D. and C. ENGINEERING

urban planning - land use - g.i.s - drone operations - m/e

THE IMPACT OF WATER SCARCITY ON WOMEN IN RURAL COMMUNITIES

D&C ENGINEERING

D. and C. ENGINEERING, 2nd floor NOT ATOI N°198 - Tevrag Zeina (Crossroads between Big Market & Cité Plage) - Nouakchott, Mauritania – PO Box: 3472

www.djigo-engineering.com

October 2025

TABLE OF CONTENTS

1. Introduction----------1

2. Context----------2

3.Impact on women----------4

3.1. Consequences----------7

3.1.1 Education----------7

3.1.2. Health----------7

3.1.3. Economie empowerment----------7

4. Case example----------8

4.1. Water scarcity in SSA----------8

4.2. Water scarcity in Mauritania ----------9

5. Strategies and Solutions----------11

6. Conclusion----------13

References----------14

LISTE OF FIGURES

Figure 1. Distribution of earth's water----------1

Figure 2. The 8 Targets for SDG 6----------2

Figure 3. The impact of climate change----------3

Figure 4. Farmer facing water scarcity----------3

Figure 5. The daily struggle of a girl fetching water ----------4

Figure 6. Primary responsibility for water collection in rural area, by gender----------5

Figure 7. The time of water collection in several countries----------6

Figure 8. Distribution of drinking water service levels----------8

Figure 9. Women and adolescent girls are primarily responsible for water collection in most households using off-premises sources----------9

Figure 10. Water Supply----------10

Figure 11. Water Scarcity----------11

Figure 12. Benefits of Harvesting Rainwater----------12

1. Introduction

Water is the most vital and necessary resource for maintaining life and livelihood. However, global water shortage has become an increasingly serious concern in recent decades (Kaur, 2022). Water scarcity, which is defined as not having enough water or access to clean water sources, occurs when water demand exceeds water availability (Matchawe et al., 2022). The water crisis affects people all across the world. Despite the fact that water covers 80% of the Earth's surface, the availability of fresh water is becoming a major worldwide concern.

Currently, over 1.7 billion people live in river basins where water demand exceeds recharge capacity, and more than 40% of the global population is expected to be affected by water scarcity in the near future (OXFAM, 2020). Climate change, population growth, and poor water management are exacerbating the crisis.

The Near East and North Africa (NENA) region is particularly vulnerable, with 11 of the 17 most water-stressed countries located there (United Nations, 2022). Sub-Saharan Africa (SSA) is also severely affected, especially in rural areas where the most vulnerable populations depend on unreliable water sources.

Global warming worsens freshwater scarcity by making surface water supplies more unpredictable and depleted. The availability, reliability, quality, and accessibility of water are increasingly undermined by climate change (Moayedi & Hayati, 2023).

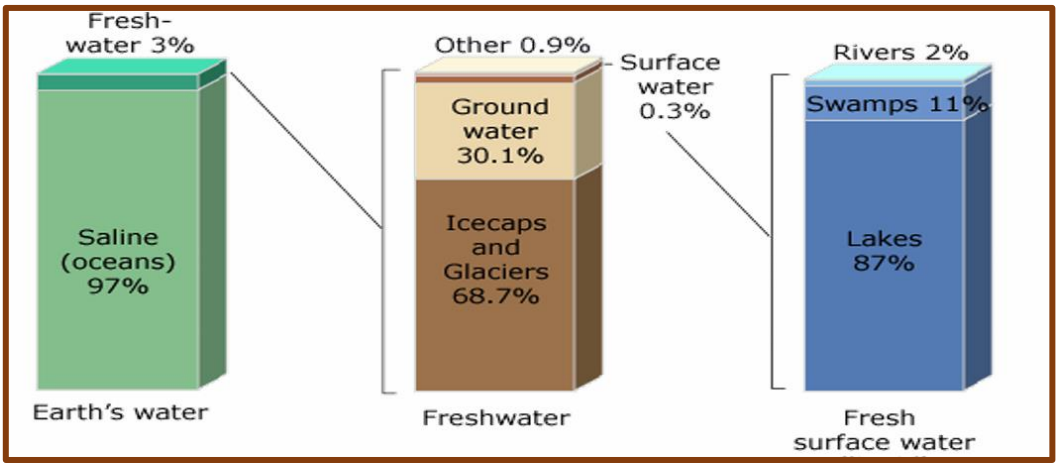

Figure 1. Distribution of earth's water.

