“Without water, nothing”: Examining the water saving practices of women in Amman under periodic water supply

Rory Dixon

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“Without water, nothing”
Examining the water saving practices of women in Amman under periodic water supply

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Abstract

Jordan is among the most water-scarce countries in the world. Consequently, water is only pumped to households once a week and households store water in tanks to last them until the next water day. Women conducting housework do so under conditions of environmental stress that this research calls resource-scarce domestic labor. In this study, I apply an eco-feminist lens to examine the water-saving practices women employ to manage and conserve domestic water supplies. I explore the larger causes of these behaviors including climate change, government management, and regional politics. Resource-scarce domestic labor is not a practice unique to Jordan and should be explored in contexts across the world. As global climate change continues to worsen, exploring the impacts of environmental factors on women is critical in building climate resilience and designing policies and interventions that mitigate the impact of climate change.

Keywords: women, resource-scarce domestic labor, government water resource management, climate change, feminism, geopolitics, regional studies: Middle East.
Scope of this research

This research explores women’s domestic water management practices in Amman, Jordan. It finds that women conduct a series of water-saving practices while doing housework that this study describes as resource-scarce domestic labor. It is beyond the scope of the research to cast any form of judgment over this practice. This research will not argue that women should or shouldn’t be domestic water managers. Given the researcher’s positionality, it would be inappropriate and unethical to cast a judgment over the accepted norms and practices of Jordan. Further information on the methods and positionality of the researcher can be found in the Methodology section.
Introduction

“Give to me your laundry when the water comes on Thursday, but if you need your laundry another day, don’t worry Mama, I will make sure we don’t run out of water.” Those were the words my host mother said to me the first night I stayed in her home. After a traditional Jordanian dinner, we discussed the logistics of living in her home. The most important practice I needed to follow was water management. We agreed I would take a 2-minute shower each day, I would give my laundry to her on Thursdays (the day that water was pumped to her home), and that she was to wash the dishes, not me. From that moment, every interaction with water felt precious. Her words “I will make sure we don’t run out of water,” inspired me to pursue this research topic and develop my understanding of women’s roles as water managers in the home.

Water in Jordan

Jordan is among the water-scarcest countries in the world. The internationally recognized absolute water scarcity line is 500m³ per capita, per year (United Nations Economic and Social Commission for Western Asia, 2015). In 2023, Jordan has 61m³ per capita, per year of available renewable freshwater resources (The Ministry of Water and Irrigation [MWI], 2023). This is expected to fall to as low as 35m³ per capita, per year by 2040. The country’s naturally scarce water resources are further strained by climate change, population growth, regional politics, over-extraction, and losses throughout the water network (MWI, 2023). No population can be sustained without a sufficient supply of water. And Jordan “serves as a global example of the difficulties posed by climate change and rapid population growth” (Al-Addous et al., 2023, p. 5).

Uses of water in Jordan are evenly split between municipal uses and agricultural uses. Around 47.5% of water in Jordan is used for municipal purposes supplying homes and
businesses (MWI, 2023). While 48.6% of the water supply is used for agricultural purposes, 3.3% is used for industrial purposes, and 0.6% is used for other purposes. The Jordanian government is taking steps to manage water demand in all sectors by educating its population through campaigns, and introducing technology for both domestic and agricultural uses that increase water use efficiency and reduce losses (MWI, 2023).

Jordan draws its water from 4 main sources: groundwater, surface water, desalinated water, and treated wastewater (Al-Addous et al., 2023). All water resources in Jordan are considered state-owned-property and are managed by the government directly or through issued licenses (the Water Authority Law & Amendments, 1988). Conventional water sources such as groundwater and surface water are the primary sources of Jordan’s water supply.

Groundwater is the largest source of water and makes up 60% of all water used in Jordan and 76% of drinking water (Al-Addous et al., 2023). Groundwater is drawn from underground aquifers across Jordan, the largest of which is the Disi aquifer which extends into Saudi Arabia (Al-Addous et al., 2023). However, given the imbalance in water demand and water supply, “groundwater is being pumped at double the safe yield of aquifers,” meaning Jordan’s current water usage is unsustainable (MWI, 2023, p.3).

Surface water, found in rivers, lakes, and natural springs, is the second largest source of Jordan’s water making up 31% of the total supply (Al-Addous et al., 2023). Surface water quantities are varied and unreliable due to changes in rainfall and high evaporation rates (MWI, 2023). Jordan has 3 rivers running through its territory, the Yarmouk River, which it shares with upstream neighbor Syria; the Jordan River, which it shares with Israel; and the Zarqa River, the only river entirely in Jordan’s territory (Al-Addous et al., 2023). However, Jordan’s already limited surface water supply is reduced by neighboring countries. Israel has reduced the Jordan
River to 10% of its natural flow by damming Lake Tiberias and Syria over-extracts water from the Yarmouk River. Given the current political climate, Jordan is unable to negotiate with either country to increase the flows of the rivers or effectively enforce previously negotiated agreements.

Non-conventional sources of water are increasingly important in Jordan. Non-conventional sources include treating wastewater, harvesting rainwater, and desalination (Al-Addous et al., 2023). Jordan treats around 90% of its annual wastewater at 32 treatment plants around the country (Al-Addous et al., 2023). This treated wastewater is then used directly or indirectly for agricultural purposes (Al-Addous et al., 2023).

Rainwater harvesting occurs via both small-scale and large-scale methods. More than 93% of Jordan receives less than 200 mm of precipitation annually (Al-Addous et al., 2023). Rainwater can be harvested on a small-scale by households with rainwater-catching systems, which are typically found in rural areas. Large-scale rainwater harvesting takes place in dams that collect and store runoff rainwater. However, the storage capacities of the dams are shrinking due to sedimentation build-up, and a staggering 93% of rainfall in 2020 was lost to evaporation (Al-Addous et al., 2023; MWI, 2023).

Desalination of water is “the most promising nonconventional method” in growing Jordan’s water capacity (Al-Addous et al., 2023, p.13). The National Water Strategy of Jordan from 2023-2040 aims to balance water demand and sustainable water supplies in Jordan by 2030 which “will be achieved by large-scale desalination wherever possible” (2023, p.7). Desalination is already ongoing on a small scale at Aqaba, Jordan’s only seaport, producing 3.12 Million Cubic Meters (MCM). However, this accounted for only 0.3% of Jordan’s total water budget in
Large-scale desalination, especially via the port of Aqaba, is viewed as one of the best solutions to supply Jordan with a sustainable water supply.

The Red Sea-Dead Sea Water Conveyance Project was considered a viable solution to this problem (Daher, 2021). The project was a planned joint effort between Jordan, Israel, and the Palestinian Authority to build a pipeline that would raise water levels in the shrinking Dead Sea and provide Jordan, Israel, and Palestine with desalinated potable water. The deal was agreed in 2013 but in 2021 it was announced that it would no longer be going ahead due to “politics” (Daher, 2021).

Water is pumped to 94% of Jordanian households via the country’s water network (MWI, 2023). However, around 50% of the water produced and transported to customers is considered non-revenue water (Al-Addous et al., 2023). Non-revenue water, or water losses, is water that is not billed to consumers. This may occur due to leakages in Jordan’s aging water network, theft, administrative errors, inaccurate metering, and improper billing. Water losses cost the government 500 million dollars a year (Al-Addous et al., 2023). The government is working to reduce water losses and aims to reduce non-revenue water to 25% of water produced and transported by 2040 (MWI, 2023).

