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Setting: Household Strategies in Juba City, South Sudan**



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Coping With Urban Water Insecurity in a Post-Conflict Setting: Household Strategies in Juba City, South Sudan



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Abstract

Purpose: This study examined the coping strategies adopted by households experiencing inadequate access to clean and safe water in Juba City, South Sudan, focusing on their perceived effectiveness, implementation challenges and long-term sustainability.

Methodology: The study adopted a qualitative research design. Data were collected through semi-structured interviews with 31 household heads, eight key informant interviews, six focus group discussions involving 46 participants and direct observations across Munuki, Juba and Kator payams. Participants were selected using purposive, convenience and critical-case sampling, while the data were analysed through thematic content analysis.

Findings: The study identified five principal coping strategies: treating water through boiling, chlorination and filtration; using alternative sources such as boreholes, streams, rainwater, vendors and bottled water; rationing and reusing water; increasing household storage and sharing water with neighbours; and promoting household and community awareness of water safety and conservation. Although these practices helped households manage immediate shortages, their effectiveness and sustainability were constrained by treatment and fuel costs, uncertain water quality, inadequate storage, health risks associated with water reuse, unequal household resources and weakening reciprocal-sharing arrangements.

Unique Contribution to Theory, Policy and Practice: The study extends the application of Stress and Coping Theory to urban water insecurity by distinguishing short-term household coping from supported and sustainable adaptation in a post-conflict setting. It provides policy evidence for affordable water treatment, regulated water supply, safe storage, rainwater harvesting and targeted assistance to vulnerable households. In practice, it demonstrates that household and community initiatives can strengthen resilience but cannot substitute for reliable, affordable and safely managed public water services.

Keywords: *Coping strategies, Household water insecurity, Post - conflict cities, Urban resilience, Juba City, South Sudan*

JEL Codes: Q25, Q56, I31, O18

Introduction

Access to adequate clean and safe water is fundamental to human health, nutrition, household welfare and sustainable development. Water supports drinking, food preparation, sanitation, hygiene and livelihood activities, while inadequate access exposes households to interconnected health, economic and social challenges [1]. Water security involves more than the physical presence of a water source; it also encompasses the quantity and quality of water available and the social conditions influencing its accessibility and use [2]. When these dimensions are not adequately addressed, households experience water insecurity and must make difficult decisions about how water is obtained, treated, stored, allocated and consumed.

Urban water insecurity is particularly severe in low-income and post-conflict cities, where rapid population growth frequently exceeds the capacity of existing infrastructure and public services [3]. Prolonged conflict can damage water-distribution systems, weaken public institutions, discourage infrastructure investment and increase dependence on informal service providers [4]. Residents may therefore live near rivers, boreholes, public water points or private vendors but remain water insecure because of high prices, unreliable services, insufficient quantities, long collection distances or concerns about water quality. Under such circumstances, households assume responsibilities normally associated with reliable public water systems, including finding alternative sources, treating water and regulating its consumption.

Coping mechanisms comprise the behavioural, technical, economic and social strategies adopted by individuals and communities to manage adverse circumstances [5]. In water-insecure settings, households may purchase water from private vendors, harvest rainwater, use shallow wells or streams, fetch water from distant sources, treat water, increase storage, ration consumption, reuse water or borrow from neighbours. These practices reflect household adaptability and can provide immediate relief when conventional water supplies are inadequate or unavailable [6]. However, the capacity to adopt particular strategies varies according to household income, knowledge, storage facilities, proximity to alternative sources and access to supportive social networks.

Household coping should not automatically be interpreted as sustainable adaptation. Some strategies reduce immediate exposure to unsafe water, whereas others transfer additional costs and risks to households. Purchasing bottled or vendor-supplied water may improve short-term availability but place considerable pressure on household income [7]. Boiling and chlorination may improve water safety but require fuel, treatment products and appropriate knowledge. Rationing and reuse can extend available supplies but may compromise hygiene when practised excessively. Similarly, borrowing from neighbours provides an important social safety net, although repeated borrowing may generate tension or become unreliable when entire communities experience shortages. Continued dependence on such measures may also divert attention and

resources from addressing underlying deficiencies in infrastructure, institutions and water governance [8].

