

Availability, Accessibility, and Sufficiency of Domestic Water among Women in Selected Areas of Baringo South Constituency, Baringo County, Kenya

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Abstract

Baringo South Constituency, located within Kenya's semi-arid Rift Valley, faces chronic domestic water scarcity that disproportionately affects women as primary household water procurers. This study evaluated the availability, accessibility, and sufficiency of domestic water for household use among women in Marigat and Mochongoi wards of Baringo South Constituency. The study was guided by the Sustainable Livelihoods Framework developed in the 1990s by the United Kingdom's Department for International Development as part of its poverty reduction and development strategies. A convergent parallel mixed-methods design was adopted. A multistage sampling procedure yielded 320 completed household surveys (81.4% response rate) from an initial sample of 393 women. Structured questionnaires, focus group discussions, and key informant interviews collected data on water sources, collection burdens, reliability, and coping strategies. The Water Poverty Index (WPI) was computed to assess multidimensional water insecurity. Descriptive statistics and Chi-square tests were applied using SPSS version 27. Boreholes (36.3%) and surface water sources (48.4%) were the main domestic supplies, yet 72.5% of sources were unavailable year-round and 51.2% were unreliable. Women were the primary water collectors in 69.4% of households; 62.5% traveled over 500 meters, and 71.9% spent more than one hour per trip. During dry seasons, 89.7% of women reported increased collection effort. Water was rarely or never sufficient for 70.3% of households, and 67.5% practiced daily or weekly rationing. The computed WPI was 32.6, indicating high water poverty. No significant spatial differences existed between Marigat and Mochongoi wards across any indicator ($p > 0.05$). In conclusion, women in Baringo South experience severe water insecurity characterized by unreliable infrastructure, extreme temporal and physical collection burdens, and chronic domestic insufficiency. Gender-responsive investments in safe water infrastructure and governance are urgently required.

Keywords: water scarcity, water accessibility, water sufficiency, women, water poverty index, arid and semi-arid lands, Kenya

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1. Introduction

Water is fundamental to human health, dignity, and socio-economic development, yet global freshwater security is deteriorating under the pressures of climate change,

demographic growth, and environmental degradation (United Nations, 2023; World Bank, 2024). Approximately 2.1 billion people worldwide still lack safely managed drinking water services, and nearly three-quarters of the global population now lives in water-insecure countries (UNESCO, 2024; WHO

& UNICEF, 2025). In sub-Saharan Africa, the crisis is particularly acute: over 411 million people lack even basic drinking water access, and only 15% of the population enjoys safely managed services (UNESCO, 2024). The burden of water procurement falls disproportionately on women and girls, who collectively spend an estimated 77 million working days annually fetching water across the region (UNESCO, 2024; Geere et al., 2018).

Kenya is classified as a water-scarce country, with renewable freshwater availability below 1,000 cubic meters per capita per year far beneath the global threshold of 1,700 cubic meters (Mulwa et al., 2021). National policy documents acknowledge that arid and semi-arid lands (ASALs) constitute approximately 80% of the country's land area and host 36% of the population, yet access to safe water in these counties often falls below 10% (Ministry of Water, Sanitation and Irrigation, 2020). Baringo County, situated in the Kenyan Rift Valley, typifies this vulnerability. Characterized by aridity indices ranging from 30% to 84% and erratic annual rainfall between 300 mm and 600 mm in the lowlands, the county faces severe seasonal water deficits (County Government of Baringo, 2024; KIPPRA, 2023). The 2019 Kenya Population and Housing Census indicated that only 39% of Baringo's population had access to safe drinking water, with rural areas a home to 89% of residents faring considerably worse (County Government of Baringo, 2024).