Jordan’s natural water scarcity presents challenges to the country. Water is so central to life in Jordan, that the very first exhibit visitors see in The Jordan Museum is on Jordan’s water usage and supply (2023). But human factors such as climate change, regional politics, population growth, and mismanagement of resources, are rapidly depleting the relatively small natural supplies of water available to Jordanians.
Water in Jordanian homes

Jordan’s extreme water scarcity is felt in the everyday lives of Jordan’s 11 million person population. Since 1987, the country has operated under a water rationing regime where water is pumped into homes only once a week for various durations (Potter & Darmame, 2010). Water is delivered to homes through municipal pipe networks that serve 94% of Jordan’s population (MWI, 2023). The rooftops of Jordanian homes are dotted with near ubiquitous plastic white 2m³ water tanks that store the household’s water supply for the week and can be seen in Figure 1. Some households have municipally filled wells that offer them a greater water storage capacity and increased household water security. Households in Amman average between 3m³ and 16m³ of water storage capacity that households ration throughout the week (Potter & Darmame, 2010).

Figure 1, water storage tanks on the roofs of buildings in the Sports City neighborhood of Amman.

Jordanians use an average of 90 liters of water per day, which is far less than other countries in the region (The Jordan Museum, 2023). Jordanians are widely aware of the importance of water conservation (Al-Tabini et al., 2022). The government is attempting to
manage the demand for water through a series of methods that include education campaigns, pricing mechanisms, and water rationing during the summer (Al-Addous et al., 2023; Masharqa, 2012). Water bills in Jordan were historically paid quarterly, however, a recent change went into effect in September requiring water bills to be paid monthly (Jordan News, 2023). The primary goal of the change is to facilitate easier monitoring of water usage.

Water is used in every aspect of domestic life, especially in domestic labor. Personal hygiene, household cleaning, laundry, dishes, cooking, and drinking are all necessary household activities that require water. The World Health Organization considers 50-100 liters of water per person/per day to be the minimum required to ensure that “the most basic needs are met and few health concerns arise” (United Nations, n.d.). Simply put, water is a need that must be fulfilled.

The average Jordanian household has 4.7 members (Department of Statistics Jordan & ICF [DOS], 2019). 12% of households are headed by women and 33% of Jordan's household population is under 15 years of age (DOS, 2019). Fertility rates have slowly declined over the past 30 years with women in Jordan having an average of 2.7 children in 2017 (DOS, 2019). Jordan is a middle-income country with a well-educated population that enjoys many of the luxuries of modern life (DOS, 2019).

Traditionally in Jordan, housework is considered to be the responsibility of women and mothers, while men are considered responsible for earning an income to support the family (Ali et al., 2022). Women in Jordan have a 14.7% labor force participation rate while men have a 62.5% labor force participation rate (The World Bank, 2023). However, “women represented 57.2% of those employed in senior and middle management in 2021,” (The World Bank, 2023). Within the home, women’s opinions are typically valued with 77.8% of Jordanian women participating in major household decisions (The World Bank, 2023). While gender roles are
gradually changing, most Jordanians still subscribe to traditional gender roles that are considered a part of Arab culture (Ali et al., 2022). Therefore, in the majority of Jordanian households, it is women who conduct the largest share of domestic labor, and by extension, water management (Ali et al., 2022).

**Literature Review**

Domestic water management is a practice conducted in every part of the world. The specific practices of water management are shaped by the social, environmental, geographical, and political contexts of water users. There is a vast body of research identifying the different ways in which water management is practiced across the world. Much of this research identifies the importance of women as water managers, especially in the domestic sphere.

*Women and Water*

Towards the end of the 20th century, a great deal of literature and international conferences argued for the importance of women’s roles in water management across the world. The 1992 International Conference on Water and the Environment held in Dublin resulted in the Dublin Statement on Water and Sustainable Development. The statement argues that “scarcity and misuse of fresh water pose a serious and growing threat to sustainable development and protection of the environment. Human health and welfare, food security, industrial development, and the ecosystems on which they depend are all at risk” (United Nations Environment Programme, & World Meteorological Organization, 1992, p. 3). The conference report offered a series of recommendations based on four guiding principles:

1) Fresh water is a finite and vulnerable resource, essential to sustain life, development, and the environment
2) Water development and management should be based on a participatory approach, involving users, planners, and policy-makers at all levels.

3) Women play a central part in the provision, management, and safeguarding of water.

4) Water has an economic value in all its competing uses and should be recognized as an economic good.

The third principle, that women play a central part in the provision, management, and safeguarding of water, recognizes common practice across the world and forms the basis for much of the body of literature that recognizes the role of women as water managers. In many countries, but especially in the Global South, women serve as both domestic water managers and water collectors, meaning they travel to collect water for the household (Mago & Gunawal, 2019; Vyas-Doorgapersad, 2013; UNFPA Jordan et al., 2022). However, in Jordan, a middle-income country with nearly 100% household connection to the national water network, women are not required to be water collectors (Potter & Darmame, 2010). Many societies, including Jordan, consider women to be managers of domestic affairs (Masharqa, 2012; Vyas-Doorgapersad, 2013). Given the critical nature of water as a resource within the home, women are often responsible for the management of water (Masharqa, 2012).

Building on the widespread recognition of women as water managers towards the end of the 20th century, Singh et. al. “highlights the significance of the ‘cultural dimension of water’” (2004, p. 245). They argue that women are “active decision-makers with respect to water procurement and water use” (Singh et al. 2004, p.245). They consider that “women’s perceptions regarding water needs are a part of the knowledge system of their society” and that a cultural understanding of water-related behaviors and beliefs is required for adequate interventions (Singh et al. 2004, p.246). Within Jordan, religion is a significant factor in the way both Muslim
and Christian women view the importance, use, and conservation of water (Burger, 2019; Saad & Shama, 2006).

In South Africa, Vyas-Doorgapersad found that though women are often responsible for domestic water management, they are often not empowered to manage water resources on a public, municipal, and governmental level (2013). Hansen and Kerr found that exclusion of the perspectives of women especially within rural Jordanian contexts, means interventions are inadequate in alleviating the impacts of water scarcity and upholding social inequalities (n.d.). Mago & Gunawal argue that “women play a critical role in managing natural resources on family and community levels and are most affected by environmental degradation” (2019, p.1). Al-Naber & Shatanwi found that “the role of women in the management of water resources is very important in countries of extreme heat like Jordan” (2004, p. 97). It was also found that the involvement of women in small-scale agricultural irrigation projects improved water efficiency (Al-Naber & Shatanawi, 2004).

Across the world, women engage in water management practices both inside and outside of the home. In Indonesia, women care for communal water sources such as rivers, because of the importance of water in domestic and public life (Rohmatin & Habsari, 2021). In Turkey, Hablemitoglu and Ozmete found that women in Turkey engage in water saving behaviors within the home (2010). And in Algeria, Habi and Harrouz found that due to the periodic water supply, “the life of households, particularly that of the housewives, depends on the availability of water” and the storage capacities of each home (2015, p.161).

Similarly to Algerian households, homes in Jordan receive water only once a week under a government policy of periodic water supply. The available academic literature on water scarcity in Amman, Jordan identifies the “water day” as a critical day of the week for women to
conduct water-intensive domestic labor (Gerlach & Franceys, 2008; Masharqa, 2012; Potter & Darmame, 2010; Potter et al, 2010). Hansen and Kerr argue that the impact of Jordan’s water scarcity is gendered in that women are primarily responsible for domestic water use and management and therefore must structure their lives around conducting water-intensive activities on *water day* (n.d.). Katrin Masharqa, found that women are expected to be domestic water managers in Amman due in part to a hegemonic discourse regarding domestic water management as the responsibility of women (2012). Masharqa (2012) identifies government education campaigns and discourse as a method of reinforcing traditional gender roles and hegemonic discourse of women as domestic water managers. Within households, there is often a gendered division in the management of water as “women take overall responsibility for the day-to-day management of water and control the use of water within the home” while the responsibility of paying water bills and maintenance of water-related equipment falls on men (Potter & Darmame, 2010, p.120). Men were also found to play a considerable role in educating children on water-saving practices (Potter & Darmame, 2010).

