



A Sociological Analysis of Coping Strategies on Poor Water Supply among the Residents of Gashua Community in Yobe State, Nigeria

Hussaini Ibn Mohammed, PhD^{1*}; Aishatu Ali²; Aishatu Umar Dahiru, PhD³

*ORCID: 0009-0000-8962-3658

¹Department of Sociology, Faculty of Management and Social Sciences, Federal University Gashua, Yobe State, Nigeria

^{2,3}Department of Sociology and Anthropology, Faculty of Social Sciences, University of Maiduguri, Borno State, Nigeria

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*Corresponding Author: Hussaini Ibn Mohammed, PhD

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Abstract

Original Research

Water insecurity in rural African communities is not simply a resource problem. It is, at its core, a structural outcome of political-economic arrangements that consistently shortchange peripheral areas. Drawing on urban bias theory, this study examines the coping strategies employed by residents of Gashua community, Bade Local Government Area, Yobe State, Nigeria, in response to chronic poor water supply. A mixed-methods design combined a structured questionnaire administered to 150 respondents selected through multistage cluster and simple random sampling, with in-depth interviews among four purposively selected key informants. Quantitative data were analyzed using descriptive statistics; qualitative data were thematically transcribed and analyzed in narrative form. The study finds that 61.6% of respondents rated water supply as poor or very poor, with piped infrastructure virtually absent and boreholes (40.0%) and wells (36.7%) serving as primary sources. The pattern of infrastructural neglect observed, specifically broken pipes (30.8%) and poor maintenance (28.3%), reflects state resource allocation consistent with urban bias theory. Coping strategies, including borehole construction, water hauling, storage, point-of-use treatment, and vendor purchase, are stratified by socioeconomic status. Wealthier households absorb the fixed cost of private boreholes, while lower-income families bear elevated health risks through reliance on unregulated vendors. Typhoid fever (40.8%) and cholera (31.6%) emerged as the dominant disease outcomes. The study argues that coping strategies in Gashua reproduce existing socioeconomic inequalities and that durable redress requires structural investment in water governance rather than household-level adaptation alone.

Keywords: Coping Strategies, Household Water Insecurity, Gashua Community, Nigeria, Rural Infrastructure Inequality, Urban Bias Theory, Water Governance, Yobe State.

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Introduction

Water is not a luxury variable in human systems. Two billion people globally still lack access to safely managed drinking water, with sub-Saharan Africa carrying a disproportionate share of that burden (WHO and UNICEF, 2023). Nigeria has made repeated policy commitments to universal water access, through the National Economic Empowerment and Development Strategy, Vision 2020, and the National Water Resources Master Plan, but implementation has been deeply uneven. Rural and peri-urban communities across the country remain underserved, a pattern especially pronounced in the northeast geopolitical zone where Yobe State sits (Kayode et al., 2021). Conflict-related disruption, climate-induced water stress, and chronic underfunding have compounded pre-existing infrastructure deficits in this region (Abubakar, 2019; Babatunde et al., 2020).

Gashua community, located in Bade Local Government Area, exemplifies the problem. Decades of deteriorating pipe infrastructure, episodic and unsustainable government intervention, and the near-total collapse of formal water distribution have left residents improvising. They dig boreholes, haul water from wells, buy from vendors, and boil what they can. Each of these strategies carries its own disease risk. Reliance on unregulated sources is a primary driver of waterborne disease burden in comparable settings (Bain et al., 2014; Shaheed et al., 2014).

Urban bias theory, developed by Lipton (1977) and extended by Bates (1981) and subsequent scholars, offers a productive framework for explaining why Gashua finds itself in this position. The theory holds that political-economic arrangements in low-income countries systematically channel public resources toward urban centers, producing persistent underdevelopment in rural areas. Water infrastructure is a textbook illustration: functioning piped supply operates in urban Government Residential Areas while rural distribution systems collapse without maintenance response. Davis and Heller (2015) and Satterthwaite and Mitlin (2014) have since refined this original formulation, showing that the binary is less urban versus rural than

politically connected versus marginalized, but the basic dynamic holds in the Gashua case.

What is absent from the literature is community-level empirical evidence on how Gashua residents actually navigate this structural condition, and how their coping strategies reproduce rather than resolve the inequalities that political marginalization produces. This study addresses that gap. Its contribution is threefold: it provides original field evidence on water access in an under-studied northeastern Nigerian community; it applies urban bias theory to explain infrastructural neglect at a granular, local level; and it demonstrates that household coping strategies are social and political outcomes, not neutral adaptations.

Statement of the Problem

Gashua residents face two overlapping burdens. The first is physical: water distribution infrastructure has collapsed and the water board has not restored it. The second is structural: in filling the gap left by state withdrawal, residents must draw on resources they do not have equally. Wealthier households install boreholes; poorer ones buy from vendors or use wells that may be contaminated. The health cost of this arrangement falls on those least able to manage it. Identifying how people cope, and at what price, is a precondition for designing interventions that target the source of the problem rather than its symptoms.