Within Baringo County, Baringo South Constituency represents a hotspot of water insecurity. The area's pastoralist and agro-pastoralist livelihood systems concentrate human and livestock pressure on limited water points, while gendered divisions of labor assign primary responsibility for domestic water collection, storage, and management to women. Previous localized studies have documented microbial contamination in water pans (Kurui et al., 2017) and seasonal disease patterns in Marigat town (Osiero, 2019), yet no investigation has simultaneously evaluated the three foundational dimensions of domestic water security such as availability, accessibility, and sufficiency through a gendered lens at the constituency scale. This gap limits the evidence base required to operationalize Kenya's Water Act 2016, the National Water and Sanitation Investment Plan, and Baringo County's Climate Change Action Plan 2023–2027 in ways that respond to women's lived realities.

Theoretically, this study is anchored in the Sustainable Livelihoods Framework (SLF), originally developed by the UK Department for International Development and refined by Scoones (1998) and Ellis (2000). The SLF conceptualizes livelihood sustainability through five capitals such as natural, physical, human, social, and financial operating within a vulnerability context shaped by climate variability, institutional processes, and governance structures (DFID, 1999; Scoones, 1998). In ASAL settings, water functions as the foundational natural capital upon which all other capitals depend; its scarcity depletes human capital through physical exhaustion and illness, erodes financial capital through water purchasing costs, and undermines social capital by intensifying intra-household and community competition (Morse & McNamara, 2013; Teshome et al., 2021). By applying the SLF, this study moves beyond purely

hydrological assessments to examine how water scarcity interacts with gendered labor, infrastructure deficits, and institutional failures to produce chronic household water poverty.

Against this backdrop, the present study was designed to evaluate the availability, accessibility, and sufficiency of water for domestic use among women in Marigat and Mochongoi wards of Baringo South Constituency. The specific research questions were: (1) What are the primary water sources, and how reliable are they throughout the year? (2) What are the spatial, temporal, economic, and safety dimensions of women's water accessibility? (3) To what extent does available water meet household domestic requirements? (4) How severe is multidimensional water poverty in the study area?

2. Materials and Methods

2.1 Study Area

The study was conducted in Baringo South Constituency (Figure 3.1), located in Baringo County within the Rift Valley region of Kenya. The county lies between longitudes 35°30' and 36°30' East and latitudes 0°10' South and 1°40' North (County Government of Baringo, 2023). It borders Turkana and Samburu counties to the north, Laikipia to the east, Nakuru and Kericho to the south, Uasin Gishu to the southwest, and Elgeyo-Marakwet and West Pokot to the west (Ganira et al., 2022; County Government of Baringo, 2023; Maurice et al., 2019). The Equator cuts across the southern part of the County, which covers an area of 11,015.3 Square Kilometers (sq km), including 165 sq km of surface water (Kateiya, 2022).

Rainfall in Baringo County varies with altitude, ranging from 1,000mm to 1,500mm in the highlands to about 600mm annually in the lowlands (Chepkilot, 2020; Akala, 2019). Koibatek Sub-County receives the highest rainfall, while Mogotio, Tiaty East, Tiaty West, and Baringo North experience relatively low amounts (Meiguran et al., 2024; County Government of Baringo, 2023). Baringo South Constituency falls within these low-rainfall zones, where the combination of scarce precipitation and high evaporative demand creates the chronic water deficit that defines daily life for women. Temperatures range between 10°C and 35°C across the county, with low humidity and average wind speed of 2m/s (County Government of Baringo, 2023). These climatic conditions intensify water loss from open sources and shallow wells, forcing women to travel longer distances as seasonal rivers dry and pans evaporate. The county's climate transitions from humid highlands to arid lowlands (County Government of Baringo, 2023), and Baringo South sits at the arid end of this gradient, where the 600mm annual rainfall is not only low but also highly erratic, concentrating into brief, intense wet-season events that generate flash flooding and surface runoff.

2.2 Research Design

A convergent parallel mixed-methods design was adopted, integrating quantitative household surveys with qualitative focus group discussions (FGDs) and key informant interviews (KIIs) (Creswell & Plano Clark, 2011). This design enabled simultaneous examination of numerical water access metrics and the lived experiences of women managing chronic scarcity. For the water access assessment, a descriptive cross-

sectional approach provided a snapshot of current conditions across wet and dry seasons.