Within Jordanian society and policy circles, women have long been recognized as critical stakeholders in Jordan’s management of its limited water supply. The Jordanian government has a policy on gender integration in the Jordanian water sector (Ministry of Water and Irrigation, 2017). USAID published a series of reports conducting a *Gender Analysis of Water Management Initiatives* indicating a significant international recognition of the roles of Jordanian women in water management (USAID, 2016; USAID, 2020).

The available literature identifies economic and social disparities in water supply and management with low-income families impacted more severely than high-income families (Gerlach & Franceys, 2008; Masharqa, 2012; Potter & Darmame, 2010; Potter et al, 2010). In
both high and low-income households women were found to be most impacted by water scarcity due to their roles as water managers (Gerlach & Franceys, 2008; Masharqa, 2012; Potter & Darmame, 2010; Potter et. al, 2010). The research finds that while all families engage in water-saving practices, high-income households have larger storage capacities, and therefore engage in fewer water-saving activities (Potter & Darmame, 2010). High-income households were found more likely to buy additional water from water tankers (Potter & Darmame, 2010). The consensus among the available literature is that while the periodic water supply has a significant impact on the daily lives of women and families, they have found ways to manage their limited supplies of water effectively (Gerlach & Franceys, 2008; Masharqa, 2012; Potter & Darmame, 2010; Potter et. al, 2010).

Potter et. al. found significant concerns regarding the quality of water delivered to homes (Potter et. al.). Amman residents were found not to trust tap water as a source of drinking water; instead, they chose to rely on water filters and bottled water (Potter et. al.). Though high-income households were more likely to buy bottled and filtered water for drinking than low-income households (Potter & Darmame, 2010).

The available literature on domestic water management in Amman offers invaluable insight into the roles, practices, and overarching reasons for women’s water management behaviors, especially in high and low-income areas of Amman. In my research, conducted over a decade after the most recent academic study identifying women in Amman as water managers, I attempt to renew these findings and assess whether significant changes have occurred following a decade of global political, economic, environmental, and social changes. In addition, I focus on middle-income families in areas of Amman not studied in previous studies.
The impact on women

This research focuses on women within the context of domestic resource scarcity worsened by climate change. Given that water management is a critical aspect of the domestic labor conducted by Jordanian women, reviewing the literature on the impact of domestic labor and climate change on women in the region offers valuable insight into the impact of water scarcity and periodic supply on women.

Women are disproportionately impacted by climate change (UNFPA Jordan et al., 2022). Women make up 70% of the world’s 1.3 billion people living in poverty conditions, and the poor will be disproportionately impacted by climate change given the scarcity of resources and lower financial means to adapt and/or recover to changes in climate. Women are also under-represented in decision-making positions and therefore their needs are often overlooked or misunderstood making them more vulnerable to resource scarcity and environmental changes. Climate change also increases the risks of gender-based violence in two ways. In cases where climate change-related events make women’s homes uninhabitable, “they may be forced to migrate to camps where living under temporary tarps or bare plastic sheets can expose them to violence from strangers” (p.3). The risks of intimate partner violence and sexual violence also increase as services that provide social protection may be disrupted by climate disasters (UNFPA Jordan et al., 2022).

Within the Jordanian context, increased water scarcity will place greater pressures on women to conserve already limited resources resulting in “increased psychological stress” (UNFPA Jordan et al., 2022, p.6). This increased pressure is felt by the whole family and can result in increased tension and potentially increased intimate partner violence. Women living in poverty, rural areas, and refugee camps are especially vulnerable to changes in climate and
resource scarcity and therefore especially vulnerable to its social impacts (UNFPA Jordan et al., 2022).

In addition, household labor and childcare are found to negatively impact the mental health of women in the Middle East and North Africa region. According to Tomoum and Hayes domestic labor is “associated with depression and anxiety among women, particularly among mothers” (2021, p.19). In addition, working mothers especially, have a high correlation between domestic labor and depression (Tomoum & Hayes, 2021). Given these factors, examining the role of women as domestic water managers through a feminist lens, in an era of social, political, and environmental change, is critically important.

**Theoretical framework**

Women in Jordan conduct domestic labor under conditions of resource scarcity. While the role of women in conducting domestic labor is widely acknowledged in feminist literature, I was unable to find academic feminist literature that explicitly describes the conduct of domestic labor under environmental stresses such as resource scarcity. In this section, I draw on several sources of feminist literature from across the world to build a theoretical framework through which to examine women’s domestic water management, creating the term resource-scarce domestic labor.

*Resource-scarce domestic labor*

Feminist ecological economics argues that care is “the most essential form of labor to functioning societies and economies” (Daibes, 2023, p.4). However, despite the fundamentalist importance of care, capitalist societies have diminished its value (Daibes, 2023). In the MENA region women conduct six times as much unpaid domestic labor as men (Daibes, 2023). Despite the societally diminished value of care and domestic labor, Daibes argues that “care is a feminist
value and resistance strategy in a system that continuously denies people the space and opportunity to receive and provide care to our loved ones and our communities” (2023, p.10).

Climate change and resource scarcity increase the amount of time and energy that women and girls expend on unpaid care and domestic labor (Daou & Kobaissy, 2022). Therefore given women’s roles as carers, they are more vulnerable to environmental changes caused by climate change. However, despite the ongoing and future impact of climate change on the lives of women in the Middle East region, climate change has “not yet made it fully to the political agenda of feminist and women’s rights organizations in the [Middle East]” (Daou & Kobaissy, 2022, p.8).

Ecofeminist author, Sherilyn MacGregor, argues that “any attempt to tackle climate change that excludes a gender analysis will be insufficient, unjust, and therefore unsustainable” (MacGregor, 2009, p. 124). Given that climate change, among other factors, will only worsen water scarcity “shedding light on the gender dimensions of climate change will enable a more accurate diagnosis, and a more promising ‘cure’ than is possible with a gender-neutral approach” (MacGregor, 2009, p. 124). Therefore understanding the contemporary impacts of water scarcity on women is critical in crafting solutions to water scarcity.

In particular, MacGregor argues that “attention to women’s gender-ascribed responsibility for social reproduction allows for recognition of the ways in which men and women will be affected differently by climate change” (MacGregor, 2009, p. 131). MacGregor’s work offers a theoretical justification for the pursuit of a gender analysis of the impacts of climate change on everyday life. In the Jordanian context, this research is critical given Jordan’s resource scarcity. Climate change, among other man-made factors including government water management and regional politics, significantly exacerbate Jordan’s historic scarcity of freshwater resources. In
addition, Jordan’s social and cultural gender dynamics mean examining the gendered differences regarding the impact of environmental factors on everyday life is especially important (Ali et. al., 2023).

Carol Farbotko (2018) builds on MacGregor’s work, identifying domestic environmental labor as a growing and increasingly important aspect of domestic labor. Farbotko writes that “domestic environmental labor is often labor-intensive, involving anything from sophisticated learning and creative effort, to mundane, repetitive, drudge-like chores, and it is implicated in wider social and political relations that are only beginning to be explored” (Farbotko, 2018, p.3). She writes that “domestic environmental labor, in an idealized form, involves accessing and using water to wash and bathe without significant depletion or pollution” (Farbotko, 2018, p.2). Farbotko’s work elucidates the value and importance of understanding environmental factors within domestic labor. However, her work is entrenched in “Western contemporary discourses” of domestic labor and environmental concerns (Farbotko, 2018, p.2). Domestic environmental labor exists in the context of ‘domestic greening’ within the home through practices such as “rinsing cans and sorting them into recycling receptacles” among other examples (Farbotko, 2018, p.2).

