

CLIMATE ADAPTATION: WOMEN AND WATER SCARCITY STRATEGIES IN KAKUMA REFUGEE CAMP, NORTH-WEST KENYA

Alamin Jebrin Tutu



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THE AUTHOR

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EXECUTIVE SUMMARY

This paper investigates the coping and adaptation strategies used by women in Kakuma refugee camp in response to water scarcity, a pressing issue worsened by climate change. Qualitative data collection methods, including focus group discussions, interviews and observations, were employed in order to understand the lived experiences of women in the camp. Results showed that women bear the burden of securing water for domestic use, often walking long distances or waiting in lengthy queues to access this scarce resource in Kakuma. To overcome such challenges, these women have developed a number of strategies, including collaboration in water collection, barter systems to exchange water for food, and innovative water conservation techniques within their households. These mechanisms are deeply influenced by cultural norms, social institutions and the need for survival in resource-scarce conditions. Overall, the paper underscores the importance of recognizing the resilience of women in refugee settings, while calling for more sustainable water management solutions to alleviate the gendered impacts of water scarcity in Kakuma refugee camp.

INTRODUCTION

Climate change is a global problem affecting different parts of the world. It is a situation that threatens all sectors of human survival. Climate change refers to significant, long-term shifts in the average climate or its variability, lasting decades or longer.¹ It can result from natural processes, external forces or persistent human activities that alter the atmosphere's composition or land use.² Different aspects of human life are affected by the impacts of climate change, ranging from water availability to food security and land degradation, and the impacts of increased temperatures and floods in different parts of the world.

In Africa, water scarcity poses a severe challenge, making the continent's population vulnerable to changes in climate. These changes pose a threat to household water security and have associated impacts on health, wellbeing and livelihoods. These risks are not evenly distributed across individuals and communities, hence the need to understand women's vulnerabilities and responses to these risks due to the disproportionate impact that water scarcity has on women.³

In Kenya, climate change over the years has resulted in decreased rainfall, high temperatures and increased the vulnerability of areas classified as Arid and Semi-arid Lands (ASALs), including Turkana, Marsabit, Isiolo, Moyale and Wajir.⁴ Water scarcity, due to climate change in these areas, impacts vast groups differently. It has a greater effect on women than men in Kakuma, which is located in Turkana, as women have to spend prolonged hours on domestic chores,

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- 1 Donatella Baiardi, 'What Do You Think About Climate Change?', *Journal of Economic Surveys* 37/4 (2022): 1255–1313.
 - 2 Anu Adhikari et al., 'Terminologies Used in Climate Change', Report, International Union for Conservation of Nature (IUCN), 2011. Accessed 15 October 2024, <https://portals.iucn.org/library/efiles/documents/2011-118.pdf>.
 - 3 Sarah Dickin, Lisa Segnestam and Mariam Sou Dakouré, 'Women's Vulnerability to Climate-related Risks to Household Water Security in Centre-East, Burkina Faso', *Climate and Development* 13/5 (2021): 443–453.
 - 4 Amos Otieno Wanjara and Paul Ogembo, 'Impact of Climate Change on Health and Livelihoods of Pastoral Communities in Kenya: A Case of North Eastern Region', *Indonesian Journal of Social and Environmental Issues* 4/3 (2023): 299–315.

family care and walking long distances to collect water.⁵

While considerable research has been done on the effects of climate change on vulnerable populations, there is relatively little literature on how women in refugee settings adapt and cope in such situations. As such, little is known about the ways in which displaced women cope with highly resource-constrained refugee environments in Kenya. There is need to highlight the positive implications of coping strategies that women adapt when faced with water shortage problems since they are the ones that are responsible for household water management. This paper seeks to address this gap by investigating both the adaptation and coping strategies employed by women in Kakuma refugee camp and the multifaceted outcomes of these strategies. Such a focus highlights women's resilience and the socio-cultural influences that shape their responses to water scarcity.

As will be shown in subsequent parts of this paper, water scarcity has the positive impact of fostering cooperation among women, as seen in their sharing of experience of techniques for conserving water and by walking together over longer distances to collect this important commodity. These interactions have not only worked as bonding mechanisms among women, but they also work as a support system for them through building communities at the informal level.

Starting from the conservation techniques used by women in Kakuma refugee camp, to the diverse range of rationing employed within their households, the women demonstrate a wide array of strategies to manage water scarcity. These methods include water recycling, minimizing water consumption in daily chores and prioritizing its essential uses, such as cooking and drinking, all of which demonstrate their resourcefulness in the face of limited resources. Such strategies emphasize the women's agency in moulding their realities. By understanding the experiences undergone by women in Kakuma refugee camp, this study amplifies their voices and contributes to the discourse on gendered impacts of water scarcity. It is crucial to acknowledge women's strength, resilience and capacity for innovation in the face of all the challenges they experience. Their stories serve as a powerful reminder of the urgent need for sustainable solutions towards addressing water scarcity in refugee settings such as Kakuma.

