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Socio-economic Barriers to Subscription, Payment, and Servicing in the Water Sector in Lebanon

Study Report

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1. Executive Summary

Lebanon's water context is rapidly changing, with the country undergoing a multi-layered socio-economic crisis, affecting both institution's capacities to supply services and household's purchasing power. The devaluation of the Lebanese pound, leading to an 162% inflation rate, has reduced income and increased prices for basic needs. The near collapse of the Regional Water Establishments (RWEs) has left them unable to cover operational costs, as expenses have surged while revenues remain low. Energy shortages, with only 2 to 5 hours of electricity daily, have further decreased water availability. In response, municipalities and residents are pushed to revert to negative fallback solutions such as water trucking or unlicensed well drilling, a largely unregulated domain that contributed to outbreaks of Hepatitis A and Cholera.

The Hawkamaa-EU project is a 4-year consortium funded by the European Union and aiming to support water governance and improve the provision of public water and wastewater services for people in Lebanon. Within the framework of the project, LebRelief contracted Information International to conduct the "Socio-economic Barriers to subscription, payment, and servicing in the water sector in Lebanon" assessment.

The research explores opportunities for water policies that promote inclusion of economically vulnerable populations in Lebanon. The potential outcome of the research can form the basis for a more user-inclusive water sector. A survey of 600 households distributed over Akkar, North, Beirut, Mount Lebanon, Baalbek/Hermel, Beqaa, and South and seven focus groups were conducted in each of the governorates to gauge their opinions on the matter.

Key findings highlight the predominant use of the services provided by Water Establishments (WEs) supplemented by purchases from water trucks and private wells. Despite the majority indicating WEs as their primary source, concerns over irregular water supply, high subscription costs relative to income levels and perceived water quality issues emerged as significant barriers to subscription.

Community perceptions and practices regarding water management differ across regions, influenced by factors, notably economic constraints, infrastructure challenges and trust in public versus private sector management. These factors underscore the need for targeted interventions that address localized challenges while promoting sustainable water management practices and equitable access across Lebanon. By analyzing these critical issues, this report aims to provide stakeholders, policymakers, and community leaders with actionable insights to enhance water governance, improve service delivery, and ensure equitable access to clean and reliable water for all Lebanese citizens.

2. Introduction

Lebanon's water landscape is undergoing rapid transformation amidst a complex crisis, driven by severe economic deterioration. The crisis has severely impacted the WASH sector, exacerbating its pre-existing vulnerabilities. Frequent power outages and unstable electricity supply disrupted water pumping and distribution leading to inconsistent water availability and pressure. Ineffective policies, lack of strategic planning, and inadequate regulatory frameworks led to poor management of water resources and infrastructure. Moreover, misallocation of funds and lack of transparency often resulted in delayed projects, substandard construction, and maintenance of WASH facilities.

Institutional capacities of WEs to provide reliable water services have been significantly compromised, paralleled by a sharp decline in household purchasing power. Old pipes, pumps, and treatment facilities require constant maintenance and upgrades that are costly and often delayed due to budget constraints, leading to prolonged service disruptions. Municipalities have increasingly intervened to fill the gaps left by struggling WEs, assuming greater responsibility for water distribution to local communities.

In response to these challenges, the Hawkamaa-EU project- a collaborative effort between the European Union and Lebanese authorities - was developed to strengthen governance and improve public sector transparency and accountability, with a significant focus on WASH services. These efforts are part of a broader strategy to tackle the country's pressing WASH challenges, which have been worsened by economic instability, political issues, and environmental factors. The approach focuses on strengthening institutional capacity, promoting transparency and accountability, and improving service delivery by upgrading existing water and sanitation infrastructure to ensure reliable and safe services.

Lebanon has unveiled a comprehensive 5-Year Recovery Plan aimed at stabilizing and revitalizing critical infrastructure and services, including water supply and mitigating the impact of the crisis on households and communities. This plan outlines several key priorities and actions, including infrastructure rehabilitation and expansion, enhancing water management, securing sustainable financing to support WASH initiatives, promoting innovation and technology as well as developing contingency plans and rapid response mechanisms to ensure the continuity of WASH services during crises.

