Examining the Factors, Trends and Climate Change Patterns and Their Implication on Farmers-Herders Conflicts in Some Selected Communities of Bassa LGA, Plateau State

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DOI: https://doi.org/10.51584/IJRIAS.2026.11080042

Received: 20 August 2026; Accepted: 25 August 2026; Published: 02 September 2026

ABSTRACT

Climate change poses a severe threat to agricultural and pastoral livelihoods, food security, and communal peace in Sub-Saharan Africa, particularly within transition zones where farming and pastoralism overlap. This study examined the factors, trends, and climate change patterns and their implications for farmer-herder conflicts in selected communities of Bassa Local Government Area (LGA), Plateau State, Nigeria. Primary data were collected through a structured Likert-scale questionnaire administered to 150 respondents (75 crop farmers and 75 herders) across five communities: Gabia, Kimakpa, Kakkek, Kishika, and Ta'agbe. The socio-economic profile points to a highly vulnerable population, with 70.7% of respondents earning a monthly household income below N50,000, making them highly sensitive to climate-driven resource shocks. Descriptive analysis of the full five-point response distribution (mean = 3.85–3.89 on a 1–5 scale across items) showed strong local consensus on anthropogenic drivers of climate change: 73.4% of respondents agreed or strongly agreed that deforestation drives local warming, 74.0% linked irregular rainfall to climate change, and 73.4% identified bush burning as a key driver of environmental degradation. A further 74.0% observed that a decade-long reduction in vegetation cover has altered the local microclimate, undermining rural community resilience and livelihood security. These climatic shifts are directly implicated in violent conflict: rising temperatures and irregular rainfall deplete pastures and dry up shared water points, forcing herders to alter historic migration routes and encroach on arable farmland. The resulting spatial competition over dwindling resources drives seasonal, violent clashes, a pattern consistent with documented farmer-herder fatalities in Bassa LGA and across Plateau State in recent years. To mitigate these conflicts, the study recommends establishing community-led reforestation programmes, implementing strict local bylaws to penalize uncontrolled bush burning, and developing climate-resilient grazing corridors equipped with earth dams or solar-powered boreholes to defuse resource competition. This research contributes to the attainment of SDG 1 (No Poverty), SDG 2 (Zero Hunger), SDG 13 (Climate Action), and SDG 16 (Peace, Justice, and Strong Institutions).

Keywords: Trends; Climate Change; Pattern; Farmers; Herders; Conflict; Resource Scarcity; Environmental Degradation

INTRODUCTION

Climate change poses significant challenges to human livelihoods by intensifying existing vulnerabilities and creating new threats. Africa's diverse ecosystems face severe impacts such as droughts, floods, and shifting weather patterns that threaten food and water security while escalating resource conflicts, particularly between farmers and herders. To build resilience and mitigate these effects, the African Union adopted the African Climate Change Strategy (African Union, 2014), supported regionally by organizations such as the Pan African Climate Justice Alliance (PACJA). While natural forcing drivers exist, climate change in recent decades has been driven mainly by rising greenhouse gas (GHG) emissions associated with industrialization, urbanization, and land-use change. Climate variability manifests as increasing mean temperatures, altered rainfall regimes, and extreme events such as droughts and heatwaves (Adesina et al., 2020). Average surface temperature in Africa

is rising faster than the global average, and in Nigeria this warming trend is compounded by land-use mismanagement, overgrazing, bush burning, and weak environmental governance (Ayanlade et al., 2018). This study speaks directly to the core objectives of SDG 13 (Climate Action), using Bassa LGA as a case study of how unsustainable land management and emissions alter local climatic patterns, and underscoring the need for proactive mitigation and adaptive resource-use strategies.

West Africa has witnessed decreasing rainfall in the Sahel zone, leading to desertification and drought, alongside increasing rainfall and associated flooding in East Africa (Niang et al., 2019), with warming most pronounced in arid and semi-arid regions. Consequently, savannah and forest biomes suffer severe drought stress, degraded soil fertility, and altered species distribution (Simelton et al., 2019). These ecological shifts undermine crop productivity, deepen rural economic fragility, and heighten climate-sensitive health risks such as malaria (WHO, 2019). Herding communities are especially vulnerable because their survival depends on natural grazing systems; climate-induced pasture loss and water depletion have rendered traditional grazing routes unreliable, forcing herders into new or disputed territories (Thornton et al., 2018). In semi-arid regions, this overlap of agriculture and pastoralism turns resource-based competition into systematic and sometimes violent conflict. Recent continent-wide evidence reinforces this pattern: analysing four decades of rainfall and conflict data across Africa, McGuirk and Nunn (2025) show that extended periods of low rainfall in transhumant pastoralist territory are followed by a measurable rise in conflict with neighbouring agricultural communities, and that policies which exclude herding communities from land-use decisions tend to intensify rather than moderate this violence. These dynamics bear directly on SDG 11 (Sustainable Cities and Communities), illustrating how climate variability destabilizes rural settlements and drives forced migration, thereby threatening the stability and resilience of affected communities.

