African Journal Of Agriculture, Nutrition And Hospitality (AJANH)
E-ISSN 3050-2276 (Online); ISSN 3050-2268 (Print)

Indexed by EBSCO and SABINET

Volume 1, Number 2, December 2024

Pp 25-48

Climate Change and Conflict: Understanding the Relationship between Environmental Challenges and Communal Conflicts in OFSP Farming Communities in Southeast Nigeria

DOI: https://doi.org/10.31920/3050-2276/2024/v1n2a2

Chigozirim Ndubuisi Onwusiribe,
Departments of Agribusiness Management and Marketing, Micheal Okpara University of Agriculture, Umudike.
onwusiribe.chigozirim@mouau.edu.ng

Ogbonnaya Ukeh Oteh,
Departments of Agribusiness Management and Marketing, Micheal Okpara University of Agriculture, Umudike.

Ambrose Oloveze,
Departments of Agribusiness Management and Marketing, Micheal Okpara University of Agriculture, Umudike.

Nnanna Mba Agwu,
Departments of Agribusiness Management and Marketing, Micheal Okpara University of Agriculture, Umudike.

Philips Okpo Okore Nto
Departments of Agribusiness Management and Marketing, Micheal Okpara University of Agriculture, Umudike.

&

John Chukwu
Departments of Agribusiness Management and Marketing,
Micheal Okpara University of Agriculture, Umudike.

Abstract

This study examines the complex relationships between climate change, environmental challenges, and communal conflicts in Orange-Fleshed Sweet Potato (OFSP) farming communities in Southeast Nigeria, addressing critical gaps in understanding how climate factors contribute to social tensions in vulnerable agricultural regions. Using a mixed-methods approach, the research combines surveys (n=150), interviews, and focus group discussions across five states. The study reveals a widespread perception of increased conflict, with 95.33% of respondents reporting increased tensions. Climate-related challenges are frequent, with 45.33% of respondents experiencing them "occasionally" and 28.67% "frequently." Thematic analysis identifies changes in weather patterns affecting crop production (59.33%) as the primary cause of conflict. A weak positive correlation (0.2137, $p<0.01$) between climate challenges and conflict perceptions suggests complex mediating factors. Structural equation modelling demonstrates that implementing climate mitigation strategies significantly reduces conflicts (coefficient 0.2145, $p=0.0086$), with strategy effectiveness playing a crucial mediating role. These findings have important implications for climate adaptation policies and conflict resolution strategies in agricultural communities. The study recommends integrated, context-specific approaches addressing environmental and socioeconomic factors to build resilience and promote peace. By providing empirical evidence on the frequency of climate challenges, causes of conflict, and effectiveness of mitigation strategies in OFSP communities, this research offers novel insights into the climate-conflict nexus in a previously understudied agricultural context, contributing to the growing literature on environmental security and sustainable development.

Keywords: *Climate, Conflict, Orange-Fleshed Sweet Potato, Sustainable Development, Adaptation, Livelihood*

Introduction

Climate change poses significant threats to agricultural livelihoods and food security globally, with developing countries like Nigeria facing particularly severe impacts. In Southeast Nigeria, OFSP farming communities are experiencing increasing environmental stresses that may be exacerbating existing socioeconomic tensions. According to Olagunju et al. (2021), climate change has led to human displacement and social

conflicts in Nigeria, with the Middle Belt region being most affected by land resource scarcity and conflicts between farmers and pastoralists. However, there is limited research specifically examining these dynamics in OFSP farming areas of Southeast Nigeria. This study aims to fill that gap by analysing the frequency and impacts of climate-related challenges, investigating the causes of conflict, evaluating the contribution of climate factors, assessing mitigation strategies, and exploring local awareness and perceptions.

The first objective of this research is to analyse the frequency of climate-related challenges and their impact on communal conflicts in OFSP farming communities. Previous studies have highlighted the vulnerability of agricultural systems to climate variability (Olagunju, 2021; Abado, 2022), but there is a lack of quantitative data on how often these communities face environmental stresses and how they relate to conflict incidence. Ikhuoso et al. (2020) found that climate change and agricultural pressures contribute to conflicts between farmers and herdsmen in Nigeria, emphasizing the need for sustainable solutions to ensure food security and reduce conflict. However, their review did not provide specific data on OFSP communities or Southeast Nigeria. This study addresses that gap by quantifying the frequency of climate challenges and statistically analysing their correlation with conflict perceptions.