The 2030 Agenda for Sustainable Development recognizes the importance of water for poverty reduction, health, and education. Under SDG 6, member states committed to ensuring safe drinking water and sanitation (targets 6.1, 6.2), improving efficiency (target 6.4), and protecting ecosystems (target 6.6) (United Nations, 2022).

Figure 2. The 8 Targets for SDG 6.

Water scarcity can be both physical (limited availability) and institutional (lack of infrastructure and services) (Palamuleni et al., 2022). Addressing it requires both global action and local adaptation.

2. Context

In rural communities, women and girls bear the primary burden of collecting water, which is often time-consuming and physically demanding. Water scarcity also threatens health, as households depend on unsafe sources, increasing risks of waterborne diseases.

Rural livelihoods particularly agriculture and livestock depend heavily on water availability. Climate change-induced droughts and erratic rainfall disrupt local hydrological cycles, reducing productivity and deepening poverty (Chauhan, 2023).

Figure 3. The impact of climate change.

Coping with water scarcity in rural areas requires complex social management systems. Among pastoralist groups, for instance, water access is tied to moral and communal beliefs that guide sharing and resilience strategies (Vium, 2015).

Figure 4: Farmer facing water scarcity.

3. Impact on Women

Water is a vital resource for life and is crucial to women's empowerment and gender equality. However, due to unequal access to water resources, men and women in Africa experience its effects differently (Seri, 2023).

The United Nations General Assembly (2010) recognized the right to water as a fundamental human right, essential for the full enjoyment of life and all human rights. For women and girls, this right is particularly critical, as they are typically the main water consumers and providers in their households. Poor access to water and sanitation endangers women's health, menstrual hygiene, and even their physical safety, as lack of proper facilities can expose them to assault. The right to sanitation is therefore closely linked, yet distinct, from the right to water.

Women and girls usually bear the primary responsibility for water collection. This task is often time consuming and physically demanding, and in areas with inadequate or unsafe water supplies, the impact on their lives is disproportionate (Kaur, 2022). Water scarcity thus deepens gender inequalities: women are more vulnerable to water-related problems, have less power than men, and must often travel long distances to fetch water.

Figure 5. The daily struggle of a girl fetching water.