3. Research Objective and Methodology

A. Research Objective

This study seeks to address an information gap overlooked by previous assessments, specifically by directly asking water right-holders about the barriers they face in subscribing to and paying for public water services. The study focuses on answering the following research questions:

- What socio-economic barriers (financial, physical, legal) prevent right-holders from subscribing to public water services in Lebanon?

- How do right-holders perceive the institutional capacity of Water Establishments (WEs) and other institutions to deliver water?
- What is the right-holders' willingness and ability to pay for services under the new revised tariffs outlined in the five-year recovery plan?

B. Methodology

The research undertook a mixed-methods approach, consisting of structured household (HH) interviews and focus groups discussions (FGDs).

Data collection at the household level uses close-ended data collection tools to help understand the general situation and specific characteristics of households within the population of interest. Only households without subscription but with a WE connection were interviewed. The household survey was conducted from March 20 to April 22, 2024, during which 600 questionnaires were administered across different Lebanese Governorates. The distribution of surveys over the Governorates and areas is detailed in Table 1.

Table 1: Sample Distribution

Governorate	Area	Number of surveys
Akkar	Mhamaaret	40
	Halba	40
Baalbek/Hermel	El Chaab	40
	El Soloh	40
	South Doris	40
Beirut	Mazraa	40
	Achrafieh	40
North	Trablous/Tebbaneh	40
	Qalamoun	20
	Heri	20
South	Saida El-Qadimeh	40
	Ansarieh	40
Beqaa	Qob Elias	40
	Ali Nahri	40

	Barr Elias	40
Mount Lebanon	Choueifat – Al Omara	12
	Choueifat – Qobeh	13
	Choueifat - Amrousieh	15
Total		**600**

Focus Group Discussions (FGDs) are used to triangulate and validate trends identified in the initial phase of data collection and provide deeper insights by capturing the social dynamics and interactions within the group. FGDs validate survey findings and identify any gaps in the identified barriers. The study conducted seven FGDs, with 1-2 held in each governorate. FGDs gathered 8 to 10 participants and included stakeholders, mukhtars, municipality public servants, activists in the water sector and members of the community. The list of FGDs and their locations is detailed in the Table 2.

Table 2: FGD Locations

Governorate	Location
Baalbek/Hermel	Douris
Akkar	Halba
North	Tripoli/Mina
Beqaa	Ali Nahri
South	Saida
Mount Lebanon	Il offices (Beirut)
Beirut	Il offices (Beirut)

C. Challenges and Limitations

The primary challenge during the survey implementation was selecting the areas to be covered; six listed areas were substituted with areas of similar population density had a 100% subscription rate to WEs. The research methodology required some households to be connected to the WE and who don't pay subscription fees, or that households had disconnected from the WE, having stopped their subscription within the past three years. Thus, the initial sample provided by LebRelief was modified after the field pilot

surveys. Moreover, access issues to Bourj El Barajneh led to its replacement with Ali Nahri.

4. Key Findings

A total of 2,535 members permanently resides in the 600 surveyed households, averaging 5 members per household. 50.1% of family members are male, while 49.9% are female with an average age of 30 years. 28.8% of the interviewed households have a total income between 15 and 30 million Lebanese Pounds, while 28.5% have an income ranging from 6 to 15 million. Additionally, 23.3% of households reported an income exceeding 30 million.

