

# Understanding Herder–Farmer Conflicts in Delta State, Nigeria: A Political Ecology and Livelihood Vulnerability Perspective

Comprendiendo los conflictos entre pastores y agricultores en el estado de Delta, Nigeria: una perspectiva de ecología política y vulnerabilidad de los medios de subsistencia

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## ABSTRACT

This research examines the causes of herder-farmer conflicts in Delta State, as well as their socioeconomic impacts and effects on relationships, employing a mixed-methods convergent parallel design. Data were gathered from 396 survey respondents and 30 key informants in three conflict-prone Local Government Areas. The results indicate considerable spatial variation in the levels of conflict, with Isoko North found to have experienced the greatest levels of conflict, resulting from land scarcity and environmental degradation. Conflict prevalence was found to be a strong predictor of economic disruption ( $\beta=.68$ ), while there was a strong correlation with food insecurity ( $r=.53$ ) and moderate correlation with social cohesion breakdown ( $r=.44$ ). Qualitative accounting indicated a decline in harvests, disruption of rural markets, interruptions to education and constraints on women's labor and mobility. Communities were found to be relying upon vigilante groups, such as trustbusters, while at the same time little confidence was placed in formal peacebuilding structures, pointing to institutional weakness. Our findings support the view of established political ecology and livelihood vulnerability perspectives, through which such conflicts are interpreted as structurally rooted and ecologically mediated, demonstrating the need for enhanced land governance measures and adaptive development strategies.

**Keywords:** Herder-farmer conflict, community development, rural livelihood, Delta State, agro-pastoralism

## RESUMEN

Esta investigación examina las causas de los conflictos entre pastores y agricultores en el estado de Delta, así como sus impactos socioeconómicos y efectos en las relaciones, empleando un diseño paralelo convergente de métodos mixtos. Se recopilaron datos de 396 encuestados y 30 informantes clave en tres áreas de gobierno local propensas a conflictos. Los resultados indican una considerable variación espacial en los niveles de conflicto, y se observa que Isoko Norte registró los niveles más altos, debido a la escasez de tierras y la degradación ambiental. Se encontró que la prevalencia del conflicto es un fuerte predictor de la perturbación económica ( $\beta=.68$ ), mientras que se apreció una fuerte correlación con la inseguridad alimentaria ( $r=.53$ ) y una correlación moderada con la ruptura de la cohesión social ( $r=.44$ ). El análisis cualitativo indicó una disminución en las cosechas, la interrupción de los mercados rurales, la interrupción de la educación y las limitaciones al trabajo y la movilidad de las mujeres. Se halló que las comunidades dependían de grupos de autodefensa, como los que luchan contra los monopolios, mientras que, al mismo tiempo, se depositaba poca confianza en las estructuras formales de consolidación de la paz, lo que apunta a una debilidad institucional. Nuestros hallazgos respaldan la visión de las perspectivas establecidas sobre la ecología política y la vulnerabilidad de los medios de subsistencia, que interpretan estos conflictos como estructuralmente arraigados y ecológicamente mediados, lo que evidencia la necesidad de mejorar las medidas de gobernanza de la tierra y las estrategias de desarrollo adaptativo.

**Palabras clave:** conflicto entre pastores y agricultores, desarrollo comunitario, medios de subsistencia rurales, estado del Delta, agropastoreo



## 1. Introduction

Recurring conflict between pastoral herders and crop farmers has become one of Nigeria's most persistent socioeconomic and political challenges, with far-reaching implications for rural livelihoods, agricultural sustainability and community development. Globally, competition for natural resources is widely recognized as a key factor in rural instability, particularly where land-based livelihoods, such as farming and pastoralism, intersect with ecological stress and weak governance structures (Setrana and Adzande, 2022; Nassef *et al.*, 2023). In Nigeria, the intensification in recent decades of the herder-farmer conflict is a result of the convergence of three factors: environmental degradation, population pressure and institutional fragility. While much of the literature has concerned the northern and middle belt regions, emerging evidence suggests that southern states, including Delta State, are increasingly affected by land competition, seasonal grazing shortages and population growth, while at the same time remaining comparatively under-examined (Dangusau, 2020; Okeke and Nnamani, 2023). Given Delta State's predominantly rural character and the predominance of its reliance upon land and water resources, it constitutes an important context for analysis of the consequences of development arising from such conflicts.

Agriculture remains central to Nigeria's economy, employing a large proportion of the population and supporting food security (Nwozor, 2023; Bello *et al.*, 2024). Disruptions to the agricultural sector directly impact household wellbeing, food security, rural markets and development, with herder-farmer conflicts resulting in crop destruction, population displacement, market disruptions and increased food insecurity. In Delta State, studies have shown significant loss of farmland, declining incomes and worsening social relations in the wake of violence (Oghuvbu, 2021; Asaju and Kwakano, 2025). Similar issues are experienced across Africa, with conflicts in Kenya and Tanzania leading to food insecurity and displacement, while a combination of desertification and migration from the north has increased land competition in the Sahel. Even in regions with stronger institutions, such as Spain and the United States, herder-farmer tensions exist, although in these contexts they tend to be managed through official government intervention (Menor de Gaspar López *et al.*, 2024). Nevertheless, these examples highlight the widespread nature of such conflict, as well as the crucial role played by institutional capacity.