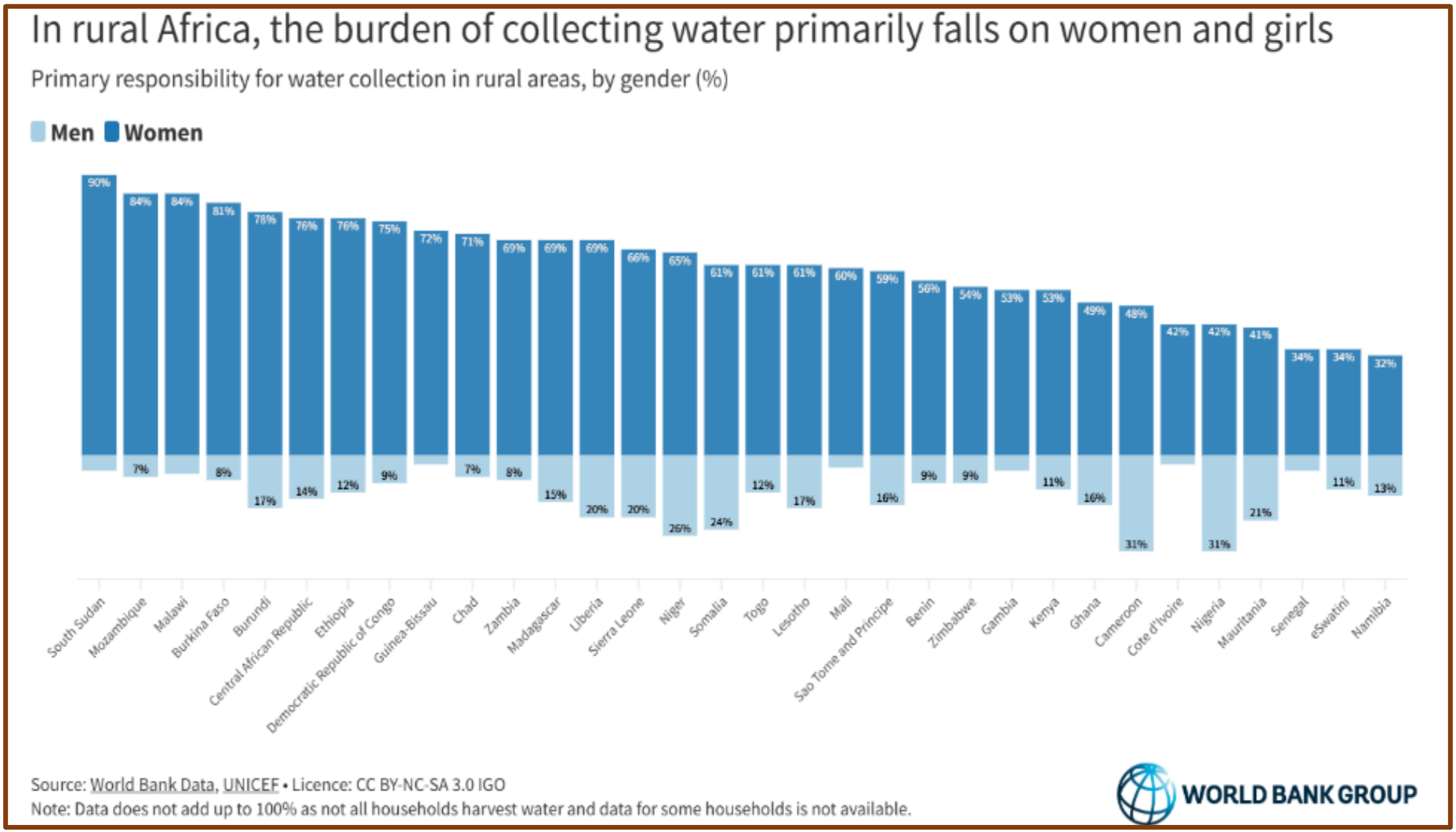

Figure 6. Primary responsibility for water collection in rural area, by gender.

