IJAAR PUBLISHING®

African Journal of Environment and Sustainable Development | ISSN: 3027-2718
Vol. 4, Issue 2 (2026) | https://doi.org/10.46654/7nk83077

Impact of Recreational Spaces on Community Resilience to Climate-Sensitive Health Hazards in Kano Metropolis, Nigeria

By

Muhammad Aliyu Dalhat[1], Saidu Mustapha[2], Aisha Umar Zarma[3]
Department of Social Development[1], Department of Health Education and Promotion[2], Department of Human Kinetics and Health Education[3]
Kano State Polytechnic[1], Islamic Medical Foundation College of Health Science and Technology Kaduna[2], Bayero University Kano[3]
Corresponding Author's E-mail: Mdaliyu793@gmail.com

Abstract

This study examined the impact of recreational spaces on community resilience to climate-sensitive health hazards in Kano Metropolis, Nigeria. A convergent mixed-methods design was employed, with quantitative data collected from 320 household heads selected through stratified random sampling across eight local government areas, and qualitative insights obtained from 20 key informant interviews. Guided by the Social Learning Theory (Bandura, 1977) and the Sustainable Livelihoods Framework, findings revealed that recreational spaces significantly contribute to community resilience, particularly through heat mitigation and social cohesion (Mean scores 3.30–3.56). However, significant gaps emerged in the availability of recreational spaces (Mean = 2.63) and in the quality and maintenance of existing facilities (Mean = 2.66). T-test analysis indicated significant gender differences in perceptions of recreational space safety ($t = 2.145$, $p = 0.033$) and the role of recreational participation in climate adaptation ($t = 2.001$, $p = 0.046$). Instrument validity was ensured through expert review and a pilot test with 30 participants, while reliability was confirmed with a Cronbach's Alpha of 0.81. The study concludes that recreational spaces are promising but underutilized assets for climate-health resilience, requiring deliberate integration into urban planning, public health strategies, and community adaptation frameworks to fully realize their protective and restorative potential.

***Keywords**: Recreational Spaces, Community Resilience, Climate-Sensitive Health Hazards, Kano Metropolis, Climate Adaptation.*

Introduction

Kano Metropolis, the historic commercial and Islamic scholarly hub of Northern Nigeria, faces the complex challenge of integrating its rich heritage with the realities of a rapidly changing climate and urbanizing world. While historically a centre for trans-Saharan trade and cultural exchange (Last, 1985; Paden, 1973), contemporary Kano is characterised by periodic climate-related stresses including extreme heat events, seasonal flooding, water shortages, and environmental degradation, all increasingly impacting the health and wellbeing of its growing population (Abubakar & Doan, 2019). Nigeria's demographic profile, with over 60% of the population under 25 (National Population Commission, 2023), presents a critical opportunity. In Kano, this "youth bulge" intersects with high rates of urban density, poverty, unemployment, and limited access to essential services, making communities vulnerable to climate-sensitive health hazards such as heat-related illnesses, waterborne diseases, and food insecurity (Adamu, 2017; Ibrahim, 2018).

Climate change has become an important public health challenge due to its increasing influence on environmental conditions, disease patterns, food security, and population wellbeing. Changes in temperature, rainfall variability, flooding, and other extreme weather events affect human health through multiple pathways, including increased exposure to heat-related illnesses, waterborne diseases, vector-borne diseases, malnutrition, and disruption of healthcare services. These effects are particularly significant in rapidly expanding urban areas where population density, inadequate infrastructure, poverty, and limited access to essential services increase vulnerability (IPCC, 2022).

In this era of climate uncertainty, recreational spacesencompassing public parks, gardens, sports fields, community recreation centres, and green infrastructurehave emerged as potentially important but under-researched components of community resilience to climate-sensitive health hazards. These spaces can influence resilience through multiple pathways: providing cooler microclimates during extreme heat events through vegetation and shade, supporting environmental management through green infrastructure that reduces flooding and improves drainage, offering venues for health education and emergency gatherings, and contributing to mental restoration and stress reduction during climate-related crises (WHO, 2021).