The Stress and Coping Theory developed by Lazarus and Folkman provides an appropriate framework for interpreting household responses to water insecurity [9]. The theory explains that individuals first assess the seriousness of a stressor and then evaluate the resources available to manage it. In the context of water insecurity, households consider how insufficient or unsafe supplies may affect drinking, cooking, hygiene and other domestic requirements before selecting feasible coping measures. Households with sufficient resources may purchase water, expand storage or invest in treatment technologies, while resource-constrained households may reduce consumption, reuse water or depend on social support. Coping strategies are therefore not merely individual preferences but reflections of the economic, social and infrastructural opportunities and constraints confronting households.

These conditions are highly relevant to Juba City, the capital of South Sudan. Decades of conflict, rapid urbanisation and inadequate infrastructure development have constrained the expansion of reliable water services [10]. Only a limited proportion of residents are served by the municipal water-distribution network, leaving many households dependent on boreholes, public filling stations, private water tankers, vendors and the Nile River. The price, quality and reliability of these sources vary substantially. Water transported by private tankers may be obtained from untreated sources, while high prices, service interruptions and long collection distances place additional pressure on households [11]. Earlier studies have consequently concentrated on Juba's water-distribution system, water quality, treatment practices and barriers to clean and safe water access.

Research conducted in Rajaf Payam established that households commonly used chlorination, boiling and basic filtration to treat drinking water [12]. Another study on water security in Juba concluded that raw water obtained from the Nile was unsuitable for drinking without appropriate treatment and emphasised the need for improved water-quality management [6]. These studies provide important evidence concerning water sources, quality and household treatment. Nevertheless, they offer limited explanation of how households combine different coping strategies, evaluate their effectiveness and confront the difficulties associated with maintaining them. Evidence from rural Zambia similarly indicates that improvements in water access can generate household benefits while redistributing water-related responsibilities among household members [13]. These findings demonstrate that the effects of water access and coping practices can vary according to gender, age and household circumstances.

Despite growing research on urban water insecurity, limited qualitative evidence exists on how households in post-conflict cities navigate persistent water shortages through interconnected treatment, substitution, conservation, storage and social-support practices. Existing studies in Juba have predominantly examined barriers to water access, the quality of available sources and the

consequences of inadequate supply. Less attention has been given to households' lived experiences of coping, their perceptions of the effectiveness of different strategies, the challenges encountered during implementation and the sustainability of these practices. This leaves an important conceptual, contextual and methodological gap in understanding household adaptation within a rapidly growing post-conflict city.

This study addressed the identified gap by examining the coping strategies adopted by households to manage inadequate access to clean and safe water in Munuki, Juba and Kator payams. It specifically explored the strategies employed, their perceived effectiveness, the challenges households encountered during implementation and their long-term sustainability. By integrating evidence from household interviews, focus group discussions, key informants and direct observations, the study provides a context-sensitive account of how urban households navigate persistent water insecurity. The findings help distinguish immediate coping from sustainable adaptation and provide practical evidence for strengthening household water security and resilience in Juba City and comparable post-conflict urban settings.

Materials and Methods

Study area and design

The study was conducted in Munuki, Juba and Kator payams of Juba City, South Sudan. The three payams were selected because they represent varied socioeconomic, residential and water-supply conditions. Households obtain water through boreholes, public water points, private tankers, vendors, piped connections and surface-water sources.

A qualitative research design was adopted to obtain an in-depth understanding of household coping practices and experiences of water insecurity [14]. The design allowed participants to explain the strategies they used, their perceived effectiveness, implementation challenges and long-term sustainability.

Participants and sampling

The study involved adult household heads, community representatives and stakeholders involved in water management and service provision. Purposive and convenience sampling were used to recruit household and focus group participants, while critical-case sampling identified key informants with specialised knowledge of water policy, supply and community management [15–17].

Participants were required to be at least 18 years old, reside in one of the selected payams and possess direct knowledge of household or community water management. The final sample comprised 31 household heads, eight key informants and 46 participants in six focus group discussions. Household interviews continued until no substantively new information was emerging.

Table 1: Distribution of study participants

Method	Munuki	Juba	Kator	Total
Household interviews	12	8	11	31
Focus group participants	14	15	17	46
Key informant interviews ¹	—	—	—	8
Total	26	23	28	85

Data collection

Data were collected during January and February 2024 through semi-structured household interviews, key informant interviews, focus group discussions and direct observations. Household interviews lasted approximately 30–45 minutes and examined coping strategies, their effectiveness, implementation challenges and sustainability. Key informant interviews provided contextual perspectives from government officials, community leaders, civil society representatives and water-sector stakeholders. The semi-structured approach-maintained consistency while allowing participants to elaborate on their experiences [18].