The next section of this paper discusses research methods, followed by an overview of women's perspectives on climate change and water scarcity in Kakuma refugee camp. Afterwards, the paper explores the various strategies adopted by women in the camp to overcome the challenges of water scarcity amid environmental uncertainty, illustrating their capacity to adapt to extreme conditions while maintaining the cohesion and survival of their communities. This is followed by a discussion section that draws on the implications of the findings for wider debate on the

5 Daniel M. Nzengeya and John Kibe Maguta, 'Gendered Vulnerability to Climate Change Impacts in Selected Counties in Kenya', in *African Handbook of Climate Change Adaptation*, eds. Nicholas Oguge, Desalegn Ayal, Lydia Adeleke and Izael da Silva, Cham: Springer, 2021.

gendered impacts of climate change on most affected populations. The paper then concludes and recommends policy interventions that are rooted in women's experiences and capacity.

RESEARCH METHODS

Kakuma refugee camp, located in north-west Kenya, is one of the largest refugee settlements in the country. It is divided into four main sections: Kakuma 1, Kakuma 2, Kakuma 3 and Kakuma 4. Each section is organized into four or five zones, which are further divided into blocks. The number of blocks within a zone varies depending on its size and population. In some areas, such as Kakuma 1, the blocks are further broken down into groups, numbered sequentially and starting from 1. This structured layout facilitates administration and service delivery, helping humanitarian organizations manage the camp's resources more effectively.

The author adopted a qualitative case study approach to acquire the in-depth experiences of women in Kakuma refugee camp with water scarcity, as occasioned by climate change. The study focuses on women located in some of the most-affected blocks in the camp, namely: Kakuma 1, zone 2, blocks 12, 14 and 15; Kakuma 2, zone 1, blocks 8, 9 and 12; Kakuma 3, zone 1, block 5 and zone 2, block 6; and Kakuma 4, zone 1, block 14.

Primary data was collected through focus group discussions, in-depth interviews and observations between 15 August 2024 to 1 September 2024. First, the author conducted four (4) focus group discussions with women in Kakuma 1, 2, 3 and 4, and two (2) with men in Kakuma 1 and 3, with the aim of gathering diverse perspectives. The focus group discussions with women provided an opportunity to discuss specific gender-related and intra-female challenges, including the physical burden of carrying water over many miles, time constraints on care for households and health problems associated with the low quantities of water stored for themselves and their families.

Women participants differed by age, marital status, the duration they had lived in the camp and household size, thus allowing for diversity in experiences and perspectives. These focus group discussions were structured to encourage dialogue around shared experiences, with a particular focus on discovering how women adapt to the increasing impact of climate change in the refugee camp. Each had a maximum of six to seven women, ensuring a manageable group size for meaningful interaction and allowing in-depth conversations that meant every participant had the opportunity to share their experiences, insights and coping strategies related to climate change and water scarcity in Kakuma. The duration of the focus group discussions was determined using the principle of saturation, where discussions were conducted until no new information or themes emerged.

Although fewer, the two focus group discussions held with men gave vital context regarding broader household and community dynamics. While men in most of the refugee communities

are found not to engage directly in water collection, their views on the division of labour, resource management and potential solutions were important for understanding how gender roles influence coping strategies in the face of water scarcity in Kakuma refugee camp. Men's focus groups highlighted the community-level challenges related to water access, such as its impact on livelihoods and any roles they might play in supporting their households during periods of severe water shortages. The size of the focus groups varied between six and seven respondents, ensuring both diversity and in-depth conversation, with each session lasting approximately 120 minutes. Transcripts of the focus group discussions were analysed to identify common themes, variations in experiences between men and women, and the intersection of water gender needs and climate change-related issues in the camp.

Second, a total of 15 in-depth interviews were conducted with women and men in the water scarcity-affected areas of Kakuma refugee camp in order to acquire detailed personal experiences and accounts. The interviews were structured around open-ended questions to allow participants to share their stories and personal accounts in their own words, providing richer, more comprehensive insights into their coping and adaptation strategies. Interviews provided an opportunity to explore aspects of the household experience that may not easily be raised in group discussions, particularly around sensitive topics of health, coping strategies and personal hardships connected to water scarcity. Since most of the water collection and management in Kakuma is done by women, the author decided to include them as the main participants. These discussions explored how women manage the inevitabilities of dirty water, revealing some of the emotional and physical strain that goes into carrying the ideal weight of liquid on your head, maintaining tidiness with minimal assets, and keeping a house clean.

Interviewees were selected based on age, household size, and duration of stay in the camp in order to ensure diversity in the data collected. Three interviews specific to men were conducted in order to gain their perspectives on water scarcity and how it affects their households and communities. Although men are typically less involved in direct water collection, their views on the broader household and community dynamics were important to understanding the gendered division of labour and the social norms that shape responses to water scarcity.