The second objective investigates the causes of conflict and the role of climate change in exacerbating these issues. While previous research has identified resource competition as a key driver of farmer-herder conflicts in Nigeria (Madu and Chimezie, 2020), the specific dynamics in OFSP farming areas remain understudied. Okoye et al. (2020) highlighted how climate change acts as a "threat multiplier" in West Africa, exacerbating existing tensions, but did not examine the unique context of Southeast Nigerian farming communities. This study conducts a thematic analysis of conflict causes, explicitly considering how climate factors interact with other socioeconomic and cultural tensions. By doing so, it provides a more nuanced understanding of the complex drivers of conflict in this region.

The third objective aims to evaluate the contribution of climate change to conflict dynamics quantitatively. While qualitative links between climate and conflict have been established in Nigeria (Adigun, 2023), there is a lack of statistical analysis quantifying this relationship in Southeast OFSP communities. Ani et al. (2022) found a weak positive correlation between climate challenges and conflict perceptions in

Nigeria broadly but did not focus on the agricultural sector or Southeast region specifically. This study employs regression analysis to determine the extent to which climate-related factors predict conflict occurrence and intensity in OFSP farming areas, addressing a key gap in the quantitative understanding of these dynamics.

The fourth objective assesses the effectiveness of climate change mitigation strategies in reducing conflicts. While adaptation strategies have been shown to increase net farm income for rice farmers in southwest Nigeria (Ojo and Baiyegunhi, 2020), their impact on conflict reduction in OFSP communities remains unclear. Daggash and Mac Dowell (2021) argued that Nigeria could meet its climate commitments without added costs, but did not examine the conflict-reduction potential of mitigation efforts. This study uses structural equation modelling to evaluate how awareness, implementation, and effectiveness of mitigation strategies relate to conflict outcomes, providing valuable insights for policymakers and community leaders.

Finally, the fifth objective explores the awareness and perception of local communities regarding climate change's impact on conflicts. Previous research has emphasized the importance of climate education and knowledge dissemination (Adebisi and Adebisi-Adelani, 2023), but there is limited data on awareness levels in OFSP farming communities specifically. Ojo (2023) found that poor policy awareness contributed to resistance against climate adaptation measures in Nigeria's Middle Belt, highlighting the need for a better understanding of local perceptions. This study addresses that gap by assessing awareness levels and analysing how they relate to conflict perceptions and mitigation efforts in Southeast OFSP communities.

By addressing these five objectives, this research provides a comprehensive analysis of the climate-conflict nexus in a previously understudied agricultural context. The multi-method approach, combining quantitative and qualitative techniques, allows for a nuanced understanding of the complex relationships between environmental challenges, social tensions, and conflict dynamics. The findings have important implications for climate adaptation policies, conflict resolution strategies, and sustainable agricultural development in Southeast Nigeria and beyond.

The study's focus on OFSP farming communities is particularly relevant given the crop's potential for addressing food security and nutritional challenges in sub-Saharan Africa. As climate change threatens traditional agricultural systems, understanding the specific vulnerabilities

and adaptation needs of OFSP farmers is crucial for developing resilient and sustainable food production strategies. Moreover, by examining the links between climate challenges and communal conflicts, this research contributes to the growing body of literature on environmental security and climate-induced migration.

One key strength of this study is its use of a mixed-methods approach, which allows for both statistical analysis of climate-conflict relationships and in-depth exploration of local perceptions and experiences. The combination of surveys, interviews, and focus group discussions provides a rich dataset that captures both quantitative trends and qualitative insights. Additionally, the use of structural equation modelling to assess mitigation strategies offers a sophisticated analysis of the complex pathways through which climate adaptation efforts may influence conflict outcomes.

Literature Review

The relationship between climate change and conflict presents a complex challenge that intersects with both traditional and modern approaches to conflict resolution, particularly in African contexts. Traditional approaches to conflict resolution, especially regarding climate-related resource conflicts, have deep historical roots that continue to offer relevant solutions alongside contemporary methods. In Yoruba-speaking communities of Western Nigeria, traditional techniques including mediation, adjudication, and reconciliation have effectively rebuilt social bridges and maintained societal order (Ajayi & Abdulraheem, 2022).

Recent studies have highlighted the intricate connections between environmental changes and societal tensions, particularly in agricultural communities (Hendrix et al., 2023). Abrahams (2020a) found that environmental pressures create complex spatial challenges across disconnected geographies, leading to resource competition. This is exemplified in Uganda's Karamoja region, where Abrahams (2020b) documented how climate change, combined with changing land use patterns, has contributed to new forms of localized conflicts.

The effectiveness of traditional conflict management is particularly relevant given current climate-related challenges, including farmer-herder conflicts and resource scarcity (Ikhuoso et al., 2020). However, Walwa (2020) demonstrates that while climate change is often cited in official narratives as the primary driver of farmer-herder conflicts, the root causes frequently lie in the marginalization of pastoral community

interests and access to resources. This finding is supported by Jellason et al. (2021), who identified that increasing rainfall variability, soil degradation, and inadequate farming systems can undermine community resilience strategies.