Jordanian women face a different form of environmental concern, water scarcity. Given the critical nature of water for both survival and functions of Jordanian homes, water management may be considered a greater environmental concern within domestic labor than labor conducted to mitigate environmental impacts. Therefore Farbotko’s work must be adapted to be applied to the Jordanian context.

For the purpose of this research, resource-scarce domestic labor will be understood as additional mental and/or physical labor conducted in an effort to access, use, and conserve
natural resources limited by human and/or environmental factors. Under this definition, resources used for cooking, lighting, and heating homes such as oil gas in addition to food products such as cooking oils may be studied. However, the scarce natural resource studied in this research is water. In addition, resource-scarce domestic labor is not considered to be explicitly gendered. Individuals regardless of their gender, can and do, conduct resource-scarce domestic labor every day. However, in many societies, women are considered responsible for conducting resource-scarce domestic labor.

Resource-scarce domestic labor is considered different in its purpose from Farbotko’s domestic environmental labor (2018). Domestic environmental labor is understood to be additional domestic labor conducted with a concern for the individual’s impact on the environment including contributing to causes of climate change. Whereas resource-scarce domestic labor is understood to mean domestic labor conducted under environmental stress manifested through resource scarcity and other consequences of climate change.

Resource-scarce domestic labor is conducted across the world and is manifested in many different forms. The most significant determinant of the form of resource-scarce domestic labor is infrastructure and service provision. For example, women and girls who travel long distances every day to retrieve water for their families conduct a different form of resource-scarce labor to women who live in homes connected to a municipal water supply.

Another significant determinant of resource-scarce domestic labor is cultural context. Culture -- manifested through language, religion, social structures, and norms -- shapes the ways in which natural resources (i.e. water) are viewed and influences the practices of those conducting resource-scarce domestic labor (Singh et. al. 2004). Within the context of Jordanian culture, Islam has a large influence on all aspects of life. Islam “emphasizes a balance and justice
in every respect of life, especially human dealings with nature” and “women being the house managers, maintain this balance” (Abdul Haq et. al., 2020, p.276). Islam teaches that Allah created all living things from water and therefore Muslims should respect water and conserve water (Saad & Shama, 2006). Saad and Sharma highlight the respect for the multiple roles Muslim women fulfill in their communities as both water managers and educators (2006).

Central to understanding resource-scarce domestic labor is the role of education. Women educate their families, especially their children, on the importance of conserving scarce domestic resources through a series of explicit and implicit actions. Zeenat Abdul Haq et. al. write that “women’s pro-environmental behaviors influence the entire family” (2020, p.284). “Being mothers they can teach all the environmental ethics to their children such as do not waste the water during brushing or bathing by presenting it while they are washing clothes or plates” (Abdul Haq et. al., 2020, p.285).

By examining women’s roles as domestic water managers through the eco-feminist lens of resource-scarce domestic labor, we are better able to appreciate the under-valued contributions of women to society and the impacts that environmental factors, such as climate change, have on the lives of women. This understanding allows for a more robust analysis and a better crafting of solutions to the impacts of climate change and resource scarcity on women.

**Methodology**

This research was conducted over the course of 5 weeks in Amman, Jordan. For four months, I lived with a Jordanian family in the Sports City neighborhood of Amman. It was in this context that I became familiar with the ways in which limited water resources are valued and managed within the home. In order to understand whether my experiences within my own home were true for others throughout Amman and Jordan, I decided to conduct research drawing on
interviews and literature review to understand the different experiences of Jordanian women and families.

Given Jordan’s family and social structures, this research identified women, especially mothers, as the primary demographic of the study. This decision was made based on knowledge of the culture and guidance from advisors. The decision to identify women, especially mothers, as the primary demographic was approved by a Local Review Board on November 13th, 2023.

Semi-structured interviews were the primary method of data collection. 12 interviews were conducted from the 15th to the 26th of November 2023. 10 of these interviews were conducted with host families of SIT Jordan. This decision was made due to logistical and practical considerations and was approved by a Local Review Board. The SIT host family network is made up of middle-income families living in different areas in West Amman. All interviewees lived in apartments. The neighborhoods of interviewees include Al-Rawabi, Al-Shmeisani, Al-Qutnah, Al-Salehein, Al-Hilal, Al-Tla'a Al Shamali, and Al-Rashid. Of the 13 families acting as host families in the Fall 2023 semester, 10 were selected for interviews. The 10 families are a representative sample of the host family network and are distributed across neighborhoods and areas.

In order to gain an understanding of the variation of experience in higher and lower-income neighborhoods, two additional interviews were conducted. Amman is considered socially and economically divided between its East and West sides with residents of East Amman considered lower income relative to those living in West Amman (Zinati, 2021). One interview was conducted in East Amman, in the Al Amira Alia neighborhood, and another interview was conducted in West Amman, in the Abdoun neighborhood. Abdoun is home to many of Amman’s foreign embassies and is widely considered a high-income area. Additional interviews were
conducted in East and West Amman to examine whether economic conditions impacted the water supply and saving practices of families. Specific questions related to household income were not asked. Instead, the neighborhoods of interviewees are used as a rough estimate of household income. While imperfect, I chose not to ask questions related to household income since economic disparities were not central to the research conducted. Given my positionality as a friend of the students living in their homes, I felt it was most appropriate not to ask questions related to household income.

Interviewees were aged between 32 and 69 with an average age of 51.6 years. All women were married with between 2 and 5 children. Some had young children, some had adult children though the exact ages of their children were not collected. The number of household residents ranged from 4-8 with an average of 5.5 residents per household. 4 of the women currently work full-time, 1 works part-time, 3 are retired after working full-time for decades, and 4 are not employed.

All interviews were arranged with support from SIT Jordan Homestay Coordinator, Feryal Hasan. Interviews lasted between 20 and 60 minutes and a copy of the interview questions can be found in the Appendix. Interviews were recorded with the explicit verbal consent of interviewees. Recordings were used for research purposes only and were accessible only to the researcher. For 7 of the twelve interviews, Feryal Hasan also served as a translator between myself and the interviewees. In 3 of the interviews where a translator was not present, the mothers I interviewed spoke sufficient English for effective communication of questions and answers. In 2 of the interviews where a translator was not present, men of the family, specifically the fathers and eldest sons, spoke perfect English. In these interviews, the men were the primary
interviewees with the mother also present and offering answers periodically following a
translation by one of the male members of the family. Though the male interviewees were not a
part of my primary demographic, these interviews offered helpful insights into the male
understanding of domestic water management.

In addition to interviews with the primary demographic of this research, I also
interviewed 3 experts to gain a broader understanding of water management in Jordan. I
interviewed activist Deema Al-Kharabsheh to gain a broader understanding of women’s roles in
the home, Arab feminist understandings of domestic labor, and domestic water management
outside of Amman. I interviewed former Minister of Water and Irrigation, Dr. Hazim El-Nasser
to better understand government management of water and the future of Jordan’s water scarcity. I
interviewed former Minister of Foreign Affairs, Dr. Jawad Anani to develop my understanding of
the implications of regional and international politics on water supply, management, and security.

I also interviewed 2 SIT Jordan staff members, Feryal Hasan, and Sakhaa Bataineh, to
develop a background understanding of Jordanian views of women, feminism, domestic labor,
and the gendered division of labor.