Six focus group discussions, two in each payam, were conducted with groups of six to ten participants. Each discussion lasted approximately 45–60 minutes and explored shared experiences of water insecurity, community-support practices and household coping. Direct observations documented water sources, transportation methods, storage facilities, household water handling and hygiene practices [20]. Interviews and discussions were audio-recorded with consent and supplemented by field notes.

Data analysis

Audio recordings were transcribed and organised using anonymised participant codes. The data were analysed manually through thematic content analysis [21]. Analysis involved familiarisation with the transcripts, open coding, grouping related codes, reviewing and defining themes, and comparing evidence across participant categories and payams [22].

A thematic matrix was used to integrate evidence from household interviews, focus group discussions and key informants. Five themes emerged: water purification and treatment, alternative water sources, water rationing and recycling, water storage and sharing, and household and community awareness. Representative quotations were selected to illustrate participants' experiences. Frequencies were used only to summarise the recurrence of themes; the principal analysis remained qualitative.

¹ Key informants were not assigned to individual payams because their responsibilities extended from community to national levels.

Trustworthiness and ethical considerations

Trustworthiness was strengthened by triangulating evidence from household interviews, focus groups, key informants and observations [23]. Audio recordings, field notes, participant codes and the thematic matrix provided an audit trail connecting the findings to the original data.

Ethical approval was obtained from the Human Research Ethics Committee of Universiti Sains Malaysia. Participants received information about the study and provided informed consent. Participation was voluntary, and participants could decline questions or withdraw without penalty. Personal identifiers were removed, data were stored securely and permission was obtained before recording interviews or taking photographs [24].

Results

The thematic analysis identified five principal coping strategies adopted by households in Juba City: water purification and treatment, use of alternative water sources, water rationing and recycling, water storage and sharing, and household and community awareness. Economic adjustments and technological initiatives emerged as cross-cutting practices influencing the households' capacity to implement these strategies.

The frequencies in Table 2 represent the number of times each theme was identified across household interviews, focus group discussions and key informant interviews. They do not represent the number of individual participants because a participant could describe more than one coping strategy.

Table 2: Household coping strategies identified through thematic analysis

Main theme	Illustrative coping practices	Frequency of mentions
Water purification and treatment	Chlorination, water guard, boiling, filtering and covering containers	45
Alternative water sources	Boreholes, wells, streams, bottled water, rainwater, taps, rivers and vendors	33
Water rationing and recycling	Reducing laundry, bathing and dishwashing; prioritising essential uses; reusing water	11
Water storage and sharing	Increasing storage capacity, using drums and tanks, borrowing and reciprocal sharing	18
Household and community awareness	Hygiene education, water-management advice, community meetings and collective initiatives	11

Water purification and treatment

Water purification and treatment was the most frequently mentioned coping strategy. Participants treated water through chlorination, water guard tablets, boiling, filtration and covering storage containers. These practices were mainly applied to water obtained from tankers, boreholes, wells and other sources whose safety was uncertain. A key informant explained how water guard tablets were used:

"I take my 20 litres, fill it and drop this water guard tablet into the 20 litres. Then I allow it to react overnight." (KII-4:205)

The quantity of water being treated influenced the treatment method selected. A participant from Munuki distinguished between treatment of smaller containers and larger storage tanks:

"Chlorine is for treating the bigger tanks. The water guards only treat the 20-litre jerry cans. They are for small quantities." (MP03:19–21)

Boiling and filtration were also used where households distrusted the safety of purchased or collected water. A focus group participant from Kator explained:

"In the house we used to boil the water. After boiling it, we filter the water." (KPFGD01_P1:150)

Despite its importance, household treatment was constrained by the cost of fuel and treatment products. Some participants also disliked the taste or smell of chlorinated water. A participant from Munuki observed:

"Boiling is good when you have fuel, but not if you're trying to conserve your fuel." (MP03:53)

The effectiveness and sustainability of water treatment therefore depended on access to fuel, treatment products, dosage information and acceptable treatment methods.