In Delta State, the socioeconomic impacts of herder-farmer conflict situations are multidimensional and unevenly distributed. Crop farmers, who constitute the majority of the rural working population, directly experience loss of livelihood, through crop destruction, resulting in income losses that exacerbate household vulnerability and food insecurity. For their part,

pastoralists are affected by reduced mobility and limited access to grazing resources (Adebajo, 2022). In terms of livelihood, conflicts produce broader social externalities. The gendered consequences of rural conflict are well documented, as women often experience increased domestic workloads, reduced mobility and greater exposure to food insecurity during periods of instability (Ryan, 2022; Sarker *et al.*, 2025). Recurring incidents of violence also breed distrust of community governance institutions, thereby undermining informal conflict resolution mechanisms and the collective action necessary for sustainable community development (Chávez-Miguel *et al.*, 2022). These outcomes demonstrate how herder-farmer conflicts impose structural limitations upon rural development.

The nature of the herder-farmer conflict in Delta State is complex, interrelated and shaped by environmental stressors, demographic pressures and institutional weakness. Competition for land and water resources has been exacerbated by environmental stresses, including soil erosion, reduced cultivable land area and climate-related displacement in northern Nigeria (Egbule and Okonta, 2024). At the same time, high population growth and agricultural expansion exert further pressure on available land, while in the face of ineffective land tenure systems and institutions incapable of resolving conflict, in many cases minor conflicts escalate into prolonged violence (Bakhtiari, 2025). Similar trends are evident in Ethiopia and Niger, where climate-driven changes in livelihood and limited state intervention have heightened tensions between pastoralists and farmers (Ntumva, 2022; Wangui, 2024). Such processes can be interpreted through a combination of complementary theoretical approaches. These include political ecology, with its focus on power asymmetry, governance gaps and institutional failure (Iduma, 2021); and livelihood and vulnerability theory, with its emphasis on sensitivity to climate and the deteriorating adaptive capacity of populations dependent upon natural resources (Hertel *et al.*, 2021; Sarker, 2023).

While a number of articles have sought to address such issues, significant gaps remain. Empirical, theory-based research on the southern part of Nigeria, particularly Delta State, remains scarce and diffuse, with existing literature mostly focused on the northern and Middle Belt regions. There is also a tendency in the existing literature to address security outcomes in isolation from livelihood vulnerability, while rarely combining the political ecology and livelihood vulnerability perspectives. Such lack of integration leads to a failure to produce a clear understanding of the interactions between power relations, institutional capacity and adaptive strategies. In addition, the documentation of micro-level household experiences, gender and occupational effects and community coping mechanisms remains insufficient. As a result, to date the links between environmental stress, governance systems and livelihood resilience

in the context of conflicts in Delta State have not been systematically conceptualized or empirically elucidated.

Based on these perceptions, in this study we integrated four analytical lenses within the conceptual framework: political ecology, livelihood vulnerability, resource scarcity and socioeconomic impacts (Iduma, 2021; Hertel *et al.*, 2021; Sarker, 2023). This combination reflects the multidimensional nature of both the causation and impact of herder-farmer conflict in Delta State. Political ecology offers a structural explanation that brings to the fore the failures of governance, historical land-tenure disparities and the unequal distribution of power that have determined pastoral mobility and access to local resources. Environmental forces that interact with political-institutional forces include desertification, land degradation and changes in rainfall patterns. These forces add complexity to competition for land, grazing paths, water sources and farmland. The livelihood and vulnerability lens examines how these pressures translate into diverse effects on communities. Loss of crops, the depletion of herds, displacement, food insecurity and social burdens impact to a varying degree farmers, pastoralists, women and the young. The impacts of such livelihood shocks are far-reaching, including market disruptions, increases in food prices, fissures in social cohesion and development setbacks. Such consequences also contribute to insecurity and vulnerability.

The context-specific explanation given in this study provides a comprehensive account of the situation in Delta State. It links structural power relations to household-level livelihood outcomes and documents differentiated community experiences and locally based adaptation responses. The paper offers a critical examination of the impact of the herder-farmer conflict on community development in Delta State, with a particular focus on agricultural productivity, rural livelihoods, social cohesion, local governance and community-level adaptation strategies.