The gradual erosion of traditional methods through Westernization and globalization has potentially contributed to increased ethnic clashes and insurgencies (Aboh et al., 2023). Tarif (2022) identified four key pathways through which climate change contributes to conflict dynamics in West Africa: worsening livelihood conditions, changing migration patterns, tactical considerations by armed groups, and elite exploitation of local grievances. Supporting this complexity, Morrow et al. (2022) found that simple causal explanations are inadequate, noting that 73% of districts with land degradation projects were co-located with active conflict events.

Research suggests that the failure to incorporate traditional community-inclusive approaches has contributed to resistance against modern climate-related policies, such as the Rural Grazing Area (RUGA) settlement policy (Ojo, 2023). Flanery et al. (2022) emphasized this point in their examination of forest governance and conflicts in Cameroon, finding that secure tenure rights and access to rule-making are crucial for successful community-based environmental management.

The role of cultural and spiritual dimensions in addressing climate-related conflicts cannot be overlooked. Tarusarira (2022) highlighted the importance of considering religious-spiritual mechanisms in climate-induced conflicts, arguing that sacred beliefs and practices significantly influence how actors position themselves within conflicts. Furthermore, McFee and Röders (2023) emphasize that effectively addressing climate-related conflicts requires understanding the differential impacts on marginalized populations and recognizing women's potential transformative role in addressing environmental degradation and insecurity.

Methodology

The study was conducted in five states in Southeast Nigeria: Abia, Anambra, Ebonyi, Enugu, and Imo. These states are known for their Orange-Fleshed Sweet Potato (OFSP) farming communities and are experiencing both climate change impacts and communal conflicts (Okpara et al., 2009; Osuji et al., 2023. The coordinates for these states are as follows (Ekwok et al., 2020):

- Abia: 5.4167° N, 7.5000° E
- Anambra: 6.3333° N, 7.0000° E
- Ebonyi: 6.2500° N, 8.0833° E
- Enugu: 6.5000° N, 7.5000° E
- Imo: 5.4800° N, 7.0300° E

The population of the study comprises OFSP farmers in the selected states. To ensure a representative sample, a multi-stage sampling technique was employed to select 150 respondents. This technique involves several stages of selection, moving from larger units to smaller ones.

Table 1: The breakdown of the sampling technique

State	**Local Government Areas (LGAs)**	**Villages**	**Number of Respondents**
Abia	2	3	5
Anambra	2	3	5
Ebonyi	2	3	5
Enugu	2	3	5
Imo	2	3	5
Total	10	30	150

Stage 1: Purposive selection of five states in Southeast Nigeria.Stage 2: Random selection of two LGAs from each state. Stage 3: Random selection of three villages from each selected LGA. Stage 4: Systematic random sampling to select five respondents from each village.
This sampling approach ensures a balanced representation across the study area while maintaining randomness in selection.

***Methods of Data Analysis*:** The study employed a mixed-methods approach, utilizing both quantitative and qualitative data analysis techniques to address the research objectives comprehensively.

1. Frequency and Percentage Analysis: This method was used to analyse the occurrence of climate-related challenges and conflicts in the study area. It provided a clear picture of the prevalence of these issues, addressing the first objective of the study (Burke et al., 2014).
2. Thematic Analysis: Qualitative data collected through interviews and focus group discussions were subjected to thematic analysis (Lochmiller, 2021). This method helped to identify recurring

themes and patterns in the causes of conflict and the perceived role of climate change, addressing the second objective.

3. Correlation Analysis: To explore the relationship between climate-related challenges and conflict frequency (Hsiang et al., 2013), Pearson's correlation coefficient was calculated. This provided insights into the strength and direction of the relationship between these variables.
4. Regression Analysis: Logit regression analysis was employed to quantify the contribution of climate change to conflicts, addressing the third objective (Anugwa et al., 2020). This helped to determine the extent to which climate-related factors predict the occurrence and intensity of conflicts.
5. Structural Equation Modelling (SEM): To evaluate the effectiveness of climate change mitigation strategies in reducing conflicts (fourth objective), SEM is used (Mardani et al., 2020). This advanced statistical technique allows for the examination of complex relationships between multiple variables simultaneously.

Model Specifications: The regression model to quantify the contribution of climate change to conflicts is specified as follows:

$$Y = \beta_0 + \beta_1 X_1 + +\beta_2 X_2 + +\beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where: Y = Conflict intensity score
X_1 = Climate change impact score
X_2 = Resource scarcity index
X_3 = Socio-economic status
X_4 = Mitigation strategy effectiveness
β_0 = Intercept
β_1, β_2, $\beta 3$, β_4 = Regression coefficients
ε = Error term

The SEM model for evaluating the effectiveness of mitigation strategies includes latent variables such as "Climate Change Impact," "Conflict Intensity," and "Mitigation Effectiveness," with observed variables serving as indicators for each latent construct.

