Households' Perceptions of Climate Change and Vulnerability in Doma Local Government Area, Nasarawa State, Nigeria

Abubakar Saidu Dantsoho[1*], Davidson Alaci[2], Adamu Musa Eya[3]

[1,3]Department of Urban and Regional Planning, Nasarawa State University Keffi, Nigeria

[2]Department of Urban and Regional Planning, University of Jos, Nigeria

[*]Corresponding Author

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ABSTRACT

This study investigates household perceptions of climate change and their vulnerability to associated hazards in Doma Local Government Area (LGA) of Nasarawa State, north-central Nigeria. A cross-sectional survey design was adopted, drawing a sample of 1,146 households from three purposively selected localities Doma, Burum-Burum and Rukubi using the Taro Yamane sampling formula applied to 2024 population projections derived from the 1991 figures and projected to 1996 figures, which was also projected to 2024 population figures. A total of 1,017 valid questionnaires (88.8% response rate) were analysed. The instrument captured household socio-economic characteristics (gender, marital status, occupation, income, age and educational attainment) alongside household perceptions of six climate hazard indicators: flooding, temperature fluctuation, soil erosion, windstorms, precipitation variability, and land use/land cover change. Chi-square tests of independence with Cramér's V effect sizes were used to examine associations between locality and each variable. Results show that household socio-economic profiles differ significantly by locality for occupation (χ^2=82.95, $p<0.001$) and educational attainment (χ^2=168.13, $p<0.001$), but not for marital status ($p=0.251$). Awareness of climate hazards was generally high across all three localities (74%–99%), with statistically significant locality differences for flooding, temperature, soil erosion, windstorms and precipitation (all $p<0.01$), while perception of land use/land cover change did not differ significantly by locality ($p=0.735$). Windstorm awareness showed the strongest locality effect (Cramér's V=0.270), with Doma reporting markedly lower awareness (74.0%) than Burum-Burum (90.6%) and Rukubi (95.7%). This study is to provide decision makers, corporate organisations and future researchers with comprehensive knowledge and insights in to climate change and community well-being, while addressing current setbacks in vulnerability adaptation in Nigeria.

Keywords: Climate change, household perception, vulnerability, community well-being, associate hazards.

INTRODUCTION

Climate change has emerged as one of the most pressing developmental challenges confronting rural agrarian communities in sub-Saharan Africa, with Nigeria's middle-belt region experiencing increasingly erratic rainfall, rising temperatures, and more frequent extreme weather events such as windstorms and flash floods (IPCC, 2022). Understanding how households perceive climate change is a critical precursor to designing effective adaptation and disaster-risk-reduction interventions, because perception shapes the adoption of coping strategies and the demand for extension and early-warning services (Tarfa et al., 2019).

It is necessary to understand climatic change from the socio-economic perspective to prepare a road map for capacity building of people and to help the policymaker in formulating future policy based on human perception and attitude (Basiru et al., 2022). However, it is very crucial to investigate what people know, think, believe and behave across a spectrum of issues related to climate change (Ruiu et al., 2024). Although the study of perception of climate change as a threat across the world has been increasing over the years, thanks to the severity and

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increased frequency of climate change impacts, especially with regard to household's livelihood (Nwajiuba et al., 2022).

The worldwide apprehension about the catastrophic consequences of climate change has highlighted the necessity of fostering knowledge and enhancing community capabilities for adaption methods to alleviate the impacts of climate change. Perspectives and anticipations significantly influence society, progress, ecology, and resource economics (Ruiu, et al, 2024). Nwajiuba et al. (2022) suggested that attitudes may serve as significant indicators of behaviours or the adoption of concepts. Onyeneke et al. (2021) underscored that households are unlikely to take action to adapt to or alleviate the impacts of climate change if they do not acknowledge its existence or perceive it as a danger to their livelihoods.

This research investigates household views of climate change in three areas within the Doma Local Government Area. The Doma, Burum-Burum, and Rukub regions vary in terms of demographic size, occupational structure, and exposure characteristics. The research: (i) establishes a suitable household sample size through recognised demographic and statistical methodologies; (ii) delineates the socio-economic attributes of the selected households; (iii) investigates household awareness and perceptions regarding six climate hazard indicators; (iv) conducts, statistical tests to ascertain if these perceptions and characteristics vary significantly among the three regions. The results aim to guide climate communication and adaptation strategies that are attentive to local contexts in Doma LGA and similar rural LGAs in Nigeria's central region.

This study addresses this gap by examining household perceptions of climate change across three localities in Doma Local Government Area. Doma, Burum-Burum and Rukub areas differ in population size, occupational composition and exposure profile. Specifically, the study: (i) determines an appropriate household sample size using established demographic and statistical procedures; (ii) profiles the socio-economic characteristics of sampled households; (iii) examines household awareness and perception of six climate hazard indicators; (iv)statistically, tests whether these perceptions and characteristics differ significantly across the three localities. The findings are intended to inform locality-sensitive climate communication and adaptation planning in Doma LGA and comparable rural LGAs in Nigeria's middle belt.

LITERATURE REVIEW

Climate Change and Rural Household Vulnerability

The worldwide scientific agreement, as summarised in the IPCC's Sixth Assessment Report, affirms that natural climate change is exacerbating the occurrence and intensity of extreme weather phenomena, disproportionately affecting low-income, climate-sensitive livelihoods globally (IPCC, 2022).

In Nigeria, empirical research consistently indicates that rural households notice alterations in the timing, duration, and intensity of rainfall, escalating temperatures, and a heightened frequency of erosion and windstorms, frequently prior to these changes being documented in official meteorological data (Ayuba, et al, 2019).