In Nigeria's Middle Belt and northern regions, including Plateau State, environmental degradation (soil erosion, desertification, and vegetation loss) combined with irregular rainfall and rising temperatures has severely reduced arable farmland and pastureland. This forces herders to encroach on farmland, escalating land-rights conflict (Mohammed & Usman, 2022). During the dry season, water sources and grassland dry up, prompting herders to move closer to farming territories, damaging crops and imposing economic hardship on farmers (Adewale et al., 2019). Recent surveys confirm that such incursions are frequent in the Guinea and Sudan savannas, and that competition over drying water points turns rivers and ponds into contested spaces where violent conflict erupts (Bukar et al., 2021). A comprehensive review of the sub-Saharan African literature by Adams et al. (2023) similarly identifies climate-induced environmental stress, land-tenure insecurity, and resource competition as the dominant drivers of farmer-herder conflict across the region, while cautioning that intergroup prejudice and weak governance frequently compound these environmental pressures. Fieldwork specifically in Plateau State reinforces this picture: Babatunde and Ibnouf (2024) show that state officials, traditional leaders, and security agents have, in practice, often deepened farmer-herder conflict in the state through the inequitable distribution of land and water resources and through peacebuilding processes that empower some groups while marginalizing others. This cycle of resource-based conflict undermines the core mandate of SDG 16 (Peace, Justice, and Strong Institutions), illustrating how ecological crisis fuels physical confrontation between farmers and herders and erodes peaceful coexistence. This study holds that durable peace depends on an unbiased justice system and strong local institutions capable of mediating resource disputes before they escalate into violence.

Three theoretical perspectives inform the analysis that follows. The environmental security tradition, associated with Homer-Dixon (1999), holds that scarcity of renewable resources such as cropland, fresh water, and forests can, in combination with other social and political stresses, contribute to civil violence; on this view, the erosion of Bassa's farmland and grazing reserves is not merely an environmental problem but a potential driver of insecurity. Political ecology, as developed by Robbins (2020), pushes this further by insisting that environmental change and resource conflict cannot be understood apart from the power relations, land-tenure arrangements, and governance structures that determine who gains and who loses from a shrinking resource base; this perspective cautions against treating farmers and herders as undifferentiated groups reacting uniformly to climate stress, and instead directs attention to the institutions that mediate their competing claims. The resource-scarcity hypothesis that links the two traditions holds, more narrowly, that where two livelihood systems depend on the same shrinking resource pool, absent effective mediating institutions, competition is likely to escalate from

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue VIII August 2026

informal friction into organized violence. Read together, these frameworks suggest that the climate perceptions and conflict dynamics documented in this study reflect not only physical environmental change but also the capacity, or incapacity, of local and state institutions to manage its consequences equitably.

The Study Area

Bassa Local Government Area (LGA) is located in the northern axis of Plateau State, Nigeria, within the North-Central geopolitical region commonly known as the Middle Belt. Bassa LGA lies between latitude 9°45'N and 10°23'N and longitude 8°38'E and 8°57'E, on a portion of the highland system of the northwestern Jos Plateau, and covers a landmass of approximately 1,743 km². It borders Kaduna State to the north, Bauchi State to the east, Jos North and Jos South LGAs to the south, and Riyom LGA to the west. Miango, Jengre, Kwall, Zukku, and Binchin are among the major settlements in the LGA (Nyelong, 2004).

Farmer-herder relationships are especially consequential in Bassa LGA given its geography. The area lies along settled grazing routes that have been used since herding communities began migrating seasonally in search of pasture and water, and it forms a contact zone between sedentary agricultural communities and nomadic cattle herders owing to its proximity to both highland and open savannah grazing. This interface generates significant spatial competition over land use, and is the setting for the five communities sampled in this study.