Primary data were collected through a structured questionnaire, semi-structured interviews, and focus group discussions. The questionnaire includes both closed-ended and open-ended questions to capture quantitative and qualitative data. It is designed to address all five objectives of the study, including sections on climate-related challenges, conflict experiences, perceived causes of conflict, awareness of climate change impacts, and effectiveness of mitigation strategies.

Semi-structured interviews were conducted with key informants such as community leaders, agricultural extension officers, and local government officials to gain more in-depth insights into the climate-conflict nexus. Focus group discussions were organized in each state to explore community perceptions and experiences collectively.

The research adhered to strict ethical guidelines. Informed consent was obtained from all participants, and their anonymity and confidentiality were ensured throughout the research process. Participation is voluntary, and respondents have the right to withdraw at any stage of the study. Potential limitations of the study include the challenge of establishing direct causal links between climate change and conflicts, as well as the possibility of recall bias in respondents' accounts of past events. To enhance validity, the study triangulated data from multiple sources and employed member checking to verify the accuracy of qualitative findings.

Results

Table 2 presents a stark picture of the perceived increase in conflict within OFSP farming communities in Southeast Nigeria. An overwhelming majority of respondents (95.33%) affirmatively indicated a rise in conflict, a finding that aligns with previous research highlighting the intricate link between climate change and conflict (Ojeh& Solomon, 2021; Adigun, 2023). This pronounced perception underscores the gravity of the situation and necessitates an in-depth exploration of the underlying drivers.

The data suggests a pervasive sense of insecurity among community members. The relatively small percentage of respondents denying an increase in conflict (3.33%) may warrant further investigation to understand the factors influencing their perspective. It is crucial to consider whether these individuals reside in areas less affected by climate change or possess coping mechanisms that mitigate conflict. Additionally, the 'maybe' category (1.33%) indicates a degree of uncertainty or ambivalence, which could reflect complex and nuanced experiences of conflict within the community.

Nevertheless, the findings from Table 2 serve as a critical foundation for understanding the complex dynamics at play in OFSP farming communities. They emphasize the urgent need for comprehensive conflict prevention and mitigation strategies that address the root causes of environmental degradation and its associated social tensions.

Table 2: Perception of increase in conflict

Increase in Conflict	Count	Percentage
Yes	143	95.33%
No	5	3.33%
Maybe	2	1.33%
Total	150	100%

Table 3 provides a quantitative overview of the frequency of climate-related challenges experienced by OFSP farming communities in Southeast Nigeria. The data reveals a concerning trend, with the majority of respondents (45.33%) reporting that they encounter these challenges "occasionally". This suggests a pervasive issue that significantly impacts the livelihoods and well-being of these communities. The relatively high percentage of "frequently" (28.67%) and "rarely" (26.00%) occurrences further underscores the variability and unpredictability of these challenges.

These findings align with previous research highlighting the vulnerability of agricultural communities to climate change (Olagunj, 2021). The frequency of climate-related challenges can act as a stressor on already fragile social and economic systems, potentially exacerbating existing tensions and contributing to communal conflicts (Adigun, 2023). This observation is consistent with Abrahams' (2020b) findings in Uganda's Karamoja region, where climate variability, combined with changing land use patterns, has led to new forms of localized conflicts and intra-household violence.

The interplay between climate variability, resource scarcity, and livelihood insecurity is a complex issue that requires further investigation to fully understand its implications for conflict dynamics in the region (Ojeh & S., 2021). This complexity is emphasized by Tarif (2022), who identified multiple pathways through which climate change affects conflict, including worsening livelihood conditions and changing migration patterns. Furthermore, Jellason et al. (2021) noted that when environmental challenges exceed previously experienced patterns, they can significantly undermine community resilience strategies.

While the data presented in Table 3 offers a preliminary understanding of the issue, Morrow et al. (2022) caution against simple causal explanations, suggesting that the relationship between climate challenges and conflict requires a more nuanced analysis. As highlighted by McFee and Röders (2023), understanding these dynamics necessitates consideration of differential impacts on marginalized populations and the potential for community-led solutions. Further research is necessary to

delve deeper into the specific nature of climate-related challenges, their underlying causes, and their consequences for conflict dynamics in OFSP farming communities, particularly considering Walwa's (2020) observation that official climate-conflict narratives may overlook important factors such as resource access and community marginalization.