Perception Studies and Their Determinants

A significant amount of research correlates household awareness of climate change with socio-demographic variables including education level, profession, income, gender, and age (Belachew, & Zuberi, 2015). Households possessing elevated educational levels and varied sources of income generally express more sophisticated perceptions and are more inclined to implement adaptive strategies, while primarily agricultural households despite their direct encounters with climate fluctuations occasionally demonstrate diminished formal awareness owing to restricted access to climate information services (Basiru, et al, 2022). Disparities in gender perception have been recorded, frequently mirroring distinct responsibilities in agricultural and household work that influence vulnerability to certain risks such flooding and water scarcity (Aydogdu, & Yenigün, 2016).

Vulnerability Frameworks and the Livelihood Vulnerability Index

Vulnerability assessment techniques, particularly the Livelihood Vulnerability Index (LVI) and its incorporation with the IPCC vulnerability framework (LVI-IPCC), define vulnerability as a product of exposure, sensitivity, and adaptive capacity (Thomas et al., 2019). This paradigm has been extensively utilised in Nigeria and other African regions to assess vulnerability among communities through composite indicators derived from household socio-demographic, health, food security, water, and social network data (Rao, Lawson, Raditloaneng, Solomon, & Angula, 2019).The current research builds upon this legacy, use locale as a surrogate for varying exposure and adaptation capacity, and utilising inferential statistics to examine if perception and vulnerability-related traits significantly vary between localities within Doma LGA.

Gaps in the Literature

A significant portion of current Nigerian literature compiles perception data at the local government area or state level, masking the locality-specific diversity essential for the formulation of tailored interventions. Moreover, little research integrates meticulous sample-size calculation and prospective population forecasting with inferential cross-tabulation analysis within a unified, reproducible framework. This research tackles these deficiencies by (a) offering a comprehensive sample-size and population-projection methodology, and (b) utilising chi-square tests of independence on a locality-disaggregated dataset of socio-economic and perception variables.

CONCEPTUAL FRAMEWORK

This research utilises the IPCC vulnerability framework, which defines household vulnerability to climate change as a function of three elements: exposure (the extent and nature of a household's experience with climate hazards like flooding, windstorms, and precipitation variability), sensitivity (the extent to which a household is impacted by that exposure, influenced by occupation, income, and asset base), and adaptive capacity (the household's capability to modify, mitigate potential harm, and capitalise on opportunities, influenced by education, gender roles, and access to services).

This research considers localities (Doma, Burum-Burum, Rukubi) as a spatial proxy that encapsulates variations in exposure (closeness to floodplains, susceptibility to erosion, and wind corridors), sensitivity (predominant occupational framework agriculture versus commerce versus public service), and adaptive capacity (levels of education and income distribution). The theoretical framework posits that the socio-economic characteristics of households and their perception of climatic hazards would differ consistently across locations, and this discrepancy can be statistically identified by cross-tabulation and chi-square analysis. Methods and Materials

The study adopted a cross-sectional, mixed quantitative survey design conducted in Doma LGA, Nasarawa State, Nigeria. Three localities — Doma, Burum-Burum and Rukubi — were purposively selected to capture variation in settlement size, occupational structure and hazard exposure. Data were collected using a structured household questionnaire administered to household heads or their representatives, capturing (i) socio-economic characteristics (gender, marital status, age, educational attainment, occupation and income) and (ii) household perception of six climate hazard indicators: flooding, temperature fluctuation, soil erosion, windstorms, and precipitation variability, plus perceived land use/land cover change. Data were analysed using descriptive statistics (frequencies and percentages) and inferential statistics (Pearson's chi-square test of independence with Cramér's V effect size) to test the association between locality and each socio-economic and perception variable.

Study Area Description

Doma Local Government Area is positioned in Nasarawa State, North-Central Nigeria, lying between latitudes 9°30'N and 10°5'N, and longitudes 8°20'E and 8°50'E. The Local Government Area encompasses an estimated surface area of 1,180 km² and has a population of roughly 183,826, according to 2016 census estimates. The region exhibits a tropical savanna climate marked by pronounced rainy (May-October) and dry (November-April) periods. The mean yearly precipitation varies between 1,000 and 1,200 mm, although considerable

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fluctuations from year to year are noted. The average yearly temperature is roughly 24-26°C. (Nigerian Meteorological Agency, 2024).

Doma is situated in the southern region of Nasarawa State and functions as the headquarters of both Doma District and Doma Local Government Area. The locality is generally defined by rolling landscapes that are conducive to residential construction. Figure 1 illustrates the position of Doma LGA inside the map of Nasarawa State.