Research Objectives

This study was guided by four objectives:

1. To assess the nature and severity of poor water supply in Gashua community.
2. To examine the health and socioeconomic consequences of poor water supply among residents.
3. To identify and analyze coping strategies adopted by residents, including their socioeconomic differentiation.
4. To propose evidence-based solutions to the problem of poor water supply in the community.

Literature Review

Conceptual Clarifications

Water scarcity refers to the physical insufficiency of water resources relative to demand, measured at basin or regional scale (Mekonnen and Hoekstra, 2016). Water insecurity, the broader concept used in this study, covers both physical availability and the social, economic, and institutional dimensions of access, including affordability, reliability, quality, and the coping burden imposed on households (Jepson et al., 2017; Young et al., 2019). The Household Water Insecurity Experiences (HWISE) scale has emerged as a validated tool for measuring this concept across low- and middle-income countries (Young et al., 2019). Poor water supply, as used here, describes a community-level condition in which formal infrastructure fails to deliver adequate, reliable, and safe water, the specific situation documented in Gashua.

Global and African Water Insecurity: Current Evidence

About 418 million people in sub-Saharan Africa currently lack basic water services (WHO and UNICEF, 2023). Progress toward Sustainable Development Goal 6 has been uneven: urban access rates have improved modestly while rural areas, and especially conflict-affected zones, continue to fall behind (UNICEF and WHO, 2021). In Nigeria, rural water supply coverage in the northeast geopolitical zone ranks among the lowest in the country, with borehole and hand-pump functionality rates often below 50% due to maintenance failures (Kayode et al., 2021).

Climate change makes this worse. Increasing aridity, erratic rainfall, and more frequent droughts are reducing groundwater recharge rates across the Sahel and northern Nigeria, including Yobe State (Babatunde et al., 2020; Ezekiel et al., 2022). Gashua sits in a semi-arid zone, which means climate-driven water stress layers on top of infrastructural deficits that already exist. Abubakar (2019) documents that post-conflict reconstruction spending in Yobe, Borno, and Adamawa states prioritized security

infrastructure over basic service delivery, crowding out water investments.

Health Consequences of Water Insecurity

An estimated 1.8 billion people globally use water contaminated with fecal matter, putting them at risk of cholera, typhoid, dysentery, and hepatitis A (Bain et al., 2014). Waterborne diarrheal diseases remain among the leading causes of death in children under five in sub-Saharan Africa (GBD Collaborators, 2020). Typhoid fever, the most common disease identified in this study, has an annual incidence of roughly 11.9 million cases in sub-Saharan Africa, with Nigeria among the highest-burden countries (Mogasale et al., 2016).

One distinction requires explicit attention. Malaria is a vector-borne disease transmitted by mosquitoes, not through contaminated drinking water. Its inclusion by some respondents among water-related diseases likely reflects awareness that water storage practices, particularly the use of open containers, create mosquito breeding sites. This pathway is real and documented (Keiser et al., 2005), though the causal chain differs from that of a *truly* waterborne pathogen. The conflation reflects a gap in community health literacy with direct implications for education program design.

Beyond disease, water insecurity carries socioeconomic costs. Wutich and Ragsdale (2008) show associations between household water insecurity and psychological distress, social conflict, and reduced productivity. Women and girls bear a disproportionate share: time spent collecting water directly displaces educational participation and income generation (Sorenson et al., 2011; Graham et al., 2016).

Coping Strategies and Household Adaptation

Pattanayak et al. (2005) identified five household coping categories in water-insecure settings: collecting, pumping, treating, storing, and purchasing. Shaheed et al. (2014), reviewing low-income country evidence, found that household water treatment adoption is shaped by income,

education, perceived water quality, and cultural norms. Boiling remains the most common treatment method but is energy-intensive and therefore unevenly distributed across income groups.

Informal water markets represent perhaps the most telling symptom of state withdrawal. Vendors selling water of uncertain quality at prices far above piped supply tariffs are documented across African urban and peri-urban settings (Solo, 2003; Kjelln and McGranahan, 2006). Kjelln and McGranahan (2006) describe the resulting dynamic as the "water poverty premium": the poorest households pay the highest per-liter costs for the lowest-quality water. This pattern is directly observable in Gashua. Water governance scholars increasingly agree that coping strategies, however adaptive, are not sustainable substitutes for formal infrastructure (Kooy and Harris, 2012; Loftus, 2015). Anand (2017) frames the right to reliable water access as a matter of infrastructural citizenship, the idea that access to basic services is constitutive of full social belonging.