## 2. Materials and methods

### 2.1. Study area

The study was conducted in three Local Government Areas (LGAs) of Delta State, namely Isoko North (5.72°N, 6.22°E), Ughelli North (5.53°N, 6.07°E) and Ukwani (5.02°N, 6.15°E). These locations were chosen deliberately to represent the political ecology and resource scarcity dimensions of the conceptual framework, in the context of reported herder-farmer conflicts, high population densities and intensive agricultural activity. The region has a humid tropical climate with a wet and a dry season, and environmental pressures, such as soil degradation, rapid land-use conversion and seasonal pasture scarcity increase competition for land for cultivation. The ecological and socio-political realities present in these LGAs constitute a

conflict-prone agrarian landscape in the southern part of Nigeria (Nwankwo, 2022).

### 2.2. Research design

A mixed-methods approach using a convergent parallel design was adopted, in order to allow for the quantitative and qualitative data to be collected and analyzed in parallel. This design enhances internal validity by combining narratives associated with the structural drivers (political ecology), ecological pressures (resource scarcity), conflict manifestations (conflict dynamics), and livelihood implications (vulnerability and resilience) (Morales-Munoz *et al.*, 2020). Quantitative and qualitative datasets were analyzed separately and combined for interpretation purposes, to enable convergence, complementarity and triangulation.

### 2.3. Target population and sampling procedures

The study population comprised farmers, herders, traders, civil servants and other residents in the selected LGAs. A stratified sampling technique was employed, in order to guarantee equal representation across gender, age, occupation and locality (in accordance with the care for differential vulnerability aspect of the conceptual framework). A total of 396 respondents were involved in the survey (Table 1). For the qualitative component, 30 key informants were purposively sampled using criterion-based sampling, including traditional leaders, women leaders, farmers, herders and local government officials with direct knowledge of the conflict dynamics.

**Table 1.** Sampling Distribution of Respondents by LGA, Gender and Occupation (N = 396)

LGA	Gender	Farmers	Traders	Civil Servants	Others	Total
Isoko North	Male	60	20	15	5	100
	Female	45	10	10	5	70
Ughelli North	Male	35	10	10	5	60
	Female	30	10	5	5	50
Ukwani	Male	25	10	10	5	50
	Female	22	6	8	5	41
Total		217	86	63	30	396

### 2.4. Data collection instruments

#### 2.4.1. Quantitative instrument

A formal questionnaire was used to collect demographic information, perceived prevalence of conflicts, environmental stress-inducing factors, socioeconomic effects and accommodation measures used by households. Items on land scarcity, grazing pressures and ecological degradation operationalized the resource scarcity construct. Likert-scale items



measured conflict intensity (conflict dynamics), and items related to livelihood loss and food insecurity measured vulnerability. Household coping and adaptation indicators were measured in order to assess resilience. Internal consistency, as measured by Cronbach's alpha, was 0.84 prior to testing. Although Likert-scale items yield ordinal responses, the composite scores in this study were treated as approximately continuous, given that they were based on several item constructs and possessed satisfactory reliability. The use of parametric statistics with aggregated Likert scales is not controversial in social science research when the scale scores contain more than five categories, and the sample size is sufficient (Norman, 2010; Sullivan and Artino, 2013).

#### 2.4.2. Qualitative instrument

Semi-structured interviews of 30-60 min duration were conducted to investigate governance mechanisms, land-use conflicts, pressures of migration (political ecology), environmental stressors (resource scarcity), experiences of conflict (dynamics), socioeconomic consequences of conflict (vulnerability) and coping mechanisms (resilience). The interviews were audio-recorded with informed consent and transcribed verbatim. However, each conceptual framework component was converted into measurable variables and indicators, in order to inform the design of the quantitative questionnaire and qualitative interview guide. These operational definitions were used to ensure theoretical alignment during data collection.

### 2.5. Data analysis

#### 2.5.1. Quantitative analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 28. The characteristics of respondents and conflict perceptions were summarized using descriptive statistics. Inferential analyses (including Chi-square tests, one-way analysis of variance, Pearson correlations and multiple regression) were conducted in order to investigate the relationships between LGA, occupation, environmental stressors, conflict prevalence and socioeconomic outcomes. These analyses provided empirical tests of linkages specified in the conceptual framework, including ecological stress conflict pathways, and links to conflict intensities and livelihood disruption.

Since the variables under analysis were composite Likert-scale indices, parametric tests were used, as evidence indicates that such tests are robust to non-normality in large scale samples (Norman, 2010). Before

conducting the inferential analysis, assumptions of normality, linearity and homoscedasticity were tested using residual plots and standardized residual diagnostics. In the multiple regression model, categorical predictors were coded. The reference categories were female (gender) and civil servants (occupation). The Variance Inflation Factor ( $VIF < 5$ ) was used to determine multicollinearity. The Durbin-Watson statistic was used to test residual independence and the residual plots were used to test normality and homoscedasticity. None of these regression assumptions were violated.