Third, the author conducted direct observation of women's daily water collection activities in order to gain an in-depth understanding of the strategies they use to manage dwindling water resources. This approach provided first-hand data on how women in Kakuma refugee camp cope with water scarcity and implement resource-management practices. This method enabled the author to observe how practices, behaviours and interactions related to water collection and management were being performed within Kakuma refugee camp that may not be captured or described as fully using verbal accounts. Key observations were gathered related to the geographic reach and distances walked by women to collect water, the type of containers they carried, water storage methods adopted at home, water reuse practices, the scheduling of water collection and the length of time used to fetch the water. For purposes of keeping study participants anonymous, interviewees have been assigned pseudonyms.

One of the most commonly noted observations, regarding the collection of water in five different blocks in Kakuma, is conflict at water points, with women involved in heated arguments over access to water taps. In some communities, the issue is resolved at the water point, while in others, elected representatives, often including the block's chairwoman have to intervene by holding a meeting between the conflicting parties. The parties involved are usually single individuals or groups of individuals who support each other. Despite these differences, women confirmed they recognised they had a great deal of social interaction, some of it positive, among themselves at these water collection points.

WOMEN'S PERSPECTIVES ON CLIMATE CHANGE AND WATER SCARCITY IN KAKUMA REFUGEE CAMP

Women in Kakuma refugee camp have limited understanding of climate change in formal terms. However, their lived experiences reflect a perceptive awareness of shifts in environmental conditions over time and space. Study respondents recalled the years 2013 and 2023 as particularly severe, compared to other years, marked by prolonged droughts and harsh windy conditions. While they did not openly reference 'climate change', their descriptions of recurring drought and dust storms and their effects on health, particularly for women and children, indicate an absolute recognition of changing weather patterns. One woman discussed and explained the situation as follows:

Seven years ago, life in the camp was not easy. It used to be hot and dry, coupled with dust. And, with little or no water during that time, I was always sick and infected. The children suffered numerous infections, and when you go or take the children to the clinics, the doctors say you will have to keep and give the children proper hygiene. However, we are unable to because we didn't have enough water or even lacked it for cooking. But now we have some rain at times, which helps to cool our bodies.⁶

Many interviewees suggested that today their communities face a continuously fluctuating and unstable supply of water. According to interviewees, the challenge of water supply was due to a drop in water levels in the boreholes that humanitarian organizations had dug. They attributed this drop to the long, dry weather. Nowadays, however, there are fluctuations due to increased floods whenever it rains in the region. One woman framed it as follows:

6 Interview with respondent 6, Kakuma 3, 19 August 2024.

We are happy to be experiencing a somewhat cold environment, especially the past few months. Nevertheless, it has brought about a bad experience. The communities experience up to a month of no water supply because the water pipes were swept away and damaged by the floods.⁷

Interestingly, the women's knowledge is deeply tied to their lived realities, whereby their past experiences shape their present understanding. For instance, the dry spells of 2013 to 2023 are recalled not just for their environmental harshness but for their wide-ranging impacts, including water scarcity and the health issues associated with it. This indicates the implications the changes in climate have had on the lives of women. For example, there are multifaceted impacts on health, including heat-related illnesses and mental health issues.⁸ Climate knowledge is a matter of experience for many of them, rather than an academic adventure. Despite lacking formal education in climate science, their awareness is rooted in their day-to-day struggles, some of which are from their countries of origin, demonstrating a form of localized knowledge that could let somebody know how to develop adaptive strategies in similar contexts. From the interviews and discussions, it is evident that respondents with prior experience of water scarcity in their home countries found it comparatively easy to navigate the challenges in Kakuma refugee camp. Their previous exposure to water shortages equipped them with coping strategies, making adaptation more manageable. One discussant framed this view as thus:

Back in my home country, we faced severe water shortages every dry season. We had to learn how to store [and] reuse water for multiple purposes and ration it carefully. So, when I arrived in Kakuma, it wasn't something entirely new. I already knew how to manage with limited water. Here, I apply the same strategies, like collecting and reusing water, and it helps me get by, even when there are delays in supply or long queues at the tap.⁹

Conversely, for those unfamiliar with such conditions in their home countries, their lack of knowledge regarding both the camp's environment and the host community made it worse and more difficult for them to adjust. For example, in block 12, zone 2 of Kakuma 1, one respondent reported that their neighbours had returned to their home country due to the persistent challenges of water scarcity.¹⁰ For these families, the hardship of navigating continuous water shortages, coupled with frequent disputes at water points, was perceived as more unbearable than enduring the civil war they had fled, she added.¹¹ This illustrates the overwhelming impact that access to water, or the lack thereof, can have on some refugees' decisions to remain in or

7 Interview with respondent 5, Kakuma 3, 19 August 2024.

8 C.L. Lokotola et al., 'Climate Change and Primary Healthcare in Africa: A scoping Review', *The Journal of Climate Change and Health* 11 (2023): 1–11.