Table 3: Frequency of Climate-Related Challenges

Frequency of Climate-Related Challenges	**Count**	**Percentage**
Occasionally	68	45.33%
Frequently	43	28.67%
Rarely	39	26.00%
Total	150	100%

Table 4 provides a critical overview of the thematic analysis of the causes of conflict and the role of climate change in OFSP farming communities in Southeast Nigeria. The results underscore the complex interplay between environmental factors and social tensions.

The most prevalent cause of conflict is linked to changes in weather patterns affecting crop production (59.33%), aligning with previous studies emphasizing the vulnerability of agricultural systems to climate variability (Olagunju, 2021; Abado, 2022). This finding resonates with Jellason et al.'s (2021) research in the Sudano-Sahelian drylands, which identified increasing rainfall variability and soil degradation as critical factors undermining farming communities' resilience strategies. This directly contributes to decreased agricultural productivity (88.67%), a key driver of conflict, as highlighted in the work of Ikhuoso et al. (2020).

Competition over dwindling resources, both land (34%) and water, exacerbates tensions, echoing findings by Madu and Chimezie (2020) on the spatial patterns of climate change and conflict. This aligns with Abrahams' (2020a) identification of complex spatial challenges across disconnected geographies that intensify resource competition. Furthermore, Walwa (2020) emphasizes that while climate change is often cited as the primary driver of such conflicts, the root causes frequently lie in the marginalization of community interests and access to resources.

Furthermore, disputes over land ownership (27.33%) indicate underlying property rights issues aggravated by climate-induced resource scarcity. This observation is supported by Flanery et al.'s (2022) research, which emphasizes the crucial role of secure tenure rights in successful

community-based environmental management. The interconnectivity between these factors is evident, with decreased agricultural productivity leading to intensified competition for land and water, ultimately resulting in conflicts. This complex relationship aligns with Hendrix et al.'s (2023) findings on how violence within societies both increases vulnerability to climate change and exacerbates its human impacts.

The emergence of increased migration due to environmental degradation (16.67%) as a conflict driver is a concerning trend, as it can introduce new dynamics and exacerbate existing tensions within communities. This observation corresponds with Tarif's (2022) identification of changing migration patterns as one of the key pathways through which climate change affects conflict dynamics. As noted by Morrow et al. (2022), these relationships are not simple cause-and-effect scenarios but rather complex interactions involving multiple factors including political crisis, poverty, and institutional weaknesses.

Table 4: thematic analysis of the causes of conflict and the role of climate change

Theme	**Sub-theme**	**Frequency**	**Percentage**
Causes of Conflict			
	Changes in weather patterns affecting crop production	89	59.33%
	Competition over resources (land, water)	51	34.00%
	Disputes over land ownership	41	27.33%
Role of Climate Change in Conflict			
	Decreased agricultural productivity	133	88.67%
	Competition for scarce resources	53	35.33%
	Increased migration due to environmental degradation	25	16.67%

Table 5 presents a correlation coefficient of 0.2137 between the perception of climate-related challenges and the perception of increased conflict in OFSP farming communities in Southeast Nigeria. This indicates a weak positive correlation, statistically significant at the $p < 0.01$ level (Obuzor, 2020). While the relationship is modest, it suggests that as the perception of climate-related challenges increases, so does the perception of heightened conflict within these communities.

This finding aligns with previous research highlighting the intricate link between climate change and conflict. For instance, Nsemba (2022) underscores the role of environmental stressors in exacerbating social tensions. In the context of Southeast Nigeria, where OFSP farming is a primary livelihood, climate change-induced challenges such as erratic rainfall, flooding, and erosion can disrupt agricultural production, leading to economic hardship and resource scarcity (Ikhuoso et al., 2020). These conditions can create fertile ground for conflict as competition intensifies over dwindling resources (Abado, 2022).

Table 5:Correlation coefficient

Correlation Analysis	**Value**
Correlation Coefficient	0.2137
Interpretation	Weak positive correlation
p-value	0.0086
Statistical Significance	Significant at $p < 0.01$

Perception of climate-related challenges: Rarely = 1, Occasionally = 2, Frequently = 3
Perception of increase in conflict: No = 0, Maybe = 0.5, Yes = 1

Table 5 presents the results of a logit regression analysis examining factors influencing the perception of increased conflict among OFSP farming communities in Southeast Nigeria. The model, with an acceptable adjusted R-squared of 0.633, demonstrates that the included variables significantly predict the perception of heightened conflict (F-statistic = 6.1054, $p < 0.0028$).

Crucially, the frequency of climate-related challenges emerges as a significant predictor of perceived conflict escalation ($p = 0.0603$). This finding aligns with previous research suggesting that climate variability and extreme weather events can exacerbate existing tensions and resource scarcity, thereby contributing to conflict (Obuzor, 2020). Abrahams (2020b) supports this observation, demonstrating how climate change, when combined with region-wide changes in land use, contributes to new forms of localized conflicts, including resource-related conflict and intra-household violence. The positive coefficient indicates that as the frequency of climate-related challenges increases, so does the perception of increased conflict, albeit with a relatively weak effect.