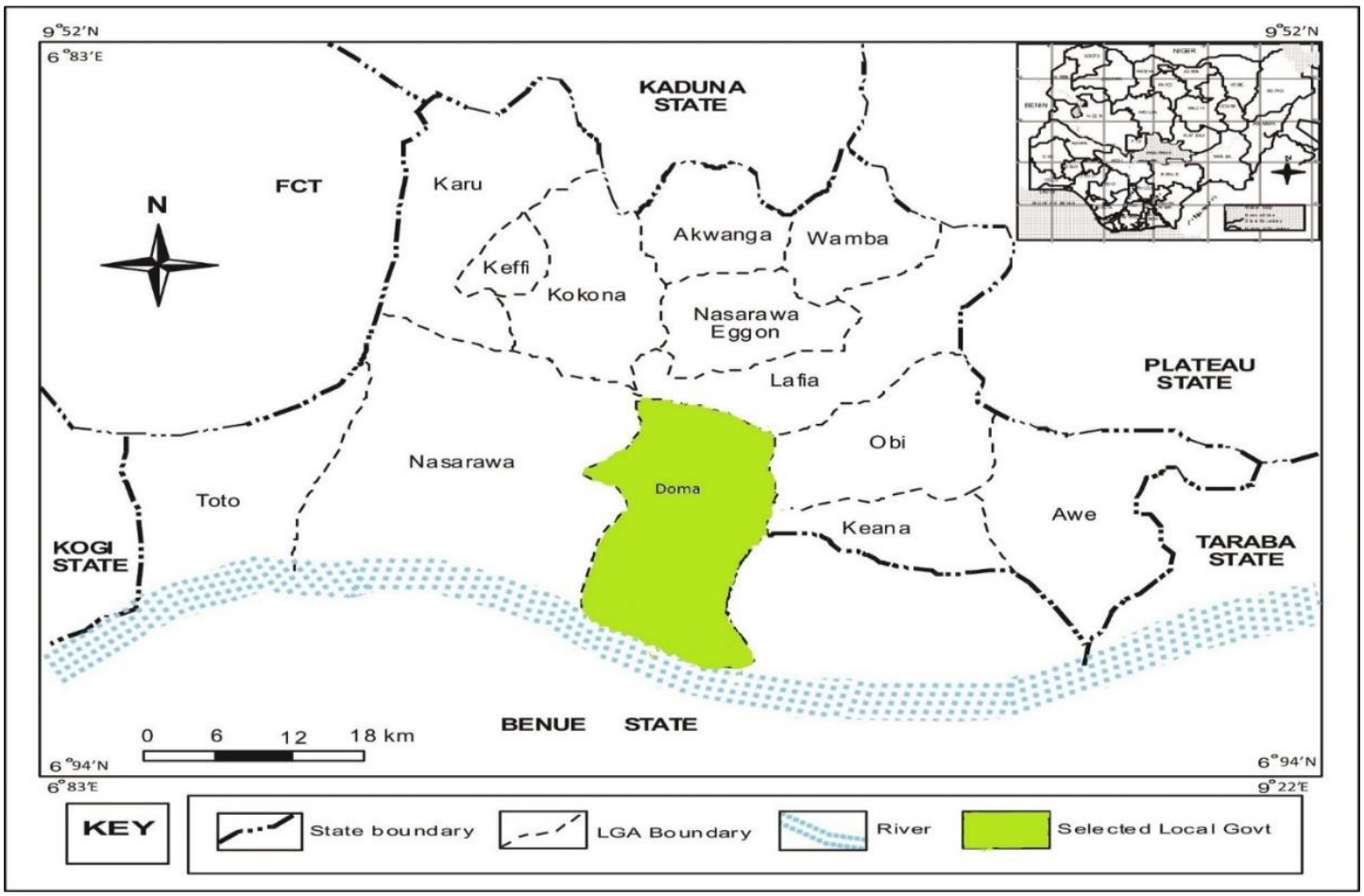


Fig 1: Map of Nasarawa State showing the 13 Local Government Areas. The shaded LGA formed the Study Area.

Source: Nasarawa State Ministry of Lands and Survey, Lafia

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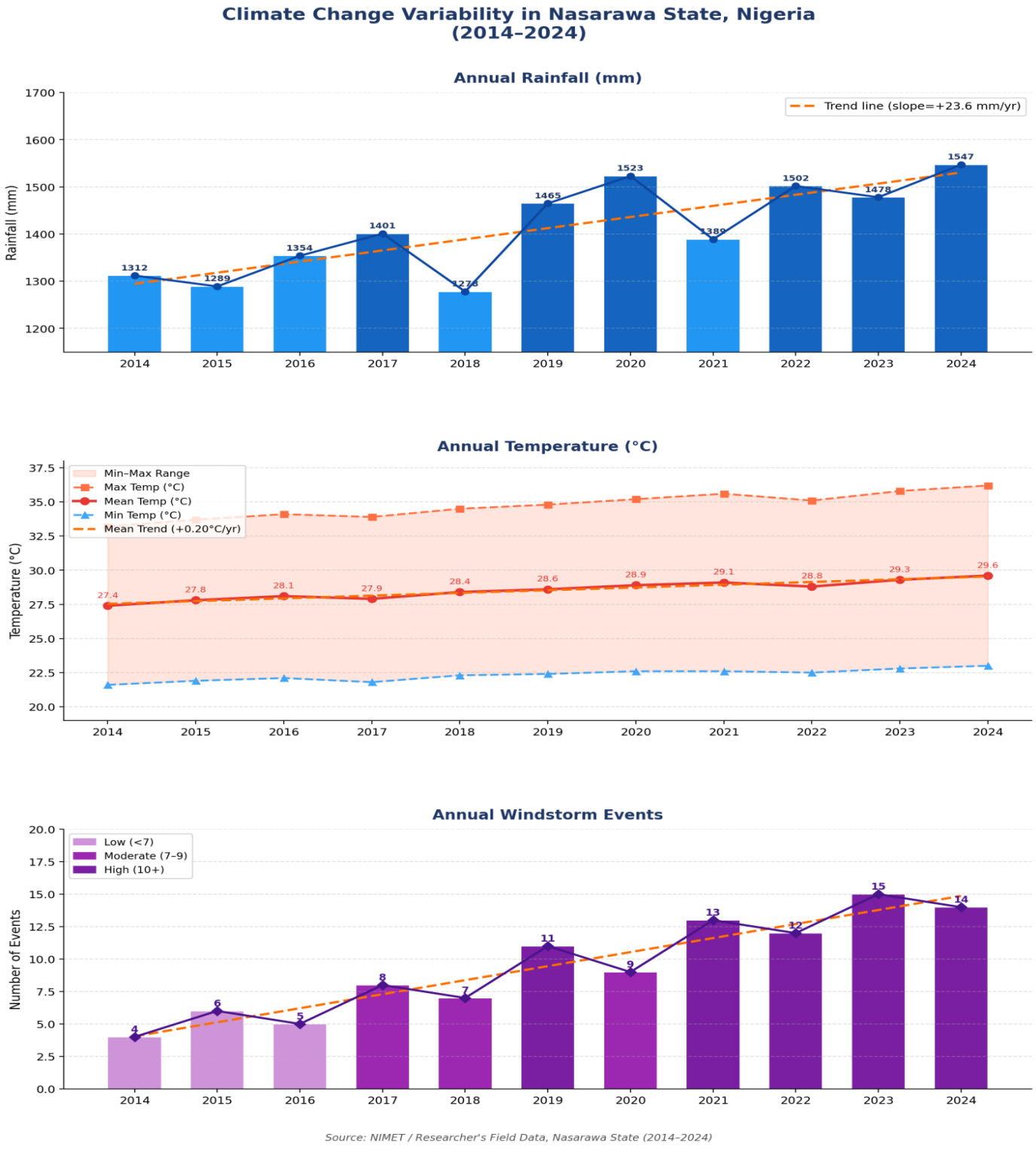