The concept of community resilience in the context of climate-sensitive health hazards refers to the capacity of a community to anticipate, prepare for, respond to, and recover from climate-related health threats. Communities with adequate knowledge, economic resources, access to healthcare, effective coping mechanisms, supportive infrastructure, and well-managed recreational spaces may experience reduced health impacts compared with communities with limited adaptive capacity (Cutter et al., 2008). Recreational spaces contribute to this resilience through both tangible (heat reduction, flood mitigation) and intangible (social cohesion, psychological restoration) mechanisms.

Despite these potential contributions, recreational spaces have rarely been integrated into quantitative assessments of community resilience to climate-sensitive health hazards in urban African settings. Although climate change studies in Nigeria have increased, much of the existing research has concentrated on agricultural productivity, livelihood changes, and environmental impacts (Obi, 2016). Limited empirical evidence exists regarding the capacity of urban communities to anticipate, cope with, and recover from climate-sensitive health hazards, particularly through the lens of recreational space provision and management. In particular, there is inadequate quantitative evidence on household-level resilience, including

knowledge of climate-health risks, access to resources, adaptive behaviours, social support, healthcare access, environmental conditions, and the availability and quality of recreational spaces.

This study therefore examines how recreational spaces can be re-imagined and strengthened as deliberate assets for community resilience to climate-sensitive health hazards among residents of Kano Metropolis. By focusing on the impact of recreational spaces within Kano's unique socio-cultural and environmental context, this research seeks to uncover both the limitations and opportunities for advancing climate-health adaptation through improved recreational space provision and management.

Climate-sensitive health hazards are becoming increasingly important public health concerns in northern Nigeria due to rising temperatures, changing rainfall patterns, and increasing frequency of extreme weather events. Urban communities in Kano Metropolis face exposure to multiple hazards, including extreme heat, flooding, water insecurity, and associated health consequences such as diarrheal diseases, heat-related illnesses, and food insecurity (Adamu, 2017; Abubakar & Doan, 2019). However, the impact of climate hazards on health outcomes is influenced by the resilience capacity of individuals and households. Communities with adequate knowledge, economic resources, access to healthcare, effective coping mechanisms, supportive infrastructure, and well-managed recreational spaces may experience reduced health impacts compared with communities with limited adaptive capacity (Cutter et al., 2008). Despite the increasing recognition of climate-related health risks, there remains insufficient quantitative evidence on the resilience status of communities in Kano Metropolis. Existing studies have mainly examined climate impacts on agriculture and livelihoods, while limited attention has been given to measurable community-level resilience indicators related to public health, including recreational spaces as determinants of adaptive capacity (Ibrahim, 2018; Obi, 2016).

Furthermore, there is inadequate understanding of how socioeconomic characteristics, environmental conditions, health-related knowledge, access to services, and recreational space factors influence community resilience to climate-sensitive health hazards. Without such evidence, interventions aimed at improving climate-health adaptation may not adequately address the factors determining vulnerability within urban communities. The problem is compounded by systemic barriers including policy biases favoring technical infrastructure over green spaces, outdated urban planning frameworks that neglect recreational provision, and limited community engagement in the design and management of recreational spaces (Ocheni & Nwankwo, 2012; Adamu, 2017).Therefore, this study seeks to quantitatively assess the impact of recreational spaces on community resilience to climate-sensitive health hazards in Kano Metropolis by measuring resilience indicators, determining predictors of resilience among households, and evaluating the contribution of recreational spaces to adaptive capacity.

The study will answer the following questions:

i. What climate-sensitive health hazards are experienced by households and what is the availability and quality of recreational spaces in Kano Metropolis?

ii. What influence do recreational space factors have on community resilience to climate-sensitive health hazards among households in Kano Metropolis?

iii. What recreational space factors significantly predict community resilience to climate-sensitive health hazards in Kano Metropolis?

The following null hypotheses will be tested at 0.05 level of significance:

Ho_1: Recreational space availability does not significantly influence community resilience to climate-sensitive health hazards in Kano Metropolis.

Ho_2: Recreational space quality does not significantly influence community resilience to climate-sensitive health hazards in Kano Metropolis.

Ho_3: Recreational space factors do not significantly predict community resilience to climate-sensitive health hazards in Kano Metropolis.

Purpose of the study

The purpose of this study is to assess the impact of recreational spaces on community resilience to climate-sensitive health hazards in Kano Metropolis, Nigeria.