#### 2.5.2. Qualitative analysis

The interview transcripts were analyzed using thematic analysis, in accordance with the Naeem *et al.* (2023) six-step procedure. Codes and themes were informed deductively by the conceptual framework and inductively worked on in order to capture emergent patterns. The themes portrayed management and institutional inadequacies (political ecology), environmental forces (resource scarcity), conflict antecedents (conflict dynamics), livelihood shocks (vulnerability) and reactions to resilience (resilience).

### 2.6. Data integration ethical considerations

In accordance with the convergent design, the quantitative and qualitative results were brought together through a triangulation protocol, in order to deepen interpretation and establish methodological convergence. Ethical approval was obtained from relevant institutional committees, and informed consent was obtained from all the participants. Confidentiality, voluntary participation and anonymity protocols were maintained throughout the study.

## 3. Results

### 3.1. Demographic characteristics of respondents

A total of 396 valid responses were analyzed. The demographic characteristics are summarized in Figure 1. 58.6 per cent of the sample were male, and 41.4 per cent were female. The dominant age group was 31-45 years (47.2%), followed by 18-30 years (29.5%), 46-60 years (18.2%) and 60+ years (5.1%). Educational levels were mixed: 39.6% had secondary education and 33.3% had tertiary education. Farmers constituted the largest occupational group (54.8%), followed by traders (21.7%), civil servants (15.9%) and others (7.6%). This demographic structure reflects the agrarian makeup and socioeconomic diversity of the study areas.

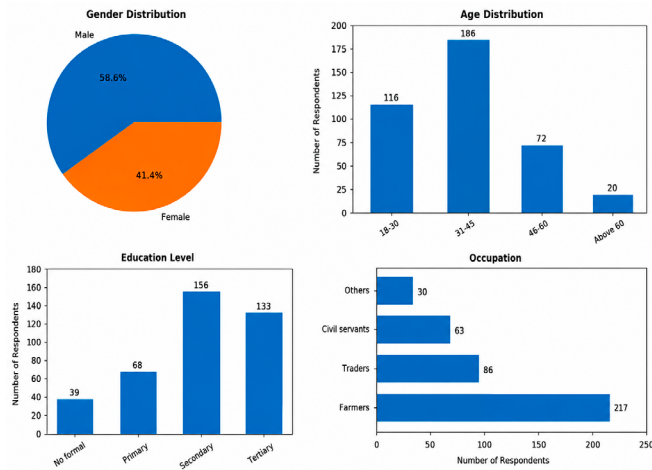


Figure 1. Demographic Characteristics of Respondents (N = 396)

### 3.2 Perceived prevalence and patterns of herder–farmer conflicts

As shown in Figure 2, perceived conflict prevalence varies across the three LGAs. Isoko North recorded the highest mean prevalence ( $M=4.32$ ,  $SD=0.74$ ), followed by Ughelli North ( $M=4.15$ ,  $SD=0.81$ ), while Ukwani exhibited a slightly lower prevalence ( $M=3.96$ ,  $SD=0.89$ ). These findings indicate spatial variation in perceived conflict prevalence across the LGAs.

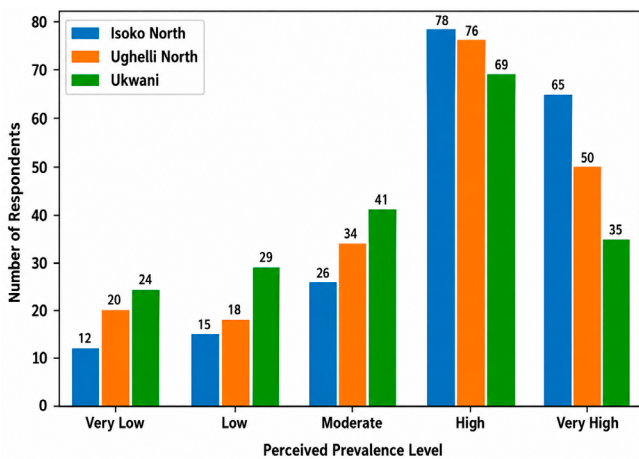


Figure 2. Perceived Prevalence of Herder–Farmer Conflicts Across LGAs

The findings from the qualitative interviews reinforced these patterns. Participants identified conflict triggers as encroachment on grazing routes, and competition for land and ecological pressures associated with the drought conditions in the north. As one herder put it: «When the pastures are dried up in the north, we will have to move to the south and conflicts start when cows eat crops» (P3). In their comments, farmers indicated that: «Farmland is scarce now, and every space is disputed» (P2).