Fig 2: Climate Change Variability in Nasarawa State, Nigeria (2014–2024)

Source: Nigerian Meteorological Agency (NIMET) / Researcher's Field Data, 2024.

This research utilises a mixed-methods design that combines both quantitative and qualitative methodologies. The quantitative aspect encompassed home surveys utilising a standardised questionnaire distributed to 1,146 households randomly picked from three intentionally chosen areas Doma, Burum-Burum, and Rukubi used the Taro Yamane sample algorithm based on 2024 population estimates. Stratified random sampling was utilised to choose homes from three localities within Doma LGA, guaranteeing representation of various socioeconomic strata. Data gathering occurred during a two-month span (June-July 2026) during the rainy season to document seasonal fluctuations in domestic activities and climatic effects.

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Doma Region. Doma serves as the headquarters for both Doma District and Doma LGA. The locality is generally defined by rolling topography that is conducive to residential construction. Figure 3 illustrates the developmental pattern of the Doma Locality through a satellite imagery map, facilitating the selection of household heads for sampling.Research Design.

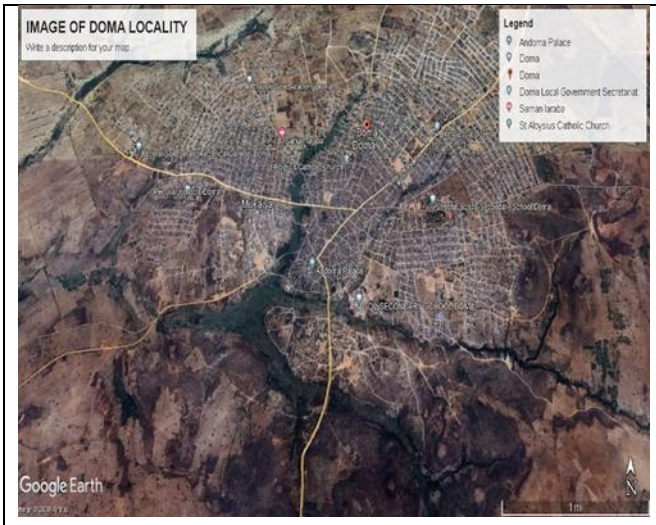


Fig 3: Image map of Doma locality.

Source: Google Earth



Fig 4: Image map of Burum Burum locality.

Source: Google Earth

Burum Burum locality

Burum Burum, situated in the northern region of Doma LGA, is among the most ancient slum communities within Doma LGA. It is historically categorised as one of the oldest regions within Doma LGA that has experienced minimal socio-economic advancement. This community has emerged at the junction of River Mada, resulting in frequent flooding whenever the river rises. Figure 4 presents satellite imagery of the Burum-Burum Locality, which facilitated the arbitrary selection of household heads. Rukubi, situated in the southern region of Doma LGA, borders Benue State along the Benue River, rendering it a more susceptible place to hazards, with floods being a frequent occurrence. Consequently, the town is significantly vulnerable to climatic extremes when it transpires.

Sample and Sample Procedure

The sampling methodology consisted of two phases: (1) identifying the research population by exponential population projection, and (2) calculating the household sample size employing the Taro Yamane (1967) algorithm.The formula for exponential population growth was utilised:

Pt equals Po multiplied by the quantity of one plus r raised to the power of t.

Where Pt denotes the anticipated population, Po represents the initial population, r signifies the yearly growth rate, and t indicates the duration of the forecast in years. Utilising the 1996 census data (Po) and the anticipated 2024 figure (Pt) for each place, with t = 28 years (1996–2024), the locality-specific yearly growth rate r was calculated by reformulating the equation: r = (Pt / Po)^(1/t) − 1.

Illustrative calculation for Doma: Po (1996) = 40,396; Pt (2024) = 78,261; t = 28. r = (78,261 / 40,396)^(1/28) − 1 = 0.0239, signifying an annual growth rate of roughly 2.39%. The comparable methodology utilised for Burum-Burum and Rukubi produced a congruent inferred growth rate of 2.39%, so affirming the internal coherence of the original 1991–1996–2024 dataset.