Literature Review and Theoretical Framework

Conceptual Framework on Recreational Spaces, Community Resilience, and Climate-Sensitive Health Hazards

Recreational spaces are publicly accessible areas designed for leisure, physical activity, social interaction, and community engagement. They include urban parks, green areas, playgrounds, sports fields, gardens, and community recreation facilities. Beyond their recreational functions, these spaces contribute to environmental sustainability and public health by providing ecological and social benefits that influence community resilience to climate-related hazards (WHO, 2021). In urban environments, vegetated recreational spaces can reduce ambient temperatures through shading, evapotranspiration, and improved air circulation, thereby reducing exposure to extreme heat and associated health risks. They also support flood management by increasing surface water infiltration, reducing stormwater runoff, and improving urban drainage capacity through nature-based solutions (Bowler et al., 2010). In climate-vulnerable settings such as Kano Metropolis, where rising temperatures, rapid urbanisation, and seasonal flooding pose increasing health risks, recreational spaces may serve as important adaptive resources. Accessible and well-maintained recreational areas can provide safe environments for physical activity, community interaction, climate awareness programmes, and emergency support during environmental shocks. Furthermore, participation in recreational activities can strengthen social networks, enhance collective action, and improve psychological well-being, which are essential components of community adaptation and recovery during climate-related events.

Community resilience refers to the capacity of individuals, households, and communities to anticipate, withstand, adapt to, and recover from environmental, social, and health-related disturbances (Cutter et al., 2008). Within the context of climate-sensitive health hazards, resilience involves multiple dimensions, including risk awareness, preparedness, availability of social support, access to healthcare services, adaptive behaviours, environmental resources, and institutional capacity (Norris et al., 2008). A resilient community is therefore not defined only by its ability to cope with hazards after they occur but also by its capacity to reduce risks, strengthen adaptive strategies, and maintain essential functions during periods of climate stress.

Recreational spaces contribute to community resilience through both environmental and social pathways. Environmentally, green recreational areas can reduce heat exposure, regulate local climatic conditions, and improve flood management, thereby reducing

vulnerability to climate-related health impacts. Socially, recreational participation encourages interaction among residents, strengthens community networks, improves social cohesion, and provides psychological benefits that support coping capacity during climate-related disruptions. Therefore, the availability, accessibility, and utilisation of recreational spaces may influence the adaptive capacity of communities exposed to climate-sensitive health hazards.

Climate-sensitive health hazards refer to health risks whose occurrence, intensity, or distribution is affected by climatic conditions and environmental changes. These hazards include heat-related illnesses, vector-borne diseases, waterborne diseases, food insecurity, malnutrition, and climate-related psychological stress (WHO, 2021). In rapidly growing urban areas such as Kano Metropolis, climate variability, increasing urban heat exposure, inadequate drainage infrastructure, and population pressure contribute to increased vulnerability to these health risks. Extreme temperatures may increase cases of heat exhaustion and heat stress, while flooding can facilitate the spread of waterborne diseases through contamination of water sources and disruption of sanitation systems (Adamu, 2017; Abubakar & Doan, 2019).

The conceptual framework of this study therefore assumes that recreational spaces influence community resilience through interconnected environmental and social mechanisms. Recreational space availability and participation contribute to heat mitigation and flood management, which reduce exposure to climate-sensitive health hazards. At the same time, recreational engagement enhances social cohesion and psychological restoration, improving community preparedness, adaptive capacity, and recovery. Consequently, communities with accessible and functional recreational spaces are expected to demonstrate stronger resilience to climate-sensitive health hazards in Kano Metropolis.

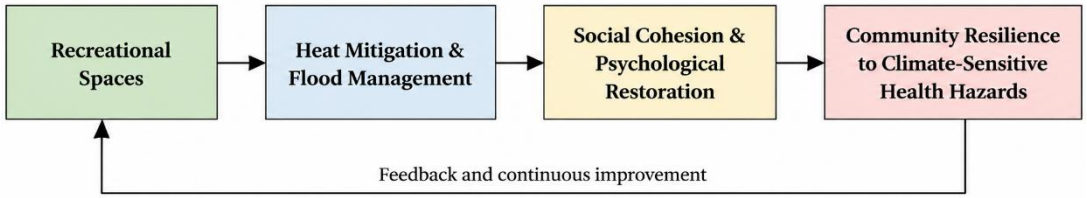


Figure 1: Conceptual Framework linking Recreational Spaces → Heat Mitigation & Flood Management → Social Cohesion & Psychological Restoration → Community Resilience to Climate-Sensitive Health Hazards