### 3.3. Inferential analysis of conflict predictors

#### 3.3.1. Chi-square test

Figure 3 shows the trend in the association between occupation and perception of the prevalence of conflict. The residuals are spread across a variety of occupational categories, indicating that deviations from expected responses are not confined to one type of livelihood but are distributed across various groups of occupational categories. The relationship is statistically significant, but the spread of the residuals and the rather small size of the deviations imply a weak association. This suggests that perceived exposure to herder–farmer conflict is widely distributed across the community, and that occupation plays only a limited role in the differences in perception. It would seem, therefore, that differences in conflict awareness are more of a community-wide issue than an occupational one.

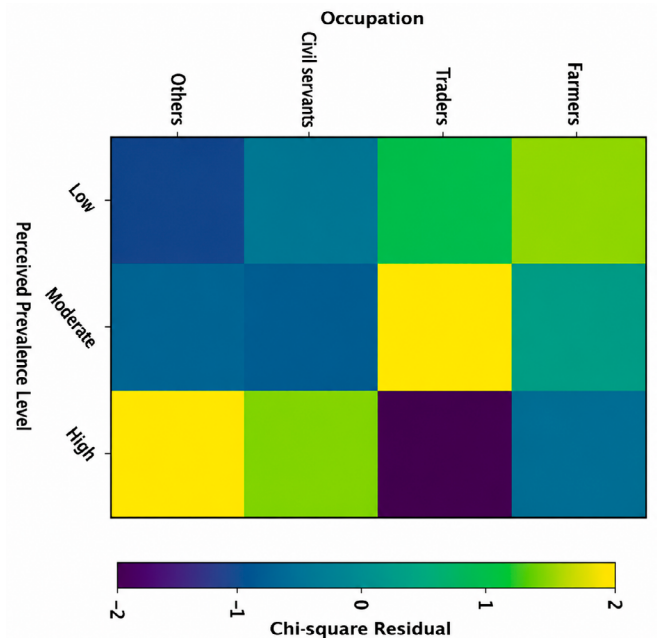


Figure 3. Chi-Square Test of Independence

#### 3.3.2. One-way ANOVA across LGAs

Figure 4 shows the effect size ( $\eta^2$ ) calculated using a one-way ANOVA to compare perceived conflict prevalence across the Local Government Areas. The effect size ( $\eta^2 = .060$ ) indicates that location accounts for about 6% of the variance in perceived conflict prevalence, suggesting a modest spatial influence. The outcome demonstrates that the perceived prevalence of conflict varies between the LGAs, but that the level of difference is moderate.



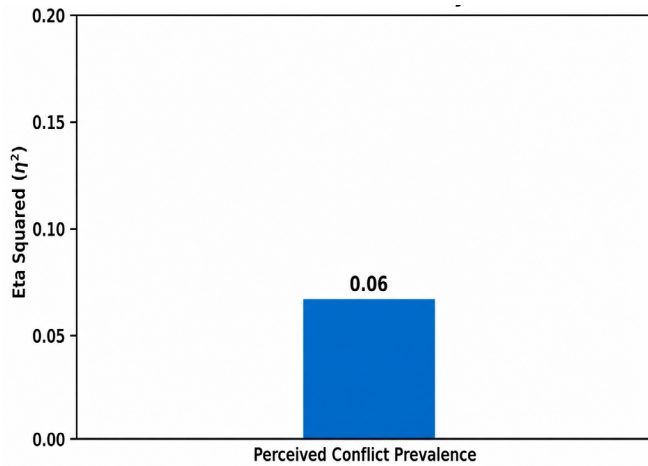


Figure 4. One-Way ANOVA Results for Perceived Conflict Prevalence

### 3.3.3 Multiple regression analysis

Multiple regression was conducted in order to test predictors of economic disruption (Table 5). The most important predictor was conflict prevalence ( $\beta = .68, p < .001$ ), indicating that greater perceived conflict intensity was associated with greater economic disruption. Gender was also influential ( $\beta = .09, p = .023$ ), with a minor difference in the disruption reported by males. Occupational categories did not play an important role in predicting economic disruption. The model explained approximately 56% of the variance in economic disruption ( $R^2 = .56$ ), indicating that perceived conflict prevalence among respondents is strongly associated with livelihood disruption.

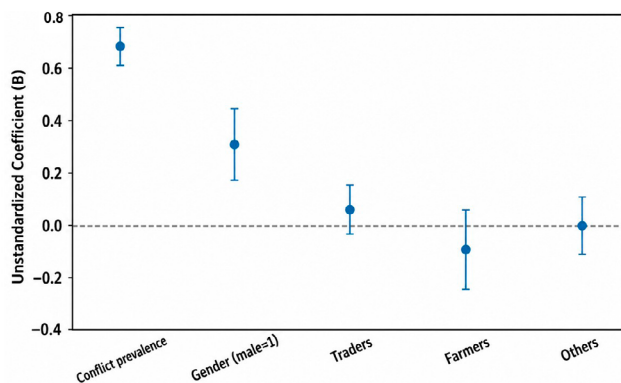


Figure 5. Multiple Regression Predicting Perceived Economic Disruption

### 3.3.4 Pearson correlation analysis

Food insecurity positively correlated (Figure 6) with conflict prevalence ( $r = .53, p < .001$ ), economic disruption ( $r = .49, p < .001$ ) and social cohesion breakdown ( $r = .44, p < .001$ ). These mixed associations imply that economic and social effects do not occur independently, but are instead both concurrent. These associations are in line with the socioeconomic vulnerability pathways theories in the conceptual framework, showing that increased perceived

conflict rates are associated with extended livelihood and social difficulties among the respondents.