Theoretical Framework: Urban Bias Theory

Lipton (1977) argued that in many low-income countries, the political and economic concentration of power in urban areas allows urban classes to extract disproportionate public investment at rural expense. Bates (1981) extended this analysis to African political economies, showing how governments systematically underpriced agricultural outputs extracted from rural areas while overpricing industrial goods consumed in cities. The result is an implicit tax on rural producers that subsidizes urban consumers.

Davis and Heller (2015) have since complicated the simple urban-rural binary, noting that urban slum dwellers often share the infrastructure deprivations of rural communities. Satterthwaite and Mitlin (2014) call for more granular analysis of which sub-populations are excluded by infrastructure investment decisions. These refinements are acknowledged here: the relevant divide in Nigeria is not all urban versus all rural but politically connected areas, typically high-income urban districts, versus politically marginalized areas, both rural

communities and low-income urban neighborhoods (Kayode et al., 2021).

The applicability to Gashua is direct. Piped water supply functions adequately in Damaturu, the Yobe State capital, and in Government Residential Areas across the region. The distribution infrastructure in Gashua has been non-functional for an extended period without maintenance response from the water board. That is not a resource scarcity problem. It is an allocation and governance problem, and urban bias theory names the mechanism.

Methodology

Research Design and Study Area

A mixed-methods design was used, combining quantitative survey data with qualitative in-depth interview data. This approach is standard in sociological studies of water insecurity (Wutich and Ragsdale, 2008; Young et al., 2019) and allows triangulation of community-level statistical patterns with contextual, experiential accounts. Gashua is located in Bade Local Government Area, Yobe State, northeastern Nigeria. It is a semi-arid community whose population, estimated at approximately 20,816 in the 2006 National Population Census for the broader Bade LGA, has grown considerably since then due to regional demographic trends.

Population and Sampling

The target population comprised adults aged 18 years and above residing in Gashua. A multistage cluster sampling technique was applied to address the absence of a complete residential sampling frame. In the first stage, the community was divided into ten residential clusters. Four clusters were then randomly selected via ballot: Hayin Dogo, Anguwan Gwaiba, Pensionnaire Quarters, and Hayin Danyaro. Thirty questionnaires were administered per cluster, yielding $n = 150$ respondents. For the qualitative component, four key informants were purposively selected to represent institutional and community perspectives: a community leader (mai angwa), a water board official, a borehole owner, and a long-term community resident.

Data Collection Instruments

Quantitative data were collected using a structured, self-administered questionnaire with five thematic sections: socio-demographic characteristics; nature of water supply; health consequences; coping strategies; and suggested solutions. Closed-ended and open-ended items were both included. Qualitative data were collected through audio-recorded semi-structured in-depth interviews conducted with prior informed consent, using guides aligned with the study objectives.

Data Analysis

Quantitative data were analyzed using descriptive statistics, specifically frequency counts and percentages, tabulated with SPSS. Qualitative interview data were transcribed verbatim and analyzed thematically, with key themes integrated into the results and discussion sections to contextualize and triangulate survey findings. Where descriptive patterns across socio-demographic groups are informative, they are discussed interpretively.

Ethical Considerations

Participation was voluntary and all respondents provided informed consent before data collection. Individual respondent and informant identities have been protected throughout. Interview recordings were used solely for research purposes.

Limitations

Several limitations warrant acknowledgment. The sample of 150 respondents is adequate for descriptive analysis but does not support generalized inferential conclusions; findings should be read as

community-level and exploratory. The gender composition, 65.3% male and 34.7% female, is a substantive limitation: women are the primary water collectors in most West African households (Sorenson et al., 2011; Graham et al., 2016), and their relative underrepresentation may lead to underestimation of the gendered burden of water insecurity. With only four key informants, the qualitative component provides contextual illustration rather than theoretical saturation. Systematic cross-tabulations between socio-demographic variables and specific coping behaviors were not conducted, which constrains analytical depth.

Results

Socio-Demographic Characteristics of Respondents

Table 1 presents the socio-demographic profile of the 150 respondents. Males constituted 65.3% of the sample and females 34.7%, a gender imbalance acknowledged in the Limitations section. Most respondents were aged 38 years and above (52.0%), suggesting an adult sample with sustained experience of the community's water conditions (see Figure 1 for age distribution). In terms of religion, 51.6% identified as Muslim and 48.3% as Christian. Marital status data showed that 73.3% were single. Educationally, 40.8% held HND or bachelor's degrees and 34.2% held diploma or NCE certificates, a distribution consistent with the presence of educational institutions in Gashua's vicinity. Hausa respondents predominated ethnically (36.6%), followed by other groups (33.3%). Each of the four residential clusters contributed 30 respondents (25.0% each), ensuring geographic balance.