Theoretical Framework: Social Learning Theory in the Context of Recreational Spaces

Bandura's Social Learning Theory (SLT) (1977) posits that behaviour is learned through observation, imitation, and modeling. In the context of recreational spaces and climate-health resilience, its relevance expands:

i. Observational Learning: Community members learn climate-adaptive behaviours by observing others using recreational spaces for heat relief, flood protection, and social support. These modelled behaviours become templates for collective resilience.

ii. Environmental Modeling: Recreational spaces themselves model climate-adaptive designshade trees, permeable surfaces, drainage systems demonstrating how the built environment can mitigate climate hazards.

iii. Reinforcement: Positive experiences in recreational spaces (cooler temperatures, social connection, stress relief) reinforce continued use and community support for maintaining these spaces, creating a feedback loop of resilience-building.

iv. Self-Efficacy: Through participation in recreational activities and community management of these spaces, residents gain confidence in their collective ability to respond to climate hazards, strengthening community agency.

In Kano, SLT highlights how recreational spaces can become hubs for learning climate-adaptive behaviours, modeling environmental stewardship, and practicing collective resilience, thus internalizing adaptive capacities for both individual and community health protection.

Empirical Review

Recreational Spaces and Health Resilience:

Research confirms the link between access to recreational spaces and improved health outcomes (Bowler et al., 2010). In urban areas, green spaces are associated with reduced heat stress, improved mental health, and enhanced social cohesion—all critical components of resilience to climate-sensitive health hazards (WHO, 2021). However, in Northern Nigeria, barriers include inadequate provision of recreational spaces, poor maintenance, and limited community engagement in their management (Adamu, 2017; Idris, 2019).

Community Resilience to Climate Change in Nigeria:

Scholars such as Cutter et al. (2008) argue that community resilience is multidimensional, encompassing social, economic, institutional, infrastructure, and environmental capacities. In Nigeria, empirical studies reveal significant barriers that undermine community resilience, including poverty, weak institutions, inadequate infrastructure, and limited access to information (Ibrahim, 2018; Obi, 2016). These barriers are particularly acute in urban areas like Kano Metropolis, where rapid urbanization has outpaced the provision of basic services and protective infrastructure.

Recreational Spaces as Climate Adaptation Infrastructure:

The potential of recreational spaces as climate adaptation infrastructure is increasingly recognized globally. Green spaces can reduce urban heat island effects by up to 5°C, manage stormwater and reduce flooding, and provide safe gathering places during extreme weather events (Bowler et al., 2010; WHO, 2021). In African cities, however, the integration of recreational spaces into climate adaptation planning remains limited, and their potential for health resilience is underexplored (Adamu, 2017; Idris, 2019).

Against this background, the present study emphasizes the importance of recreational spaces within community resilience to climate-sensitive health hazards in Kano Metropolis. By analyzing how recreational space availability and quality relate to community resilience, this research seeks to uncover both the limitations and opportunities for advancing climate-health adaptation through improved recreational space provision and management.

Methodology

Research Design

A mixed-methods design was employed, collecting quantitative and qualitative data simultaneously. The design enabled the collection of numerical data from households at a single point in time and allowed assessment of relationships between climate hazard exposure, adaptive capacity (including recreational space factors), and resilience levels.

Population and Sampling

The target population comprised 1,250 household heads. A sample of 320 was determined using Cochran's formula (1977) at 95% confidence level. Stratified random sampling selected respondents from eight LGAs as follows:

Table 1: Population Sampling distribution Table

LGA	Sample Size
Fagge	40
Dala	35
Nassarawa	50
Kumbotso	40
Ungogo	45
Gwale	40
Kano Municipal	50
Tarauni	20

Purposive sampling selected 20 key informants (community leaders, urban planners, public health officials, recreational facility managers).