Interestingly, while awareness of climate change impacts is included in the model, it does not significantly predict the perception of increased conflict ($p = 0.098$). This result contrasts with studies emphasizing the

role of knowledge and awareness in shaping societal responses to climate change (Ikhuoso et al., 2020). Tarusarira (2022) offers a potential explanation for this discrepancy, suggesting that religion-spiritual mechanisms and sacred beliefs often play a more significant role in how actors position themselves within climate-induced conflicts than formal awareness of climate change impacts.

The findings suggest a complex relationship between climate change, environmental challenges, and conflict perception within OFSP farming communities. This complexity is consistent with Morrow et al.'s (2022) assertion that simple causal explanations are inadequate for understanding climate-conflict dynamics. Furthermore, as highlighted by Tarif (2022), the relationship operates through multiple pathways, including worsening livelihood conditions, changing migration patterns, and elite exploitation of local grievances.

While the frequency of climate-related challenges appears to influence conflict perceptions, the absence of a significant effect on awareness of climate change impacts calls for further investigation into the underlying mechanisms driving this relationship. This aligns with McFee and Röders' (2023) emphasis on understanding differential impacts on marginalized populations and the need for context-specific analysis. Additionally, as Hendrix et al. (2023) note, the relationship between climate change and conflict often creates dangerous feedback loops where violence increases vulnerability to climate change, which in turn exacerbates conflict risks.

Table 5. Logit regression: Factors affecting the perception of increased conflict

Variable	**Coefficient**	**Standard Error**	**t-value**	**p-value**
Intercept	0.8691	0.0524	16.5854	<0.0001
Frequency of climate-related challenges	0.0456	0.0241	1.8922	0.0603
Awareness of climate change impacts	0.0308	0.0185	1.6649	0.098
R-squared	0.763			
Adjusted R-squared	0.633			
F-statistic	6.1054			
p-value	0.0028			

Frequency of climate-related challenges: Rarely = 1, Occasionally = 2, Frequently = 3 Awareness of potential impacts of climate change: Not at all aware = 0, Not very aware = 1, Somewhat aware = 2, Very aware = 3
Perception of increase in conflict No = 0, Maybe = 0.5, Yes = 1

Based on the provided Table 6 and Figure 1, the structural equation modelling (SEM) results reveal important insights into the relationships between climate change mitigation strategies and conflict reduction in OFSP farming communities in Southeast Nigeria.

The SEM path diagram illustrates the interconnected nature of awareness, implementation of strategies, effectiveness, and conflict reduction. The path coefficients and p-values in Table 6 provide statistical evidence for these relationships.

A key finding is the significant direct effect of implementing climate change mitigation strategies on reducing conflicts, with a path coefficient of 0.2145 ($p=0.0086$). This suggests that as communities implement more mitigation strategies, there is a corresponding decrease in conflicts (Okon et al., 2021). However, the relatively modest coefficient indicates that implementation alone does not fully explain conflict reduction.

The model reveals a stronger indirect pathway through the effectiveness of strategies. Implementing strategies has a substantial positive effect on their effectiveness (coefficient 0.3267, $p<0.0001$), which in turn has the strongest direct influence on conflict reduction (coefficient 0.4012, $p<0.0001$). This implies that not just implementing strategies, but ensuring they are effective, is crucial for reducing climate-related conflicts (Daggash& Mac Dowell, 2021).

Awareness plays an important role as well, with significant positive effects on both implementation (coefficient 0.1856, $p=0.0231$) and effectiveness of strategies (coefficient 0.2367, $p=0.0036$). This underscores the importance of climate change education and knowledge dissemination in communities (Adebisi & Adebisi-Adelani, 2023).

The model also shows sizeable residual variances (depicted by the curved arrows in Figure 2) for each variable, indicating that factors outside the model also influence these outcomes. For instance, the 1.20 residual variance for conflict reduction suggests other important determinants beyond the modelled climate change mitigation factors (Ikhuoso et al., 2020).

These findings align with previous research highlighting the complex, multi-faceted nature of climate-conflict relationships. As Olabisi et al. (2021) note, effective climate change adaptation requires building

resilience to various external drivers. The indirect pathways revealed in this model support the notion that climate acts as a "threat multiplier," affecting conflict through multiple mechanisms (Pacillo et al., 2022).

The results also resonate with studies emphasizing the need for context-specific, participatory approaches to climate adaptation. The significant role of awareness and strategy effectiveness underscores the importance of involving local stakeholders in developing and implementing climate mitigation measures (Ojo & Baiyegunhi, 2020).

