 3^0 58' E of the Greenwich Meridian. The land area is 784 feet above sea level and is about 50km away from the most densely populated city in sub-Saharan Africa, Ibadan (Bradford & Boler, 2015).

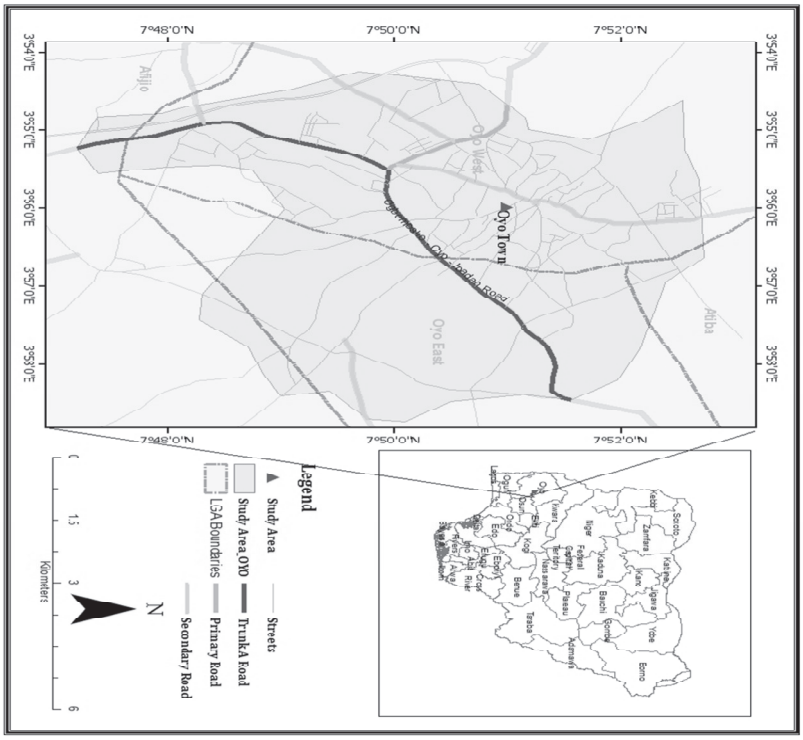

Fig 1: Map of Oyo Town showing the Local Government Area Source: Oyo State Ministry of Physical Planning and Urban Development

Methodology

The researcher adopted stratified random sampling technique to draw out the sample for the study. Using stratified random sampling, eight (8) villages were drawn for the study. Out of the eight (8) villages randomly selected, eighty (80) respondents were selected across the four (4) Local Governments for the study. The distribution of questionnaire across to the villages selected varies because of the size and population. The villages randomly selected are Otefon and Olose from Atiba, Fasola-Soku and Iyabeji from Oyo West, Iware and Elepe from Oyo East and Imini and Fiditi from Afijio Local Governments respectively. Otefon and Olose village (15)

respondents, Fasola-Soku and Iyabeji (25) respondents, Iware and Elepe (25) and Imini and Fiditi (15) respondents making the total of Eighty (80) respondents. Eighty (80) copies of questionnaire were distributed to the farmers in the villages randomly selected. The research questions raised were answered using descriptive statistics such as mean and standard deviation while the hypothesis rose were tested with Analysis of Variance (ANOVA).

Results

Research question 1: What are the public awareness and perception of climate change on soil quality in Oyo Metropolis?

Table 1: The public awareness and perception of climate change on soil quality in Oyo Metropolis (∞=80).

S/N	Variable: criterion mean cut-off mark [Mean ≥ 2.50]	Mean	SD	Remark
1	Decreased Soil Fertility	2.31	0.95	Disagree
2	Increased Incidence of Pests and Diseases	2.51	1.05	Agree
3	Climate Change Awareness	2.60	0.86	Agree
4	Soil Quality Assessment	2.75	1.03	Agree
5	Changes in Soil Moisture Levels	2.69	0.99	Agree
	Grand mean	**2.57**	**0.98**	**Agree**

Source: Author's Survey, 2024

Table 1 shows the public awareness and perception of climate change on soil quality in Oyo Metropolis. The results indicated that respondents generally disagreed with decreased soil fertility (2.31 ± 0.95). However, respondents agreed that increased incidence of pests and diseases (2.51 ± 1.05), climate change awareness (2.60 ± 0.86), soil quality assessment (2.75 ± 1.03), and changes in soil moisture levels (2.69 ± 0.99). The grand mean rating was 2.57±0.98 indicating that the respondents generally agreed with the increased incidence of pests and diseases, climate change awareness, soil quality assessment, and changes in soil moisture levels. However, they disagreed with decreased soil fertility. It can be inferred that

integrating pest management (IPM) strategies focus on sustainable pest control methods that minimize environmental impact and improve crop resilience. These methods include biological control, cultural practices, mechanical control, and the judicious use of chemical controls. By implementing IPM, farmers can reduce the reliance on chemical pesticides, which can lead to improved soil quality and reduced environmental degradation. Climate-smart agriculture (CSA) is needed to promote practices which aim to enhance productivity, increase resilience to climate change, and reduce greenhouse gas emissions. Techniques such as conservation agriculture, agroforestry, and the use of drought-resistant crop varieties can help maintain soil moisture levels and improve overall soil health.