Alternative water sources

Households diversified their water sources to cope with unreliable conventional supplies. The alternatives included boreholes, hand-dug wells, streams, rainwater, bottled water, public taps, private vendors and water obtained from neighbours. Source selection depended on availability, cost, intended use and perceived safety. Boreholes and wells were preferred where they were accessible. A participant from Munuki explained:

"We just pump the water, and it is good; it is not salty. We actually boil it and drink it." (MP01:157)

Rainwater harvesting provided an important seasonal supplement to purchased or delivered water. A participant in a Juba payam focus group stated:

“During the rainy season, my wife and I use rainwater to minimise water shortage. The things that can hold water are used to collect the rainwater.” (JPFGD-2:72)

Bottled water was generally reserved for drinking, visitors or situations in which the safety of other sources was uncertain. However, bottled water was not affordable to all households. Lower-income households sometimes used nearby streams for washing, bathing and cleaning utensils. A key informant explained:

“Most people are going to collect water, especially the low-income earners ... and the water is not clean because it is located near markets.” (KII-8:15)

The use of alternative sources consequently demonstrated both household adaptability and socioeconomic inequality. Households with greater financial resources could purchase bottled water or invest in boreholes, while poorer households were more likely to depend on streams, borrowing or other potentially unsafe sources.

Water rationing and recycling

Households rationed water by reducing the frequency and quantity used for laundry, dishwashing and bathing. Drinking and cooking were generally prioritised, while activities considered less urgent were postponed or undertaken using smaller quantities. Some households also reused water for multiple domestic purposes. Participants in Munuki described reducing laundry frequency and explained how dishwashing activities were combined. On the other hand, another participant from Kator described how bathing practices were also adjusted:

“Washing is once a week, so you accumulate your clothes to the end of the week and wash once so that you can minimize water.” (MP01:91)

“You have to wash after you’ve had lunch and dinner. Put everything together so that you’re not washing twice or thrice a day.” (MP03:43)

“Especially in showering, when you are going to shower, you take a small quantity of water.” (KP07:101)

Some households locked water drums or taps to prevent unregulated use by other compound residents. Others reused water previously used for washing for cleaning, flushing, or other purposes. Although these practices helped water last longer, prolonged rationing and inappropriate reuse potentially compromised household hygiene and comfort.

Water storage and sharing practices

Households increased storage capacity by acquiring additional drums, tanks and jerry cans. Storage provided a reserve when tanker deliveries were delayed, or water points were temporarily unavailable. The quantity stored depended on household size, income, available space and the affordability of containers. A participant from Munuki described increasing storage for a large household while another participant explained how storage supported household planning:

“When we are 20 in a house, and there is only one drum, what we did was add two to make three drums and increase water storage.” (MPFGD-2_P2:114)

“When you have more storage, you can easily plan ... that can take you for at least two days before the tanker comes along.” (MP08:85–90)

Storage was complemented by borrowing and reciprocal sharing. Participants reported obtaining one or two jerry cans from neighbours during temporary shortages and returning the assistance when their own supplies became available:

“You can give your neighbour one jerry can or two jerry cans, and when mine gets difficult, they can also give me.” (MP05:220–222)

However, some households stored water in uncovered drums, increasing the possibility of contamination. Repeated borrowing could also generate discomfort, gossip or tension. Storage and sharing therefore provided important household and social buffers but were limited by the affordability of storage containers, water-handling practices and the reliability of neighbourhood relationships.

Household and community awareness

Participants identified household education, hygiene campaigns, community meetings and water-management advice as important coping practices. Awareness activities focused on water treatment, safe storage, cleanliness, conservation and responsible consumption.

Family heads instructed household members on proper water use, while community members exchanged information through meetings and informal neighbourhood discussions. One participant stated:

“You also need to assist your neighbour in awareness, to be careful with water management.” (KPF02_P9:131)

Key informants reported that people trained by non-governmental organisations passed information on treatment and hygiene to other community members. Some communities progressed from information sharing to collective infrastructure development. A key informant described one such initiative:

“They mobilised funding on their own to do their own borehole with a water pump and a solar pump, and then the same community manages it.” (KII-1:118)

The effectiveness of awareness initiatives was constrained by differences in education, language and access to accurate information. Some households did not treat water or lacked clear knowledge of treatment procedures. Continuous, accessible and locally appropriate education was therefore considered necessary.

Cross-cutting economic and technological adaptations

Economic adjustment influenced the coping strategies available to households. Participants reported reorganising their budgets to prioritise water purchases, particularly when tanker prices increased, or regular supplies failed. This sometimes required reducing expenditure on food, clothing, education-related items and other household requirements. Some households reportedly undertook additional income-generating activities to meet water-purchasing and treatment expenses.