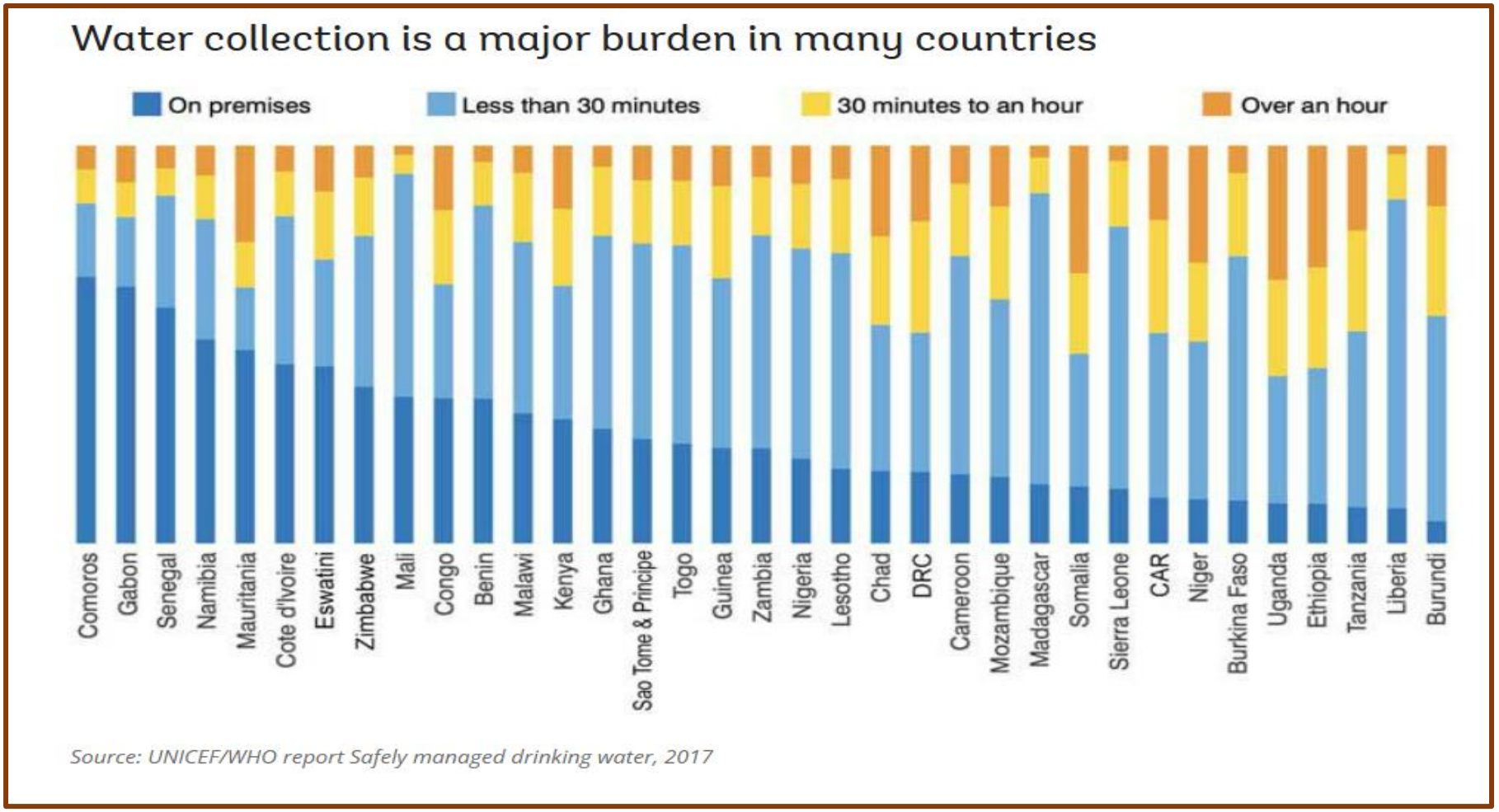

Figure 7. The time of water collection in several countries.

3.1 The consequences are multiple:

- ✓ **Education**: Young girls often drop out of school to help their mothers and sisters with water collection and household duties, limiting their educational attainment and future opportunities (Woldemicael).
- ✓ **Health**: Restricted access to clean water exposes women to waterborne illnesses, while their role as primary caretakers places them at the frontline of health risks.
- ✓ **Economic empowerment**: The lack of clean water reduces women's opportunities for income-generating activities and worsens poverty (Seri, 2023).

Water scarcity also highlights the importance of involving women in water-based emergency preparedness. Since they are the main water users in households, their participation is essential to ensure effective strategies (Barech & Ainuddin, 2019).

Finally, the issue of water and women cannot be separated from climate change. Climate change intensifies water scarcity by causing hydrological disruptions such as droughts and erratic rainfall (Chauhan, 2023). This directly threatens water availability, sanitation, and hygiene (WASH) systems, especially in rural areas where they are already limited. As a result, women and girls who are the most dependent on these resources bear the heaviest burden.

4. Case examples – sub-Saharan Africa SSA and Mauritania

4.1. Water scarcity in SSA

Four aspects of water scarcity are as follows:

1. First-order water scarcity refers to the limited supply of water resources for present and future demands.
2. Second-order scarcity emphasizes the lack of funding required to create better water resources.
3. accessible to the public; institutional setup failure or insufficient infrastructure causes the third-order water scarcity.
4. Social inequality causes the fourth-order water scarcity, where the less fortunate find it difficult to obtain enough and safe water.

Different parts of SSA experience these four types of water scarcity.

Africa is home to half of the world's population that consumes water from contaminated sources. Only 27% of SSA's population has access to basic sanitation, and 319 million people still lack access to clean drinking water.

Africa appears to possess an abundance of water resources. There is a conflicting relationship between water scarcity and the number of water sources in sub-Saharan Africa and Africa in general (Matchawe et al., 2022).