9 Participant in a focus group discussion, Kakuma 3, 19 August 2024.

10 Participant in a focus group discussion, Kakuma 1, 17 August 2024.

11 Participant in a focus group discussion, Kakuma 1, 17 August 2024.

leave the camp.

From the responses given by the women about their experiences, it is evident that significant environmental changes have occurred over the years. Women's knowledge of climate change through traditional sources significantly increases their likelihood of perceiving climate change.¹² The women participating in the research did not directly identify these changes as caused by environmental uncertainty but attributed them to various other factors, often drawing from cultural beliefs and local narratives. For example, during a focus group discussion in Kakuma 3, one elderly woman reflected positively on the role of migration in influencing weather patterns, stating: 'The changes in the region, and Kakuma refugee camp, in general were due to the blessing occasioned by the influx and arrival of many Sudanese women.'¹³

She further explained how, far back in her memory, Egyptians had experienced prolonged droughts, but when Sudanese people, who had lived along the Nile River, migrated to Egypt, it had begun to rain. This was interpreted as a blessing brought by the Sudanese women travelling with their children, a belief that has persisted over time, associating their presence with the arrival of rain.

Another perspective shared by women, in the face of water scarcity, is the pressure it places on their economic livelihoods. Women who had previously engaged in agriculture, and who continued the practice through kitchen farming in the camp, faced considerable challenges in maintaining these activities. In addition to the long distances that they were already travelling to collect water for household consumption, the effort of securing additional water for irrigating their vegetable gardens became increasingly burdensome.

In a focus group discussion in Kakuma 2, a group of neighbouring women expressed frustration over watching their kitchen gardens dry up due to lack of water, highlighting the emotional and economic toll of their situation.¹⁴ One woman shared how she used to grow kale and spinach, which she sold in the local market to supplement her family's income.¹⁵ However, as water scarcity worsened, her once-thriving garden became barren, forcing her to abandon the practice entirely. The women emphasized that the strain of watching their crops dry up not only affected their physical well-being, but also had an emotional toll, as they felt a sense of helplessness and loss.

Ultimately, the perspectives of women in Kakuma refugee camp on climate change and

12 Hajra Batool et al., 'Women's Perception of Climate Change and Coping Strategies in Pakistan: An Empirical Evidence', *Earth Systems and Environment* 2 (2018): 609–619.

13 Participant in a focus group discussion, Kakuma 3, 19 August 2024.

14 Participant, focus group discussion, Kakuma 2, 24 August 2024.

15 Participant, focus group discussion, Kakuma 2, 24 August 2024.

water scarcity reveal a deep, lived awareness of environmental shifts, even without formal understanding of climate science. Their narratives highlight the profound socio-economic and health impacts that these changes have on their daily lives. From coping with extreme heat, dust storms and prolonged droughts, to navigating the emotional and economic strain of water shortages, their experiences underscore the multifaceted challenges that climate variability brings, particularly for those responsible for caregiving and providing for their families. Despite these difficulties, many women draw upon their embodied knowledge and past experiences to manage these challenges, illustrating their resilience in the face of persistent hardship.

STRATEGIES IN ACCESSING AND PRESERVING WATER AMID ENVIRONMENTAL UNCERTAINTY

Water scarcity presents a thoughtful challenge for residents in Kakuma, impacting their daily lives, livelihoods and overall well-being.¹⁶ However, in the face of such adversity, women have shown extraordinary resilience and resourcefulness, developing a range of adaptation and coping strategies to manage the persistent lack of water. These strategies, which range from collaborative water-collection efforts and barter systems to innovative water conservation techniques, not only highlight their resourcefulness but also underscore the crucial role women play in sustaining their households and communities amid resource scarcity. By forming support networks and embracing traditional cultural practices, these women have created systems that provide both practical solutions and emotional support in their battle against water scarcity. This section explores the various strategies adopted by women in Kakuma to overcome water scarcity amid environmental uncertainty, illustrating their capacity to adapt to extreme conditions while maintaining the cohesion and survival of their communities.

COLLABORATION FOR WATER COLLECTION

Women in Kakuma refugee camp have embraced a collaborative approach to collecting water as one of their adaptation strategies. Walking together over longer distances to search for water has created a system of mutual support and the sharing of physical burdens. Through these, they are ensured of their security and reduce the strain of long treks. The communal approach used by these women has been the basis of solidarity and safety for them as they work to address the critical need for water in their communities. In an interview, one woman remarked:

Normally, under extreme water conditions, my neighbours and I—a group of four women—carry each a 20-litre and five-litre jerrycan and walk across different boreholes, from Kakuma 3 to Kakuma 1, in search of water for our households. Sometimes we go as early as possible in order to be in front of everyone and get some water, but sometimes we walk and come back empty-handed.¹⁷

16 Elizabeth Danielle Bishop, 'Kakuma Shadows: Everyday Violence in Lives of Young People Living at the Turkana Kakuma Refugee Camp Nexus', PhD Dissertation, York University, York, 2020.