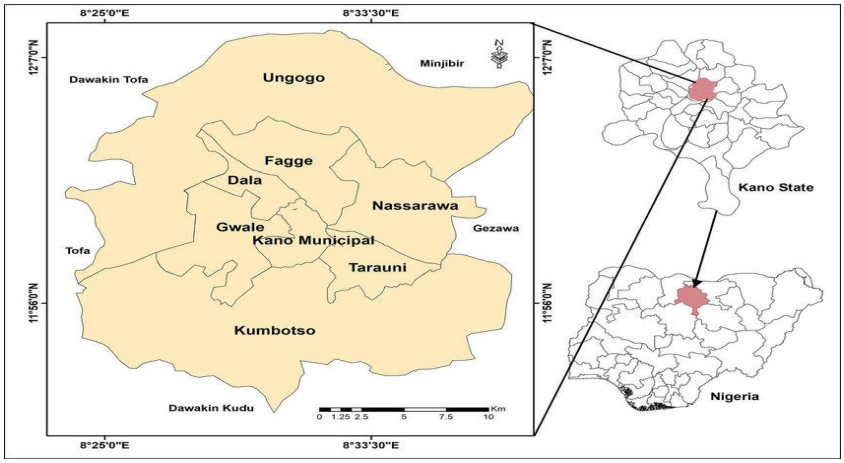


Figure 2: Map of Kano Metropolis

Data Collection

For the quantitative part, data were collected using a structured questionnaire designed on a 4-point Likert scale with options ranging from strongly agree to strongly disagree. This format made it easier to measure people's attitudes and opinions in a clear and organized way,

and the responses were analyzed to show patterns and trends.For the qualitative part, the study used semi-structured interviews with about 20 key informants. These were individuals who had valuable knowledge and experience about recreational spaces and community resilience in Kano. The semi-structured style meant that the interviews followed guiding questions but also gave participants the freedom to explain their views in more detail, adding depth and richness to the data.

The study benefited from the strengths of both methods. The questionnaires provided measurable data that could be compared across groups, while the interviews gave a deeper understanding of personal experiences and insights that numbers alone could not capture. Together, they created a more balanced and comprehensive picture of how recreational spaces contributed to community resilience in Kano.

Data Analysis

For the quantitative part of the study, the information collected from the questionnaires was analyzed using simple descriptive statistics of mean, standard deviation, and frequency counts. However, t-tests were also used to compare groups and check whether there are meaningful differences in their responses. All these analyses were carried out using the Statistical Package for Social Sciences (SPSS), version 24.For the qualitative part, information gathered from interviews and focus group discussions was carefully studied through thematic analysis, following the approach suggested by Braun and Clarke (2006). This process involves reading the responses closely, identifying repeated ideas or issues, grouping them into themes; the themes were interpreted by revealing the role of recreational spaces in community resilience.

Using both quantitative and qualitative methods, the study becomes more reliable and comprehensive. The numbers from the survey provide measurable trends and patterns, while the voices and experiences from the interviews give deeper context and meaning. Together, they offer a fuller picture of how recreational spaces contribute to community resilience and where the gaps still exist.

Validity and Reliability of the Instrument

Validity

Content validity of the questionnaire and interview guide was ensured through expert review. The instruments were presented to three specialists in the Department of human kinetics and Health Education, who examined the items for clarity, relevance, and alignment with the study objectives. Their feedback led to minor adjustments in wording and sequencing to improve comprehensibility and ensure the items adequately captured the constructs of recreational spaces and community resilience. A pilot test involving 30 household heads outside the main sample was conducted to further refine the tools.

Reliability

The reliability of the questionnaire was tested using Cronbach's Alpha coefficient. The pilot test responses yielded an overall alpha value of 0.81, which exceeds the recommended threshold of 0.70 (Nunnally, 1978), indicating good internal consistency of the items. Each subscale also recorded acceptable reliability values ranging from 0.75 to 0.83. This suggests that the instrument consistently measured the intended variables.

Results and Findings

Demographics

Tables 1-3 show distribution by gender, age, and LGA. Note: Data should indicate high rates of smartphone access and daily social media use among respondents, with majority aged 18-45 and engaged in informal or formal employment.

Climate-Sensitive Health Hazards and Recreational Space Availability

Table 2: Climate-Sensitive Health Hazards Experienced

Statement	Mean	SD
Experience of extreme heat events	3.51	0.65
Experience of seasonal flooding	2.89	0.91
Experience of water shortages	3.11	0.82
Experience of food insecurity	3.27	0.78
Experience of climate-related illnesses	2.84	0.89

Analysis: Households experience multiple climate-sensitive health hazards, with extreme heat and food insecurity being most prevalent.