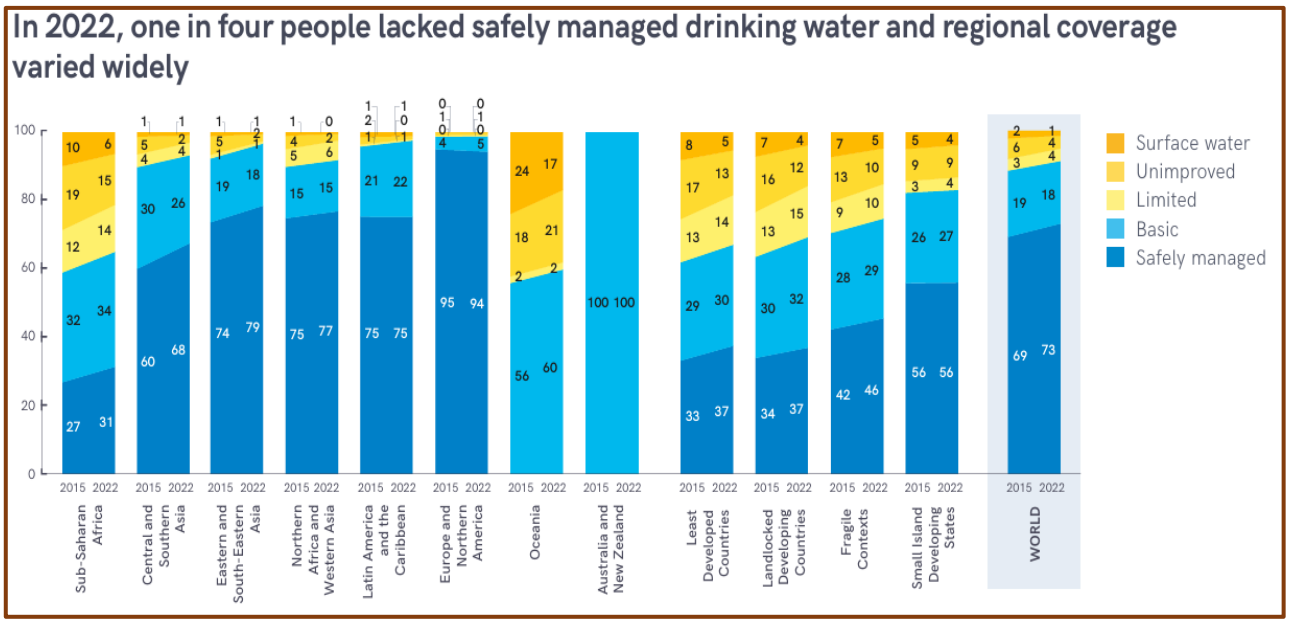

Figure 8. Distribution of drinking water service levels.

Source: WHO/UNICEF Joint Monitoring Programme (JMP), 2023.

About 10% of deaths worldwide among children under five are caused by unsafe drinking water, which is also a major source of diarrhea. 42% of people in sub-Saharan Africa still do not have access to basic water supplies, which are upgraded water sources that are within a 30-minute round-trip commute, despite attempts to increase water access (Obong'o et al., 2024).