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Table 1: Population Projection (1996–2024) and Sample Size Determination

Locality	1991 Census	1996 Projected	2024 Projected	Annual r (%)	Sample Size 2024 (n)
Doma	34,846	40,396	78,261	2.39	398
Burum-Burum	2,479	2,873	5,566	2.39	373
Rukubi	2,722	3,155	6,112	2.39	375
Total	40,047	46,424	89,939	—	1,146

Sample Size Determination

The Taro Yamane (1967) formula was used to determine the household sample size from each locality's population:

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

Where n = sample size, N = locality population, and e = margin of error, fixed at 0.05 (5%). Applying this formula to the 2024 population figures: for Doma, $n = 78,261 / (1 + 78,261 \times 0.05^2) = 398$; for Burum-Burum, $n = 5,566 / (1 + 5,566 \times 0.05^2) = 373$; and for Rukubi, $n = 6,112 / (1 + 6,112 \times 0.05^2) = 375$ — giving a combined study sample size of 1,146 households, of which 1,017 questionnaires (88.8%) were returned and validated for analysis (350 in Doma, 330 in Burum-Burum, and 337 in Rukubi).

Cross-Tabulation of Tables and Explanation

The subsequent cross-tabulations encapsulate the socio-economic characteristics and climate-hazard perceptions of the 1,017 surveyed households by locality. Comprehensive disaggregations by gender and age group, as first gathered, are preserved in the source dataset; the subsequent tables display locality-specific aggregates, which underpin the statistical analyses presented.

Marital Status of Household Heads by Locality

Married individuals constitute the predominant household heads in all three areas, with percentages varying from 56.4% in Rukubi to 62.9% in Doma. The percentage of divorced, single, and widowed household heads is generally comparable across different areas, however Rukubi has a somewhat greater rate of single-headed households (13.4%) compared to Doma (8.0%).

Table 2: Marital Status of Household Heads by Locality

Locality	Married	Divorced	Single	Widowed	Total
Doma	220 (62.9%)	70 (20.0%)	28 (8.0%)	32 (9.1%)	350
Burum-Burum	195 (59.1%)	57 (17.3%)	40 (12.1%)	38 (11.5%)	330
Rukubi	190 (56.4%)	65 (19.3%)	45 (13.4%)	37 (11.0%)	337

Source: Survey, 2026

Occupation of Household Heads by Locality

The composition of occupations varies significantly by region. Doma's economy is more varied, with civil service (29.7%) and commerce (30.0%) competing with agriculture (27.4%) as the primary professions. Conversely, agriculture prevails in Burum-Burum (57.6%) and Rukubi (53.4%), suggesting that these regions are more agricultural and, consequently, possibly more susceptible to climate-induced production risks.

Table 3: Occupation of Household Heads by Locality

Locality	Farmers	Civil Servants	Traders	Others	Total
Doma	96 (27.4%)	104 (29.7%)	105 (30.0%)	45 (12.9%)	350
Burum-Burum	190 (57.6%)	55 (16.7%)	45 (13.6%)	40 (12.1%)	330
Rukubi	180 (53.4%)	58 (17.2%)	57 (16.9%)	42 (12.5%)	337

Source: Survey, 2026

Educational Attainment of Household Heads by Locality

Doma exhibits much greater levels of tertiary educational achievement (37.1%) in contrast to Burum-Burum (5.8%) and Rukubi (10.1%), whilst the latter two regions possess considerably larger proportions of household heads lacking formal education or possessing only primary school. This educational disparity reflects the employment trend and is anticipated to influence varying adaptive abilities among the three regions.

Table 4: Educational Attainment of Household Heads by Locality

Locality	No Formal Ed.	Primary	Secondary	Tertiary	Religious	Total
Doma	55 (15.7%)	50 (14.3%)	95 (27.1%)	130 (37.1%)	20 (5.7%)	350
Burum-Burum	92 (27.9%)	111 (33.6%)	98 (29.7%)	19 (5.8%)	10 (3.0%)	330
Rukubi	90 (26.7%)	123 (36.5%)	71 (21.1%)	34 (10.1%)	19 (5.6%)	337

Source: Survey, 2026

Households Perception of Flooding as a Climate Change Impact

Table 5 and Figure 6 distinctly illustrate that the recognition of flooding as a climate-associated risk is elevated in all three areas, with Doma at 91%, Rukubi at a maximum of 97%, and Burum-Burum at 93%. The persistently elevated awareness levels suggest that flooding is a commonly acknowledged climatic threat in the research region, with Rukubi households exhibiting the highest sensitivity or vulnerability to flood occurrences, while Doma households display slightly lower sensitivity, although still represent a significant majority. Recognition of floods as a climate-change-related threat is prevalent in all areas, increasing with distance from Doma, reaching its zenith in Rukubi (97.0%).