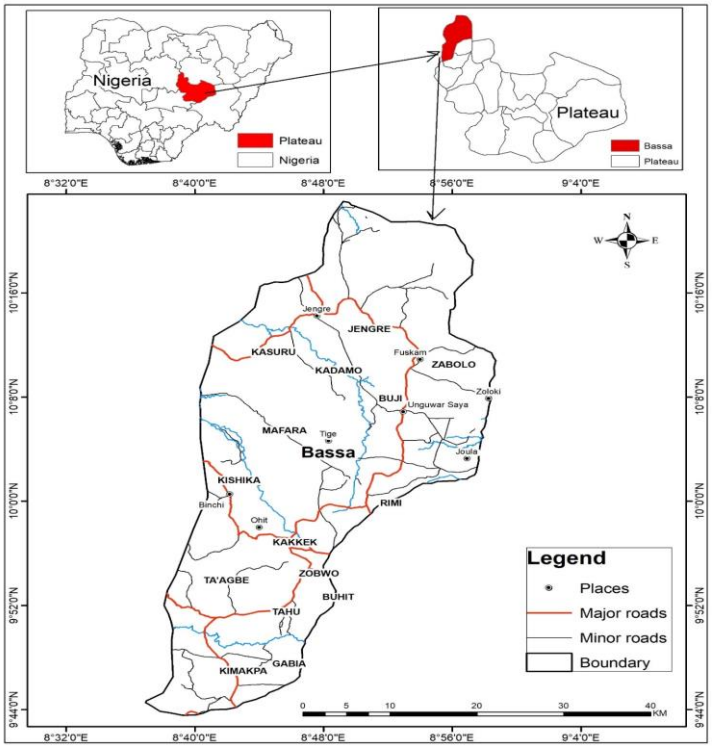

Figure 1: The Study Area

METHODOLOGY

Primary data were collected using a structured Likert-scale questionnaire administered to both farmers and herders to gather quantitative data on perceived factors responsible for climatic change in their communities. The questionnaire was administered to a total of 150 respondents, comprising 75 crop farmers and 75 herders, ensuring equal representation of the two primary stakeholder groups involved in farmer-herder interactions in the study communities. The core statements evaluated by respondents, each on a five-point scale ranging from Strongly Disagree to Strongly Agree, addressed: deforestation and rising local temperatures; irregular rainfall as a consequence of climate change; bush burning as a human-induced driver of climate change; the combined role of natural and anthropogenic factors in local climate change; and the influence of decade-long vegetation loss on local climate. Responses were treated as ordinal data and scored from 1 (Strongly Disagree) to 5 (Strongly

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Agree) to compute item-level means and standard deviations alongside the frequency distribution across all five response categories, in addition to the percentage-based descriptive summaries reported in Section 4.2.

The sampling procedure combined stratified random sampling with purposive sampling. Bassa LGA was stratified into farming- and pastoral-dominated communities, namely Gabia, Kimakpa, Kakkek, Kishika, and Ta'agbe. Within each community, respondents were randomly selected to ensure unbiased representation, while purposive sampling was used to target only farmers and herders for the study. A native interpreter was engaged to assist with interpreting the questionnaire to respondents. SPSS Version 21 was used to statistically analyze survey responses using descriptive techniques, including frequencies and percentages.

The sample size was determined using the Mott and Long (2017) sampling method, which incorporates population size, desired confidence level, and margin of error. Using a projected population of approximately 296,211 (NPC, 2024), a 95% confidence level, and an 8% margin of error, the formula is expressed as:

$n = N / [1 + N(e)^2]$

where n = sample size, N = population, and e = margin of error. Substituting the study parameters:

$n = 296,211 / [1 + 296,211(0.08)^2] = 296,211 / [1 + 1,895.75] = 296,211 / 1,896.75 \approx 156$

The final achieved sample of 150 respondents (75 farmers and 75 herders) reflects the equal-representation design applied across the five sampled communities and falls within the practical range of the calculated minimum.

Table 1: Sample Frame Allocation for the Selected Communities in Bassa LGA

Selected Community	Projected Population	Proportion of Total	Allocated Respondents
Gabia	19,317	0.1979	30
Kimakpa	20,871	0.2138	32
Kakkek	18,903	0.1937	29
Kishika	18,507	0.1896	28
Ta'agbe	20,008	0.2050	31
Total	97,606	1.0000	150

RESULTS AND DISCUSSION

Demographic Information

Age Distribution of Respondents

The largest group of respondents fell within the 26–40 years age bracket, accounting for 41.3% of the total, followed by respondents aged 41–60 years at 29.3%. Younger respondents aged 11–25 years constituted 18.8%, while respondents aged 60 years and above represented the smallest proportion at 10.7%. Overall, 70.6% of respondents were between 26 and 60 years, indicating that the sample predominantly captures the working-age population most directly exposed to resource competition, with comparatively lower representation from both the youngest and oldest age groups.