2.3 Target Population and Sampling

The target population comprised approximately 22,623 women aged 18 years and above, responsible for water collection in Marigat and Mochongoi wards. The sample size was determined using the Yamane (1967) formula for finite populations, yielding a required sample of 393 respondents at a 95% confidence level and 5% margin of error. Marigat and Mochongoi wards were purposively selected from the five wards of Baringo South Constituency to capture variation in agro-ecological and water-access conditions. Marigat represents a lowland, semi-arid area with pastoral activities and reliance on seasonal rivers and pans, while Mochongoi represents a transitional zone with mixed farming and greater borehole dependence. One water-scarce location was purposively selected from each ward using County Government of Baringo (2023) drought vulnerability assessments and NGO reports. Two sub-locations per selected location were then purposively selected to capture variation in water sources and accessibility, including improved and unimproved sources. Villages within the selected sub-locations were randomly selected using a lottery method from official village lists. Finally, eligible women were randomly selected from household lists compiled with village elders, giving each woman an equal chance of selection and supporting unbiased estimates.

2.4 Data Collection Instruments

Primary data were collected using structured questionnaires, FGD guides, and KII schedules. The questionnaire captured socio-demographic characteristics, primary and alternative water sources, distance and time to sources, collection frequency, water costs, perceived sufficiency, rationing practices, and coping mechanisms. Focus group discussions with 6–10 participants per session explored seasonal changes, safety risks, and intra-household water allocation. Key informant interviews with healthcare workers and local administrators triangulated reported disease burdens and infrastructure gaps. Instrument reliability was established during pilot testing ($n = 39$) in Elgeyo Marakwet County, yielding a Cronbach's alpha of 0.70, which met the threshold

for acceptable internal consistency (Mugenda & Mugenda, 2003; Onwuegbuzie & Collins, 2007).

2.5 Water Poverty Index

The Water Poverty Index (WPI) was computed to provide a multidimensional assessment of water insecurity. Following Uddin et al. (2021) and Brown et al. (1972), the index integrates five components such as Resources (R), Access (A), Capacity (C), Use (U), and Environment (E) each scored on a 0–100 scale where lower values indicate greater poverty. The composite WPI is the arithmetic mean of the five components, interpreted as: 0–24 very high water poverty, 25–49 high water poverty, 50–69 moderate water poverty, 70–89 low water poverty, and 90–100 no water poverty.

2.6 Data Analysis

Quantitative data were cleaned and analyzed using SPSS version 27. Descriptive statistics (frequencies, percentages, means, and standard deviations) summarized water availability, accessibility, and sufficiency indicators. Chi-square tests of independence examined spatial differences between Marigat and Mochongoi wards. Qualitative data from FGDs and KIIs were transcribed, translated, and thematically analyzed to identify recurring patterns.

3. Results

3.1 Response Rate and Socio-Demographic Characteristics

Out of 393 questionnaires administered to women in Marigat and Mochongoi wards, 320 were duly completed and returned, representing an overall response rate of 81.4%. Table 1 summarizes the socio-demographic profile of the respondents. The majority (70.7%) were aged between 26 and 45 years, representing the reproductive and economically active cohorts. Most respondents (61.6%) were married, while 29.7% were single and 8.8% were widowed. Educational attainment was generally low: 54.7% had not progressed beyond primary school, and only 14.4% had attained tertiary education. Households were moderately large, with 48.4% comprising 4–6 members. Economically, 67.2% of the respondents were unemployed, and only 4.1% were in salaried employment.