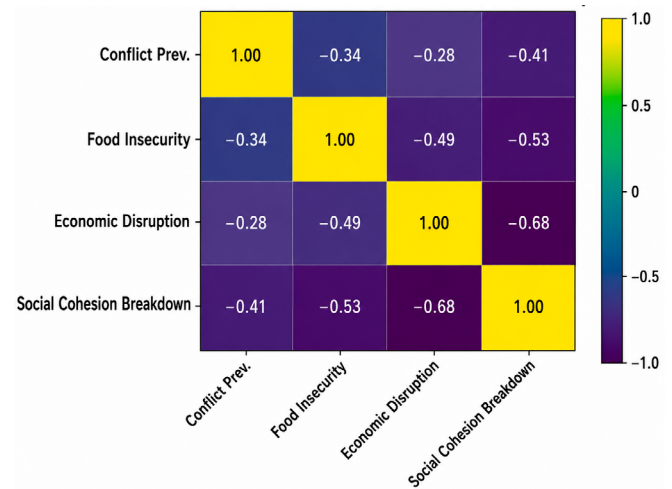


Figure 6. Pearson Correlations Between Conflict Prevalence and Development Outcomes

### 3.4. Socioeconomic impacts of herder–farmer conflicts

The perceptions of respondents regarding development related impacts are summarized in Figure 7. Economic disruption had the highest mean score ( $M = 4.41, SD = 0.67$ ), followed by lower agricultural yield ( $M = 4.28, SD = 0.72$ ), food insecurity ( $M = 4.21, SD = 0.76$ ), displacement ( $M = 4.11, SD = 0.83$ ) and breakdown of social cohesion ( $M = 4.09, SD = 0.84$ ). According to these results, perceived levels of economic, agricultural, and social impacts are high among the respondents.

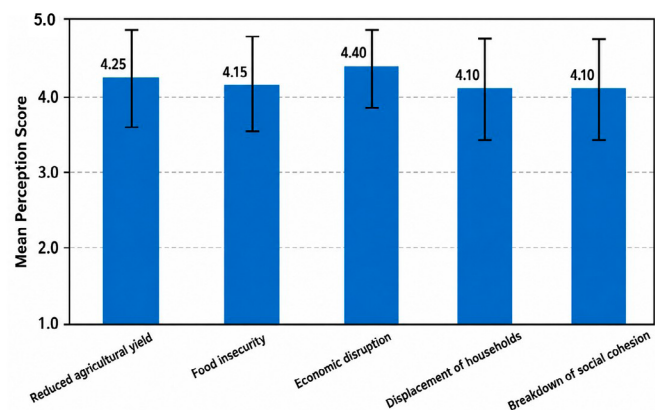


Figure 7. Perceived Socioeconomic Impacts of Herder–Farmer Conflicts

These findings were put into perspective through qualitative accounts, including farmers' reports that «there are significant crop losses, especially of cassava and maize» (P1). Traders reported «low levels of market activity and falling food prices» (P10). Civil servants described «disruptions to schooling», while women reported that «the burden of labor is associated with

water availability and the migration of households to seek safety» (P4).

### 3.5. Gendered dimensions of conflict impacts

The role of gender on economic disruption was significant ( $\beta = .09, p = .023$ ), as indicated in the multiple regression analysis (Section 4.3.3). In the quantitative outcomes, male respondents recorded higher scores for economic disruption whereas, according to the qualitative answers received, women sustained more domestic labor disruptions and constraints on movement. One female respondent reported: «The workload is further intensified, since women are forced to walk longer distances to acquire water and food in case the families move to safer places» (P4). Rather than reflecting overall exposure, these results show that gender groups experience different effects of conflict.

### 3.6. Coping strategies and community-level responses

Figure 8 presents the frequency of coping strategies employed by affected households. Formation of vigilante groups was the most common strategy adopted ( $M = 4.02, SD = 0.88$ ), followed by appeals to local government ( $M = 3.84, SD = 0.91$ ), seasonal farm migration ( $M = 3.67, SD = 0.95$ ) and direct negotiation with herders ( $M = 3.42, SD = 1.01$ ).

