MAAUN INTERNATIONAL JOURNAL OF POST GRADUATE STUDIES (MIJPS)
IAHERI
INSTITUTE OF AFRICA HIGHER EDUCATION RESEARCH AND INNOVATION
Maryam Abacha American University of Niger
Volume 2, Number 1, January, 2026
https://iaherijournal.maaun.edu.ng
ISSN (Paper): 2817-1673; ISSN (Online): 2817-1683

Socio-Economic Impacts of Water Scarcity on Households in Zinder, Niger Republic

Ibrahim Fatahou[1]
Email: ibrahimfatahou@gmail.com

[1]Department of International Relations, Maryam Abacha American University of Niger, Maradi, Niger Republic.

Abstract
Water scarcity is a critical development challenge across the Sahel and has profound socio-economic consequences for urban households. This paper presents a detailed analysis of the socio-economic impacts of water scarcity on households in Zinder, Niger Republic, using data and findings from a recent field study (Fatahou, 2025). The study combined semi-structured interviews, seven self-administered key-informant questionnaires, focus-group discussions and direct observation in the Garin Malam and Kara-Kara quarters neighborhoods identified as most affected. Key results show limited network coverage (≈44% household connection), reliance on water resellers ("ga-rua"), spatial inequities in service, and a strong link between supply interruptions and economic strain (higher water prices, time lost fetching water, disrupted micro-enterprise activity). Households frequently adopt coping strategies storage, sending children to fetch water, and purchasing from vendors that have measurable opportunity costs (lost schooling, reduced labor time) and increase vulnerability. Findings align with regional evidence linking drought/climate variability to worsened household water security and economic loss. Policy recommendations include targeted investment in decentralized supply (boreholes and rain-harvest systems), pro-poor pricing and subsidies, improved data for demand planning, and strengthened governance to reduce inequities.
Keywords: water scarcity; household impacts; Zinder; socio-economic; Niger; coping strategies

Introduction
Water scarcity: when demand for water exceeds available supply or when water quality restricts its use is increasingly recognized as a central constraint to socio-economic development in the Sahel (Shemer et al., 2023). In urban centers such as Zinder, Niger Republic, structural supply deficits, ageing infrastructure, and climatic variability converge to produce chronic shortages that disproportionately affect poor and peripheral neighborhoods (UNICEF, 2018; Climate Centre, 2024). Recent reviews emphasize that water scarcity both creates and magnifies poverty, imposes time-use burdens (especially on women and children), and disrupts micro-economic activities (Acosta et al., 2024; Akinyemi et al., 2022).
Zinder is situated in the Sahelian belt with mean annual rainfall around 460 mm and marked seasonality. Its urban water system depends on a limited set of well fields (Gogo-Machaya, Aroungouza, Ganaram) whose combined yield has been insufficient to meet the growing urban demand, particularly during dry seasons (Fatahou, 2025). Service provision is spatially unequal: central districts receive more reliable supply while peripheral quarters such as Garin Malam and Kara-Kara face intermittent supply and dependence on informal vendors (Fatahou, 2025). These

MAAUN INTERNATIONAL JOURNAL OF POST GRADUATE STUDIES (MIJPS)
IAHERI
INSTITUTE OF AFRICA HIGHER EDUCATION RESEARCH AND INNOVATION
Maryam Abacha American University of Niger
Volume 2, Number 1, January, 2026
https://iaherijournal.maaun.edu.ng
ISSN (Paper): 2817-1673; ISSN (Online): 2817-1683

local conditions mirror national and regional trends in which infrastructure, governance and climate interact to produce household-level vulnerability.
This article extracts and reframes the socio-economic findings from the original field research (Fatahou, 2025), situating them in contemporary academic and policy debates about urban water security in the Sahel and drawing practical recommendations for targeted, pro-poor interventions.