*Ethical Considerations*

Before embarking on this research, I completed a Research Methods and Ethics course
with SIT Jordan. In addition, I completed Human Research training by CITI Program as
mandated by my home institution, Georgetown University. From these courses, I gained a strong
understanding of the practices required to conduct my research in an ethical manner. I signed a
statement of ethics adapted from the American Anthropological Association. The statement
outlined my responsibilities to the people whose lives and cultures are studied in addition to my
responsibilities to my host institution. My research proposal was approved by a Local Review Board and my research followed all ethical requirements.

The informed consent of all interviewees was obtained at the beginning of every interview. Each interviewee signed a consent form that was translated into Arabic. The consent form allowed interviewees to decide whether I could use their name, position, and organizational affiliation in the final study, in addition to using the data obtained in any later studies. Explicit verbal consent of interviewees to record interviews was obtained. Interviewees were also made aware that they could refuse to provide an answer or end the interview at any point and for any reason.

Given that not all interviewees among my primary demographic consented to the use of their names, all primary demographic interviewees will be given pseudonyms in this paper. All information identifiable to the interviewees is stored securely and accessible only to me. All experts interviewed consented to the use of their names and positions, and to use the collected data in future studies. These experts will therefore be referred to by name given the additional credibility provided. All signed consent forms will be stored by SIT Jordan following the submission of this research.

No vulnerable populations were interviewed during the course of this research. During the interviews, cultural practices were observed. These cultural practices included offering to remove my shoes, accepting any snacks and drinks offered, and waiting for a woman to extend her hand before shaking hands. No observations were conducted within the home and no information was shared with other SIT students or interviewees.

In addition, as mentioned in the section on the scope of this research, it would be unethical and inappropriate for me to cast judgment over water management practices or
domestic labor practices. Especially given that these practices are accepted cultural and social norms within the country.

During my interviews, I did not ask questions related to the impact of domestic labor on my interviewees. Due to my positionality, and given that I am a student of International Politics, I am not capable of gathering meaningful data related to the psychological, physical, and social impact of domestic water management and domestic labor practices. Information pertaining to the topic was gathered in my interview with activist Deema Al-Kharabsheh and via a review of the relevant literature. From these generalized conclusions will be drawn. However, it should be explicitly stated that such information was not gained directly from interviewees.

**Posittionality**

My positionality was taken into consideration at all times. I am a white, non-religious, male, beginner Arabic speaker, born and raised in the United Kingdom, and an undergraduate student at an American university. During interviews, ethical considerations related to my positionality included not being alone in a room with female interviewees as noted by a member of the Local Review Board. Given my positionality, it is possible that interviewees responded differently than they would have with a researcher of a different background. However, I have no reason to believe that any of the answers provided were untrue or inaccurate.

In addition, it is important to reflect on my positionality while building my theoretical framework. To build the framework I drew on feminist theory from an array of different cultural and academic contexts. These include Western feminist perspectives, Islamic feminist perspectives, Middle Eastern feminist perspectives, ecofeminist perspectives, feminist ecological economic perspectives, and Jordanian feminist perspectives. I did so as a man who is not a
member of these groups nor an expert in these fields. Therefore, I welcome critiques of my work so that the best academic conclusions can be drawn on the topic I am researching.

Findings

“Without water, nothing” was how Amira described the importance of water in her home. Farah said “you can’t live without water” and Iman said “no water, no life.” Water is critical to the lives of every interviewee. All interviewees receive water once a week for a period of roughly 24 to 36 hours, barring disruptions caused by maintenance work. The water storage capacity of interviewees ranges from 3m$^3$ to 44m$^3$. All interviewees stored their water in water tanks on their roof and/or in the basement of their apartment building. 2 interviewees had household wells, 1 interviewee had a 36m$^3$ capacity well while the other had a 40m$^3$ capacity well.

Household wells are filled via the municipal water supply. According to Dr. Hazim El-Nasser, housing regulations in Amman now require all new buildings to include a household well. Household wells reduce the impacts of water scarcity by giving users a greater supply of water to use during the summer months when water is further rationed.

Having a well significantly increases a household’s water budget. Elham has a 40m$^3$ well in addition to two 2m$^3$ tanks leading to a total capacity of 44m$^3$. She described having no concerns related to water. Her weekly water budget is 8.8m$^3$ per person, over 9 times greater than the average weekly water budget of interviewees without wells (0.962m$^3$). Despite this, she still described a practice of not using more water than the minimum necessary, citing general water scarcity and habits developed when she lived in another part of the city that relied solely on water tanks.
The household water budgets of the interviewees can be found in *Table 1*. For the purposes of this research, weekly water budgets of households were calculated by dividing the storage capacity of each household by the household population; this figure was then divided by 7 to calculate the daily household water budget per person.

The 10 interviewees with only water tanks for storage purposes have a storage capacity ranging between 3m³ and 7m³ with an average of 5.4m³ storage capacity. Those with only water tanks have an average household population of 5.7, meaning that interviewees have an average water budget of 0.962m³ per person/per week, (137 liters per person/per day).

Ghazal’s family has the smallest water budget of 0.667m³ per person/per week (95 liters per person/per day). Ghazal’s family has a storage capacity of 4m³ between 6 people and noted that they would like an additional water tank but make do with the amount they have.

To provide context to these figures. An 8-minute shower uses 0.064m³ (64 liters) of water, flushing a toilet uses 0.0075m³ (7.5 liters) per flush, and washing hands uses 0.0015m³ (1.5 liters) per wash (The Jordan Museum, 2023). In the context of Ghazal’s family, if a family member were to take a 12-minute shower (0.096m³), they would exceed their daily water budget.
<table>
<thead>
<tr>
<th>Household Population</th>
<th>Water Storage Capacity (m$^3$)</th>
<th>Weekly water budget per person (m$^3$)</th>
<th>Daily Water Budget per person (m$^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amira</td>
<td>8</td>
<td>0.750</td>
<td>0.107</td>
</tr>
<tr>
<td>Bushra</td>
<td>6</td>
<td>1.000</td>
<td>0.143</td>
</tr>
<tr>
<td>Carmen</td>
<td>7</td>
<td>0.857</td>
<td>0.122</td>
</tr>
<tr>
<td>Um Daoud</td>
<td>5</td>
<td>1.400</td>
<td>0.200</td>
</tr>
<tr>
<td>Elham*</td>
<td>5</td>
<td>8.800</td>
<td>1.257</td>
</tr>
<tr>
<td>Farah</td>
<td>4</td>
<td>0.750</td>
<td>0.107</td>
</tr>
<tr>
<td>Ghazal</td>
<td>6</td>
<td>0.667</td>
<td>0.095</td>
</tr>
<tr>
<td>Halima*</td>
<td>7</td>
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<td>0.776</td>
</tr>
<tr>
<td>Iman</td>
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<td>0.114</td>
</tr>
<tr>
<td>Jamila</td>
<td>6</td>
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<td>0.143</td>
</tr>
<tr>
<td>Khadija</td>
<td>5</td>
<td>1.200</td>
<td>0.171</td>
</tr>
<tr>
<td>Latifa</td>
<td>5</td>
<td>1.200</td>
<td>0.171</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>5.750</strong></td>
<td><strong>11.333</strong></td>
<td><strong>1.988</strong></td>
</tr>
<tr>
<td><strong>Average without well</strong></td>
<td><strong>5.700</strong></td>
<td><strong>5.400</strong></td>
<td><strong>0.962</strong></td>
</tr>
</tbody>
</table>

Table 1, Water Budgets of households. *Indicates owning a household well

Women as water managers

The primary domestic uses of water are cleaning, laundry, showering, cooking, and plant watering. Central to understanding women’s roles as water managers, is understanding women’s roles in the household. Of the women interviewed, 75% do all or most of the domestic labor. 33% of interviewees have a domestic worker, but those who do have a domestic worker still help out with “some things” (Carmen, despite having a domestic worker, does most of the housework). 1 of the 12 interviewees mentioned her husband helps her on Fridays. None of the interviewees indicated that a man was in charge of the housework. According to activist Deema Al-Kharabsheh, for men to conduct domestic labor would be considered shameful to both the man and the women in his household. Deema described women conducting most or all of the
housework as “by default.” She said, “anything inside the home, [women] are responsible.” Therefore, women manage domestic water supplies, because women manage domestic affairs.