17 Interview with respondent 3, Kakuma 3, 17 August 2024.

Another form of collaboration mentioned is the form of assistance offered to the neighbouring host community and to the vulnerable in their own communities. In areas such as Block 14 in Kakuma 1, the host community village, Natir 2, borders them just across the Tarach River. For these refugee and host communities, the sharing of water sources has been a common thing, where women from Natir 2 could come and fetch water from the refugee communities, even though refugee women found it difficult to cross the river to the host communities due to insecurity. Women who are pregnant or breastfeeding their babies, and those who are physically challenged, are prioritized when collecting water. On occasions where accessing water at the community level becomes harder, some women, especially the young, volunteer to help fetch water for these vulnerable people in their communities. This testifies to the level of support women are willing to give each other in the face of all these adversities.

However, during occasions that require a lot of water to be collected, women reported that boys were tasked with collecting water. And when water needed to be fetched from longer distances away, boys or men would sometimes use bicycles, wheelbarrows or motorbikes to transport larger quantities of water to their homes, while the women stayed behind to manage kitchen tasks. At the same time, only a few reported being helped by their boys in fetching water for household use, as the boys believe it was not their role.

In many of these communities, fetching water is culturally regarded as a woman's responsibility, and it often falls on the women of the household to ensure water is available for domestic use. From this study, it was found that women from the Democratic Republic of the Congo, Burundi, Sudan and Uganda got help from their men in fetching water. However, men and boys from South Sudan and Somalia were found not to engage in this activity unless they lived in a household without a female. As one interviewee narrated:

Culturally, it has never been the responsibility of men to fetch water; that duty traditionally falls to women. As men, our primary roles are to provide food for the family, engage in farming activities and care for livestock. It is seen as a societal norm that each gender has specific responsibilities, and fetching water has always been considered part of women's work in our community.¹⁸

While boys may occasionally assist, for example, at times of high demand or for special occasions, their involvement is typically voluntary rather than expected. The decision for boys to help with water collection depends largely on their personal willingness, as the task is traditionally seen as a part of a woman's duties. The cultural norm of women's sole responsibility for fetching water reinforces gendered divisions of labour, placing a significant burden on women, particularly in contexts of water scarcity. Nevertheless, it was noted that women in male-headed households were not under as much strain as women in women-headed households.

18 Interview with respondent 11, Kakuma 4, 25 August 2024.

WATER EXCHANGE SYSTEMS

Water exchange practices have become a survival mechanism for most of the women in some communities in the camp. The engagement of women in barter enables those who lack clean water in their households to trade surplus food items in exchange for water or for other services they may need. It is worth noting that the women involved in these exchange systems consistently preferred receiving food items over money. During an in-depth interview, one woman stated:

I normally fetch water for my fellow women, and in return I get food items which I use to feed my children. I am a single mother with six children under my care. The food I receive from the ration does not last us the period till the next month, so at times when there is no water in the community, I become so happy since I find an opportunity to get more food for my children. One 20-litre jerrycan is equivalent to three 'bakuli' [dish-like container, used by local women as a unit of measurement equivalent to a kilo] of rice, maize or sorghum, depending on the available food item.¹⁹

Besides highlighting the problem of water scarcity, the above sentiments also reflect the level of food insecurity in the camp. Turkana County faces persistent food insecurity. The county's reliance on pastoralism, its limited rainfall and high poverty levels have left it dependent on food aid and donor interventions.²⁰ The water exchange system is therefore important as it enables participating parties to meet their families' essential nutritional needs. This practice represents the resourcefulness of women in Kakuma in creating informal yet efficient solutions to their everyday water and nutritional challenges.

The extreme challenges experienced in the camp highlight the precariousness of refugee lives in Kenya: Given such severe scarcity, how can refugee populations aspire to live meaningful and fulfilling lives? And what does this mean for proposals of broader integration? The Revised Refugee Act, 2021 has introduced a policy encouraging integration, allowing refugees the option to live and work within Kenyan society rather than remaining confined to camps. However, the hardship refugees face raises concerns about how feasible this option truly is under current conditions. The refugees interviewed constantly expressed their worry about the feasibility of integrating in the Turkana context where there are few economic opportunities for earning a meaningful livelihood and added that they yearned for answers from the United Nations High Commissioner for Refugees (UNHCR) to this question.

19 Interview with respondent 8, Kakuma 2, 20 August 2024.

20 Thomas E. Akuja and Jacqueline Kendagor, 'A review of Policies and Agricultural Productivity in the Arid and Semi-arid Lands (ASALS), Kenya: The case of Turkana County', *Journal of Applied Biosciences* 140 (2019): 14304–14315.