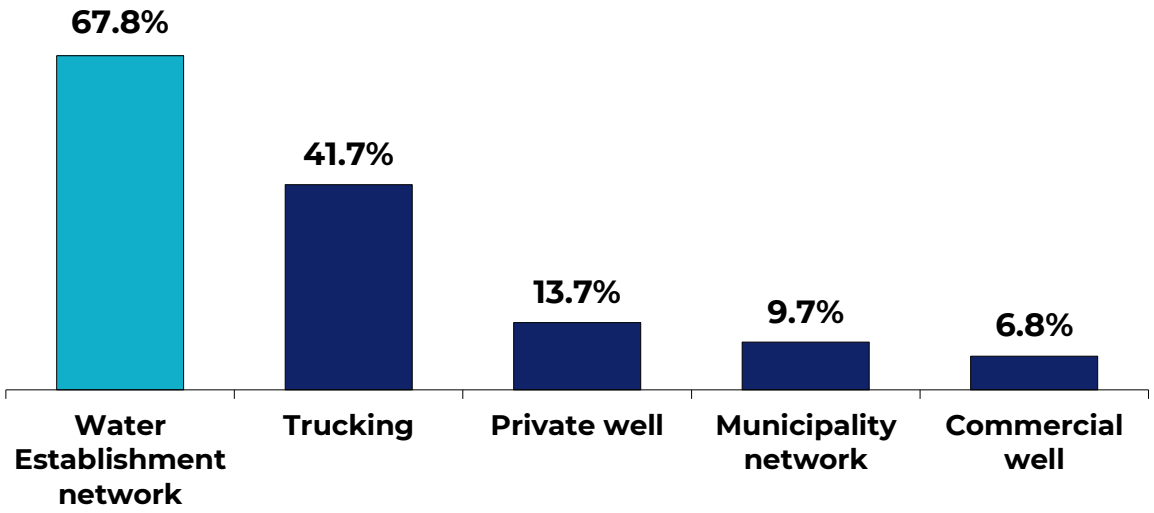
A. Water Sources

a. Primary Water Source

67.8% of surveyed households receive water from WEs, while 41.7% purchase water from trucks. 13.7% of households have their own wells, 9.7% receive water from the municipality network, while 6.8% buy water from commercial wells (Graph 1).

All surveyed households in the South receive water from WEs, followed by 95% in Mount Lebanon, 85.8% in Baalbek-Hermel, and 77.5% in Beirut. Additionally, 66.3% of residents in Beirut also purchase water from trucks, as do 60% in Baalbek-Hermel and 55.8% in the Beqaa region. In the North, 50% of residents have their own water wells, while 55% of households in Akkar are connected to the municipal network. FGD participants in Akkar reported that state artesian wells are their main water source, with water being pumped from these wells to village tanks and distributed to households through new public water networks developed by the municipality, NGOs or benefactors in related villages.

Graph 1: Primary Water Source

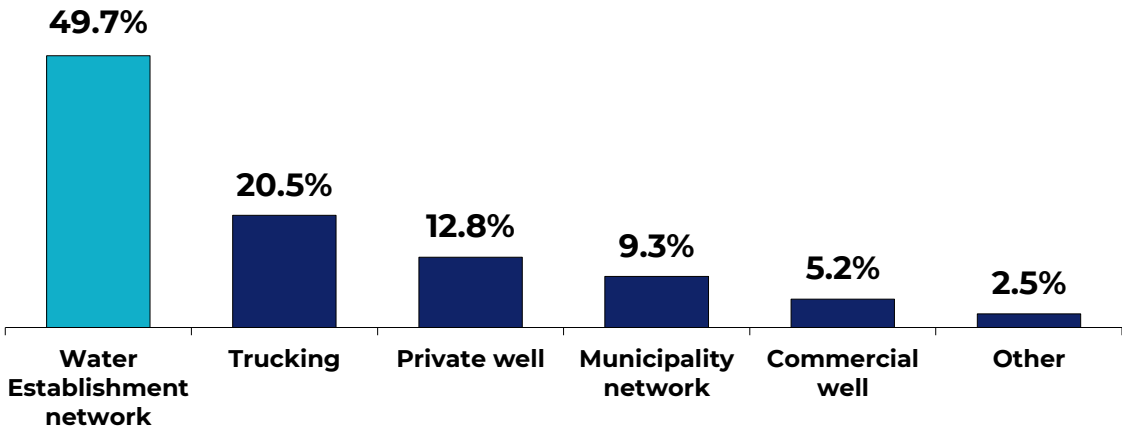


b. Most Used Water Source

Almost half of households (49.7%) mainly rely on water supplied by WEs, while 20.5% rely on water delivered by trucks. 12.8% primarily use water from their own wells and 9.3% rely on water provided by the municipality network (Graph 2).