Research question 2: What are the impacts of climate change on soil quality?

Table 2: The impacts of climate change on soil quality (∞=80).

S/N	Variable: criterion mean cut-off mark [Mean ≥ 2.50]	Mean	SD	Remark
1	Increased drought frequency	2.59	0.65	Agree
2	Increased flooding	2.64	0.51	Agree
3	Changes in soil water retention	2.53	1.05	Agree
4	Contamination of soil	2.59	0.99	Agree
5	Loss of topsoil	2.42	1.02	Disagree
	Grand mean	**2.55**	**0.84**	**Agree**

Source: Author's Survey, 2024

Table 2 shows the impacts of climate change on soil quality in Oyo Metropolis. The results indicate that respondents generally disagreed with loss of topsoil (2.42 ± 1.02). However, respondents agreed with increased drought frequency (2.59 ± 0.65), increased flooding (2.64 ± 0.51), changes in soil water retention (2.53 ± 1.05), and contamination of soil (2.69 ± 0.99). The grand mean rating was 2.57±0.98 indicating that the respondents generally agreed with the increased drought frequency, increased flooding, changes in soil water retention and contamination of soil. However, they disagreed

with decreased loss of topsoil. It can be inferred that respondents generally disagreed with the assertion that there has been a decreased loss of topsoil. This indicates that soil erosion and the loss of the fertile top layer remain significant concerns.

Research question 3: What are the primary climatic factors influencing soil degradation?

Table 3: The primary climatic factors influencing soil degradation (∞=80).

S/N	Variable: criterion mean cut-off mark [Mean ≥ 2.50]	Mean	SD	Remark
1	Decreased rainfall	2.38	0.97	Disagree
2	Higher temperatures	2.82	0.94	Agree
3	Lower temperatures	2.59	1.05	Agree
4	Prolonged drought periods	2.57	1.01	Agree
5	Stronger winds	2.45	0.95	Disagree
	Grand mean	**2.56**	**0.98**	**Agree**

Source: Author's Survey, 2024

Table 3 shows the primary climatic factors influencing soil degradation in Oyo Metropolis. The results indicate that respondents generally disagreed with decreased rainfall (2.38 ± 0.97) and stronger winds (2.45 ± 0.95). However, respondents agreed with higher temperatures (2.82 ± 0.94), lower temperatures (2.59 ± 1.05), and prolonged drought periods (2.57 ± 1.01). The grand mean rating was 2.56±0.98 indicating that the respondents generally agreed with the decreased rainfall, lower temperatures and prolonged drought periods. However, they disagree with decreased rainfall and stronger winds.

Hypothesis stated that the level of education among residents of Oyo Metropolis is positively correlated with the adoption of sustainable soil management practices

Table 4: Summary of analysis of variance (ANOVA) of difference level of education among residents of Oyo Metropolis with the adoption of sustainable soil management practices.

Variables	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	7.379	3	2.379	9.30	.003
Within Groups	19.456	76	.256		
Total	26.835	79			

Source: Author's Survey, 2024 DF=79 / F= .003, Sig. = Level of significance at $p<0.05$

The result in the table showed the comparative analysis of the level of education among residents of Oyo Metropolis with the adoption of sustainable soil management practices, with an F value of 9.30 and a p-value of 0.003. Since the p-value is less than 0.05, the null hypothesis is therefore rejected. The F value of 9.30 with a p-value of $0.003 < 0.05$ indicates that there is difference in the level of education among residents of Oyo Metropolis with the adoption of sustainable soil management practices. It thus inferred that higher education levels are often associated with increased environmental knowledge, which can lead to more informed and proactive behaviours regarding environmental conservation. This hypothesis suggests that individuals with higher levels of education are more likely to understand the importance of sustainable soil management practices and, therefore, are more likely to adopt such practices.