Table 1: Socio-Demographic Characteristics of Respondents

Variable	Category	<i>n</i>	%
Age (years)	18–25	64	20.0
	26–35	110	34.4
	36–45	116	36.3
	46–55	19	5.9
	Above 55	11	3.4
Marital status	Single	95	29.7
	Married	197	61.6
	Widowed	28	8.8
Level of education	No formal education	28	8.8
	Primary	147	45.9
	Secondary	99	30.9
	College/University	46	14.4
Household size	1–3 members	63	19.7
	4–6 members	155	48.4
	7–9 members	64	20.0
	More than 9 members	38	11.9
Occupation	Unemployed	215	67.2

Self-employed	67	20.9
Salaried employment	13	4.1
Farming	25	7.8

3.2 Water Availability and Source Reliability

Table 2 presents the primary sources of domestic water and indicators of supply reliability. Boreholes were the predominant source, utilized by 36.3% of households. However, surface water from rivers, streams, or lakes constituted the second most common source (29.4%), followed by water pans (16.9%). Collectively, unimproved sources including surface water, pans, unprotected wells, and unprotected springs accounted for over half of all household

supplies. Only 25.3% of respondents reported that their main source was available throughout the year; the majority (72.5%) indicated year-round unavailability. In terms of frequency, 64.1% reported that water was available only “sometimes,” while just 17.5% enjoyed a continuous (24/7) supply. Regarding weekly unavailability, 51.6% of households experienced 3–4 days without water, and 9.7% faced 5–6 dry days per week. Overall, 51.2% of respondents characterized their primary source as unreliable, compared with 35.0% who considered it always reliable.

Table 2: Primary Water Sources and Reliability Indicators

Indicator	Category	n	%
Primary source	Borehole	116	36.3
	River, stream, or lake	94	29.4
	Water pan	54	16.9
	Unprotected well	18	5.6
	Protected spring	17	5.3
	Rainwater harvesting	11	3.4
	Unprotected spring	10	3.1
Availability throughout the year	Yes	81	25.3
	No	232	72.5
Frequency of availability	Only during rainy seasons	7	2.2
	Always (24/7)	56	17.5
	Most of the time	23	7.2
	Sometimes	205	64.1
	Rarely	36	11.3
Days water is unavailable per week	0 days	49	15.3
	1–2 days	71	22.2
	3–4 days	165	51.6
	5–6 days	31	9.7
	7 days	4	1.3
Reliability of water source	Always reliable	112	35.0
	Sometimes reliable	40	12.5
	Unreliable	164	51.2
	Highly unpredictable	4	1.3

3.3 Water Accessibility

3.3.1 Responsibility, Distance, and Time Expenditure

Table 3 shows that adult women bore the primary responsibility for water collection in 69.4% of households. Shared responsibility between men and women was reported in 20.0% of households, while collective sharing among all members occurred in only 10.6%. Physical accessibility was severely constrained: only 8.1% of households had a water

source within 100 meters, while 62.5% were located more than 500 meters away, including 29.7% who traveled 1–3 kilometers. Temporal burdens were equally pronounced. Less than one-third of women (28.1%) completed water collection in under one hour per trip; the majority (46.6%) spent 1–2 hours, and 25.3% spent 2–4 hours. During dry seasons, 89.7% of women reported a significant increase in the time and physical effort required to fetch water.

Table 3: Water Collection Responsibility, Distance, and Time Burden

Indicator	Category	n	%
Primary responsibility for collection	Adult women	222	69.4
	Both men and women	64	20.0
	Everyone shares	34	10.6
Distance to primary water source	Within 100 m	26	8.1
	101–500 m	94	29.4
	501 m–1 km	101	31.6

Time spent collecting water per trip	1–3 km	95	29.7
	More than 3 km	4	1.3
	Less than 30 min	18	5.6
	30 min–1 hr	72	22.5
	1–2 hrs	149	46.6
Increased burden during dry season	2–4 hrs	81	25.3
	Significant increase	287	89.7
	Moderate increase	33	10.3

3.3.2 Physical Barriers, Safety Risks, and Financial Burden

As shown in Table 4, women faced multiple concurrent hazards during water collection (respondents could select multiple options). Long distances were reported by 83.8%, queues and crowds by 69.1%, wildlife encounters by 61.9%, difficult terrain by 58.1%, risk of assault or violence by 54.4%,

and unsafe conditions due to poor lighting by 51.6%. Only 10.0% reported no significant barriers.