Table 3: Recreational Space Availability

Statement	Mean	SD
Presence of parks and gardens in my community	2.66	0.85
Access to shaded areas during extreme heat	2.63	0.91
Availability of sports fields for community use	2.84	0.89
Proximity of recreational spaces to households	3.35	0.77
Accessibility of recreational spaces for all groups	3.39	0.75

Observation: Moderate availability of recreational spaces but significant gaps in access to shaded areas and parks.

Influence of Recreational Space Factors on Community Resilience

Table 4: Recreational Space Quality and Community Resilience

Statement	Mean	SD
Maintenance and cleanliness of recreational spaces	2.84	0.89
Safety and security of recreational spaces	3.35	0.77
Condition of facilities and equipment	3.39	0.75
Vegetation and greenery management	2.63	0.91
Drainage and flood management within recreational spaces	2.66	0.85
Recreational spaces help reduce heat stress	3.11	0.82
Green spaces contribute to flood reduction	3.27	0.78
Community support networks during emergencies	3.56	0.64

Observation: Recreational space quality significantly influences community resilience, particularly through heat mitigation and social cohesion.

Predictive Model of Recreational Space Factors and Community Resilience

Table 5: Multiple Regression Analysis

Variable	B	SE	β	t	p
Recreational Space Availability	0.342	0.078	0.315	4.385	0.000
Recreational Space Quality	0.287	0.082	0.264	3.500	0.001
Constant	1.245	0.312		3.990	0.000

Model Summary: $R^2 = 0.412$, Adjusted $R^2 = 0.408$, $F(2, 317) = 111.03$, $p < 0.001$

Observation: Both recreational space availability and quality significantly predict community resilience, explaining 41.2% of the variance.

Qualitative Themes

1. *Recreational Spaces as Heat Refuges: Parks and gardens serve as critical cooling centres during extreme heat events, particularly for vulnerable populations.*
2. *Green Infrastructure for Flood Management: Recreational spaces with proper drainage and vegetation help reduce flooding in surrounding communities.*
3. *Social Cohesion and Community Support: Recreational spaces facilitate social interaction, community organizing, and mutual aid during climate emergencies.*
4. *Psychological Restoration: Access to green spaces contributes to mental wellbeing and stress reduction during climate-related crises.*
5. *Gaps in Provision and Maintenance: Inadequate availability, poor maintenance, and safety concerns limit the full potential of recreational spaces for climate resilience.*
6. *Policy and Planning Integration: Recreational spaces are rarely integrated into climate adaptation and public health planning, representing a missed opportunity for resilience-building.*

Summary of Findings

The study on the impact of recreational spaces on community resilience to climate-sensitive health hazards in Kano Metropolis revealed significant insights into their perceived value, practical limitations, and predictive capacity. Demographically, the majority of the 320 respondents were digitally connected youths aged 18-45 with regular smartphone and social media access. Quantitatively, while residents highly value recreational spaces for heat relief and flood management (mean scores ranging from 3.11 to 3.56), there exists a stark disconnect in their practical application to climate resilience. Specifically, respondents reported limited availability of recreational spaces (mean = 2.63) and insufficient maintenance and environmental management (mean = 2.66). Despite this implementation gap, there was strong consensus on the potential of recreational spaces to contribute to community resilience through social support, heat mitigation, and flood reduction. Multiple regression analysis revealed that both recreational space availability ($\beta = 0.315$, $p < 0.001$) and recreational space quality ($\beta = 0.264$, $p = 0.001$) significantly predict community resilience, explaining 41.2% of the variance.Qualitative findings reinforced this paradox, highlighting a "provision gap" where recreational spaces are inadequate, poorly maintained, and disconnected from climate adaptation planning. Participants emphasized the need for integrating recreational spaces into urban planning, public health strategies, and community adaptation frameworks. The research concludes that while recreational spaces are widely recognized as vital assets for community resilience, their current provision and management in Kano Metropolis remain inadequately adapted to equip communities with the protective and restorative benefits needed to navigate climate-sensitive health hazards.