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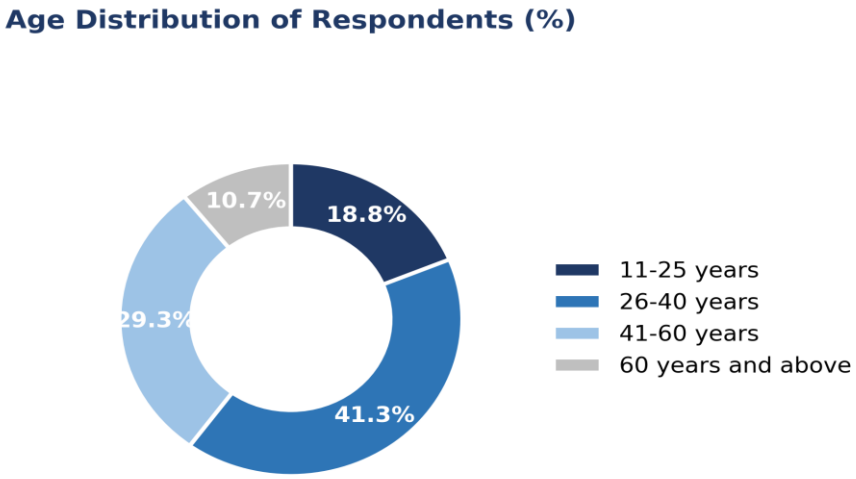

Figure 2: Age Distribution of Respondents

Gender Distribution of Respondents

Male respondents formed the majority, accounting for 96 individuals or 64% of the total sample, while female respondents made up the remaining 54 individuals, or 36%. The sample was therefore male-dominated, reflecting approximately 1.8 male respondents for every female respondent, a pattern broadly consistent with the gendered division of labour in farming and pastoral livelihoods in the region, where men more often engage directly in herd migration and market-facing farm activity while women's labour is concentrated in household and near-farm production.

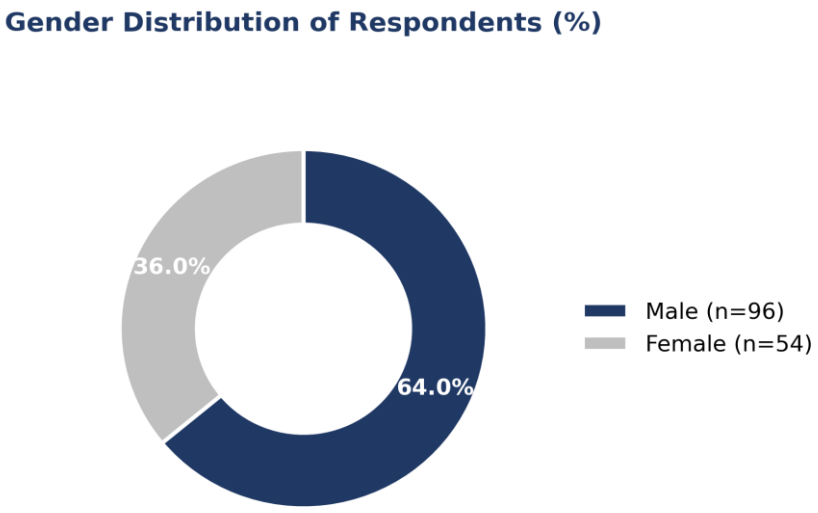

Figure 3: Gender Distribution of Respondents

Occupational Distribution of Respondents

The sample was evenly split between the two occupations by design: farmers constituted 75 respondents (50%) and herders the remaining 75 (50%), with no other occupational group represented. This equal allocation ensures that the perception data reported in Section 4.2 reflect a balanced pooling of both stakeholder perspectives rather than the view of either group alone.

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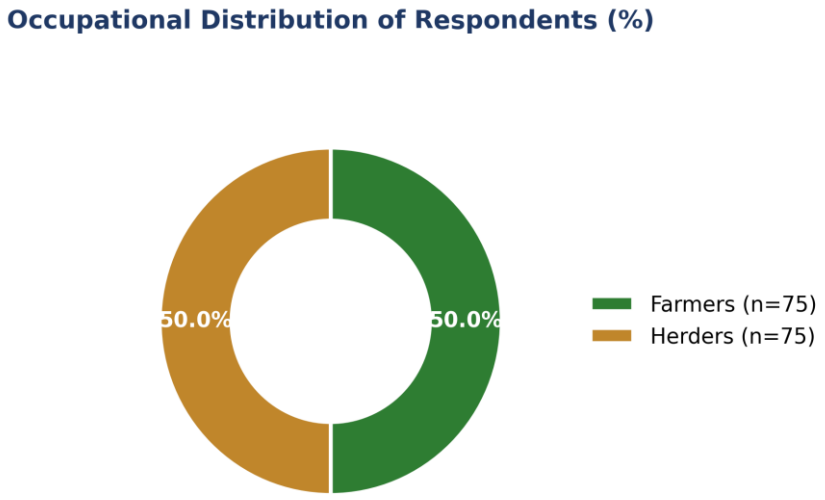


Figure 4: Occupational Distribution of Respondents

Educational Distribution of Respondents

Respondents with primary education constituted the largest group (46 individuals, 30.7%), followed by those with secondary education (42 individuals, 28.0%). Respondents with non-formal education accounted for 38 individuals (25.3%), while those with tertiary education formed the smallest group at 24 individuals (16.0%). In total, 58.7% of respondents had formal education up to secondary level, while the remaining 41.3% had either non-formal or tertiary education, indicating a sample composed largely of respondents with basic education.