Economic accessibility was also a major constraint. A majority (73.2%) paid for water either regularly (51.9%) or sometimes (21.3%), while only 4.7% accessed water at no cost. Monthly expenditure was concentrated in the 100–1000 Kenyan Shillings (KES) range (71.5%), yet nearly a quarter (24.8%) spent more than 1000 KES. For 57.2% of respondents, these costs constituted a significant financial burden.

Table 4: Physical Barriers and Financial Burden of Water Collection

Barrier/Risk/Indicator	Category	<i>n</i>	%
Physical barriers and risks ^{<sup>}	Long distance	268	83.8
	Queues/Crowds	221	69.1
	Wildlife encounters	198	61.9
	Difficult terrain	186	58.1
	Risk of assault/violence	174	54.4
	Lack of safety (poor lighting)	165	51.6
	No significant barriers	32	10.0
Payment for water	Yes, regularly	166	51.9
	Yes, sometimes	68	21.3
	No, it is free	15	4.7
	Not applicable (natural source)	71	22.2
Monthly expenditure (KES) ^{<sup>}	Less than 100	7	2.2
	100–500	105	32.9
	501–1000	123	38.6
	More than 1000	79	24.8
	Varies	5	1.6
	Not applicable	7	2.2
Perceived financial burden	Significant burden	183	57.2
	Moderate burden	43	13.4
	Not a burden	23	7.2
	Not applicable (free water)	71	22.2

Note. <sup> Respondents could select multiple barriers. <sup> *n* = 319.

3.4 Water Sufficiency for Domestic Use

3.4.1 Consumption, Sufficiency, and Rationing

Table 5 presents data on daily water consumption, perceived sufficiency, and rationing practices. Daily household consumption was predominantly modest: 55.6% used 50–100 liters, and 24.1% used 101–200 liters. Despite low

consumption, water sufficiency was critically inadequate. Only 6.6% of respondents reported always having sufficient water, whereas 70.3% combined indicated that supplies were rarely sufficient (35.0%) or never sufficient (35.3%). Consequently, water rationing was widespread and severe: 48.4% of households practiced daily rationing, and 19.1% rationed weekly, meaning that more than two-thirds (67.5%) engaged in regular rationing at least once per week.

Table 5: Daily Water Consumption, Sufficiency, and Rationing Practices

Indicator	Category	<i>n</i>	%
Daily household water use	50–100 liters	178	55.6
	101–200 liters	77	24.1
	201–300 liters	40	12.5
	More than 300 liters	25	7.8
	Always sufficient	21	6.6
Water sufficiency for household needs	Most of the time	7	2.2
	Sometimes sufficient	67	20.9
	Rarely sufficient	112	35.0
	Never sufficient	112	35.0

Frequency of water rationing	Never sufficient	113	35.3
	Rarely (once a month)	8	2.5
	Sometimes (few times a month)	96	30.0
	Often (weekly)	61	19.1
	Always (daily)	155	48.4

3.4.2 Compromised Activities, Coping Mechanisms, and Treatment Practices

Table 6 summarizes the domestic activities most affected by water insufficiency, the coping strategies employed, and household water treatment behaviors (respondents could select multiple options for affected activities and coping mechanisms). Laundry was the most frequently compromised activity (81.9%), followed by drinking (75.9%), cleaning utensils (74.7%), personal hygiene (73.4%), cooking (69.1%), and sanitation (61.9%).