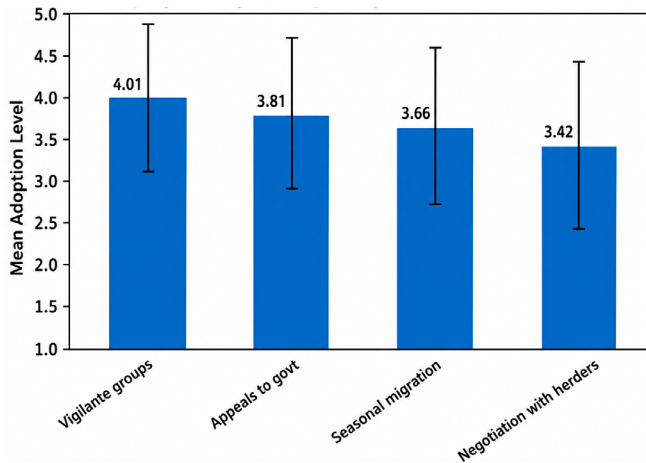


Figure 8. Coping Strategies Adopted by Affected Communities (N = 396)

Interview narratives indicated that vigilante groups were filling gaps in security where formal responses to insecurity were inadequate: Security personnel stated that «they lack vehicles, and sometimes they arrive too late» (P6). Some households reported that «the only way to cope is to diversify sources of income, such as women doing petty trade or some small-scale processing activities» (P4). These findings indicate the commonly reported coping strategies among respondents.

### 3.7. Peacebuilding structures and governance responses

While communities demonstrated a widespread ability to cope, respondents indicated that formal peacebuilding structures were only moderately effective ( $M = 3.12, SD = 0.98$ ). Interviews revealed low trust in institutional mechanisms, due to weak enforcement, slow government response times and poor land-use governance (Figure 9). A community leader reported that «the only way is to improve land demarcation, clear policies on grazing routes, and strengthen the relationship between traditional authorities and security agencies» (P1). A clergyman emphasized that their role is to «preach about peace and continually facilitate dialogue» (P8). Respondents indicated a difference between the perceived effectiveness of formal and informal peacebuilding mechanisms.

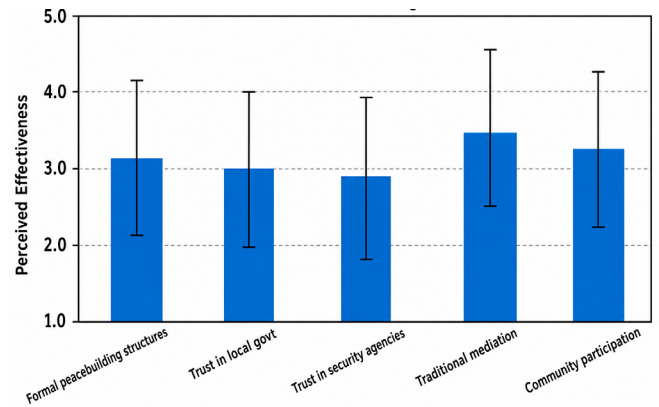


Figure 9. Perceived Effectiveness of Peacebuilding and Governance Structures

## 4. Discussion

The findings of this study align with the theoretical propositions of political ecology and livelihood vulnerability frameworks, which describe how resource-based conflicts emerge from the interaction of environmental stress, livelihood dependence and institutional governance structures. This study shows that herder-farmer conflict in Delta State is shaped by the nexus of ecological stress, livelihood vulnerabilities and institutional weakness, and is inconsistent with political ecology and livelihood-based explanations of resource conflicts. The far-reaching conflict exposure reported by farmers is a function of their high land dependence and predictable seasonal cycles, to which they are particularly sensitive when access to these resources is contested. Similar patterns have been recorded across Nigeria and Sub-Saharan Africa, where agrarian households suffer disproportionate income losses during major confrontations between farmers and herders (Ntumva, 2022). The finding that conflict prevalence is strongly associated with economic disruption ( $b = .68, p < .001$ ) adds to the evidence that violent encounters directly undermine agricultural productivity, income stability and food systems (Okonkwo *et al.*, 2023; Shemyakina, 2022).



Despite higher direct economic losses for men, qualitative narratives of greater unpaid labor and reduced mobility for women are consistent with the existing literature, which identifies conflict in rural livelihoods as gender-exacerbating (Ryan, 2022; Sarker *et al.*, 2025).

The general observation of increased spatial variation, with Isoko North emerging as a conflict hotspot, underscores the importance of localized land-use pressures and ecological degradation. Previous research links such geographic concentration to population growth, shrinking arable land, and the corrosive process of customary land loss (Brottem and Turner, 2025; Menor de Gaspar López *et al.*, 2024). Interview responses that associate conflict escalation with southward pastoral migration further substantiate analyses from region-wide studies that point to climate-induced migration as the root of resource competition in West Africa (Abubakar *et al.*, 2025; Morales-Muñoz *et al.*, 2020). These dynamics reveal that environmental change, combined with the absence of robust regulatory frameworks, increases the risk of conflict rather than acting as a standalone trigger (Egbule and Okonta, 2024; Nassef *et al.*, 2023).