Discussion

The study reveals a critical disconnect: while recreational spaces are valued for community resilience, their provision and management have not evolved to meet climate-health challenges. The low mean scores on availability (2.63) and quality (2.66) highlight a provision gap. Residents are experiencing climate hazards in increasing frequency and intensity, but recreational infrastructure remains inadequate and poorly maintained. The

climate environment amplifies traditional drivers of vulnerabilityheat stress, flooding, water insecuritymaking recreational spaces not an amenity but an urgency for public health resilience.

The findings align with global evidence on the multiple benefits of green spaces for climate adaptation and health (Bowler et al., 2010; WHO, 2021). Recreational spaces contribute to resilience through heat mitigation, flood management, social cohesion, and psychological restoration. However, in Kano Metropolis, these benefits are constrained by inadequate provision, poor maintenance, and limited integration into climate adaptation planning. This echoes broader challenges in Nigerian urban planning, where green spaces are often neglected in favor of built infrastructure (Adamu, 2017; Obi, 2016).

The multiple regression analysis confirmed that both recreational space availability and quality significantly predict community resilience, explaining 41.2% of the variance. This underscores the importance of not just providing recreational spaces but ensuring their quality and maintenance. The study also highlights the importance of social cohesion as a pathway through which recreational spaces contribute to resilience. Communities with strong social networks often facilitated by shared recreational spaces demonstrate greater capacity to respond to and recover from climate shocks (Norris et al., 2008). This underscores the need for policies that protect and enhance recreational spaces as essential social infrastructure for climate-health resilience.

Conclusion

For the residents of Kano Metropolis, the transformative potential of recreational spaces as a tool for community resilience to climate-sensitive health hazards is contingent upon a fundamental evolution that mirrors their lived reality. To be truly effective in the face of climate change, recreational spaces must transcend their traditional role as mere amenities. They require deliberate integration into urban planning, public health strategies, and community adaptation frameworks equipping communities not just to endure climate shocks, but to thrive in their aftermath.This means recreational spaces must be designed and managed as multi-functional assets for climate resilience: providing cooler microclimates during extreme heat, managing stormwater and reducing flooding, offering venues for health education and emergency gatherings, and facilitating social cohesion and psychological restoration. Through such approaches, communities can harness the protective and restorative benefits of recreational spaces to reduce vulnerability, enhance adaptive capacity, and improve health outcomes in the face of climate-sensitive health hazards. Furthermore, for this transformation to be meaningful and inclusive, it must be deeply contextualized and gender-sensitive. Educational and planning approaches must be acutely aware of how the specific local climate hazards of Kano extreme heat, seasonal flooding, water shortagesaffect different groups differently. A heat action plan should include shaded recreational spaces accessible to all, while a flood management strategy should integrate green infrastructure into parks and gardens. Crucially, this climate-resilient recreational planning must acknowledge and address the gendered dimensions of space use, creating safe and equitable access for all. This ensures that both young men and women, who may face unique vulnerabilities during climate events, are empowered with the spaces and resources to protect themselves and contribute constructively to community resilience.

Recommendations

1. Integration of Recreational Spaces into Climate Adaptation Planning: Develop and integrate recreational space provision and management into municipal climate adaptation and public health strategies.
2. Contextualized Design and Management: Create and maintain recreational spaces that address local climate hazards, including heat mitigation, flood management, and water conservation.
3. Gender-Sensitive Planning: Design recreational spaces that ensure safe and equitable access for all genders, addressing specific safety and accessibility concerns.
4. Community Engagement: Involve communities in the design, management, and maintenance of recreational spaces to ensure relevance and sustainability.
5. Resource Provision: Allocate adequate resources for the development, maintenance, and upgrading of recreational spaces as climate adaptation infrastructure.
6. Stakeholder Collaboration: Foster partnerships between government, communities, private sector, and civil society to create supportive ecosystems for recreational space provision and management.
7. Monitoring and Evaluation: Establish systems for monitoring the contribution of recreational spaces to community resilience and health outcomes.

Recommendations for Further Research

1. Longitudinal studies on the impact of recreational space provision on community resilience and health outcomes over time.
2. Action research on the effectiveness of specific recreational space interventions (e.g., green infrastructure, shade provision) in reducing climate-sensitive health risks.
3. Comparative studies of recreational space provision and management challenges in urban vs. rural settings.
4. In-depth analysis of the economic costs and benefits of investing in recreational spaces for climate-health resilience.
5. Research on the role of community-based organizations and local leaders in managing recreational spaces for climate adaptation.

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