To cope, women most commonly reduced personal hygiene practices (83.8%) and laundry frequency (75.9%). Purchasing water from vendors (74.7%), fetching from unsafe sources (69.1%), and reusing water (61.9%) were also prevalent. The data further revealed that 80.0% of respondents had missed or postponed meals due to water shortages in the past month, with 41.9% doing so more than four times. Water treatment was inconsistently practiced: only 11.9% always treated their water before use, 48.1% treated it sometimes, and 36.9% never treated it. Among those who did treat water, boiling (29.4%) and chlorination (27.5%) were the most common methods.

Table 6: Domestic Activities Affected, Coping Mechanisms, and Water Treatment Practices

Indicator	Category	n	%
Domestic activities affected<sup>	Laundry	262	81.9
	Drinking	243	75.9
	Cleaning utensils/household items	239	74.7
	Personal hygiene	235	73.4
	Cooking	221	69.1
	Farming/Livestock	214	66.9
	Sanitation	198	61.9
Coping mechanisms used<sup>	Reduce personal hygiene	268	83.8
	Reduce laundry frequency	243	75.9
	Buy water from vendors	239	74.7
	Fetch from unsafe sources	221	69.1
	Reduce cooking water	214	66.9
	Store water in containers	206	64.4
	Reuse water	198	61.9
	Borrow from neighbors	186	58.1
Missed/postponed meals due to shortage	Yes	256	80.0
	No	64	20.0
Frequency of missed meals (past month)<sup>	1–2 times	65	20.3
	3–4 times	121	37.8
	More than 4 times	134	41.9
Water treatment before use	Always	38	11.9
	Sometimes	154	48.1
	Never	118	36.9
Treatment methods used<sup>	Boiling	94	29.4
	Chlorination	88	27.5
	Filtration using cloth	14	4.4
	Sedimentation	6	1.9

Note. <sup> Respondents could select multiple options. <sup> Among those who missed meals ($n = 256$). <sup> Among those who treated water.

3.5 Perceived Water Scarcity and Temporal Trends

Table 7 presents women's perceptions of water scarcity severity and trends over time. An overwhelming majority (78.4%) perceived water scarcity as frequent, particularly during dry seasons, while 14.4% described it as persistently severe. Only 7.2% considered scarcity occasional. Regarding trends over the past five years, 32.8% of respondents reported

deterioration in water availability, 47.8% observed no change, and only 19.4% noted improvement. The effects on women's daily routines were multidimensional: 67.2% reported spending more time collecting water, 55.6% spent more money buying water, 47.5% experienced emotional or physical stress, 44.7% had reduced time for childcare or rest, 42.5% lost time for income-generating activities, and 40.0% reported disrupted sleep patterns.

Table 7: Perceived Water Scarcity, Trends, and Effects on Daily Routine

Indicator	Category	n	%
Perceived frequency of scarcity	Occasional	23	7.2

Trend in availability (past 5 years)	Frequent	251	78.4
	Persistent severe scarcity	46	14.4
	Worse	105	32.8
	Same	153	47.8
	Better	62	19.4
Effects on daily routine^{<sup>}	Spend more time collecting water	215	67.2
	Spend more money buying water	178	55.6
	Emotional or physical stress	152	47.5
	Reduced time for childcare/rest	143	44.7
	Reduced income-generating activities	136	42.5
	Wake early or stay late to fetch water	128	40.0

Note. <sup> Respondents could select multiple effects.

3.6 Spatial Variation across Marigat and Mochongoi Wards

Table 8 presents the results of Chi-square tests examining differences in water availability, accessibility, and sufficiency between Marigat and Mochongoi wards. No statistically significant differences were observed across any indicator.

Year-round availability yielded $\chi^2(2) = 2.239, p = .326$; source reliability yielded $\chi^2(3) = 4.585, p = .205$; distance to source yielded $\chi^2(4) = 2.516, p = .642$; time spent collecting yielded $\chi^2(3) = 2.562, p = .464$; water sufficiency yielded $\chi^2(4) = 2.840, p = .585$; and rationing frequency yielded $\chi^2(3) = 2.133, p = .545$. These findings indicate that water insecurity is not localized to one ward but is a shared, constituency-wide phenomenon.