DIVERSIFICATION OF LIVELIHOODS

The diversification of livelihoods is one of the direct strategies used by women in Kakuma refugee camp to respond to water scarcity. For women who had kitchen farms in their households, most of their activities shifted from agricultural to non-agricultural practices. Recognizing that, with limited access to water, the sustenance of their kitchen farms could be hampered, they shifted their attention to alternative sources of generating income, such as crocheting, handicrafts and small-scale trading. This provided them with more income opportunities and demonstrated their ability to adapt, reducing their vulnerability amid resource limitations. One female focus group discussion framed it thus:

I am a Burundian, [and] I have always grown [up] to like making myself dirty by touching and picking small green leaves from my small farms while experiencing the cold mud on my feet. But here, nowadays, it has become difficult just because of water, and we all know it doesn't rain here, again our taps are dry. Now I do this [she showed us a beautiful tablecloth she had been working on as we talked]. I have to depend on it in order to have some money for food and even water.²¹

Therefore, the diversification of livelihoods in the camp plays a crucial role in enhancing the resilience of displaced communities facing environmental and economic challenges. By adopting a range of income-generating activities, such as small-scale agriculture, entrepreneurship and labour opportunities within the camp, refugees are better equipped to cope with resource scarcity and climate-related stressors. These diverse livelihoods not only offer economic benefits but also empower individuals, particularly women, to take on new roles as providers and contributors to household sustainability. The integration of traditional ecological knowledge and modern strategies further strengthens their ability to adapt, demonstrating the importance of livelihood diversification in fostering long-term resilience in the face of displacement and environmental change.

WATER CONTAINERS AS A SOLUTION TO WATER SCARCITY

In many households, the use of larger water storage tanks has become a critical practice for managing water scarcity. These tanks are filled during periods when water is accessible through community taps and are reserved for use during times of water shortages. This stored water plays a crucial role in supporting domestic activities, particularly for women, who rely on it to avoid travelling long distances to access water. The practice is informed by the women's cultural and lived experiences from their countries of origin, where they keep the water sources secure for later use during extreme droughts. One interviewee noted, 'Back home, during dry seasons we used to keep our unused wells closed. This helped the family preserve water for the family and our animals.'²²

21 Interview with respondent 7, Kakuma 2, 20 August 2024.

22 Interview at Kakuma 2, 20 August 2024.

In some communities in Kakuma, it was observed that water collection at public taps was regulated to ensure equitable distribution. Women were allowed to collect water using a single 20-litre container or other containers of equivalent volume, such as four five-litre containers or two ten-litre containers. To promote fairness, each household was limited to filling two 20-litres when water is available. However, larger households, due to their increased water needs, must seek additional water resources beyond the communal allocation. This system highlights the challenges faced by women in accessing sufficient water, particularly in contexts where household sizes vary, and water scarcity is a persistent issue. It was also observed that most households preferred to use smaller water containers, mainly five-litre plastic jerrycans. This is to ease the process of asking for water from various communities and at water taps that are not their own. As one interviewee noted it was ‘easier for people to help fill for you a five-litre water container than a 20-litre container, when you ask [for it] from them’.²³

SCHEDULES FOR WATER ACCESS

Rotational schedules for accessing water at water points were observed as one of the most systematic strategies used by most communities in the camp for addressing water scarcity. Due to the limited flow of water compared to the large number of people, women have developed a system where they take turns at water collection points. For example, those who fill their containers on a particular day, skip the following day in order to allow others to get some water too. The practice ensures equal distribution of the scarce amount of water available within the camp. This system has minimized the rate of conflict and competition in some communities. However, it has been an issue in some communities too: In a focus group discussion, one respondent stressed this system did not work for their particular community because of uncertainty involved in the flow of water at water points. As the respondent observed:

At times when a group’s turn comes to fetch water, but the water does not flow, the next day no one sympathizes with them that they did not have any water. Some women could tell you that ‘today is not your day’. Most of the time we end up fighting at the water taps just because of a lack of understanding among ourselves, just because we cannot sympathize and help each other. But I can’t blame them because, by the next day, they already did not have water in their homes either. After all, the water that flows [from the taps] is not enough to cater to some households, especially those with large sizes.²⁴

23 Interview at Kakuma 2, 20 August 2024.

24 Participant in a focus group discussion, Kakuma 2, 24 August 2024.

Nonetheless, this collective scheduling approach is viewed by many as one of the best ways to foster fairness. It also helps to reduce the physical and emotional disturbance of waiting in long queues or moving every day over long distances to get water.