Most of the South (91.3%) and Mount Lebanon (90%) households rely on water from the Water Establishment, followed by 65.8% in Baalbek-Hermel. In Beirut, 53.8% of residents rely on Wes, while another 33.8% purchase water from trucks. In Beqaa, 35.8% of residents primarily rely on WEs, compared to 36.7% who rely on water trucking. In Akkar, 52.5% of households use water provided by the municipality, whereas 47.5% of North residents extract water from their own wells.

Graph 2: Most Used Water Source



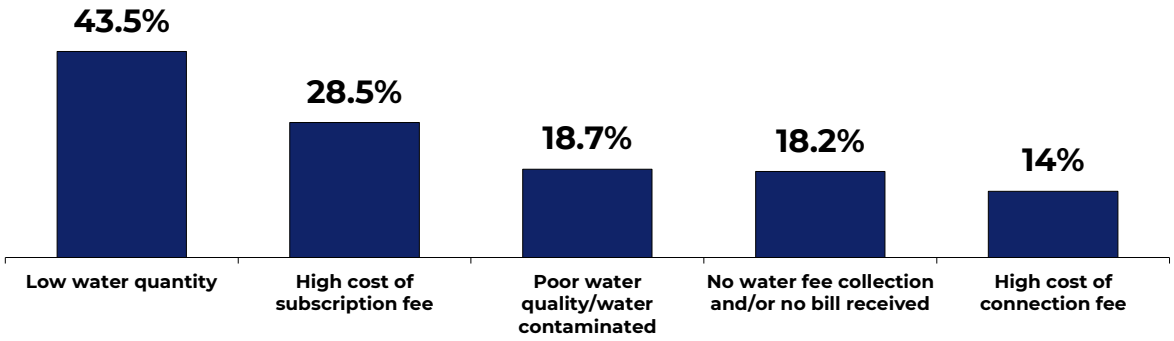
Moreover, 32.8% of the surveyed households have a water meter and another 59.7% reported having a water gauge installed.

B. Barriers to Public Water Subscription in Lebanon

The primary barriers subscribing to the Water Establishment network are irregular and insufficient water delivery, as reported by 43.5% of respondents and highlighted in focus group discussions. The high cost of the annual subscription, relative to per capita income, ranks as the second major barrier, especially in the context of limited job opportunities and the country's worsening economic situation, with 28.5% unable to afford the subscription fee and 14% unable to pay the connection fee. Poor water quality

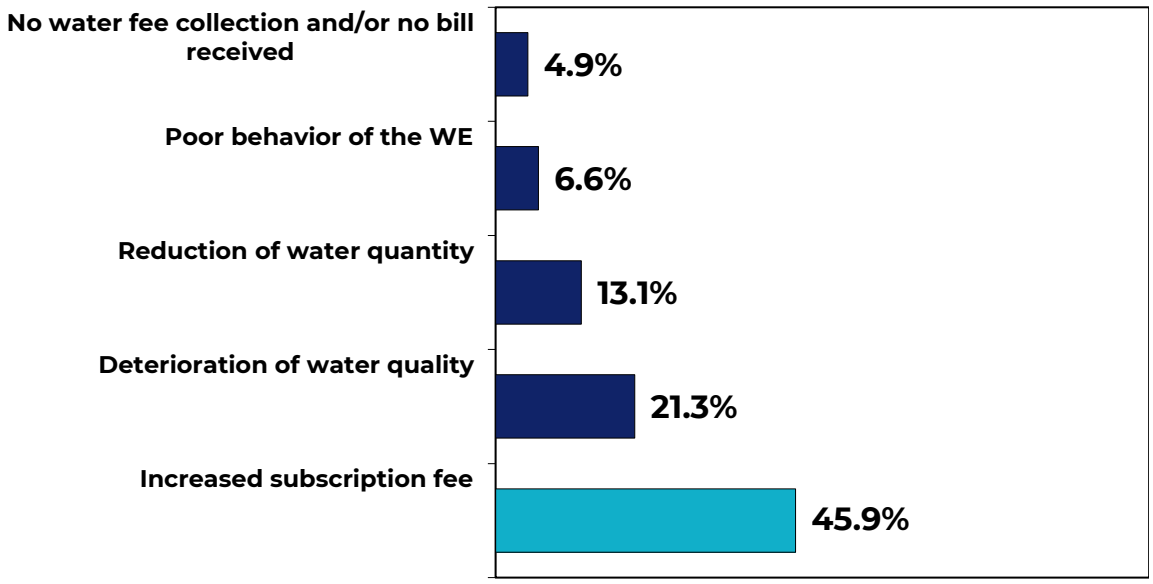
or contamination of WE water ranks third at 18.7%, followed by issues such as the absence of water fee collection or non-receipt of bills (Graph 3).