Table 5: Households Perception of Flooding as a Climate Change Impact

Locality	Yes	No	Total
Doma	319 (91.0%)	31 (9.0%)	350
Burum-Burum	308 (93.0%)	22 (7.0%)	330
Rukubi	328 (97.0%)	9 (3.0%)	337

Source: Survey, 2026

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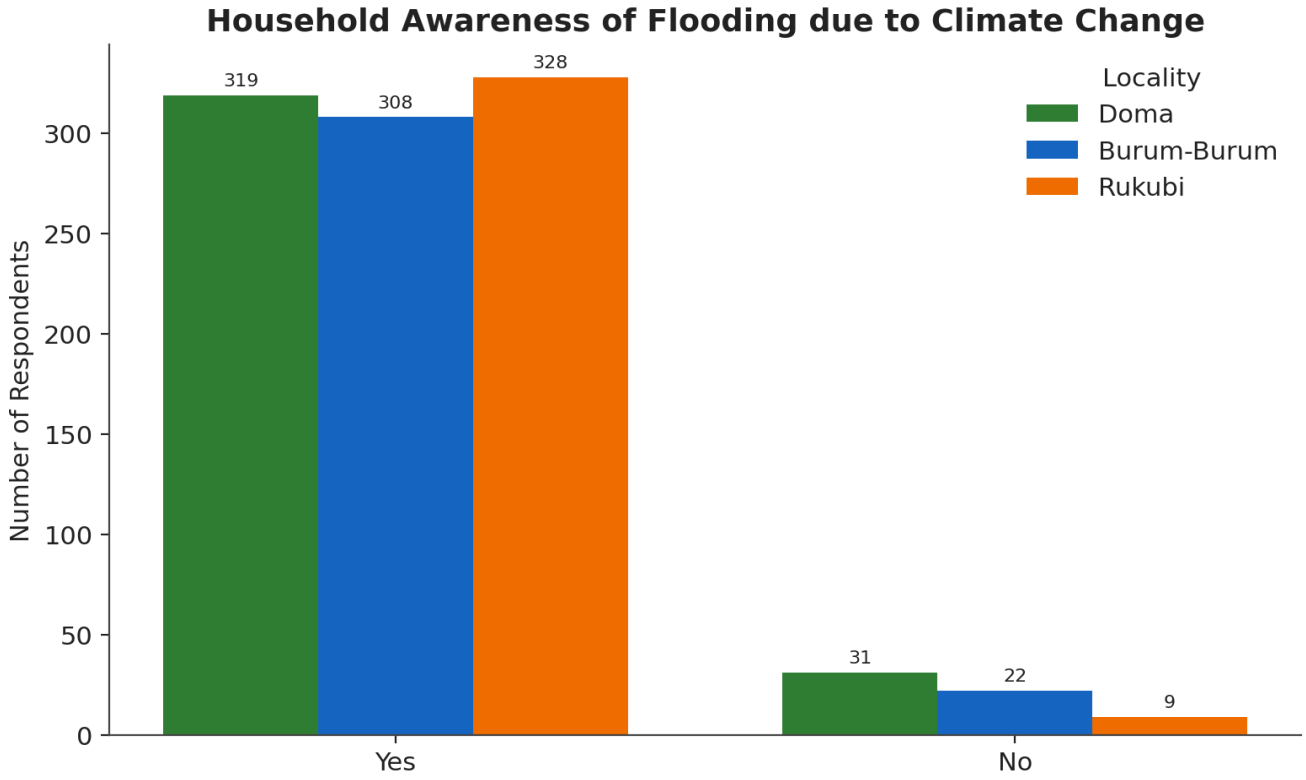


Figure 6: Household awareness of flooding as a climate change impact, by locality

Households Perception of Temperature Fluctuation

Table 6 and Figure 7 demonstrate that consciousness regarding variable temperatures associated with climate change is significantly elevated throughout the research region. Burum-Burum exhibits the most awareness at 97%, trailed by Rukubi at 95%, but Doma is comparatively lower at 87%. The more diminished awareness in Doma might indicate its more varied, less agriculture-reliant economy, where families may be less directly cognisant of temperature-related alterations in farming circumstances compared to the mostly agricultural villages of Burum-Burum and Rukubi. Doma has the least awareness of temperature variation at 87.0%, significantly lower than Burum-Burum's 97.0% and Rukubi's 95.0%.

Table 6: Households Perception of Temperature Fluctuation

Locality	Yes	No	Total
Doma	305 (87.0%)	45 (13.0%)	350
Burum-Burum	320 (97.0%)	10 (3.0%)	330
Rukubi	319 (95.0%)	18 (5.0%)	337

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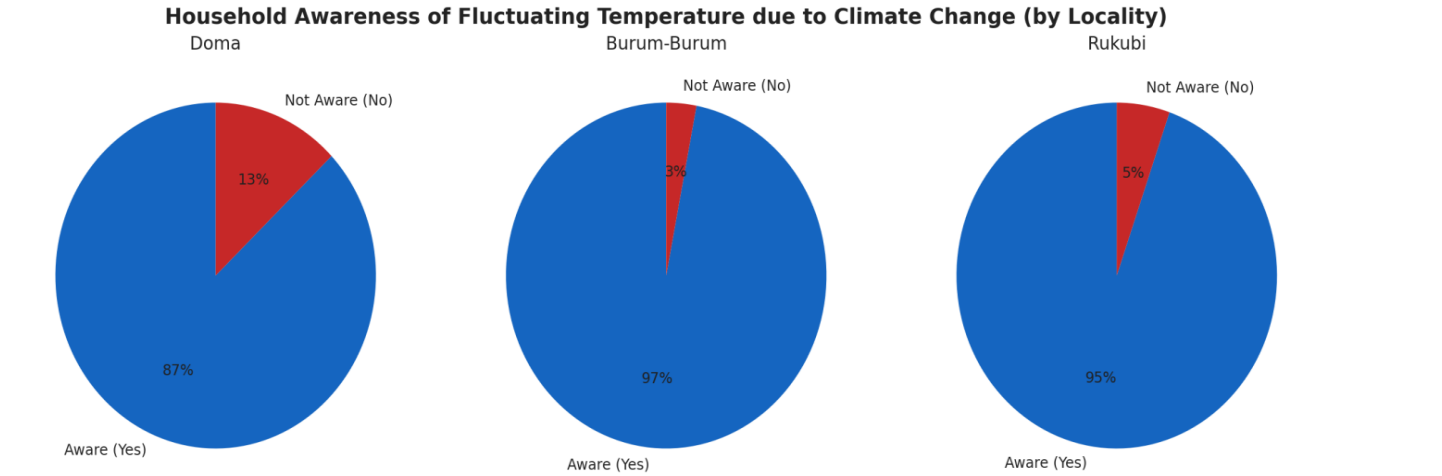