Table 8: Chi-Square Test for Differences in Water Availability, Accessibility, and Sufficiency Across Marigat and Mochongoi Wards

Variable	Indicator	χ^2	df	p
Availability	Availability throughout the year	2.239	2	.326
	Reliability of water source	4.585	3	.205
Accessibility	Distance to water source	2.516	4	.642
	Time spent collecting water	2.562	3	.464
Sufficiency	Water sufficiency levels	2.840	4	.585
	Frequency of rationing	2.133	3	.545

3.7 Water Poverty Index

Table 9 presents the component scores and composite Water Poverty Index for Baringo South Constituency. The overall WPI was 32.6, classifying the area in the “high water poverty” category. Among the five components, Environment recorded the lowest score (22), followed by Access (28) and Resources

(32). Use scored 35, while Capacity registered the highest value at 46. The low Environment score reflects severely degraded source conditions and poor water quality, while the low Access score confirms that even when water is physically present, it remains beyond practical reach for most women due to distance, time, and safety barriers.

Table 9: Water Poverty Index Component Scores for Baringo South Constituency

Component	Indicator Basis	Score (/100)
Resources (R)	Seasonal scarcity, unreliable sources, dry-season shortages, dependence on pans/rivers/wells	32
Access (A)	Long collection distances, severe physical strain, high time burden on women	28
Capacity (C)	Moderate coping ability, treatment attempts, mixed socioeconomic resilience	46
Use (U)	Water rationing, skipped meals, hygiene limitations, competing household uses	35
Environment (E)	Poor water quality, contamination, degraded source conditions	22
Composite WPI	(R + A + C + U + E) / 5	32.6

4. Discussion

This study provides integrated constituency-level assessment of domestic water availability, accessibility, and sufficiency among women in Baringo South Constituency. The findings reveal severe and chronic water insecurity in which natural capital depletion, infrastructure deficits, and gendered labor norms converge to produce disproportionate burdens on women.

The reliance on boreholes (36.3%) and surface water (48.4%) mirrors patterns documented elsewhere in Kenya’s ASALs, where communities depend on a mix of deep groundwater and highly variable surface sources (Abungu et al., 2026;

Waswala-Olewe et al., 2026). However, the finding that 72.5% of sources are unavailable year-round and that 51.2% are unreliable indicates a systemic failure of supply continuity that exceeds national averages. Njora and Yilmaz (2021) observed that climate change, rapid population growth, and poor distribution networks continue to limit water accessibility across Kenya; the present findings suggest that in Baringo South, these structural constraints manifest as near-universal seasonal unreliability. The lack of significant spatial differences between Marigat and Mochongoi wards further indicates that water insecurity is not confined to specific localities but is a constituency-wide phenomenon driven by

regional aridity and underinvestment in climate-resilient infrastructure.

The gendered division of water labor documented where 69.4% of primary collectors being adult women aligns with global and regional evidence. UNESCO (2024) reports that women and girls bear primary responsibility for fetching water in rural sub-Saharan African households, while Geere et al. (2018) established through systematic review that water carriage is strongly associated with musculoskeletal pain, fatigue, and injury. In the present study, 71.9% of women spent more than one hour per trip, and 89.7% reported intensified burdens during dry seasons. These temporal demands constitute a form of time poverty that constrains women's engagement in income-generating activities, childcare, and rest, thereby eroding human capital across multiple domains (Bisung & Elliott, 2016; Tsai et al., 2016). Physical accessibility was characterized by extreme barriers. The finding that 62.5% of households are located more than 500 meters from their primary source exceeds the WHO/UNICEF (2025) threshold for "basic access," while the 29.7% traveling 1–3 kilometers fall into the "limited access" category associated with significantly worse health and economic outcomes. The multiplicity of hazards such as wildlife encounters (61.9%), difficult terrain (58.1%), and risks of gender-based violence (54.4%) corroborates qualitative evidence from pastoralist settings in Tanzania and Côte d'Ivoire, where water points have been documented as sites of physical danger and intra-community conflict (Ngomuo & Msoka, 2012; Seri, 2023). The reported cases of snake bites, thorn-induced amputations from invasive *Prosopis juliflora*, and sexual violence at collection points underscore that water accessibility is not merely a matter of distance but of bodily safety and dignity.