Graph 3: Reasons Behind Non-Subscription



Out of the households that paid the subscription fee in 2021 or 2022 and have currently cancelled their subscription, 45.9% attributed their decision to increased prices. Additionally, 21.3% cited declining water quality, 13.1% reported reduced water supply, 6.6% mentioned poor behavior by the WEs, and 4.9% noted issues such as non-collection of water fees or non-reception of bills (Graph 4).

Graph 4: Reasons for Subscription Cancellations



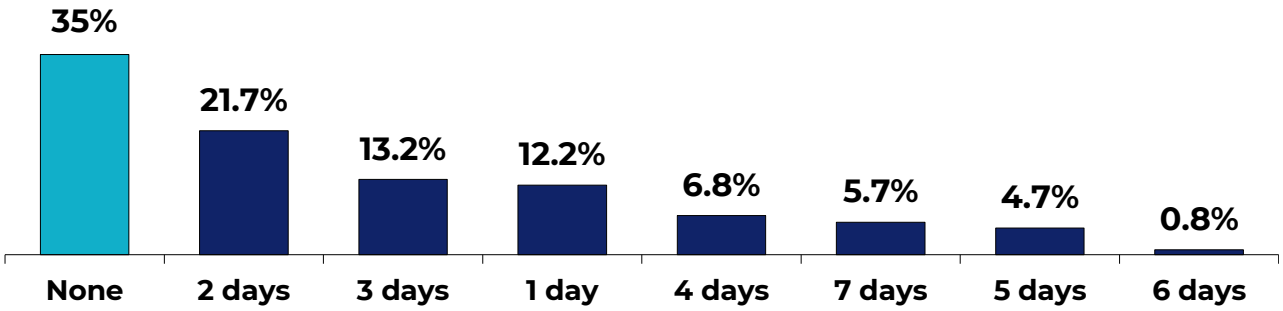
Participants in focus group discussions highlighted additional barriers, including the inexistence of a public water network in newly established areas and neighborhoods. Participants mentioned a cultural barrier related to people's attitudes towards water subscription fees, where some expect to benefit from services without payment. These views are rooted in beliefs such as "defrauding the government is permissible", a form of water theft, or "Halal" as stated by participants, reflecting a cultural acceptance of accessing services without payment. Practices mentioned include illegally connecting water from one property to another or using water from the network without paying.

Participants across all governorates cited insufficient water delivery to their households; 68.8% in the North, 57.5% in Beqaa, 56.7% in Baalbek-Hermel, and 48.8% in Beirut. Moreover, in the South, 56.3% of respondents mentioned the high cost of the fee, with 41.3% also unable to pay the fee. Furthermore, 77.5% of Mount Lebanon residents attributed their non-subscription to the absence of water fee collection or not receiving a bill at all. Additionally, 53.8% of North residents and 30% of Beqaa residents reported dissatisfaction with water quality or contamination.

a. Weekly Water Supply Frequency from the WE Network (Past Month)

35% of households reported not receiving water from the WE network in the past month. Another 21.7% of respondents reported receiving water from the WE network twice a week in the last month, while 13.2% received it for 3 days per week (Graph 5).

Graph 5: Weekly Water Supply Frequency from the WE Network



Most households in Akkar (77.5%) and the North (76.3%) did not receive water from the WE network in the last month. Meanwhile, 62.5% of households in Mount Lebanon and 53.8% in the South reported receiving it 2 days per week.

b. Average Daily Hours of Good Quality Water (Past 3 Months)

Good quality water is clean water, safe, and suitable for its intended use. It is free from bacteria that cause illness, free from unusual smells or flavors as well as free from suspended solids, sediments, and turbidity.