Table 1. *Socio-Demographic Characteristics of Respondents (N = 150)*

Variable and Category	Frequency	Percentage (%)
Sex		
Male	98	65.3
Female	52	34.7
Age Group		
18 to 22 years	9	6.0
23 to 27 years	23	15.3
28 to 32 years	19	12.7
33 to 37 years	21	14.0
38 years and above	78	52.0
Religion		
Islam	62	51.6
Christianity	58	48.3
Marital Status		
Single	88	73.3
Married	31	25.8
Widowed	1	0.8
Level of Education		
Primary school certificate	1	0.8
Secondary school certificate	26	21.7
Diploma or NCE	41	34.2
HND or B.Sc.	49	40.8
Other	3	2.4

Variable and Category	Frequency	Percentage (%)
Ethnic Group		
Hausa	44	36.6
Yoruba	17	14.2
Igbo	14	11.7
Others	40	33.3
Area of Residence		
Hayin Dogo	30	25.0
Hayin Danyaro	30	25.0
Pensionnaire Quarters	30	25.0
Anguwan Gwaiba	30	25.0
Total	150	100.0

Note. Source: Field survey, 2025.

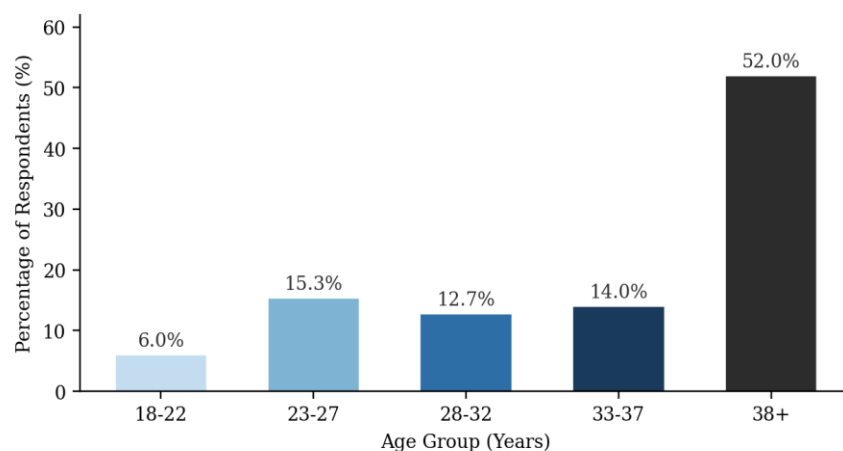


Figure 1 Age distribution of respondents (N = 150). Field survey, 2025.

Nature and Severity of Water Supply

A combined 61.6% of respondents rated water supply in Gashua as poor (28.3%) or very poor (33.3%), with only 19.1% rating it as good or very good (Table 2; Figure 2). Key informants described the situation plainly: all pipes from the water board had ceased to function for an extended period,

leaving households to source water independently through boreholes, wells, or vendors. One community leader stated that the pipes had been broken for years and nobody came to fix them. Figure 3 shows the distribution of primary water source types, with boreholes (40.0%) and wells (36.7%) accounting for the vast majority, while tap water served only 5.8% of respondents.

Table 2. Respondents' Ratings of Water Supply Level in Gashua (N = 150)

Rating	Frequency	Percentage (%)
Very good	13	10.8
Good	10	8.3
Fair	21	17.5
Poor	34	28.3
Very poor	40	33.3
Total	118	98.3a

Note. Source: Field survey, 2025. a Two respondents (1.7%) did not respond to this item.

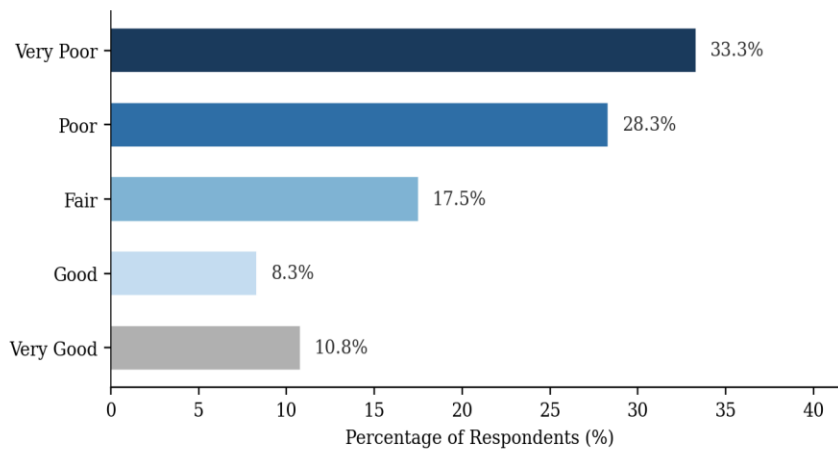


Figure 2 Respondents' ratings of water supply level in Gashua (N = 150). Field survey, 2025.

Table 3. Primary Water Sources for Gashua Residents (N = 150)

Water Source	Frequency	Percentage (%)
Borehole	48	40.0
Well	44	36.7
Other (including water vendors)	11	9.2
Rainwater	8	6.7
Tap water	7	5.8
Total	118	98.3a

Note. Source: Field survey, 2025. a Two respondents (1.7%) did not respond to this item.