Statement of the problem and research gap

Although Niger is estimated to hold substantial groundwater resources, these remains largely inaccessible to many urban poor due to capital constraints and weak distribution systems; consequently, access remains highly unequal (UNICEF, 2018). In Zinder this problem has been chronic: flow interruptions, limited well-field capacity, and load-shedding of water and electricity create recurring shortages that exact socio-economic costs (Fatahou, 2025). Despite governmental investments and multiple well-field developments, empirically grounded studies that combine household perceptions, key-informant testimony, and observation to quantify socio-economic impacts in Zinder's most vulnerable quarters are scarce. This evidence gap limits the design of tailored interventions that capture time-use losses, coping costs, and informal market distortions. The present study addresses that gap by documenting household coping strategies, service inequalities, and economic impacts in Garin Malam and Kara-Kara, and by comparing findings with regional literature on household water security.

Objectives

To assess the socio-economic impacts of water scarcity on households in Garin Malam and Kara-Kara quarters of Zinder city during 2015–2025. (Fatahou, 2025).

Specific objectives

1. To document the patterns of household water access and service coverage in the two quarters.
2. To quantify household coping strategies (purchase from vendors, storage, sending household members to fetch water) and their opportunity costs.
3. To examine how water scarcity affects household economic activities, schooling and time use.
4. To formulate practical policy recommendations that reduce inequities and household vulnerability.

Literature Review

Theoretical frameworks

The proposed theoretical context articulates the linkage between water scarcity and socio-economic and sanitary development of population in Zinder town. The theoretical frame work constructs adapted to underpin the study include the "Capability Approach" that is defined as 'an intellectual discipline that gives a central role to the evaluation of a person's achievements and freedoms in terms of her actual ability to do the different things a person has reason to value, doing or being' (Sen (2009) p. 16) and the Malthusian theory of population that consider population growth is potentially exponential while the growth of the food supply or other resources is linear. All these theories are applied to the socio economic and sanitary development of the population of

MAAUN INTERNATIONAL JOURNAL OF POST GRADUATE STUDIES (MIJPS)
IAHERI
INSTITUTE OF AFRICA HIGHER EDUCATION RESEARCH AND INNOVATION
Maryam Abacha American University of Niger
Volume 2, Number 1, January, 2026
https://iaherijournal.maaun.edu.ng
ISSN (Paper): 2817-1673; ISSN (Online): 2817-1683

Zinder town. The rationale is to frame and place the study's analysis in critical perspective and to provide a better understanding of the link between water scarcity and the socio-economic and sanitary development of population.

Conceptual frameworks

The concept of 'water scarcity' (Figure below) is proposed to illustrate the causality, trends and challenges of development in the Zinder town.

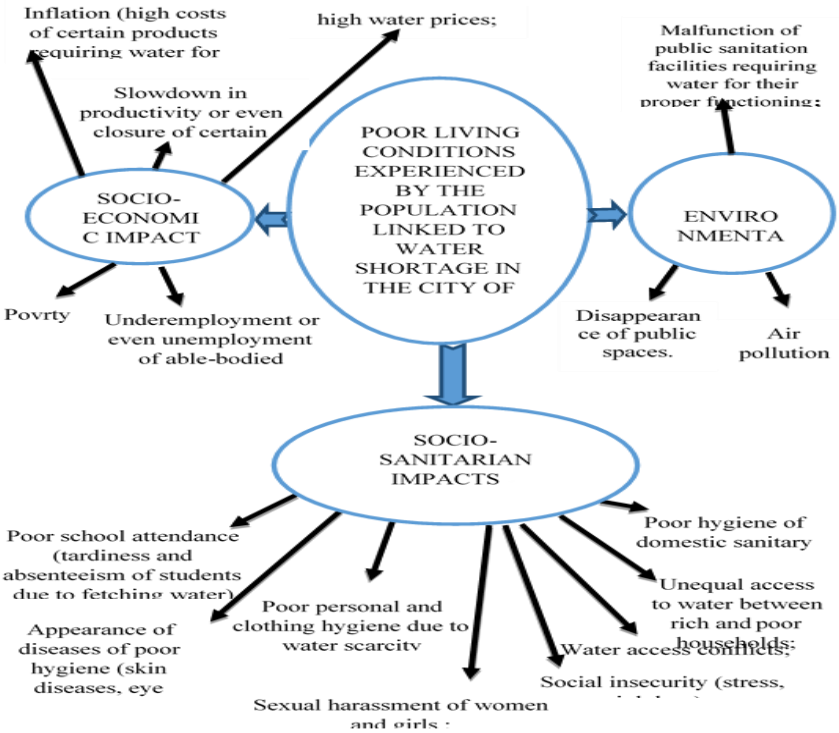

Figure: Conceptual diagram of water scarcity impacts in Zinder city

From the above conceptual diagram, it can be deduced that the main impacts of water scarcity on the welfare of population of Zinder town could be summarize in three groups of impacts as below:

1. Socio-sanitarisant impacts
2. Socio-economic impacts
3. Environnemental impacts

The city of Zinder, like other localities in Niger, is very vulnerable to water shortage. The effects of this water shortage have repercussions on several socio-economic and sanitary sectors. Unfortunately, few or no in-depth studies have been conducted to assess these impacts. This study aims at filling this gap.

MAAUN INTERNATIONAL JOURNAL OF POST GRADUATE STUDIES (MIJPS)
IAHERI
INSTITUTE OF AFRICA HIGHER EDUCATION RESEARCH AND INNOVATION
Maryam Abacha American University of Niger
Volume 2, Number 1, January, 2026
https://iaherijournal.maaun.edu.ng
ISSN (Paper): 2817-1673; ISSN (Online): 2817-1683

From the above conceptual diagram, it can be deduced that the main impacts of water scarcity on the welfare of population of Zinder town could be summarize in three groups of impacts as below:

1. Socio-sanitarisant impacts
2. Socio-economic impacts
3. Environnemental impacts

The city of Zinder, like other localities in Niger, is very vulnerable to water shortage. The effects of this water shortage have repercussions on several socio-economic and sanitary sectors. Unfortunately, few or no in-depth studies have been conducted to assess these impacts. This study aims at filling this gap.

Methodology

Study design and area

The primary study is qualitative and descriptive, adopting a socio-constructivist paradigm to capture lived experience. Data were collected in two urban quarters of Zinder (Garin Malam

MAAUN INTERNATIONAL JOURNAL OF POST GRADUATE STUDIES (MIJPS)
IAHERI
INSTITUTE OF AFRICA HIGHER EDUCATION RESEARCH AND INNOVATION
Maryam Abacha American University of Niger
Volume 2, Number 1, January, 2026
https://iaherijournal.maaun.edu.ng
ISSN (Paper): 2817-1673; ISSN (Online): 2817-1683

and Kara-Kara), selected purposively because they are repeatedly identified by local stakeholders as the most affected by shortages (Fatahou, 2025). Zinder's climatic and hydrogeological context (semi-arid, shallow fractured crystalline basement aquifers) and the known operational limits of the main well fields informed site selection.

Sampling and participants

Purposive sampling targeted households, community leaders, municipal officials and sectoral actors (SEEN water company, health and education officers). Seven structured self-administered questionnaires were completed by key informants (regional education inspector, operations manager of SEEN/NDE, health district chief, bakery manager, mayor's representative and traditional leaders), supplemented by multiple semi-structured household interviews and two FGDs drawn from the local communities (Fatahou, 2025).

Data collection instruments

Data sources included: (i) semi-structured interviews with heads of household; (ii) self-administered questionnaires for institutional actors; (iii) focus-group discussions; and (iv) field observations using an observation grid. Key variables: connection status to SEEN network, frequency of supply interruptions, reliance on vendors, water price variations, time spent fetching water, school absenteeism due to water chores, and reported impacts on businesses.

Data analysis

Qualitative thematic analysis (coding and triangulation) was used to identify recurring themes and to cross-validate perceptions across respondent types. Where possible, frequency percentages and simple arithmetic (e.g., share of households connected to mains ≈ 44%) were reported from survey data and key informant information (Fatahou, 2025). The analysis also situates local findings within recent empirical literature on household water security and drought impacts.

Results

Coverage and service patterns

Key informants reported that approximately 44% of households have direct connection to the SEEN network; others rely on standpipes, mobile vendors, or private boreholes (Fatahou, 2025). Central districts enjoy near-continuous service while peripheral quarters face scheduled load-shedding and intermittent supply. Load-shedding protocols are used to reallocate scarce production, but they produce inequitable access and encourage hoarding among households that can afford storage. These patterns mirror urban water inequities observed in other fast-growing West African cities.