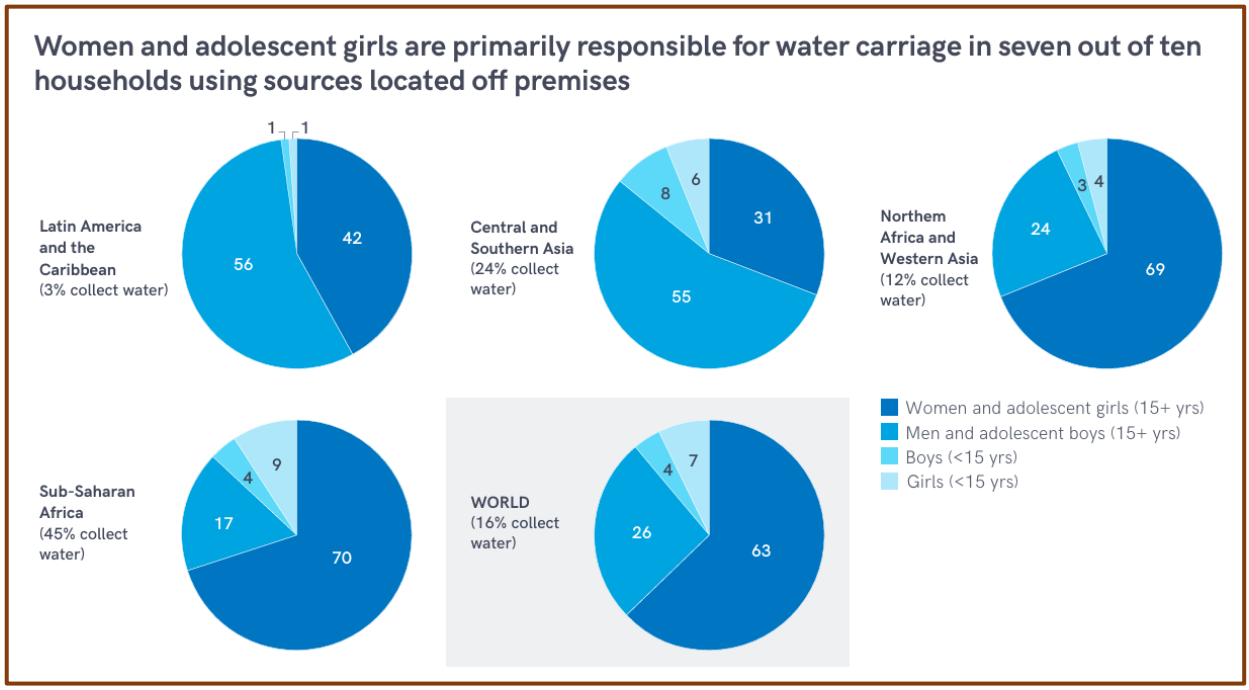

Figure 9. Women and adolescent girls are primarily responsible for water collection in most households using off-premises sources.

Source: WHO/UNICEF Joint Monitoring Programme (JMP), 2023.

4.2. Mauritania illustrates the acute reality of water scarcity:

- ✓ In many urban districts, households still rely on traditional wells due to inadequate infrastructure.
- ✓ Access to water services is a major source of public dissatisfaction; while 32% of Mauritanians report being somewhat satisfied, only 7% say they are very satisfied; six in ten express dissatisfaction or extreme dissatisfaction (Arab Barometer VIII, 2024).

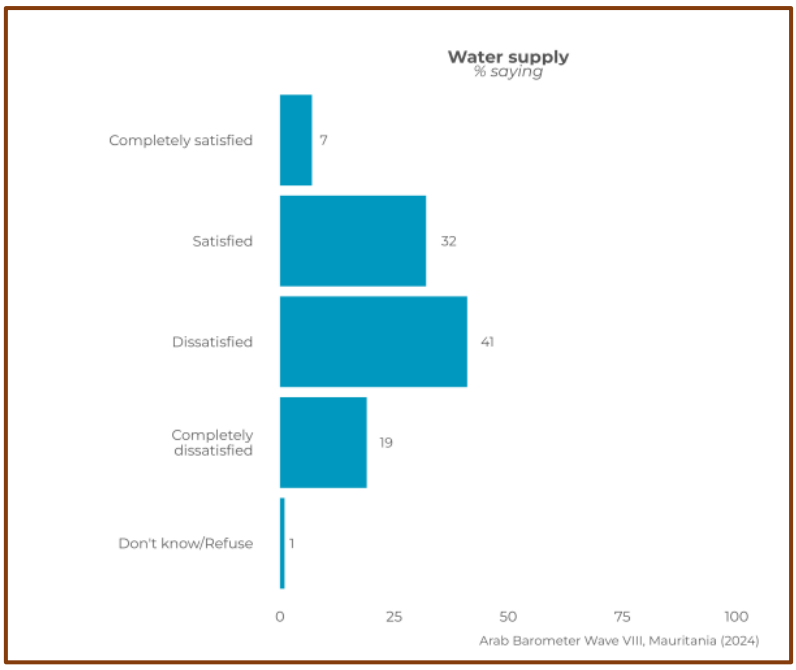

Figure 10. Water Supply.

- ✓ Rising temperatures have worsened the situation: 42% of respondents say their daily life is "considerably impacted," while 32% report being "somewhat impacted."
- ✓ In terms of water scarcity specifically, 49% report being significantly affected, 28% moderately, 17% slightly, and only 4% say not at all (Arab Barometer VIII, 2024).