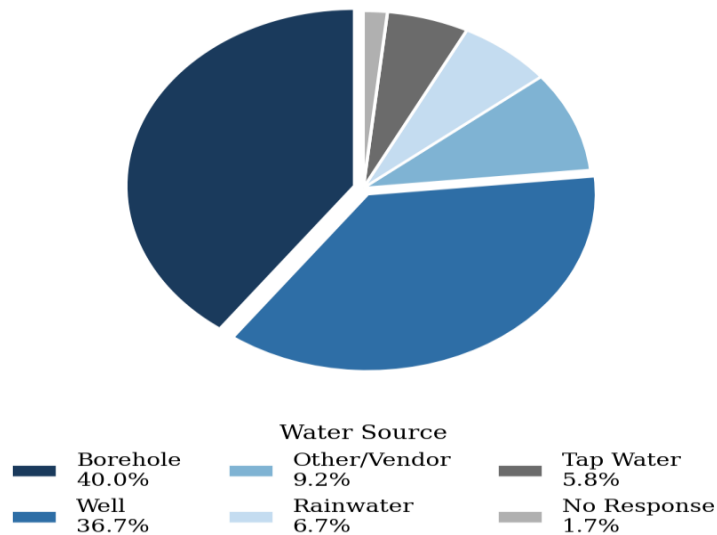


Figure 3 Distribution of primary water sources among Gashua residents (N = 150). Field survey, 2025.

Regarding the infrastructure challenges driving this situation, broken pipes (30.8%) and poor maintenance (28.3%) were cited most often, followed by electricity shortages (20.8%) and bad roads (10.0%; Table 4; Figure 4). These figures are consistent with Kayode et al.'s (2021) findings on water infrastructure functionality in northeastern

Nigeria and with Abubakar's (2019) analysis of post-conflict spending patterns in Yobe State. Qualitative informants noted that a government water tanker scheme had operated briefly before being discontinued, illustrating the episodic character of state intervention in the community.

Table 4. *Infrastructure Challenges Cited by Respondents (N = 150)*

Challenge	Frequency	Percentage (%)
Broken pipes	37	30.8
Poor maintenance	34	28.3
Electricity shortage	25	20.8
Bad roads	12	10.0
Other	7	5.8
Total	115	95.8a

Note. Source: Field survey, 2025. a Five respondents (4.2%) did not respond to this item.

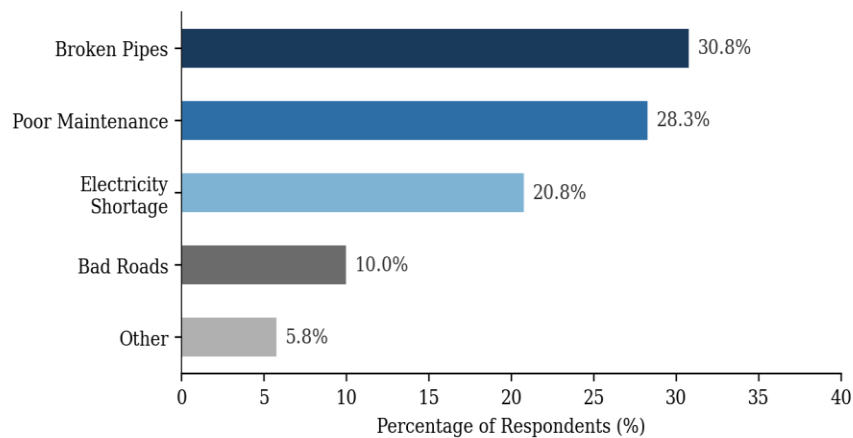


Figure 4 Infrastructure challenges identified as contributing to poor water supply (N = 150). Field survey, 2025.

Health Consequences of Poor Water Supply

An overwhelming 86.7% of respondents reported that poor water supply had negative effects on their health and well-being, while 13.3% disagreed. Typhoid fever was identified as the most prevalent disease (40.8%), followed by cholera (31.6%), unspecified fever (17.5%), and malaria (10.0%; Table 5; Figure 5). Typhoid and cholera combined

account for 72.4% of disease responses, consistent with the epidemiological profile of communities dependent on unregulated water in sub-Saharan Africa (Mogasale et al., 2016; GBD Collaborators, 2020).

The inclusion of malaria requires interpretive care and is not treated here as evidence of misunderstanding. As Keiser et al. (2005) document,

inadequate water storage practices create mosquito breeding sites that contribute indirectly to malaria risk. Community members' association of malaria with poor water supply likely reflects awareness of this environmental pathway. It also signals a specific health literacy gap that WASH education programs

should target. A key informant recalled a prior cholera outbreak in Gashua and described residents resorting to Coca-Cola and Maggi seasoning as improvised preventive measures, a vivid illustration of both community resourcefulness and the absence of formal public health response.