Households with greater financial capacity could purchase bottled water, install larger tanks, buy treatment products or contribute to borehole construction. Resource-constrained households were more likely to ration, borrow or rely on less costly and potentially unsafe sources. Household income therefore shaped both the range and safety of coping practices.

Technological and collective initiatives included solar-powered boreholes, rainwater-harvesting systems and communal storage facilities. These measures offered greater potential for sustainable adaptation but required initial investment, technical knowledge, maintenance and effective management. Their success consequently depended on community organisation and support from government institutions, NGOs or development partners.

Discussion

The findings demonstrate that households in Juba City did not depend on a single response to water insecurity. Instead, they combined treatment, source substitution, conservation, storage and social-support practices according to changing water availability, affordability and perceived quality. This combination reflects the multidimensional nature of household water insecurity, in which water quantity, quality and socioeconomic access interact to shape household decisions [2].

The findings also support the Stress and Coping Theory. Households first evaluated the threat that inadequate water posed to drinking, cooking, hygiene and other domestic requirements and then assessed the resources available to manage it [9]. Households with stronger financial and material resources adopted relatively costly problem-focused strategies, such as purchasing water, expanding storage and investing in treatment. Resource-constrained households were more likely to ration, reuse or seek assistance from neighbours.

Boiling, chlorination and filtration represented active attempts to reduce risks associated with water from uncertain sources. Similar practices were identified in Rajaf Payam, where households used chlorine, boiling and basic filtration to improve drinking-water safety [12]. Their occurrence across Munuki, Juba and Kator suggests that household treatment is an established response to limited confidence in public and commercial water supplies. However, treatment depended on fuel, treatment products and knowledge. Concerns regarding the taste and smell of chlorine further affected its acceptance. Evidence from Ethiopia similarly indicates that household treatment and safe storage depend on knowledge, product availability and household

circumstances [25]. Water-treatment interventions in Juba should therefore combine affordable products with clear information on dosage, application and safe storage.

Using multiple water sources enabled households to maintain some level of access when tanker deliveries, public points or other regular supplies failed. Similar diversification has been identified among water-insecure households in low-income neighborhoods in Botswana [26]. Boreholes and rainwater offered potentially sustainable alternatives, while vendors, bottled water, streams and borrowing provided more immediate options. Nevertheless, access to safer alternatives was unequal. Households with sufficient income could buy bottled water, expand storage or contribute to private and communal infrastructure. Poorer households were more likely to depend on streams and other uncertain sources. This finding supports the coping-cost approach, which recognizes that households incur direct expenditure and indirect sacrifices when securing water [7]. The existence of several sources should not therefore be interpreted as equitable access because their quality, reliability and affordability differ.

Reducing laundry, dishwashing and bathing helped households preserve water for drinking and cooking. Household water-use decisions are generally shaped by income, household size, infrastructure, behavior and perceptions of scarcity [27]. The practices identified in Juba reflect deliberate conservation under conditions of restricted supply. However, prolonged rationing can shift from conservation to deprivation. Reducing bathing, postponing laundry and reusing water may affect hygiene, comfort and dignity. Rationing can therefore help households survive short shortages but cannot provide a sustainable solution to inadequate supply. Its continued use demonstrates that households are managing scarcity rather than achieving water security.

Increasing storage reduced exposure to intermittent supply and allowed households to prepare for delayed deliveries. However, storage may introduce water-quality risks when containers are uncovered, difficult to clean or used for prolonged periods. Safe-storage support should therefore accompany efforts to increase household storage capacity [25].

Water sharing functioned as a community safety net. Borrowing from neighbours enabled households to manage short interruptions without immediately purchasing additional water. Evidence from different cultural settings confirms that water gifts, exchanges and transfers are common responses to scarcity [28]. Nevertheless, water sharing is not unlimited. It may generate tension, and neighbours may be unable to help when an entire area experiences shortage. Sharing should be recognized as social solidarity but not treated as a substitute for reliable water services.

Household education, community sensitization and NGO-supported training strengthened knowledge of treatment, conservation, storage and hygiene. Information was transferred from trained individuals to families and neighbourhoods, demonstrating the value of community-based knowledge sharing. On the other hand, community participation also progressed beyond awareness to infrastructure initiatives such as collectively financed boreholes and solar-powered pumps. Studies of community-managed water systems indicate that local participation can improve

ownership and sustainability when accompanied by financial, technical and institutional support [29]. Community initiatives in Juba therefore offer potential for improving resilience but should complement rather than replace government responsibility.