- ✓ On average, Mauritanians have 20 liters of water per person per day, far below the 50 liters per person/day recommended by the World Health Organization for decent living.

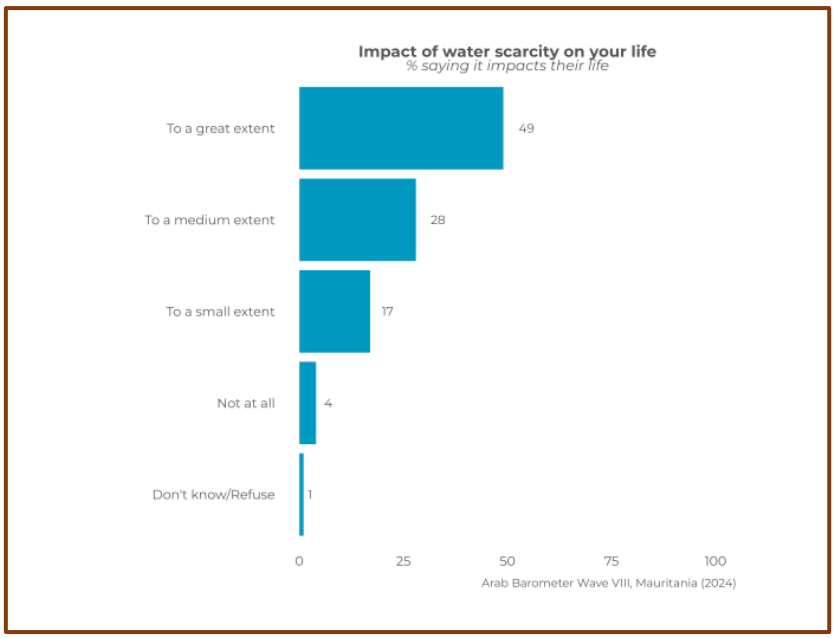

Figure 11. Water Scarcity.

In urban settings like **Nouakchott**, people engage in "**water tinkering**" informal practices such as negotiating with private vendors or adapting small-scale solutions to secure access in the face of shortages and high costs (Vium, 2016).

5. Strategies and Solutions

To face growing water scarcity, different strategies have been identified:

- ✓ **Community-based approaches**: strengthening local water management committees and including vulnerable groups, especially women, in decision-making.

- ✓ **Water conservation policies**: governments encouraging responsible water use through **pricing systems**, water restrictions, and pro-environmental education.

- ✓ **Technology & infrastructure**: investments in water-saving technologies, modern irrigation methods, and improved distribution networks.

- ✓ **Climate adaptation measures**: developing drought-resistant crops, promoting rainwater harvesting, and improving storage systems.