Table 5. Diseases Associated with Poor Water Supply as Reported by Respondents (N = 150)

Disease	Frequency	Percentage (%)
Typhoid fever	49	40.8
Cholera	38	31.6
Fever (unspecified)	21	17.5
Malaria (indirect association) ^a	12	10.0
Total	120	100.0

Note. Source: Field survey, 2025. ^a Malaria is a vector-borne disease. Community attribution likely reflects awareness of water storage as a mosquito breeding site rather than direct waterborne transmission (Keiser et al., 2005).

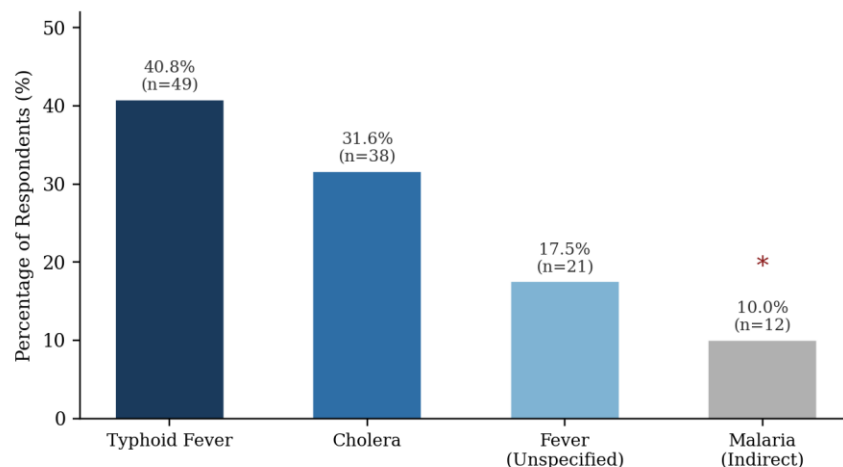


Figure 5 Diseases associated with poor water supply as reported by respondents (N = 150). Asterisk (*) indicates vector-borne disease with indirect water-storage pathway (see note to Table 5). Field survey, 2025.

Coping Strategies: Patterns and Socioeconomic Differentiation

In the absence of formal supply, Gashua residents employ a diverse set of coping strategies. Table 6 and Figure 6 show the supplementary water sources used:

boreholes (40.8%), wells (30.8%), vendor purchase (20.8%), water tanks (5.8%), and other sources (1.7%). A majority of respondents, 59.2%, reported that the government had provided no alternative water source, confirming the near-total transfer of water provision responsibility to households.

Table 6. *Supplementary Water Sources Used by Gashua Residents (N = 150)*

Supplementary Source	Frequency	Percentage (%)
Borehole	49	40.8
Well	37	30.8
Water vendors	25	20.8
Water tanks	7	5.8
Other	2	1.7
Total	120	100.0

Note. Source: Field survey, 2025.

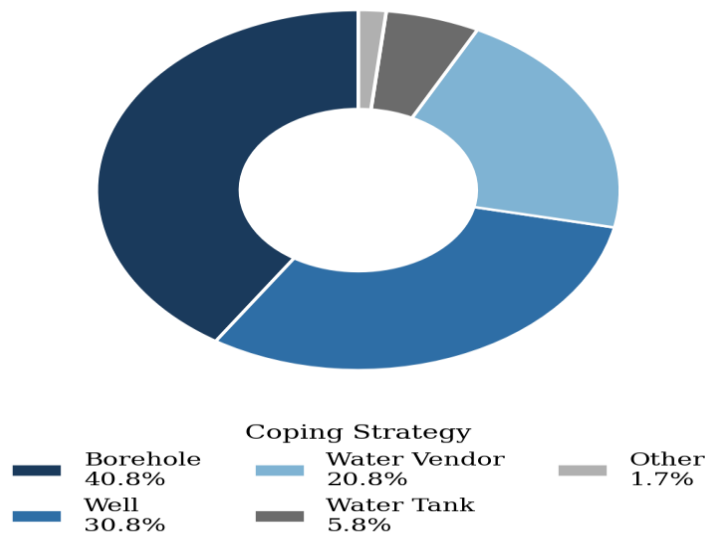


Figure 6 Distribution of supplementary water sources used as coping strategies (N = 150). Field survey, 2025.

The socioeconomic stratification of these strategies is analytically central. Key informant accounts showed that borehole ownership is largely confined to households with sufficient capital: civil servants, traders, and borehole business operators. Lower-income households, primarily subsistence farmers and casual workers, depend on communal wells and vendors. Vendor water quality is unregulated and frequently unknown. Communal well water is often contaminated due to inadequate casing and proximity to open sanitation. Treatment practices, including boiling, filtering, and Uro-Guard tablet use, were reported as inconsistent. Higher-educated respondents were more likely to treat water, consistent with Shaheed et al.'s (2014) finding that awareness and education predict treatment behavior. Income mediates this relationship: even aware households may lack fuel for boiling or access to commercial purification products.