Figure 7: Proportional share of temperature-change awareness by locality

Households Perception of Soil Erosion

Recognition of soil erosion associated with intense precipitation is exceedingly prevalent in all regions (91%–99%), with Rukubi indicating nearly universal cognisance.

Table 7: Household Perception of Soil Erosion

Locality	Yes	No	Total
Doma	320 (91.0%)	30 (9.0%)	350
Burum-Burum	300 (91.0%)	30 (9.0%)	330
Rukubi	331 (98.0%)	6 (2.0%)	337

Source: Survey, 2026

Households Perception of Windstorms

Windstorm awareness has the most significant regional disparity across all hazard indicators, with 84.0% in Doma compared to 94.0% in Rukubi, indicating varying levels of direct exposure or differing prominence of this threat.

Table 8: Household Perception of Windstorms

Locality	Yes	No	Total
Doma	295 (84.0%)	55 (16.0%)	350
Burum-Burum	225 (98.0%)	5 (2.0%)	330
Rukubi	318 (94.0%)	19 (6.0%)	337

Source: Survey, 2026

Households Perception of Precipitation Variability

Awareness of precipitation variability is nearly universal in Doma (99.0%), although it is slightly lower in Rukubi (93.0%), contrasting with the trends observed in floods and windstorm indicators.

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Table 9: Household Perception of Precipitation Variability

Locality	Yes	No	Total
Doma	348 (99.0%)	2 (1.0%)	350
Burum-Burum	319 (97.0%)	14 (3.0%)	330
Rukubi	313 (93.0%)	24 (7.0%)	337

Source: Survey, 2026

Household Perception of Land Use/Land Cover Change

The belief that alterations in land use and land cover, such as those caused by development, significantly impact climate change is consistently elevated (93%–95%) and exhibits minimal fluctuation across different regions.

Table 10: Household Perception of Land Use/Land Cover Change

Locality	Yes	No	Total
Doma	332 (95.0%)	18 (5.0%)	350
Burum-Burum	310 (94.0%)	20 (6.0%)	330
Rukubi	315 (93.0%)	22 (7.0%)	337

Source: Survey, 2026

Analysis of the Tables

The chi-square (χ^2) test of independence by Pearson was utilised for each cross-tabulation of locality versus a socio-economic or perception variable, to ascertain if the response distribution varies substantially among the three localities. Cramér's V was calculated for each test to quantify effect size (degree of association), categorised as: inconsequential (<0.10), weak (0.10–0.20), moderate (0.20–0.30), and strong (>0.30). The alpha level for significance was established at 0.05.

Nine out of the 10 examined relationships exhibited statistically significant correlations with locale. Only marital status ($p = 0.251$) and land use/land cover perception ($p = 0.735$) did not achieve statistical significance, suggesting that these two factors are similarly distributed among Doma, Burum-Burum, and Rukubi. All other socio-economic and perceptual variables exhibit considerable variation among localities, but with generally weak-to-moderate impact sizes (Cramér's V ranging from 0.11 to 0.29), where educational attainment ($V = 0.288$) and windstorm perception ($V = 0.270$) have the most pronounced locale effects.

Table 11: Summary of Chi-Square Test Results by Variable

Variable (vs. Locality)	χ^2	df	N	p-value	Cramér's V	Decision
Gender	36.94	2	1,017	<0.001	0.191	Significant
Marital status	7.82	6	1,017	0.251	0.062	Not significant
Occupation	82.95	6	1,017	<0.001	0.202	Significant
Educational attainment	168.13	8	1,017	<0.001	0.288	Significant
Flooding perception	11.76	2	1,017	0.003	0.108	Significant
Temperature perception	27.17	2	1,017	<0.001	0.163	Significant
Soil erosion perception	30.51	2	1,146	<0.001	0.163	Significant
Windstorm perception	83.33	2	1,146	<0.001	0.270	Significant
Precipitation perception	19.66	2	1,020	<0.001	0.139	Significant
Land use/cover perception	0.62	2	1,017	0.735	0.025	Not significant

Results of the Analysis

The socio-economic analysis of the 1,017 surveyed households indicates that a majority of household heads are married (56–63% across different areas), with a stark contrast in occupational distribution by locality: Doma exhibits a varied occupational landscape (with civil service and trade surpassing agriculture), whereas Burum-Burum and Rukubi are primarily agricultural (54–58% engaged in farming). Educational achievement exhibits a similar trend, with Doma households significantly more inclined to own tertiary degrees (37.1%) compared to Burum-Burum (5.8%) or Rukubi (10.1%) households.

Awareness of climate dangers is elevated throughout the research region (74%–99% for specific variables), indicating that households generally acknowledge the assessed risks. Nonetheless, statistically meaningful variations in locale were seen for five out of six hazard markers. The awareness of windstorms demonstrated the most significant disparity and the highest effect size, with Doma (74.0%) significantly lagging behind Burum-Burum (90.6%) and Rukubi (95.7%). In contrast, the recognition of precipitation variability was greatest in Doma (99.0%) and least in Rukubi (93.0%), inverting the trend observed for flooding and windstorms. The perspective of land use and land cover change shown no significant variance among localities, indicating it is a widely held view irrespective of local occupational or educational backgrounds.