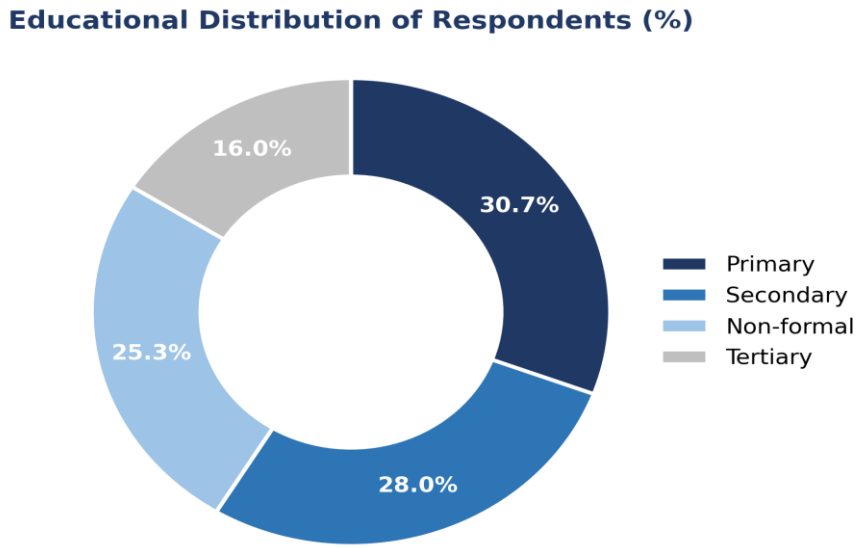


Figure 5: Educational Distribution of Respondents

Income Distribution of Respondents

Respondents earning below N20,000 monthly formed the largest group (54 individuals, 36.0%), followed by those earning N21,000–N50,000 (52 individuals, 34.7%). Respondents earning N51,000–N100,000 constituted 32 individuals (21.3%), while the smallest group, those earning above N101,000, comprised 12 respondents (8.0%). Overall, 70.7% of respondents earned N50,000 or less per month, indicating that the majority of the sample falls within the low- to lower-middle-income bracket and is correspondingly exposed to climate-driven shocks to farm and herd income.

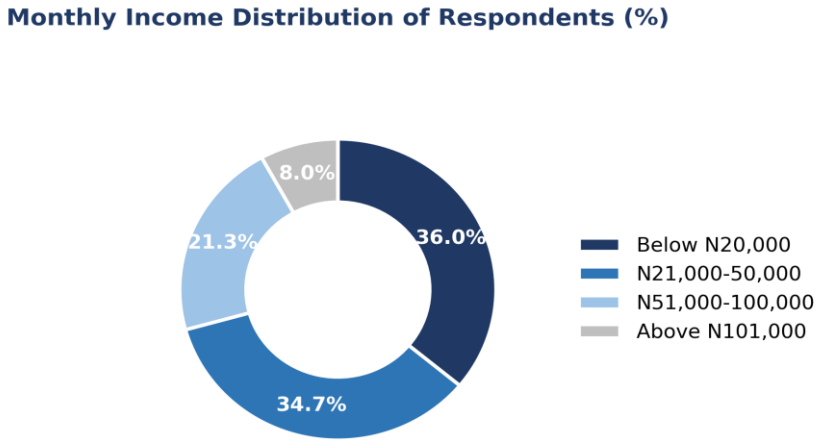


Figure 6: Income Distribution of Respondents

Major Natural and Human-Induced Factors Contributing to Climate Change in the Study Area

This section examines respondents' perceptions of the natural and human-induced factors contributing to climate change in Bassa LGA, including deforestation, irregular rainfall, bush burning, the interaction of natural and anthropogenic drivers, and vegetation loss, and how these are understood to shape the local environment and socio-economic activity. Table 2 summarizes the full five-point response distribution, together with the mean score and standard deviation, for each of the five statements evaluated.