Qualitative accounts also surfaced gendered dimensions of water coping. Female informants described spending significant time daily obtaining water, time taken from domestic productivity and,

for younger women, schooling. This is consistent with the gender and water literature (Sorenson et al., 2011; Graham et al., 2016) and reinforces the argument that water insecurity is experienced differently across social positions within the same community.

Suggested Interventions

Table 7 and Figure 7 present respondents' priority recommendations. Construction of adequate boreholes in every residential area was cited most frequently (35.8%), followed by replacement of broken pipes (25.0%), dam and reservoir construction (21.8%), and reliable electricity supply for pumping (17.5%). Community-level suggestions from qualitative informants included collective well-digging, community maintenance committees, and organized advocacy to government through community leaders. One informant stated plainly that the government must lead, because not everyone can afford a borehole.

Table 7. Respondents' Suggested Government Interventions for Water Supply (N = 150)

Suggested Intervention	Frequency	Percentage (%)
Construct sufficient boreholes in every area	43	35.8
Replace broken pipes	28	25.0
Build dams and reservoirs	26	21.8
Ensure constant electricity supply	21	17.5
Total	118	100.0a

Note. Source: Field survey, 2025. a 32 respondents did not respond to this item.

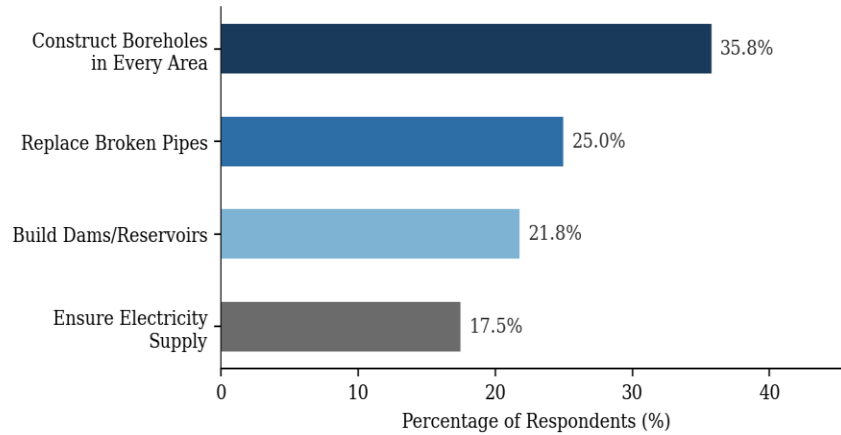


Figure 7 Suggested government interventions as recommended by respondents (N = 150). Field survey, 2025.

Discussion

The results form a coherent picture. Chronic water insecurity in Gashua is not the product of physical water scarcity. Yobe State has documented groundwater resources. The community once had a functioning piped supply system. What has changed is not the physical environment alone but the political-economic decision not to maintain, repair, or reinvest in rural distribution infrastructure. Urban bias theory names this mechanism precisely, and the Gashua case provides community-level empirical grounding for a theory that is often argued at national or regional scale.

Infrastructural Neglect as a Political Outcome

The finding that 61.6% of respondents rated water supply as poor or very poor, alongside the near-complete absence of tap water access, points to a governance failure, not a resource one. Water board pipes have been non-functional for years without remediation. The brief government tanker scheme that was introduced and then withdrawn within two months illustrates the episodic and performative character of state intervention in politically peripheral communities. This aligns with Abubakar's (2019) documentation of post-conflict infrastructure spending priorities in northeastern Nigeria and with Kayode et al.'s (2021) finding that borehole

functionality in the northeast zone is among the lowest in the country due to absent maintenance systems.

Urban bias operates here not only through active allocation decisions, directing spending to urban GRAs, but through neglect: the failure to maintain existing rural infrastructure, enforce water board accountability, or respond to documented public health crises. This extension of the theory's logic from allocation to neglect is an analytical contribution of the present study. When the state withdraws from service provision, the burden shifts to households, but it shifts unequally.

Coping Strategies Reproduce Inequality

The five coping strategies documented in Gashua map well onto the taxonomy of Pattanayak et al. (2005). What this study adds is the social distribution of those strategies. Private borehole installation, the most effective and healthiest option, requires capital that lower-income households do not have. Vendor purchase, the fallback for those without wells or borehole access, is expensive per liter and delivers water of uncertain quality. This is the water poverty premium Kjelln and McGranahan (2006) describe: the poorest residents pay the most for the worst water.