SUMMARY OF FINDINGS

- A total sample of 1,146 homes was calculated employing the Taro Yamane formula (e = 0.05) based on 2024 population forecasts; 1,017 valid responses (88.8%) were examined.
- Doma exhibits greater occupational and educational diversification compared to Burum-Burum and Rukubi, which primarily maintain an agrarian focus with diminished formal schooling levels.
- Occupational and educational levels vary markedly by region ($p<0.001$), although married status shows no significant variation ($p=0.251$).
- Climate hazard awareness is predominantly elevated (74%–99%), although exhibits considerable variation across different regions concerning flooding, temperature, soil erosion, windstorms, and precipitation (all $p<0.01$).
- Windstorm awareness exhibits the most pronounced locality-specific correlation (Cramér's $V=0.270$), with households in Doma demonstrating significantly lower awareness compared to those in Burum-Burum and Rukubi.
- Land use and land cover change perception is consistently elevated and shows no significant variation across different localities ($p=0.735$), indicating it is a collective, locality-agnostic perception.
- Rukubi is the sole area where female-led households surpass those led by males, and it also has the highest level of flood awareness at 97%.
- Doma is distinguished by its varied employment foundation, elevated levels of tertiary education, and a larger proportion of affluent households.
- Burum-Burum and Rukubi are mostly agricultural societies characterised by lower levels of educational achievement and income, but a heightened awareness of flooding and temperature variations.
- Awareness of climate change effects, such as flooding and temperature variations, exceeds 85% in all three regions, highlighting that households are generally cognisant of the climate threats impacting their areas, irrespective of socio-economic status.

DISCUSSION OF FINDINGS

The discovery that employment and educational levels vary markedly among Doma, Burum-Burum, and Rukubi provides empirical validation for the theoretical framework's assertion that locality serves as an indicator of varied sensitivity and adaptive capability within one Local Government Area. Burum-Burum and Rukubi's increased dependence on agriculture, coupled with diminished educational levels, likely results in heightened vulnerability to climate fluctuations impacting crop production, as well as limited formal avenues (such as literacy-based extension resources) for assimilating and translating climate data into adaptive measures —

aligning with previous Nigerian findings that associate education and livelihood diversification with adaptive capacity.

The significant disparity in windstorm awareness, with Doma households exhibiting a notably lower awareness rate (74.0%) compared to Burum-Burum (90.6%) and Rukubi (95.7%), is striking considering Doma's comparatively superior educational background — a trend that contradicts the straightforward assumption that increased education correlates with heightened awareness. This indicates that consciousness of particular dangers may be influenced more significantly by firsthand experience (i.e., areas often affected by windstorms exhibit greater awareness irrespective of educational background) than by overall educational achievement, reflecting the exposure-related perception trends noted in the extensive African climate-perception studies.

The lack of notable differences in land use/land cover perception across localities, despite considerable variation in other indicators, implies that households within the LGA possess a shared, potentially externally influenced belief that construction and land-use alterations are contributors to climate change, a perception seemingly less reliant on direct occupational or educational experiences than the other hazard indicators examined. Factors associated with climate change, including perception, understanding, and behaviour, are evidently intricate and multifaceted. The aim of this research was to present extensive and thorough factors that underpin behaviours associated with climate change.

RECOMMENDATIONS

Climate adaptation communication in Doma LGA ought to be tailored to specific localities instead of being standardised: Burum-Burum and Rukubi necessitate agriculture-centric climate-smart extension messaging due to their agrarian foundation and lower levels of formal education, whereas Doma might gain more from resilience messaging associated with occupational diversification. Targeted programs for early warning and knowledge regarding windstorms should be emphasised in Doma, where awareness (74.0%) significantly trails behind the other two areas, in order to bridge the evident perception gap. In light of the substantial correlation between education and location, it is imperative to enhance literacy-independent communication avenues (such as radio, community town-hall meetings, and networks of religious and traditional leaders) in Burum-Burum and Rukubi to successfully engage households with lower educational attainment.

Livelihood diversification assistance (non-agricultural income prospects, vocational education) ought to be provided to Burum-Burum and Rukubi to mitigate the vulnerability linked to almost total reliance on rain-fed agriculture. Future investigations ought to expand upon the existing cross-sectional framework by incorporating panel or repeated cross-sectional data collection, while also integrating objective climate and meteorological records (such as rainfall, temperature, and windstorm frequency) to corroborate household perceptions with actual climate trends.

CONCLUSION

This research indicates that household views on climate change and related socio-economic traits in Doma LGA vary by locality, being systematically influenced by the distinct occupational framework and educational levels of each area. The analysis, based on a meticulously obtained sample of 1,017 households from Doma, Burum-Burum, and Rukubi, reveals statistically significant variations in occupation, education, and five out of six indicators of climate-hazard perception by locality, whereas marital status and perceptions of land use/land cover are largely consistent throughout the region. The 12-year population forecast extending to 2024 offers a substantiated foundation for adjusting future survey iterations, enabling the LGA to conduct longitudinal assessments of climate perception and susceptibility. These results highlight the necessity of breaking down climate perception studies underneath the LGA level and formulating adaptation strategies that cater to local exposure, sensitivity, and adaptive capacity characteristics instead of using a uniform LGA-wide approach.

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