Table 2: Summary of Likert-Scale Responses on Perceived Climate Change Factors (N = 150)

Statement	SA %	A %	U %	D %	SD %	Mean	SD
Deforestation contributes to rising local temperatures	38.7	34.7	8.0	12.0	6.6	3.87	1.24
Irregular rainfall patterns result from climate change	41.3	32.7	7.3	11.3	7.4	3.89	1.26
Bush burning is a key human-induced cause of climate change	42.7	30.7	6.6	12.0	8.0	3.88	1.30
Climate change is driven by both natural and anthropogenic factors	36.7	38.7	6.0	10.6	8.0	3.85	1.25
Decade-long vegetation loss has influenced local climate	40.7	33.3	7.3	10.7	8.0	3.88	1.27

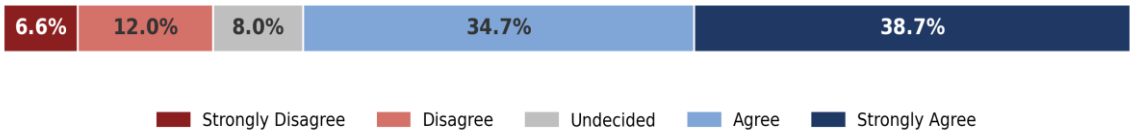
Across all five statements, mean scores cluster tightly between 3.85 and 3.89 on the 1–5 scale, with a corresponding standard deviation of 1.24–1.30, indicating a broadly consistent, moderately strong level of agreement with comparatively modest dispersion around that consensus. Undecided responses remained low throughout (6.0–8.0%), suggesting that most respondents held a clear view on each statement rather than genuine uncertainty.

Deforestation and Rising Local Temperatures

As shown in Figure 7, 38.7% of respondents strongly agreed and 34.7% agreed that deforestation has contributed to rising temperatures in Bassa, against 12.0% who disagreed, 6.6% who strongly disagreed, and 8.0% who were

undecided. The greater share of strong agreement relative to strong disagreement indicates a firm local conviction about the effect of vegetation loss on local climate, consistent with scientific evidence that deforestation alters the land surface energy balance, reduces evapotranspiration, and raises local temperature (Adepoju et al., 2020). Research in tropical regions similarly shows forest-cover loss to be a major contributor to surface-temperature rise and microclimatic alteration (Adepoju et al., 2020).

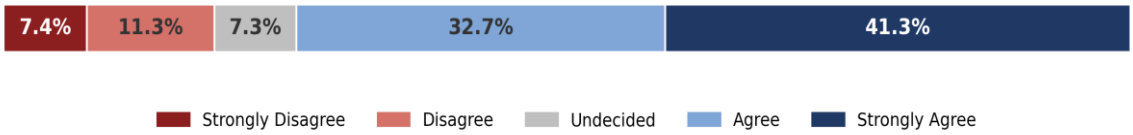
Figure 7: Deforestation contributes to rising local temperatures in Bassa



Irregular Rainfall and Climate Change

Figure 8 shows that 41.3% of respondents strongly agreed and 32.7% agreed that irregular rainfall patterns result from climate change, while 11.3% disagreed, 7.4% strongly disagreed, and 7.3% were undecided. The resulting 74.0% combined agreement indicates that most respondents link rainfall variability directly to climate change, consistent with Nigerian evidence of increasing variability in rainfall onset and cessation (Adesina et al., 2020).

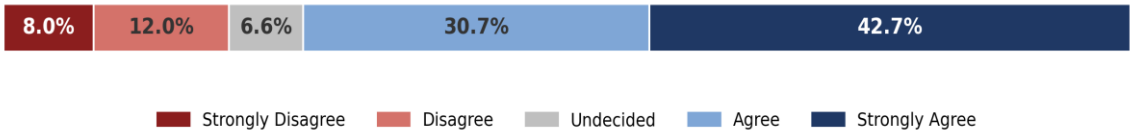
Figure 8: Irregular rainfall patterns are a result of climate change



Bush Burning as a Human-Induced Driver

Figure 9 shows that 42.7% of respondents strongly agreed and 30.7% agreed that human-induced activities such as bush burning are key causes of climate change, while 12.0% disagreed, 8.0% strongly disagreed, and 6.6% were undecided. The substantial share of strong agreement points to a clear local understanding of the environmental consequences of bush burning, consistent with evidence that the practice releases greenhouse gases and destroys vegetation, thereby contributing to warming and environmental degradation; empirical research in Nigeria similarly identifies uncontrolled bush burning as a major driver of climate variability and land degradation (Adefisan et al., 2022).

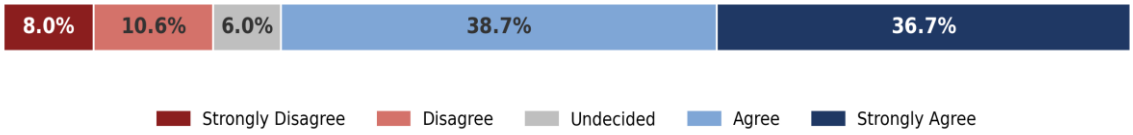
Figure 9: Bush burning is a key human-induced cause of climate change



Natural and Anthropogenic Drivers Combined

Figure 10 shows that 36.7% of respondents strongly agreed and 38.7% agreed that climate change in the study area is driven by both natural and human factors, while 10.6% disagreed, 8.0% strongly disagreed, and 6.0% were undecided. That agreement (75.4%) is here driven marginally more by moderate than strong agreement suggests a nuanced local understanding: respondents recognize natural climatic oscillation while also attributing a substantial share of observed change to land-use practices and GHG emissions, a holistic view consistent with the broader scientific literature on climate variability in Nigeria (Onyekuru & Eze, 2020).