Discussion

Result from research question one indicating that the respondents generally agreed with the increased incidence of pests and diseases, climate change awareness, soil quality assessment, and changes in soil moisture levels. However, they disagree with decreased soil fertility. It can be inferred that Integrating Pest Management (IPM) strategies focus on sustainable pest control methods that minimize environmental impact and improve crop resilience. These methods include biological control, cultural practices, mechanical control, and

the judicious use of chemical controls. By implementing IPM, farmers can reduce the reliance on chemical pesticides, which can lead to improved soil quality and reduced environmental degradation. Climate-Smart Agriculture (CSA) is needed to promote practices which aim to enhance productivity, increase resilience to climate change, and reduce greenhouse gas emissions. Techniques such as conservation agriculture, agroforestry, and the use of drought-resistant crop varieties can help maintain soil moisture levels and improve overall soil health. This work is in-line with the work of Chauhan and Mahajan (2021) investigated that climate-smart agricultural practices showed significant improvements in soil moisture retention and crop productivity, highlighting the effectiveness of CSA in mitigating climate change impacts. Also, research has shown that IPM practices can significantly reduce pest populations and increase crop yields. A study by Parsa *et al.* (2014) found that IPM reduced pesticide use by 30-50% and increased yields by 10-15% in various crops across different regions.

Result from research question two indicated that the respondents generally agreed with the increased drought frequency, increased flooding, changes in soil water retention and contamination of soil. However, they disagree with decreased loss of topsoil. It can be inferred that respondents generally disagreed with the assertion that there has been a decreased loss of topsoil. This indicates that soil erosion and the loss of the fertile top layer remain significant concerns. This study is in-line with the study of Lal, (2020b) investigated that practice involves minimal soil disturbance, which helps in maintaining soil structure, reducing erosion, and improving water retention is expected to be encouraged. Also, the study of Blanco-Canqui (2021) corroborated planting cover crops during off-seasons can protect the soil from erosion, improve soil fertility, and enhance water retention. Research indicates that cover crops can significantly reduce soil erosion and improve soil health. The study of Barker (2022) corroborated this study that adding organic materials such as compost and manure can improve soil structure, enhance water retention, and provide essential nutrients.

Result from question three indicating that the respondents generally agreed with the decreased rainfall, lower temperatures and

prolonged drought periods. However, they disagree with decreased rainfall and stronger winds. It can be inferred that divergence in opinions highlights a nuanced understanding among the respondents regarding the impact of various climatic factors on soil degradation. The general agreement on prolonged drought periods and lower temperatures suggests recognition of their direct and observable effects on soil health, such as reduced soil moisture and increased soil compaction. Conversely, the disagreement on decreased rainfall and stronger winds indicate a perception that these factors are less influential in their specific locality or human factors. This study is in-line with the study Lal (2020a) which highlighted that conservation agriculture can significantly improve soil organic carbon content, water retention, and overall soil health, making it a resilient practice against prolonged droughts and temperature fluctuations. Also, the study of Adetomiwa and Adeyera (2023) found that conservation agriculture practices can lead to better crop yields and increased resilience to climate variability, particularly in regions experiencing reduced rainfall and temperature extremes.

Result from hypothesis indicated that there is difference in the level of education among residents of Oyo Metropolis with the adoption of sustainable soil management practices. It thus inferred that higher education levels are often associated with increased environmental knowledge, which can lead to more informed and proactive behaviours regarding environmental conservation. This hypothesis suggests that individuals with higher levels of education are more likely to understand the importance of sustainable soil management practices and, therefore, are more likely to adopt such practices. This study is in-line with the study of Adesina and Zinnah, (2022) underscored the correlation between higher education and the adoption of sustainable agricultural practices, emphasizing the role of education in enhancing farmers' understanding and implementation of soil management techniques. Also, the study of Ashraf and Ahmad (2024) demonstrated that targeted educational programs significantly improve the adoption of soil conservation practices among farmers, particularly when these programs are adapted to different educational backgrounds.

Conclusion

The study concluded that climate change's perceptions and impact on soil quality sustainability in Oyo Metropolis revealed that while awareness is increasing, the severity of these impacts varies and that many residents perceived climate change as a significant issue affecting soil fertility, erosion rates, and agricultural productivity. Adaptation strategies include altering agricultural practices and soil conservation, but their effectiveness is influenced by socioeconomic factors and emphasizes the need for improved education, targeted support, and proactive policy interventions.

Recommendations

i. There should be a way of Integrating Pest Management (IPM) combined with climate-smart agricultural practices which can effectively address the increased incidence of pests and diseases, as well as other challenges posed by climate change.
ii. based on the survey findings and recent empirical research, it is recommended to implement integrated soil management practices. There should be practices combine various strategies to enhance soil health and mitigate degradation caused by climatic factors.
iii. there should be adaptive agricultural practices and conservation agriculture techniques to mitigate the effects of prolonged drought and lower temperatures on soil degradation.
iv. Implement targeted educational programs should be taken serious for soil management that are tailored to different educational levels to enhance awareness and adoption of sustainable practices.

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