When asked how many hours of good quality water from all water sources households had daily in the previous three months, 45% of respondents stated they had none. On the other hand, 42.3% of respondents reported receiving 1-4 hours of good quality water and a smaller proportion of 7.8% received 5- 10 hours of good quality water during the same period. Merely 0.8% of respondents reported having access to good quality water for 20 to 24 hours each day during that timeframe.

Specifically, 30.7% of respondents receiving water from WE reported getting zero hours of good quality water daily over the past three months, while 54.1% received 1-4 hours of good quality water per day during the same period.

Table 3: Average Daily Hours of Good Quality Water from WE for the Past 3 Months

In the past 3 months, how many hours of good quality water did your household receive daily from the WE?	%
None	**30.7%**
1 - 4	**54.1%**
5 - 10	**9.3%**
11 - 14	**2%**
15 - 19	**2%**
20 - 24	**1%**
Don't know	**1%**
Total	**100%**

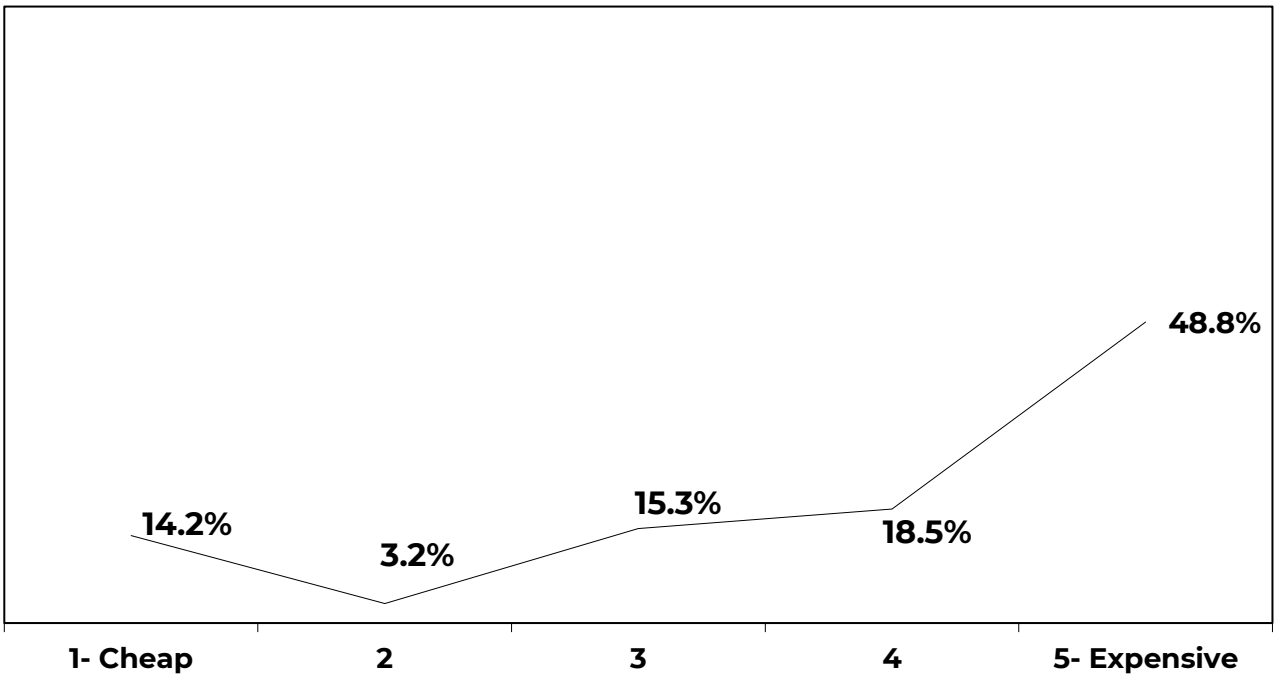
c. Community Perceptions of Water from the Water Establishment

Findings highlight the main barriers for the non-subscription, notably high prices of the water, insufficient quantity and low quality.