The strong association between conflict prevalence and food insecurity ( $r=.53$ ), as well as moderate associations with economic disruption and loss of social cohesion, highlight the multiplier effects of violence beyond the immediate loss of livelihood. The high average levels of displacement, food insecurity and social breakdown are similar to those observed in Nigeria and other contexts where conflict disrupts markets, drives food price increases, disrupts schooling and erodes trust among community members (Asaju and Kwakano, 2025; Nwozor, 2023). Qualitative accounts of diminishing harvests and broken intergroup relations further strengthen the case for asserting that conflict asymmetrically affects both material well-being and social capital, generating multidimensional vulnerability (Chávez-Miguel *et al.*, 2022; Hertel *et al.*, 2021).

Coping responses reflect the constrained resilience of the community and low levels of confidence in formal institutions. Reliance on vigilante groups and appeals to the government reflect the conditions commonly observed in conflict-ridden rural areas, where state security and dispute-resolution mechanisms are perceived as slow or ineffective (Adebajo, 2022; Setrana and Adzande, 2022). While informal strategies might elude short-term security, the literature points out that unregulated self-help security can perpetuate cycles of violence and mistrust (Bakhtiari, 2025; Ahmadnia *et al.*, 2022). Participants' focus on the need for land use regulation, grazing route control and coordination between traditional authorities and security agencies can be understood within the framework of scholarship in political ecology, which has identified the need for governance reform as core to the

sustainable mitigation of conflict (Brottem and Turner, 2025).

In summary, the combined quantitative and qualitative results of this study place the herder-farmer dispute in Delta State within the context of broader regional trends driven by climate stress, livelihood vulnerability and ineffective governance. By providing spatially disaggregated information, quantifying the effects of social cohesion and foregrounding gendered vulnerability, this study enriches the existing literature and deepens our empirical understanding of resource-based conflicts in southern Nigeria.

#### 4.1. Implications for theory

This study advances conflict and rural development theory in three key ways. Firstly, it provides empirical validation of political ecology propositions by demonstrating that conflict prevalence varies significantly across space, driven by interactions among ecological stressors, land-use pressures and governance weaknesses. Secondly, it extends livelihood vulnerability theory by quantifying the relationships between conflict intensity, economic disruption and food insecurity, demonstrating that the livelihood impacts of conflict are both gendered and occupation-specific. Thirdly, it contributes to resilience scholarship by revealing a dual system under which communities have relied extensively upon informal security mechanisms, in a context of weak formal peacebuilding structures. These insights contribute to a multi-scalar understanding of conflict, mapping the link between the micro level of household vulnerabilities, the meso level of social cohesion, and the macro level of governance systems.

#### 4.2. Conclusion

This study shows that herder-farmer conflicts occur in Delta State due to a combination of ecological pressures, livelihood dependence and governance limitations. Conflict intensity is not uniform across the LGAs due to variations in land scarcity and environmental degradation, and in access to and utilization of natural resources, which are challenging and involve high socioeconomic costs, including lower agricultural productivity, increased food insecurity and weaker social cohesion. Vulnerability is unevenly distributed, with farmers bearing the greatest direct losses, while women bear substantial indirect burdens.

The community coping mechanisms adopted include vigilante groups and informal mediation. While well-intentioned, such actions are inadequate for addressing the structural drivers of these conflicts. Strengthening land-use governance, better management of pastoral mobility, and the ensuring of institutional responsiveness remain important for sustainable conflict reduction. Future interventions will also need to be gender-sensitive

and livelihood-focused, in order to support those households most affected by food instability.

By presenting integrated empirical data that combine ecological, socioeconomic and governance aspects, this study proposes a framework for comprehensive, context-specific policy formulation, in order to reduce vulnerability to resource-use conflicts in Delta State, as well as in other similar ecosystems across Sub-Saharan Africa.

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### **Authors' contributions**

Oghenejabor Obaro, Dominic: Conceptualization, methodology, formal analysis, investigation, writing of the

original draft; writing, revision and editing; supervision, project administration.

Idisi, Benjamin Evi: Literature review, data curation, investigation, qualitative analysis, and writing, revision and editing.

Kukaye, Malvin Nnamdi: Quantitative analysis software, validation, visualization, and writing, revision and editing.

### **Conflict of interest statement**

The authors declare that they have no known financial, institutional or personal relationships that could have influenced any aspect of the conduct, analysis, interpretation or reporting of this research. The study was conducted independently, with no financial or institutional pressure, and there exist no competing interests that might have affected the objectivity or integrity of the results.

### **AI declaration**

The Authors confirm that no AI was used during the drafting of this document.



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