The gendered dimension compounds this picture. Women's accounts of daily water procurement as a time-consuming labor burden, confirmed by the qualitative data despite the survey's male-skewed sample, echo findings from Sorenson et al. (2011) and Graham et al. (2016) across comparable African contexts. Water insecurity is not a uniform household experience. It is absorbed differently depending on gender, income, and social position. Interventions that treat the household as a homogeneous unit will miss these internal inequalities and produce inequitable outcomes.

Anand's (2017) concept of infrastructural citizenship is illuminated by the Gashua case in a specific way. Residents are not passive victims. They organize to dig wells, pool resources for borehole installation, and develop knowledge of treatment methods. But this effort is a form of subsidizing state failure through community labor and expenditure. The fact that they do so does not mean the arrangement is acceptable or sustainable. It means the state has externalized its service delivery obligation onto citizens who are least equipped to absorb it.

Disease Burden and the Water-Health Pathway

Typhoid (40.8%) and cholera (31.6%) dominate the disease profile reported by respondents. Both pathogens thrive precisely in the conditions Gashua exhibits: reliance on wells of uncertain casing quality, vendor water of unknown provenance, and point-of-use treatment that is inconsistent and income-dependent. Bain et al. (2014) find that piped supply disruption is associated with sharp rises in typhoid and diarrheal incidence. The qualitative account of a prior cholera outbreak, addressed by community members with carbonated drinks rather than oral rehydration salts or formal medical response, illustrates the public health vacuum that poor water governance creates.

The malaria finding invites a more careful reading than simple dismissal. The indirect environmental pathway through water storage and mosquito breeding is empirically established (Keiser et al., 2005). Pruss-Ustun et al. (2019) advocate for integrated WASH and vector control responses

precisely because these disease burdens share environmental determinants at the community level. The health education component of any water intervention in Gashua should address this pathway explicitly, correcting imprecise attributions while reinforcing the underlying environmental health message.

Theoretical Contributions

The Gashua case contributes to urban bias scholarship in three specific ways. First, it shifts the analytical scale from national resource allocation statistics to community-level infrastructure outcomes, demonstrating that the theory's predictions are observable at the household and neighborhood level, not only in aggregate policy data. Second, it extends the theory's mechanism from active allocation to governance neglect, showing that rural marginalization operates through what the state does not do as much as through what it actively decides. Third, it links urban bias outcomes to the reproduction of intra-community inequality: the coping strategies that infrastructure neglect forces onto communities are not equally distributed within those communities, and the distribution of coping burdens maps onto pre-existing socioeconomic hierarchies.

Conclusion

Gashua community's water crisis is produced by political-economic arrangements, not by nature. The collapse of piped infrastructure, the absence of maintenance response, and the episodic character of government intervention are outcomes consistent with the urban bias thesis: resources flow to politically visible urban centers while peripheral communities are left to manage. Residents adapt through an array of coping strategies, but these strategies are stratified by socioeconomic status and reproduce rather than resolve the inequalities that political marginalization creates.

Three contributions emerge from this study. It provides original field evidence on water access conditions in a northeastern Nigerian community

that rarely appears in the academic literature. It applies and extends urban bias theory to explain infrastructural water inequality at the community level, showing that neglect is a mechanism of urban bias as much as active allocation is. It argues that coping strategies are structural outcomes requiring structural responses, not simply behaviors to be modified through education alone.

Sustainable improvement in Gashua's water access requires consistent government investment in infrastructure, accountable maintenance systems, and a political commitment to rural service delivery as a right rather than a discretionary benefit. Future research should use gender-stratified sampling, validated instruments such as the HWISE scale, and comparative designs across communities in Bade LGA to deepen and generalize these findings.

Recommendations

Sustained infrastructure rehabilitation. Federal, State, and Local Government authorities should commit to long-term rehabilitation of water distribution infrastructure in Gashua, including pipe replacement, community borehole installation with solar-powered pumping, and small-scale reservoir development. One-off interventions have consistently failed; budgeted and accountable maintenance programs are the minimum requirement.

Water governance accountability. State water boards should face transparent performance reporting and civil society oversight to ensure maintenance responsibilities are discharged. Community-based water management committees, with gender-equitable membership and representation across income groups, should be established and resourced.

Gender-responsive intervention design. Given women's primary role in water collection and household water management, interventions should locate water points in safe and accessible areas, include women in governance committees, and measure outcomes through gender-disaggregated access and burden indicators.

Integrated WASH and health education. Public health education programs should address the full water-disease nexus, including the indirect relationship between water storage and vector-borne disease, and should be delivered in local languages through community channels.

Regulation of informal water markets. The water board and local government should develop a basic quality monitoring and certification framework for water vendors operating in Gashua, protecting low-income consumers who have no alternative but to use vendor water.

Future research priorities. Subsequent studies should employ gender-stratified sampling; use the HWISE scale to allow cross-community and cross-country comparison; extend analysis to neighboring communities in Bade LGA for regional comparative data; and use longitudinal designs to track changes following any interventions implemented.

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