According to Deema, the traditional contract between a husband and wife was that men would work and provide the family with income while women would do housework and manage domestic affairs. However, due to a series of economic and cultural factors, more and more women are beginning to work. Of those interviewed, 33.3% currently work full-time. 8.3% work part-time, 33.3% don’t work, and 25% are retired after working full-time for decades. I found that regardless of whether women work outside of the home, they still conduct most or all of the housework. Of the interviewees who had domestic workers, only 1, Carmen, worked full time, and she still completed most of the housework.

In my interviews with Feryal Hasan and Sakhaa Bataineh, they said that among younger generations, the social expectations on the gendered division of domestic labor are gradually changing. Both women are in their thirties and said that they, and many of their friends, believe that domestic labor should be divided between partners based on the number of hours each of them work outside the home, rather than based on gender alone. However, Sakhaa, Feryal, and Deema Al-Kharabsheh, all said this is not a universal view among Jordanian women, and many still subscribe to traditional gendered divisions of labor.

Under traditional gendered divisions of labor, men still have important responsibilities in domestic water management. According to Sakhaa Bataineh, Jordanian culture views some tasks as the responsibilities of women, and others as the responsibilities of men. Interviewees indicated that men monitor water tank levels, play active roles in managing their children’s usage of water, and are often the ones paying for the water bills. This gendered division of labor means that water conservation is a task for the whole household, with women at the helm.
Managing water use within the household water budget is critical for families. 66.6% of the women interviewed indicated that they are always or often thinking about saving. Interestingly, the 2 men who were interviewed alongside their wives indicated that they only think actively about saving water when there is a problem such as leakages or maintenance disruption. In 66% of households interviewed, women are considered responsible for ensuring that the household didn’t run out of water, 25% considered it a shared responsibility between the husband and wife, and 8.3% considered no specific person responsible for water management given their high storage capacity.

As noted previously the primary uses of water are cleaning, laundry, showering, cooking, and plant watering. Women conduct or oversee the majority of these tasks and subsequently engage in a series of water-saving practices to ensure that water is conserved and managed effectively. 83.3% of women noted that they conduct the majority of their water-intensive housework on the day that water is pumped to their homes, also known as water day. The 16.6% who do not conduct the majority of their water-intensive housework on water day have wells.

Water-intensive housework includes laundry, deep cleaning the home, and plant watering. Many interviewees described completing as many loads of laundry as possible on water day and working to take advantage of the available water supply without diminishing the water levels in their water tanks. 50% of interviewees only do laundry once a week (on water day), 16.6% do laundry twice but aim to do it once, and 33.3% do laundry 3-4 times a week. Those who do laundry 3-4 times a week either have young children who require a large amount of laundry or have a large storage capacity. Those who do have a large storage capacity noted that before they had their current storage capacity, they had to do all laundry on water day. Ultimately, the importance of water day is dependent on the storage capacity of each household.
Ghazal noted that she is at work from 10am-7pm on water day. She wakes up early on water day to begin the housework before she leaves for work. During the day she has her adult daughter help by conducting some of the housework while she’s at work. She completes the remainder of the necessary housework after she returns home in the evening.

Throughout the week women employ a series of water-saving practices to make their supply last until the next water day. When washing dishes it is standard to wet all dishes briefly, turn off the tap, scrub all dishes, then rinse off all dishes at once. Those who have dishwashers often only use them if a large amount of dishes are required to be cleaned after hosting guests. Multiple women use a bucket or jug (seen in Figure 2) to clean the house throughout the week. Khadija said that she fills the jug with approximately 2 liters of water up to 4 times to clean her entire apartment. Ghazal and Farah lowered the water capacity of their toilets to reduce the amount of water used to flush. All interviewees described having short showers and making sure to turn off the tap while brushing their teeth, washing dishes, or whenever they are not directly using water from the tap. All described being cognizant of water use at all times. Um Daoud said that she can judge by the water pressure from the taps whether her family’s supply is low or not.

50% of women reported using greywater in some ways. Greywater is relatively clean waste water gathered from uses such as cleaning vegetables, excess water in appliances, and unused water from the shower. Carmen saves the water she uses to clean her vegetables to water the plants in her home. Amira collects in a bucket the cold water her shower produces before it warms up. She then uses this water to clean the floors and water plants. Iman who describes her
4 m³ water capacity as “more than enough” for her 5 household members credits greywater use as the reason she rarely uses both of her 2 m³ tanks. Her water filter is not efficient “1 cup of filtered water takes 1 liter of water.” And so using a pipe, she collects the wastewater from her water filter and from her air-conditioning unit to clean her floors.

Interviewees who employed domestic workers described having to teach their domestic worker of the importance of water management and teach them water-saving techniques. Interestingly, interviewees who felt they had sufficient water capacity levels said that they still employ many of the water-saving practices they employed when they had an insufficient capacity citing Jordan’s general water scarcity as a reason to save water.

Despite the ubiquity of water-saving practices among interviewees, only 16.6% of interviewees said they speak with their friends and neighbors about water-saving and water scarcity. 66.6% explained that since everyone has this problem, everyone knows they have to save water and so there’s no point in discussing it. 50% of interviewees said they’d speak with their neighbors when there’s a problem. Interestingly, in my interview with Carmen and her husband, her husband said that there’s no need to discuss water saving with neighbors and friends, but Carmen responded “of course” she speaks with other women about water saving. In response, her husband said “it’s their business actually,” affirming that domestic water management is considered the responsibility of women.

Parents regularly talk with their children about water saving. 75% of interviewees regularly remind their children to save water. Interviewees often tell their children to take shorter showers, ensure that they don’t waste water by leaving the tap running or playing excessively with water. Both mothers and fathers play active roles in ensuring their children don’t use
excessive amounts of water. However, most parents noted that their children are already aware of the need to conserve water.

Water-saving is an important part of the education system. Farah, a middle school teacher, said that in the week before our interview, her school had held a week of water-saving and scarcity-themed classes. Ghazal said that her children are so aware of the importance of saving water that at times her 12-year-old son has scolded her for using too much water. Former Minister of Water and Irrigation, Dr. Hazim El-Nasser, said that the integration of water-saving into the education system means “if you go to my house my children are more water-friendly than me.” This indicates that government efforts to manage domestic water demand among young generations are successful.

All interviewees said that they hear from the government via TV, billboards, or social media about the importance of water saving. However, most said that these campaigns didn’t change their behaviors since they already understood the importance of water-saving.

All interviewees noted that it’s more difficult to save water in the summer. They cited higher water usage due to increased showering, cleaning of outside areas, and plant watering. Rain typically only falls in Jordan during the winter months and water evaporation rates are high in the summer, straining families’ already limited water supplies. During the summer months, interviewees reported being extra vigilant about water saving, because they are more vulnerable to running out of water.