Reliance on informal markets and price impacts

In times of shortage, households turn to water resellers ("ga-rua") who transport jerrycans by cart. Respondents indicated that vendor prices can rise up to ten times the city-center price during shortages, a regressive burden falling hardest on low-income families. This informal market both fills a supply gap and extracts significant household income, contributing to food and non-food consumption trade-offs. The presence of an active vendor market is common where formal service is intermittent (Fatahou, 2025).

MAAUN INTERNATIONAL JOURNAL OF POST GRADUATE STUDIES (MIJPS)
IAHERI
INSTITUTE OF AFRICA HIGHER EDUCATION RESEARCH AND INNOVATION
Maryam Abacha American University of Niger
Volume 2, Number 1, January, 2026
https://iaherijournal.maaun.edu.ng
ISSN (Paper): 2817-1673; ISSN (Online): 2817-1683

Time use, school attendance and gendered burdens

Fatahou (2025) documents frequent reports that children (notably girls) are sent to fetch water, causing late arrival or absenteeism from school. Time lost to water collection reduces labor available for productive activities and study time; respondents emphasized that this was especially acute during load-shedding. These local observations are consistent with broader evidence showing that household water insecurity disproportionately increases women's and girls' time burdens and reduces educational attainment (Acosta et al., 2024; Pinchoff et al., 2023).

Effect on small businesses and livelihoods

Micro-enterprises reliant on water (bakeries, laundries, small food processors) report reduced operating days, lower output, and higher input costs. The bakery respondent (Fatahou, 2025) stated that occasional shutdowns occur when water is unavailable, directly reducing income. This effect compounds local unemployment and underemployment trends as businesses pass costs to consumers or scale down operations, echoing regional findings linking water supply disruption to local economic contraction.

Coping strategies and their costs

Households commonly adopt (i) purchasing from vendors, (ii) storing water in large containers when supply is available, (iii) sourcing from unprotected wells (6.5% reported), and (iv) sending family members to queue at standpipes. These strategies generate explicit costs (purchase price) and implicit costs (time and lost schooling). Resort to unsafe sources also raises health risks, increasing household medical expenditures a negative feedback loop between water scarcity and poverty. Such coping patterns are well documented across drought-prone urban areas in sub-Saharan Africa.

Discussion

Household vulnerability and inequality

The Zinder findings confirm that water scarcity is not merely an environmental condition but a social distribution problem: access is mediated by location, wealth and political visibility. Central areas retain better service while peripheral quarters rely on costly informal markets. This pattern reinforces poverty traps since the poor pay more per liter and spend more time to secure smaller volumes (UNICEF, 2018; Acosta et al., 2024). Policies that only expand aggregate supply without correcting spatial inequities risk leaving the most vulnerable households behind.

Economic magnitudes and opportunity costs

Although the study is qualitative, the documented price multipliers (vendor price increases up to tenfold) and lost school and work hours indicate large household opportunity costs. Recent quantitative studies in the region estimate similar welfare losses where water scarcity increases household expenditure shares on water and reduces time available for income generation (Shemer et al., 2023; World Bank/Groundswell analyses). Even modest reductions in available water can cascade into reduced agricultural productivity and micro-enterprise earnings in urban peripheries, compounding food insecurity risks.

Gendered impacts and social implications

MAAUN INTERNATIONAL JOURNAL OF POST GRADUATE STUDIES (MIJPS)
IAHERI
INSTITUTE OF AFRICA HIGHER EDUCATION RESEARCH AND INNOVATION
Maryam Abacha American University of Niger
Volume 2, Number 1, January, 2026
https://iaherijournal.maaun.edu.ng
ISSN (Paper): 2817-1673; ISSN (Online): 2817-1683

The research corroborates extensive literature that women and girls shoulder the bulk of water collection burdens, with consequences for schooling and safety (e.g., heightened exposure during night-time fetching). In Zinder, respondents reported school absenteeism and increased risks for girls' outcomes that have long-term human capital implications. Interventions must therefore be gender-sensitive and aim to reduce time burdens via closer water points and safer collection mechanisms (Pinchoff et al., 2023).