The economic adjustments identified in the study show that water insecurity affects the allocation of household resources. Water purchases, treatment products, fuel and storage equipment impose direct costs, while time spent collecting water and undertaking additional work creates indirect costs. Households may consequently sacrifice other important expenditure to secure water. Coping capacity was therefore socially and economically differentiated. Higher-income households could adopt safer and more reliable strategies, while lower-income households faced a narrower and riskier set of alternatives. Household resilience should not be judged simply by the number of strategies adopted; it should also be evaluated according to the safety, affordability and sacrifices associated with those strategies.

Solar-powered pumps, communal boreholes, rainwater harvesting and shared storage represented movement from immediate coping towards longer-term adaptation. These interventions can reduce dependence on tanker vendors, unreliable electricity and distant water sources. Their collective nature may also strengthen community ownership and responsibility. However, technological interventions require appropriate planning, water-quality testing, maintenance, financing and technical expertise. Solar pumps require replacement components, boreholes require sustainable groundwater management, and rainwater systems need safe collection and storage. Without these supporting arrangements, technological interventions may deteriorate and become temporary solutions.

The findings reveal a continuum between immediate coping and sustainable adaptation. Boiling, borrowing, rationing and purchasing bottled water primarily addressed short-term shortages. Rainwater harvesting, safe storage, community education and solar-powered boreholes offered greater potential for longer-term resilience. Even these measures, however, required institutional support and reliable maintenance. The resourcefulness of households should therefore be recognised without interpreting it as evidence that existing water arrangements are adequate. Persistent dependence on household coping can conceal structural weaknesses in infrastructure and governance [8]. Sustainable water security in Juba requires reliable public infrastructure, regulated and affordable services, accessible treatment options, safe storage, support for community initiatives and targeted assistance for households unable to finance their own coping measures.

Conclusion

The study established that households in Munuki, Juba and Kator payams employed multiple strategies to manage inadequate access to clean and safe water. These included boiling, chlorination and filtration; using boreholes, wells, rainwater, vendors, bottled water and streams; rationing and reusing water; increasing storage and sharing with neighbours; and promoting

household and community awareness. Economic adjustments, communal water projects and solar-powered boreholes further demonstrated the adaptability and resourcefulness of households and communities facing persistent water insecurity.

However, the effectiveness and sustainability of these strategies were constrained by household income, treatment and fuel costs, inadequate storage, uncertain water quality, limited technical knowledge and unequal access to safer sources. Excessive rationing, unsafe reuse, prolonged storage and dependence on unprotected sources could introduce additional hygiene and health risks. Household coping is therefore necessary for addressing immediate shortages but cannot substitute for reliable, affordable and safely managed public water services. Sustainable water security requires transforming short-term coping practices into supported adaptation through infrastructure investment, affordable treatment, safe storage, technological innovation and targeted assistance to vulnerable households.

Recommendations

Government agencies, NGOs and water-sector partners should increase access to affordable water-treatment products, safe covered storage containers and practical household education on chlorination, boiling, filtration, storage hygiene, conservation and safe water reuse. Education should be delivered in locally understood languages through community leaders, health workers, schools, women's groups and neighbourhood associations. Targeted subsidies should prioritise low-income and large households that cannot independently afford safe water, treatment products or adequate storage facilities.

Rainwater harvesting, protected boreholes, solar-powered pumps and community-managed storage facilities should be expanded as sustainable alternatives to unsafe and unreliable sources. Communities should receive financial, technical and maintenance support, together with clear arrangements for managing access, contributions and accountability. These initiatives should complement public investment rather than transfer full responsibility for water provision to households and communities.

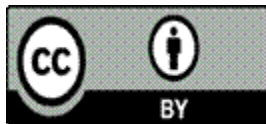
Private tanker and vendor-supplied water should be regulated through routine quality monitoring, hygienic transportation requirements and transparent pricing. In the longer term, the government and development partners should expand the municipal distribution network, increase water-treatment capacity, maintain existing infrastructure and establish protected water points in underserved areas. These measures would reduce dependence on costly and potentially unsafe coping practices while strengthening equitable and sustainable water access across Juba City.

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