Activist Deema Al-Kharabsheh said that to understand the impact of resource-scarce domestic labor on women, it must be placed within the context of expectations of all domestic labor. Deema said that Jordanian culture expects women “to be perfect in every responsibility she has, as a mother, as a wife, as an employee, as a sister, as a daughter” and that “these things
put you under more and more pressure over time.” She said that resource-scarce domestic labor is an additional burden on top of the already heavy burden of managing the household and societal expectations of her. Deema said that this “definitely” impacts both the mental and physical health of Jordanian women.

*When water runs out*

Generally speaking, women ensure their families do not run out of water. However, running out of water remains a concern for many households in Amman. 50% of interviewees said that they worry about running out of water regularly, 25% said they sometimes worry but that it’s not a big concern, and 25% said they never worried about running out of water. These concerns are reflections of the reality that running out of water is a very real possibility for many families. Of the interviewees, 25% never run out of water, while 75% have run out of water at least once. Only 25% of interviewees have ever run out of water because of overuse and noted extenuating circumstances as the reason for running out.

The primary reason interviewees noted for running out of water was maintenance on the water lines. Amman’s aging water network requires regular maintenance to stem leaks and reduce losses. However, maintenance often means families do not receive their water on *water day*. The government offers no alternative supply and residents have to ration the previous week’s water supply for an uncertain length of time. Consequently, families adopt extreme water rationing prioritizing only the most important uses of water. All families named bathroom usage and hygiene as the most important use of water, and that “all other things can be delayed.”

While I was conducting research for this project, my own host family’s water supply was cut due to maintenance. *Figure 3* features a picture of the maintenance work at the end of my
street. My host family and I adopted extreme rationing methods. I showered at the local gym, and water was used only for using the bathroom. My host mother was unsure how long the water outage would last, telling me “maybe 3 days, maybe 2 weeks!” Fortunately, the water was delivered on time on water day, and as usual, my host mother conducted all of the water-intensive housework she had delayed.

Had water not been delivered on water day, my host family would have had to call a water tanker to deliver water. When interviewees were asked what they would do when they ran out of water, 75% of interviewees said that they would order a water tanker. See Figures 4, 5, and 6, for pictures of a water tanker. Interviewees told me that water tankers priced water between 3 and 5 JD per m³ of water. Interviewees indicated that 1-2m³ from a water tanker is roughly equal to their monthly water bill, and therefore, turning to water tankers is considered a last resort option for the middle-income and low-income families I interviewed. 16.6% of interviewees said they would first rely on a backup tank in their apartment building, and 25% of interviewees said they would first ask their neighbors. Khadija explained to me that when a person orders a water tanker, they have to buy the full capacity which is typically about 6m³. But if they want to fill just one of their 2m³ tanks, they are still required to pay 20-25 JD for the full 6m³. And so Khadija and two other interviewees said that if others in their building suffered the same fate, they would join with neighbors to share the water and cost of the tanker.
High-income families have different experiences with water management to low and middle-income families. The primary demographic interviewed in my research were middle-income families in West Amman. To examine if there was a variation in the experiences of high-income, medium-income, and low-income households, I interviewed Halima’s family in Abdoun, a neighborhood known to be one of the wealthiest in Amman; and Iman’s family in the Al Amira Alia neighborhood of East Amman, an area home to lower-income residents.

Iman has a water storage capacity of 4m$^3$ to support the 5 people living in her household. She described a process of careful water management, use of greywater, and discipline by her family members to ensure that their supply lasts until the next water day.

Halima has a water storage capacity of 38m$^3$ (36m$^3$ well and 2m$^3$ tank). However, she stressed that though her water storage capacity is 38m$^3$, the municipality only supplies between 4-6m$^3$ per week to support the 7 members of her family. Halima described a series of water-saving practices (short showers, mopping rather than throwing water on the floor to clean, washing their car with a bucket, and drought-resistant plants). However, despite these practices, her family often runs out of water, (in the week before our interview they ran out twice).

Consequently, her family relies on private water tankers. The water tankers supply her home with around 10m$^3$ of water at a cost of 40JD, or $56.38 USD. This indicates that the municipal water supply doesn’t favor high-income areas over low-income areas, but that high-income households are able to afford private sources of water to support higher levels of water usage.
A more comprehensive study on the variations of usage between high-income and low-income households that includes financial incomes is necessary to evaluate whether this indication is repeatable in a larger sample.

**Drinking water**

None of the interviewees drank tap water directly. Some used water coolers, either buying water jugs from stores or having them delivered to their homes. Others had installed water filters to improve the quality of the municipal water so that it could be drunk safely. Some used both filtered water and water coolers as a drinking source. None trusted that the water was safe enough to drink but 83.7% said that they cook using municipal water.

Both Farah and Jamila described an incident related to the contamination of the municipal water supply over 20 years ago that made drinking municipal water unsafe. Farah said in 2002 the water supply was contaminated and that for four months people had to source water themselves and couldn’t rely on the municipally supplied water. Jamila said there was an incident exactly 28 years ago (1995) that she can’t quite remember the details of but said that it was the reason that people don’t trust the water for drinking purposes. Both noted that the water network had been cleaned and decontaminated following the event, but that they no longer trusted the water for drinking purposes.

No other interviewees articulated why or when they started to distrust municipal drinking water. I was only able to find one source on the internet that made reference to an incident of water contamination in Amman in the summer of 1998 when for a few days “the water pumped into Amman had an unusual and unpleasant smell” due to “unusual heat” (Ashton, 2008, p.358). However, a major incident during the late 20th/early 21st century related to the contamination of the water supply appears to be part of the collective memory of Jordanians.
In my interview with Dr. Hazim El-Nasser, I asked him whether an incident of water contamination in 2002 was behind Jordanian’s distrust of water for drinking and he responded that this happened “many years ago” but that the marketing campaigns of bottled water companies are much stronger than the government. Dr. El-Nasser said that Jordan’s municipal water standards are higher than those of bottled water companies and that the municipally supplied water is of better quality than bottled water. He argued that a choice to drink bottled or filtered water is a sign of a developing society, and cited the practice in the US and other countries across the West. He also noted that from the government’s perspective, the use of bottled and filtered water increases efficiency and reduces waste since users perceive it as more precious than tap water and are less likely to allow it to be wasted.

*Perspectives on water scarcity*

Despite Jordan’s water scarcity, the Jordanian government has endeavored to ensure that water remains affordable to its citizens by operating the water network at a significant deficit. In 2021, Jordanians “paid only one-third the total cost of water and wastewater services” at 0.76JD/m³ with a 1.40JD/m³ subsidy (MWI, 2023, p.15). Among interviewees, 50% view their water bills as a fair price, 33.3% view their water bill as expensive, and 16.6% view their water bill as cheap.

Historically water bills were paid quarterly. However, from September 2023 water bills are required to be paid monthly (Jordan News, 2023). 41.6% of interviewees feel the change makes no significant difference. 33.3% of interviewees prefer this change, with some saying they believe their bills will be cheaper and others saying it allows them to better monitor their usage.
25% of interviewees dislike the change saying that paying quarterly was more comfortable for them and that they believe their bill will increase as a result of the change.

All interviewees were aware of Jordan’s scarcity. 16.6% believe water scarcity is improving due to increased supply via the Disi groundwater aquifer. However, 83.3% of interviewees believe that Jordan’s water scarcity is getting worse. Interviewees were able to provide as many reasons as they wanted to explain the worsening of water scarcity. Climate change was the most cited reason for worsening water scarcity with 66.6% of interviewees making reference to it. Population growth (at 41.6%), government management of the water network, historic water scarcity, and regional politics (33.3% each) were also common factors cited by interviewees. Other reasons cited included a large refugee population (25%), excessive private usage by the wealthy (16.6%), and regional conflicts (8.3%).