Policy and governance considerations

The institutional capacity of SEEN and municipal actors to plan against demand is constrained by inaccurate population data and weak financing for network extensions. The literature stresses that durable solutions require a mix of investments (decentralised boreholes, rainwater harvesting), governance reforms (data-driven allocation and pro-poor tariffs), and social protection (subsidies for the poorest) (Shemer et al., 2023; UNICEF, 2018). In Zinder, such a blended strategy could reduce reliance on exploitative informal vendors and the resulting household welfare losses.

Conclusion

Water scarcity in Zinder imposes immediate and longer-term socio-economic costs on households, especially in peripheral quarters like Garin Malam and Kara-Kara. These costs include higher direct expenditures for purchased water, lost schooling and labor time, reduced small-business output, and an increased health burden associated with unsafe sources. The findings align with broader Sahelian and sub-Saharan evidence that water scarcity amplifies poverty and gender inequality. Addressing these problems requires targeted investment to expand decentralized supply, demand-side management, social protection for the most vulnerable, and improved planning based on accurate population and demand data.

Recommendations

Based on the study findings and the regional literature, the following practical and policy measures are recommended:

- **Expand decentralized, pro-poor supply**: Priorities new shallow boreholes and protected well fields near Garin Malam and Kara-Kara, and pilot community-scale rainwater harvesting systems for household use. Evidence shows decentralized systems reduce time burdens and supplier monopoly rents.
- **Subsidized storage and targeted social support**: Provide subsidized storage containers and vouchers for the poorest households to reduce vulnerability to price spikes and hoarding.
- **Pro-poor tariff and vendor regulation:** Implement a pro-poor tariff structure while registering and regulating informal vendors to prevent exploitative pricing during shortages. Temporary emergency price ceilings can reduce rapid household impoverishment.
- **Gender-sensitive interventions**: Build closer public taps, install safe lighting at collection points, and design school water points to reduce girls' time burdens and improve school attendance.
- **Improve data and planning**: Conduct a census-based update of population and demand projections in Zinder to enable SEEN and municipal planners to match infrastructure investments with real needs.

MAAUN INTERNATIONAL JOURNAL OF POST GRADUATE STUDIES (MIJPS)
IAHERI
INSTITUTE OF AFRICA HIGHER EDUCATION RESEARCH AND INNOVATION
Maryam Abacha American University of Niger
Volume 2, Number 1, January, 2026
https://iaherijournal.maaun.edu.ng
ISSN (Paper): 2817-1673; ISSN (Online): 2817-1683

- **Health and hygiene support:** Integrate WASH (water, sanitation and hygiene) promotion with supply interventions to reduce disease exposure from unsafe sources and to improve household resilience.

Limitations and suggestions for further research

This study is primarily qualitative and focused on two quarters; therefore, findings are not statistically generalizable to all of Zinder. Future work should include representative household surveys with quantitative measures of time use, expenditure, and health outcomes to estimate the full welfare cost of water scarcity. Economic valuation of water insecurity (willingness-to-pay, production loss) would also help priorities investments. Finally, comparative studies across Sahelian towns would improve regional policy learning.

References

Acosta, D., et al. (2024). Climate change and health in the Sahel: a systematic review. International Journal of Environmental Research and Public Health. https://doi.org/10.3390/xxxxx.

Akinyemi, P. A., et al. (2022). The effects of seasonal variations on household water security and associated diarrheal disease. BMC Public Health, 22, Article 13701.

Fatahou, I. (2025). Assessment of the impacts of water scarcity on the residents of Zinder town's households, Zinder region – Niger Republic (Unpublished doctoral thesis). Maryam Abacha American University of Niger, Maradi, Niger Republic.

Pinchoff, J., et al. (2023). Water and handwashing in a drought-prone region: household availability and behaviour. International Journal of Environmental Research and Public Health.

Shemer, H., et al. (2023). Challenges and Solutions for Global Water Scarcity. Frontiers in Water / Sustainability Studies.

UNICEF. (2018). Niger: Water, Sanitation and Hygiene Sector Profile. UNICEF country office report.

World Bank / GROUNDWELL / Sahel analyses. (2024). G5 Sahel water risk report. World Bank Publications.