Economic accessibility emerged as a critical yet under-addressed dimension. With 57.2% of respondents characterizing water costs as a significant burden and monthly expenditures frequently exceeding 1000 KES, households are compelled to divert limited financial resources away from food, healthcare, and education. Prieto-Curiel and Borja-Vega (2024) demonstrated that in water-scarce contexts, reliance on vendor-purchased water can increase household expenditures by up to 75%, deepening poverty traps. The additional finding that women predominantly shoulder these costs alone because men "don't contribute financially toward buying water" illustrates a structural mismatch between gendered responsibility for water and gendered control over household finances, a dynamic consistent with feminist political ecology critiques of the Sustainable Livelihoods Framework (Scoones, 2009; Morse & McNamara, 2013).

Water sufficiency data paint a stark picture of domestic deprivation. The WHO (2017) recommends a minimum of 20 liters per person per day for basic health and hygiene; yet 55.6% of households in this study consumed only 50–100 liters per day for the entire family, and 70.3% reported supplies as rarely or never sufficient. The resulting rationing practices such as daily for 48.4% of households compromised laundry (81.9%), personal hygiene (73.4%), and even drinking water (75.9%). Such widespread rationing is associated in the literature with increased risks of urinary tract infections,

reproductive tract morbidity, and compromised menstrual hygiene management, particularly in contexts where women lack privacy and water for washing (Jasper et al., 2012; Rosinger, 2018). The finding that 80.0% of women missed or postponed meals due to water shortages extends the impact of scarcity from WASH outcomes to nutrition security, suggesting that water poverty functions as a structural determinant of food insecurity as well.

The Water Poverty Index score of 32.6 places Baringo South in the "high water poverty" category, comparable to some of the most water-stressed regions globally. The particularly low Environment component score (22) reflects severely degraded source conditions, while the Access score (28) confirms that even when water exists physically, it remains beyond practical reach for most women. This multidimensional assessment is essential for policy: single-indicator interventions, such as borehole drilling without attention to maintenance, distribution, or safety, are unlikely to shift the composite index substantially. Instead, integrated investments in piped systems, rainwater harvesting, source protection, and gender-responsive governance are required to improve multiple WPI components simultaneously.

From a theoretical perspective, the findings strongly support the SLF's proposition that water scarcity in ASALs depletes multiple livelihood assets concurrently. Natural capital (water) is degraded by climatic variability and overuse; physical capital (infrastructure) is insufficient to buffer seasonal shocks; human capital is eroded through musculoskeletal strain, infectious disease risk, and psychological distress; financial capital is consumed by water purchasing; and social capital is strained by conflict at scarce water points. The SLF's vulnerability context is clearly manifested in the seasonal alternation between drought-induced scarcity and flood-induced contamination, while transforming structures and processes such as county water policies, national standards, and community governance have evidently failed to translate into equitable service delivery for women in Baringo South.

5. Conclusion and Recommendations

This study establishes that women in Baringo South Constituency face severe domestic water insecurity characterized by unreliable sources, extreme collection burdens, chronic insufficiency, and high multidimensional water poverty. The absence of significant spatial differences between Marigat and Mochongoi wards indicates a systemic crisis requiring constituency-wide intervention. Gender-responsive policies must prioritize expanding climate-resilient water infrastructure, reducing collection distances, ensuring year-round reliability, and addressing the safety and economic burdens that women currently bear alone. Future research should examine the cost-effectiveness of decentralized water treatment, the scalability of rainwater harvesting, and the long-term health trajectories of women in high water-poverty settings.

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