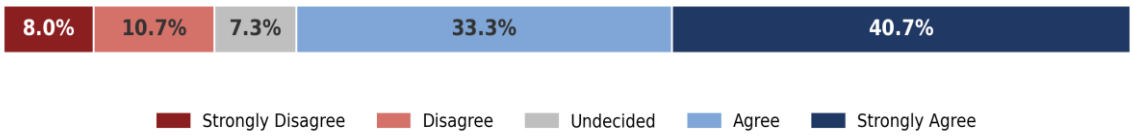
Figure 10: Climate change is driven by both natural and anthropogenic factors



Vegetation Loss and Local Climate Alteration

Figure 11 shows that 40.7% of respondents strongly agreed and 33.3% agreed that reduction in vegetation cover over the past decade has influenced local climate change, while 10.7% disagreed, 8.0% strongly disagreed, and 7.3% were undecided. The high proportion of strong agreement points to firm confidence that vegetation loss has substantially affected local climate; taken with those who moderately agreed, almost three-quarters of respondents (74.0%) regard vegetation decline as a significant climatic factor. This aligns with scientific reports linking vegetation loss to higher land-surface temperature and decreased soil-moisture storage, and with Nigerian remote-sensing evidence that vegetation loss contributes significantly to localized climate change (Olanipekun et al., 2021).

Figure 11: Reduction in vegetation cover has influenced local climate change



Conflict Incidence in Bassa LGA and Plateau State

The perception data reported above align with the documented pattern of farmer-herder violence in and around Bassa LGA. Conflict-tracking by Nextier SPD records a 2021 attack on Bassa LGA that killed 17 people, part of a broader pattern of serial, targeted killings across Plateau and neighbouring states over the past decade (Nextier SPD, 2024). Media investigation drawing on a farmer-herder conflict database has similarly identified Bassa as one of the local government areas with the highest recorded fatalities from such clashes in Plateau State in recent reporting periods, with dozens of deaths attributed to the LGA (SaharaReporters, 2023). At the state level, Plateau has recorded some of the deadliest single incidents in the country's farmer-herder crisis, including a coordinated attack across Bokkos and Barkin Ladi LGAs in December 2023 that killed an estimated 200 people, destroyed over 221 houses, and displaced at least 10,000 residents into camps (Nextier SPD, 2024). While these incidents occurred outside the five communities directly sampled in this study, they establish the wider security context within which Bassa's farmers and herders form their perceptions of climate-driven resource pressure, and they lend weight to respondents' own account of a direct pathway from vegetation loss and water scarcity to violent land competition.

DISCUSSION

Climate Perceptions, Theory, and the Wider Literature

The perception data presented in Section 4.2 describe a mechanism consistent with both the environmental-security and resource-scarcity perspectives outlined in Section 1.0: respondents overwhelmingly link deforestation, bush burning, and vegetation loss to local warming, and these environmental factors are, in the same communities, associated with the drying of pasture and water points that pushes herders onto farmland. This is precisely the mechanism McGuirk and Nunn (2025) document at continental scale, where rainfall deficits in pastoralist territory predict a subsequent rise in conflict with neighbouring farming communities. The political ecology perspective (Robbins, 2020) adds an important qualification, however: Babatunde and Ibnouf (2024) find, in Plateau State specifically, that the outcome of resource scarcity is not simply automatic violence but is substantially shaped by how state officials, traditional authorities, and security agents allocate access to the

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue VIII August 2026

shrinking resource base. Read together with the conflict-incidence evidence in Section 4.3, this suggests that the deforestation and vegetation-loss trends so consistently identified by Bassa's farmers and herders translate into violence not only because resources are scarcer, but also because the institutions that would otherwise mediate access to what remains have, in places, struggled to do so equitably. Adams et al.'s (2023) review of the sub-Saharan African literature reaches a similar conclusion, identifying resource competition and land-tenure insecurity, rather than environmental stress alone, as the consistent drivers of farmer-herder conflict across the region. This underlines the recommendations developed in Section 5.0: reforestation and bylaws against bush burning address the environmental drivers documented in Section 4.2, while shared water infrastructure and grazing corridors address the institutional gap identified in this discussion.