Understanding the reasons Jordanians believe are behind the state of water scarcity may indicate potential avenues of political mobilization. For example, if a majority of Jordanians believe that climate change is the cause of worsening water scarcity, the Jordanian population may call for increased action to prevent climate change. Future studies should examine the relationship between perceptions of causes of water scarcity and the political views of participants to better understand the relationship between water scarcity and political mobilization.

The larger story

According to activist Deema Al-Kharabsheh, women across Jordan conduct resource-scarce domestic labor and have fairly similar experiences to those in Amman. Government policy is for water to be delivered to all homes across Jordan once a week, but water
services to rural areas are more likely to be disrupted or sporadic than in Amman due to network difficulties. She also noted that a lack of political power in rural areas makes water disruptions more likely. Wells, particularly rainwater harvesting wells, are more common in rural areas than in Amman given the lower population density of rural areas. These wells provide greater resilience to rural residences to endure irregular service, and increased use in the summer.

Overall she noted that similar water-saving practices are observed in rural areas, but that specific practices vary between individuals and households.

Former Minister of Water and Irrigation, Dr. Hazim El-Nasser offered insights into the role that government management plays in the experiences of women under water scarcity. Dr. El-Nasser said that an increased effort was made to manage water demand in the last 20 years. This demand management has been successful in maintaining “a relatively acceptable level of water supply” despite an increase in demand and a reduction in supply.

Dr. El-Nasser said that the government recognizes women’s roles as domestic water managers, so much so that in 2018 the government released a policy on the inclusion of women in the water sector (Ministry of Water and Irrigation, 2017). He mentioned that women were involved in all campaigns to manage water demand, and highlighted several programs including the Water Wise Women Initiative which trains women in rural areas to be plumbers and increases awareness of water scarcity and management (Ibáñez Prieto, 2018).

Dr. El-Nasser believes that efficiency and water recycling will be key to the future of water management in Jordan and that deep groundwater aquifers and desalination at Aqaba will supply Jordan with water for years to come. He didn’t foresee a reduction in the frequency of water delivery, but more technology would have to be adopted and incorporated into domestic and agricultural life to increase efficiency levels.
Former Minister for Foreign Affairs Dr. Jawad Anani, offered an expert perspective on the impact of regional politics on Jordan’s water scarcity. Regional politics is a large factor for Jordan’s water supplies given that the flows of Jordan’s two largest rivers, the Jordan River and the Yarmouk River, are controlled by neighboring countries. Dr. Anani said that both countries take more than their fair share of water from the rivers, and Jordan is unable to prevent such actions. With regards to potential agreements to resolve such issues, Dr. Anani responded that “everybody reneges on water,” and that the problem with international water agreements “is not the deal, it’s fulfilling.” He said that any future deals will need to be based on interdependence if they are to succeed. Dr. Anani also noted that projects such as large-scale desalination at Aqaba, require international support and funding. However, funding for the projects from Europe and the US is much harder to come by without Israeli cooperation on projects. And given current regional politics and conflicts, cooperation between the two countries is unlikely.

Dr. Hazim El-Nasser said “we used to think [water] is an element for regional cooperation and building peace and trust. After the recent war on Gaza, it’s no more valid, I think this is gone forever.” Given the national security implications of water “what Israel did on Gaza, using water as a weapon on people, might happen with Jordan or any other country.” He said that Jordan’s previously planned deal with Israel and the UAE was “definitely dead” and that Jordan would have to seek independent water sources for decades to come.

When asked about the future of resource-scarce domestic labor, Deema Al-Kharabsheh said that despite gradual changes in women’s role in the home, climate change and government mismanagement of resources means “it will be worse.” She believes as water scarcity worsens in Jordan, so too will the experiences of women conducting resource-scarce domestic labor; “anything that happens to the people in Jordan, it will be 10 times worse for women.”
Conclusion

Women in Jordan conduct resource-scarce domestic labor under a periodic supply of water. The social role of women in Jordan as managers of domestic affairs, also means that they are managers of domestic water supplies, and are therefore required to adopt water-saving practices when conducting housework. Under normal circumstances, all women interviewed were able to manage their household water consumption so that they did not run out of water before the following water day. However, extenuating circumstances such as maintenance on water supply lines, forced families to stretch their week’s water supply for longer periods. Under these circumstances, families turn to private water tankers as a last resort and buy an additional supply of water at a premium.

Jordan is a naturally water-scarce country. However, climate change, population growth, government management, and regional politics all significantly exacerbate Jordan’s water scarcity, in ways that are felt on the household level. These factors will only grow in intensity in the following decades and Jordan’s development may be harmed as a consequence. As global climate change continues to worsen, exploring the impacts of environmental factors on women is critical in building climate resilience and designing policies and interventions that mitigate the impact of climate change.

Recommendations

Domestic labor conducted under resource scarcity is a vastly understudied phenomenon. I strongly recommend that resource-scarce domestic labor be studied across the world as climate change will only make the phenomenon more common.

Within Amman, studies examining the relationship between political views and perceived causes of water scarcity should be examined. In addition, renewed research on the variations
across income brackets, inclusive of middle-income households, should be conducted. Ultimately research into the impacts of environmental factors on women and their families will inform better policy and increased resilience to climate change.

To mitigate the worsening impacts of resource-scarce domestic labor on women in Jordan I recommend that the international community, especially global financial institutions, financially support Jordan’s unilateral pursuit of a large-scale desalination project at Aqaba. Given current regional political factors, regional cooperation on water projects is very unlikely. The unilateral pursuit of large-scale desalination will reduce Jordan’s dependence on its neighbors for water and allow groundwater aquifers to replenish over time.

I recommend that while conducting maintenance on pipelines the government should fulfill its obligation to supply households with water by providing water via water tankers for impacted households. In addition, water-saving technologies such as water-efficient shower heads, flow restrictors, and water-efficient washing machines should be subsidized and promoted to the Jordanian population.

Limitations

This study was conducted with a small sample size in a short period of time. While every effort was made for the findings of this research to be broadly relevant, future studies should engage larger sample sizes and employ a variety of methods to collect data and understand experiences. Conclusions drawn from this study should be considered preliminary and more in-depth studies should be conducted to understand the broader experiences of women and families in conducting resource-scarce domestic labor.
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Appendix

Interview questions

Do I have consent to record this interview?

What is your name?

How old are you?

Are you married?

Do you have children?

How many live in your household?

Where do you live?

Do you work?

If so, roughly how many hours do you work?

Who does most of the housework in your household?

How is water delivered to your home?

When and how often do you receive water?

Do you have water tanks? How many?

Do you have a well?

Would you like additional water tanks?

Have you run out of water before?

If so, how often?

Do you worry about running out of water?

What are your main uses of water?

Do you drink tap water?

Do you wash dishes by hand?
How often do you do laundry?

How long is a normal shower for you?

Do you have plants you water?
   
   If so, do you use tap water or greywater to water your plants?

What do you think are the most important uses of water in your home?

What do you do to save water?

Do you think about water saving often?

Is it harder to save water in the summer?

Who in your household is responsible for ensuring that you don’t run out of water?

Do you talk with your children about water saving?

Do you talk with your husband/wife about water saving?

Do you talk with your neighbors or friends about water saving/water scarcity?

Do you hear from the government about water saving?

What resources would you like to make water saving easier, e.g. technology or information?

What do you think about the new law that requires you to pay monthly for water?

Do you think water is expensive?

What do you think worsens water scarcity?

   Examples offered if requested: government management/policy, regional politics/conflicts, climate change, population growth.

Has water scarcity worsened over time?

Is there anything else I should have asked you about?