This SEM analysis provides valuable insights into the dynamics of climate change mitigation and conflict reduction in Southeast Nigerian farming communities. It highlights the interconnected nature of awareness, implementation, effectiveness, and conflict outcomes, while also pointing to the complexity of these relationships and the need for comprehensive approaches to address climate-related conflicts.

Table 6: Climate Change Mitigation Strategies and Conflict Reduction

Path	Coefficient	p-value
Implementing Strategies ← Reduction in Conflicts	0.2145	0.0086
Effectiveness of Strategies ←Implementing Strategies	0.3267	0.0001
Awareness ← Reduction in Conflicts	0.1856	0.0231
Effectiveness of Strategies← Awareness	0.2367	0.0036

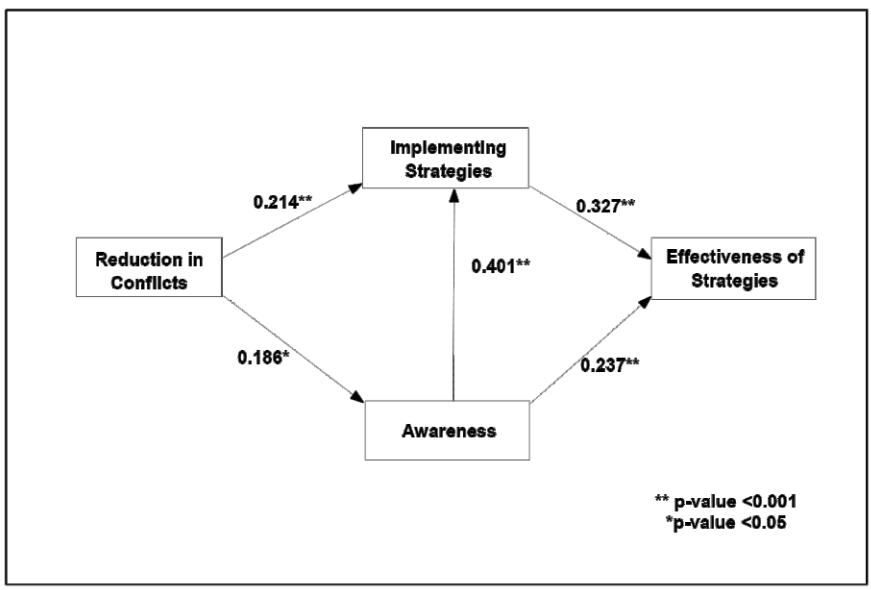

Figure 1: SEM Path Diagram: Climate Change Mitigation Strategies and Conflict Reduction

Discussion

The research findings reveal a complex and concerning relationship between climate change and communal conflicts in Orange-Fleshed Sweet Potato (OFSP) farming communities of Southeast Nigeria. The data presents compelling evidence of how environmental challenges are reshaping social dynamics and agricultural practices, while simultaneously highlighting the intricate nature of conflict resolution in these communities.

One of the most striking findings is the overwhelming perception of increased conflict, with 95.33% of respondents reporting a rise in tensions. This stark statistic underscores the severity of the situation and suggests a significant transformation in community relations. The research establishes a weak but statistically significant positive correlation (0.2137, $p<0.01$) between climate-related challenges and conflict perceptions, indicating that while climate change contributes to conflict, the relationship is more nuanced than simple causation would suggest.

The impact of climate change on agricultural productivity emerges as a primary concern. Changes in weather patterns affecting crop production were identified by 59.33% of respondents as a major cause of conflict, while an overwhelming 88.67% reported decreased agricultural productivity. As noted in the findings, "erratic rainfall, flooding, and erosion can disrupt agricultural production, leading to economic hardship and resource scarcity" (Ikhuoso et al., 2020). This agricultural stress creates a cascade effect, intensifying competition for increasingly scarce resources.

Resource competition has become a critical flashpoint, with 34% of respondents reporting conflicts over land and water resources. This finding aligns with Walwa's (2020) observation that while climate change is often cited as the primary driver of conflicts, the underlying issues often relate to "marginalization of community interests and access to resources." The research also reveals that 27.33% of disputes involve land ownership, supporting Flanery et al.'s (2022) emphasis on "the crucial role of secure tenure rights in successful community-based environmental management."

Environmental migration has emerged as a significant consequence of these challenges, with 16.67% of respondents reporting increased migration due to environmental degradation. This observation supports Tarif's (2022) identification of "changing migration patterns as one of the key pathways through which climate change affects conflict dynamics."

The movement of people in response to environmental stress introduces new pressures on community resources and social structures, potentially exacerbating existing tensions.