TRADITIONAL BELIEFS

In some communities, traditional beliefs on the usage of water are very important in helping women to cope with the challenge of water scarcity in Kakuma refugee camp. These practices are passed on from past generations and they believe that respecting them has helped them maintain and respect the importance of water especially for their children. However, these beliefs are practised by only a few in the community. In an interview, one of the respondents explained how they still adhered to their cultural norm of observing water as sacred and of attributing its importance to nourishing their ancestors as a household practice. This belief was captured by an elderly woman during a focus group session, who noted how:

For us, it is not good to leave my house to sleep without even a little water—it will be like I am inviting a curse to my household. We believe that those who died come and visit us at night and they would need some water to drink. Not having water will be like neglecting them and chasing them away. Therefore, it becomes a curse to my family if I don't strive to find a little water to live for them. Every time I wake up in the morning, I pour a little water at the doors of our kitchen and all other rooms as a sign of respect.²⁵

By practicing these cultural norms, some women have found it easier to find a mindful approach to the use of water in their households, an approach that in turn allows them to maximize the use of this limited resource while connecting deeply with their environment and their community values

WATER RECYCLING

The women in Kakuma refugee camp have opted to use and reuse water multiple times as a technique to cope with water scarcity. For example, the water used for washing clothes is also used to clean floors and washing the latrines, while a few women reported—using it for watering their kitchen farms. Another notable technique is the efficient use of minimal water for washing plates and cooking. Additionally, due to the high temperature of the climate in Kakuma, households allocate more water for drinking, whereas personal hygiene is given the least priority.

25 Participant in a focus group discussion, Kakuma 3, 19 August 2024.

In several focus group discussions, women mentioned they often avoid the use of basins to take showers, preferring to use five-litre and three-litre jerrycans instead. They believe this technique helps them make use of the little water they have and avoids wastage. These methods, which have proven helpful, enable the women in Kakuma refugee camp to reduce the number of their trips to fetch water, hence reducing their physical burden. The methods further ensure that the little water they have acquired can be used to cover multiple needs over longer periods, hence relieving them of the burden of water collection.

DISCUSSION

These findings resonate strongly with the literature on the gendered impacts of climate change that suggests that water-scarce regions are the most affected. Like elsewhere in refugee and marginalized communities, women in Kakuma do most of the water-fetching for their families, often travelling long distances and using innovative methods of water conservation. This mirrors a larger international pattern, where women and girls, due to traditional gender roles, invest larger amounts of their time managing household water resources than men and boys.²⁶ For instance, Phiri and Velmurugan demonstrate how water shortages experienced by slum residents in cities compel women to continue in their traditional role as the primary collectors of household water.²⁷

Coping strategies among women in Kakuma refugee camp, such as exchanging water for food through a barter system, provide insights that would have been difficult to discover in many refugee settings. By focusing on exchange practices among women, we can discern that these economic practices allow some mitigation in situations of scarcity. Water scarcity can also provide opportunities for vulnerable households to exchange this precious commodity for foodstuff. It can also help poor households to make an income through fetching water for businesses or households that are better off.

Some studies highlight traditional ecological knowledge in managing environmental changes among indigenous communities more broadly, while the Kakuma experience, with its preference for barter, reflects evidence-based innovation.²⁸ In addition, the results also suggest situations in which women's adaptation makes them more effective in managing their water resources. This raises questions about how generalizable these adaptive strategies are, as the extent to which these strategies can be applied elsewhere is limited by the sociocultural context in

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- 26 Douglas Nyathi et al., 'Women's Vulnerability and Adaptive Capacity to Climate Change in Agrarian Settings of Zimbabwe', in *Climate Crisis, Social Responses and Sustainability: Socio-ecological Study on Global Perspectives*, eds. Uttam Mukhopadhyay, Subhasis Bhattacharya and Pradip Chouhan, Cham: Springer, 2024.
- 27 Autilia C. Phiri and T. Velmurugan, 'An Exploratory Study on Water Scarcity and Coping Mechanisms Among Women Households with Special Reference to Chidothe Village in Zomba, Malawi', *Journal of Arts, Humanities and Social Science* 1/1 (2024): 21–27.
- 28 Sébastien Boillat and Fikret Berkes, 'Perception and Interpretation of Climate Change Among Quechua Farmers of Bolivia: Indigenous Knowledge as a Resource for Adaptive Capacity', *Ecology and Society* 18/4 (2013): 1–13.

which they occur. For example, women face similar resource constraints in the Dadaab refugee complex in northeast Kenya, but a study by Hyndman and Giles found that social hierarchies and clan affiliations can limit the effectiveness of community-based solutions, such as water-sharing networks.²⁹ So, while Kakuma might present a promising model, the strategies used by women in Kakuma might not necessarily apply to other refugee contexts.

While specific local contexts shape adaptive strategies, it is also possible that some strategies employed by women in Kakuma could be applicable to other refugee settings where women face similar constraints. In the Rohingya refugee camps in Bangladesh, for instance, women also use informal mechanisms to ration and share resources in the face of shortages. Research into water security challenges in Rohingya camps highlights women's sharing behaviours in dire circumstances,³⁰ though the exchange system that prevails in Kakuma offers a unique insight into such survival tactics.