Gender Dimensions of Climate Change and Farmer-Herder Conflict

Although the demographic profile in Section 4.1.2 shows the sample to be 64% male, reflecting men's more visible role in herd migration and market-facing farm labour in the study area, the burden of climate-driven resource conflict is not confined to those directly engaged in disputes over land and pasture. Feminist political-economy analysis of Nigeria's herder-farmer conflicts argues that mainstream environmental-security framings, which treat these conflicts primarily as competition over scarce resources, can obscure how climate stress and conflict interact with existing gender inequality in land access and household decision-making to leave rural women disproportionately exposed to the economic and physical consequences of violence. In Nigeria's herding communities specifically, gender roles vary by ethnic group: among Fulani pastoralists in the Jos Plateau area, men typically undertake the seasonal migrations while women remain in fixed settlements managing other aspects of pastoral livelihood, a division that shapes women's particular exposure to conflict risk. Within farming communities, women's already limited access to land is further constrained where farmer-herder tension over land competition intensifies. United Nations peacebuilding work in Nigeria's Middle Belt has correspondingly identified the gender dimension, alongside the environmental dimension, as one of the central axes along which climate-driven farmer-herder conflict must be addressed, given women's disproportionate exposure to its consequences and their comparatively limited voice in the traditional and security-sector institutions that mediate land and water disputes. Gender-responsive design of the reforestation, water-infrastructure, and grazing-corridor interventions recommended in Section 5.0, for example ensuring women's participation in the community bodies that manage new water points and grazing reserves, would help ensure that climate-adaptation investment in Bassa LGA does not reproduce the exclusion documented in this wider literature.

Linking the Findings to the Sustainable Development Goals

The findings reported above bear on a wider set of Sustainable Development Goals than climate action alone. The income profile in Section 4.1.5, in which 70.7% of respondents earn N50,000 or less monthly, shows how climate-driven disruption to farming and herding livelihoods directly threatens SDG 1 (No Poverty) and SDG 2 (Zero Hunger): where deforestation, irregular rainfall, and vegetation loss (Section 4.2) reduce crop yields and pasture availability, household income and food security are placed under simultaneous strain. The same dynamic bears on SDG 8 (Decent Work and Economic Growth), since resource competition and violent conflict of the kind documented in Section 4.3 disrupt farm labour, destroy livestock and crops, and displace rural workers from productive activity. The conflict pathway documented throughout this study, from vegetation loss to resource competition to violence, most directly threatens SDG 16 (Peace, Justice, and Strong Institutions), while the reforestation and land-management interventions recommended in Section 5.0 speak to SDG 13 (Climate Action) and SDG 15 (Life on Land) by targeting the loss of vegetation cover that respondents themselves identify as a central driver of local climate change. Nigeria's National Climate Change Policy and its commitments under the Paris Agreement similarly emphasize community-based adaptation and ecosystem restoration as central mitigation strategies, of which the community-led reforestation and grazing-corridor recommendations developed in this study are a local expression.

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue VIII August 2026

CONCLUSION AND RECOMMENDATIONS

This research demonstrates that climate change in the study communities is an active, deeply felt reality with severe socio-economic consequences for both crop farmers and herders. The demographic data highlight a vulnerable population, with 70.7% of respondents living on a monthly household income of less than N50,000, making them highly sensitive to climate-driven resource shocks. Over 73% of respondents recognize that human-induced activities, specifically deforestation, bush burning, and the resulting loss of vegetation cover, directly exacerbate local warming and disrupt historical rainfall patterns. As rising temperatures, irregular rainfall, and land degradation deplete pasture and dry up shared water points, herders are forced to shift their routes, encroaching on sedentary agricultural land in ways that documented conflict incidents in Bassa LGA and across Plateau State show can escalate into violence. Addressing climate change and its impacts in these communities is therefore not only an environmental necessity but a crucial precondition for restoring social peace and food security in the area.

The following recommendations are suggested:

Implement community-led reforestation and sustainable fuelwood programmes, since over 73% of residents link deforestation and vegetation loss to rising local temperatures.

Establish and enforce bylaws against bush burning, given that 73.4% of respondents identify bush burning as a primary driver of environmental degradation.

Develop shared water infrastructure and climate-resilient grazing reserves, as drying water points and reduced pasture generate competition for scarce resources and are the immediate triggers of dry-season farmer-herder conflict.

Strengthen the capacity of local and traditional institutions to mediate land and water access equitably between farming and herding communities, addressing the governance gap that the political-ecology literature identifies as a key factor determining whether resource scarcity escalates into violence.

Ensure women's representation in the community bodies established to manage new water points, grazing corridors, and reforestation programmes, so that climate-adaptation investment addresses rather than reproduces existing gender inequality in land and resource access.

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