The frequency of climate-related challenges presents a concerning pattern, with 45.33% of respondents experiencing these challenges "occasionally" and 28.67% facing them "frequently." This persistent environmental stress creates a continuous burden on community resilience and adaptive capacity. As Morrow et al. (2022) note, these relationships involve "multiple factors including political crisis, poverty, and institutional weaknesses," suggesting the need for comprehensive approaches to conflict resolution.

However, the research also reveals promising findings regarding mitigation strategies. The structural equation modelling demonstrates that implementing climate change mitigation strategies has a significant direct effect on reducing conflicts (coefficient 0.2145, $p=0.0086$), with strategy effectiveness playing an even stronger role (coefficient 0.4012, $p<0.0001$). This suggests that well-designed and effectively implemented adaptation measures can contribute meaningfully to conflict reduction.

The role of awareness emerges as crucial, with significant positive effects on both implementation (coefficient 0.1856, $p=0.0231$) and effectiveness of strategies (coefficient 0.2367, $p=0.0036$). This underscores the importance of climate education and knowledge dissemination in communities, as highlighted by Adebisi and Adebisi-Adelani (2023). However, the substantial residual variances in the SEM model (1.20 for conflict reduction) indicate that factors beyond climate change mitigation significantly influence conflict outcomes.

These findings collectively suggest that addressing climate-related conflicts in OFSP farming communities requires a multi-faceted approach. First, there is a clear need for strengthening property rights and resource access mechanisms to reduce tensions over land ownership and resource competition. Second, climate education and awareness programs should be enhanced to improve the implementation and effectiveness of mitigation strategies. Third, community-based adaptation strategies should be developed with strong local participation to ensure their relevance and sustainability.

The research makes a significant contribution to understanding the climate-conflict nexus in Southeast Nigerian OFSP farming communities. However, it also highlights the need for more comprehensive, context-specific approaches to address these challenges effectively. As communities continue to face environmental pressures,

the development of integrated solutions that address both climate change impacts and social tensions becomes increasingly crucial. Success in this endeavour will require careful attention to local contexts, strong community participation, and the recognition that environmental and social challenges are inextricably linked.

Conclusion

This study provides a comprehensive examination of the complex relationships between climate change, environmental challenges, and communal conflicts in Orange-Fleshed Sweet Potato (OFSP) farming communities in Southeast Nigeria. The findings underscore the multifaceted nature of climate-related conflicts and the urgent need for integrated approaches to address both environmental and socioeconomic factors in building resilient and peaceful communities.

The research reveals a widespread perception of increased conflict within OFSP farming communities, with a significant majority of respondents reporting a rise in tensions. This perception is coupled with frequent experiences of climate-related challenges, highlighting the vulnerability of these agricultural communities to environmental stressors. The study's thematic analysis illuminates the intricate connections between climate change impacts, agricultural productivity, resource competition, and conflict, providing a nuanced understanding of the drivers of social tension in the region.

While the correlation between climate-related challenges and conflict perceptions was found to be statistically significant, its modest strength suggests that the relationship is complex and likely mediated by other factors. This finding emphasizes the need for comprehensive conflict resolution strategies that address not only environmental issues but also underlying socioeconomic and cultural tensions.

The evaluation of climate change mitigation strategies offers promising insights for policy and practice. The significant direct and indirect effects of implementing and ensuring the effectiveness of these strategies on conflict reduction highlight the potential of well-designed climate adaptation measures in addressing social tensions. This underscores the importance of not just implementing strategies, but also ensuring their effectiveness and relevance to community needs.

However, the study also reveals challenges in translating climate change awareness into conflict reduction, suggesting the need for more targeted education and engagement approaches. This finding points to

the importance of context-specific, participatory approaches to climate adaptation that involve local stakeholders in developing and implementing mitigation measures.

While this research provides valuable insights, it is important to acknowledge its limitations, including its cross-sectional nature and focus on a specific region. Future studies could benefit from longitudinal designs and comparative analyses across different agricultural contexts to further elucidate the dynamics of climate-related conflicts.

Therefore, this study makes a significant contribution to our understanding of the climate-conflict nexus in agricultural communities. By providing empirical evidence on the frequency of climate challenges, causes of conflict, effectiveness of mitigation strategies, and local perceptions, it offers valuable insights for policymakers, development practitioners, and researchers. The findings underscore the need for integrated, context-specific approaches that address both environmental and socioeconomic factors in building resilient and peaceful communities in the face of climate change. As climate impacts continue to intensify, such nuanced understandings will be crucial for developing effective strategies to promote sustainable development and social harmony in vulnerable agricultural regions.

Acknowledgement

We would like to acknowledge the Tertiary Education Trust Fund (2023) for providing funding support for this research project.

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