The communal water-sharing practices in Kakuma, such as rotational schedules, reflect similar systems in arid regions of Sub-Saharan Africa, such as in rural Niger. Here, research by Djoudi and Brockhaus on gender roles in climate adaptation shows that women rely on community solidarity to manage water scarcity.³¹ The addition of formalized scheduling in Kakuma, where women take turns accessing limited water resources, adds an organizational layer not always seen in other contexts, suggesting that women in Kakuma are not only adapting to scarcity but also improving the governance of that scarcity.

These findings are relevant to water management in refugee settings more broadly, not exclusively at Kakuma refugee camp. They suggest that women, being the principal actors in water management, should be at the forefront of decision-making in water governance. In Kakuma, women often take the lead in looking for solutions. When communities go for extended periods of time without water, it is the women who take the initiative, walking to the offices of the organizations concerned to demand action and push for improved water access. This underscores women's vital role as key stakeholders in water resource management. It is women who experience the impact of water shortages and who should therefore be deeply involved

29 Jennifer Hyndman and Wenona Giles, 'Protracted Displacement: Living on the Edge', in *Forced Migration: Current Issues and Debates*, eds. Alice Bloch and Giorgia Dona, Oxon: Routledge, 2019.

30 Mehereen Akhter et al., 'Drinking Water Security Challenges in Rohingya Refugee Camps of Cox's Bazar, Bangladesh', *Sustainability* 12/18 (2020): 1–26.

31 H. Djoudi and M. Brockhaus, 'Is Adaptation to Climate Change Gender Neutral? Lessons From Communities Dependent on Livestock and Forests in Northern Mali', *International Forestry Review* 13/2 (2011): 123–135.

in finding solutions, including collaborating with policymakers to find sustainable solutions to their problems. Cleaver and Hamada emphasize inclusive, gender-sensitive approaches in water governance in rural areas, approaches that could be extrapolated to water, sanitation and hygiene interventions for refugee camps.³² Furthermore, a water scheduling system, based on the collective needs of communities, similar to what is seen in Kakuma, can be applied to other refugee camps with similarly scarce availability of resources.

Ultimately, the adaptation strategies used by women in Kakuma highlight the resilience and agency of refugee women in the face of climate-induced water scarcity. These results underscore the need for policies that not only provide immediate access to water but also strengthen the adaptation capacities that women already possess, ensuring long-term sustainability in water-scarce environments.

32 Frances Cleaver and Kristen Hamada, ““Good” Water Governance and Gender Equity: A Troubled Relationship’, *Gender and Development*, 18/1 (2010): 27–41.

CONCLUSION

The scarcity of water in Kakuma refugee camp is a critical issue, worsened by the effects of climate change, and it disproportionately affects women due to their traditional gender roles. This paper has exposed different coping and adaptation strategies used by women in the camp, showcasing their resilience and how resourceful they can be in the face of water scarcity. Despite facing various challenges, including health risks, economic burdens and social pressure, women have developed innovative solutions to navigate the challenges of water scarcity in Kakuma.

The most interesting finding in this paper is the water exchange systems developed by women to meet their families' additional needs. Women actively participate in this process, making it a regular activity for acquiring extra food items for their families. While it may seem like an additional burden, they accept it because of the benefits it brings to their families. This exchange system is especially significant as it emphasizes the challenges faced by women in the camp within the larger economy. It also highlights the overall situation in Kakuma, confirming the interconnected problems of food security and water scarcity.

Household water conservation practices have also emerged as a critical strategy for water storage within the camp. For instance, after washing laundry, some women collect the used water and repurpose it for additional tasks, such as cleaning floors. In other cases, this water is redirected to water small kitchen farms, where it provides moisture for plants. Some even go as far as reusing the same water to wash additional loads of laundry, when necessary. This careful use of every drop reflects their understanding of managing scarce resources. Additionally, many women have adapted to using small containers instead of larger basins for tasks such as washing dishes and showering, which minimizes water wastage by controlling the amount.

In addition to resource availability, cultural beliefs and traditional practices have influenced how women in Kakuma interact with water. Some believe that water is sacred and are inspired to engage in conservation actions that can be culturally bound. These ancestral beliefs have acted as coping mechanisms and a form of environmental stewardship, encouraging water-deprived communities to revere their only God-gifted resource, while also fostering the efficient use of what little they possess.

Despite these adaptation strategies, however, women in Kakuma continue to be at high risk of water stress, due to the chronic nature of water scarcity there. With limited camp infrastructure and resources to meet the demands of a growing refugee population, the effects of climate change are only worsening an already frightening scenario.

Finally, although the ingenuity of the women in Kakuma demonstrates just how resilient they are to water scarcity, their tactics remain short-term fixes rather than long-term solutions. On this note, both humanitarian agencies and policymakers need to move to ensure sustainable water solutions in the camp, which overflows with residents every day. Any viable solution should seek to diminish the disproportionate impact of water scarcity on women and a larger issue of resource distribution within refugee areas. Doing so is the better way to ensure those most vulnerable—especially women—get the support they need to survive and thrive in a climate-changed world of water crises.

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