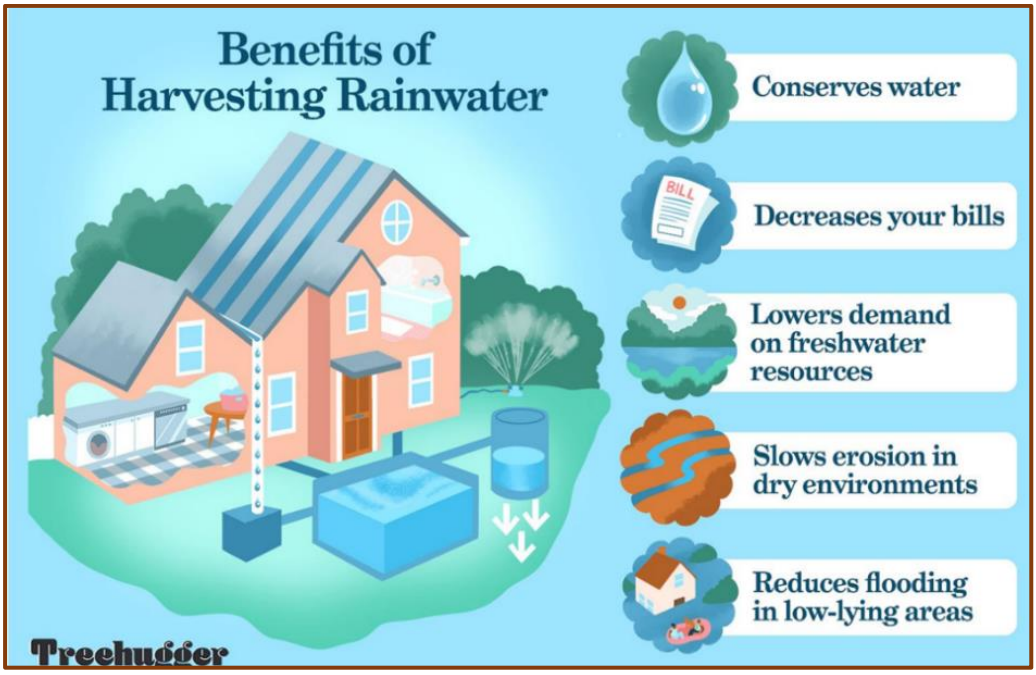

Figure 12. Benefits of Harvesting Rainwater.

- ✓ **International frameworks**: reinforcing commitments under **SDG 6** to ensure safe, accessible, and sustainable water for all.

6. Conclusion:

One of the most urgent issues affecting rural populations, especially in emerging nations, is still water scarcity. The results of this study demonstrate that because of their social and domestic responsibilities, women are disproportionately affected by inadequate access to water.

Women and girls in many rural communities spend a large amount of their day getting water, frequently from dangerous or far-off sources. In addition to putting them at danger for physical harm and health issues, this also restricts their access to social interaction, education, and employment prospects.

Water scarcity's gendered aspect draws attention to systemic injustices. Women bear the immediate effects of inadequate access to water and sanitation, even if men may make decisions and manage resources.

The effects of climate change, which worsen droughts, decrease rainfall, and interfere with conventional water supplies, further exacerbate the situation. Inadequate water governance and infrastructure exacerbate rural households' vulnerability, as seen in Mauritania and other African countries.

As a result, solving water scarcity is a development and gender equality issue as well as an environmental one. Instead of viewing women as passive victims of scarcity, sustainable solutions must acknowledge them as active change agents.

References

Matchawe, C., Bonny, P., Yandang, G., Cecile Yangoua Mafo, H., & J. Nsawir, B. (2022). Water Shortages: Cause of Water Safety in Sub-Saharan Africa. *Drought - Impacts and Management*, *May*. https://doi.org/10.5772/intechopen.103927

Obong'o, B. O., Ogutu, F. O., Hurley, S. K., Okiko, G. M., & Mahony, J. (2024). Exploring the Microbial Ecology of Water in Sub-Saharan Africa and the Potential of Bacteriophages in Water Quality Monitoring and Treatment to Improve Its Safety. *Viruses*, *16*(12), 1–26. https://doi.org/10.3390/v16121897

Barech, S., & Ainuddin, S. (2019). The Impact Of Water Scarcity On Women In Rural Area In Quetta. *Pakistan Journal of Gender Studies*, *18*(1), 129–143. https://doi.org/10.46568/pjgs.v18i1.29

Chauhan, A. (2023). The Impact of Industrial Pollution on Water Quality in India's Major River: An Analytical Study. *Turkish Online Journal of Qualitative Inquiry*, *11*(2), 639–644. https://doi.org/10.52783/tojqi.v11i2.9983

Kaur, P. (2022). "Water Wives: a Harsh Consequence of Water Scarcity for Women in Maharashtra." *International Journal of Research Publication and Reviews*, *July 2022*, 113–117. https://doi.org/10.55248/gengpi.2022.3.7.2

Moayedi, M., & Hayati, D. (2023). Identifying strategies for adaptation of rural women to climate variability in water scarce areas. *Frontiers in Water*, *5*. https://doi.org/10.3389/frwa.2023.1177684

Seri, J. A. E. (2023). Women: guardians of water and cultural link amid drinking water scarcity in Gboguhé Sub-Prefecture, Central-West Côte d'Ivoire. *Discover Water*, *3*(1). https://doi.org/10.1007/s43832-023-00043-z

United Nations. (2022). *A feminist approach to the water crisis recognizes the hugely important role women play in their communities as the main collectors, protectors and managers of water.*

Vium, C. (2016). *Christian Vium ´ d'Aarhus Aarhus University / Universite*. *58*, 243–249.

D&C
ENGINEERING