Price

Nearly half of the interviewed households (48.8%) reported that the price of water from the WE network is expensive. Additionally, 18.5% found it somewhat expensive, and 15.3% rated it as moderately expensive. This perception was echoed in nearly all focus group discussions, where participants emphasized the high cost of the subscription fee. In contrast, only 14.2% considered it to be cheap (Graph 6).

Graph 6: Subscription Fees for Water Supplied by the WE Network

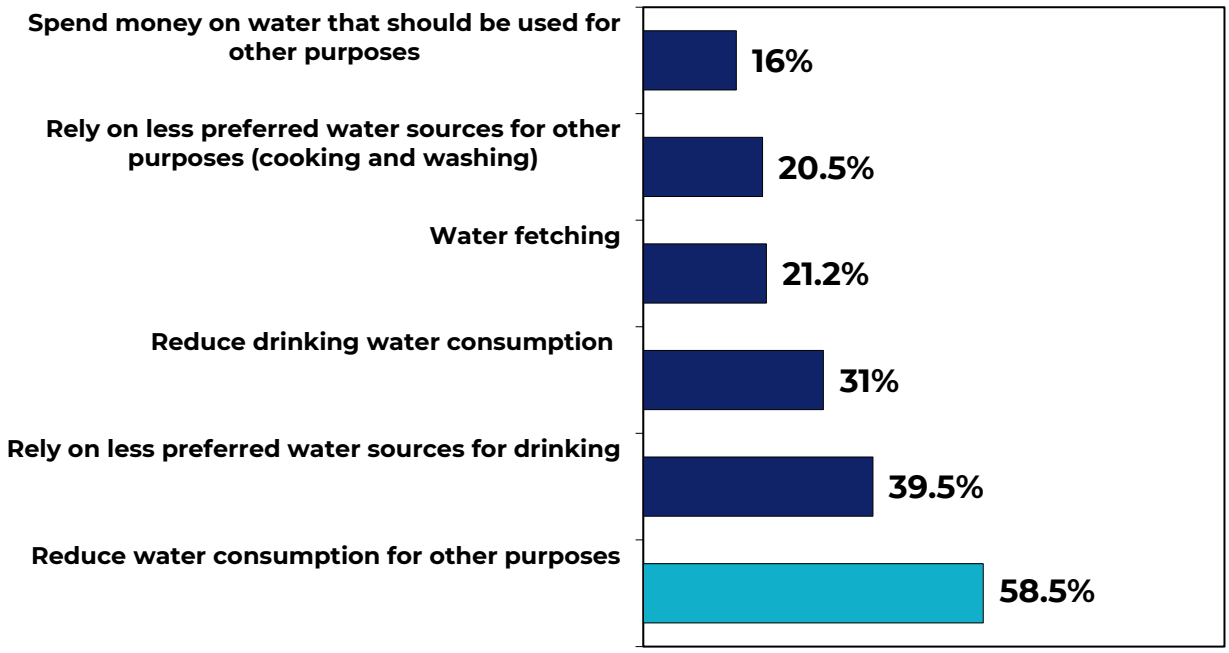


Most respondents in both the South (97.5%) and the North (96.3%) view the cost of WE water as expensive, with 60% of residents in Beqaa and 80% in Baalbek-Hermel sharing the same view. In Akkar, 48.8% of respondents find WE water affordable. Power outages and unstable electricity disrupted water distribution led many to switch to the public network despite low water pressure.

In Beirut, 41.3% of residents rate the cost of WE water as moderate, while 40% find it expensive. Beirut FGDs noted that subscribing to the WE network is more cost-effective than relying on expensive alternative water sources. In contrast, 75% of respondents in Mount Lebanon find it cheap, with FGDs confirming that the WE subscription fee is more affordable than buying water from other sources, as water trucking costs have risen due to fuel price fluctuations.

The financial burden of WE subscription is also reflected in how households cope with water scarcity. More than half reported reducing domestic water use, notably bathing, and around 40% rely on less preferred water sources for drinking. Additionally, 31% said they reduced their consumption of drinking water, 21.2% fetch water from farther away, and another 21.2% use less preferred sources for cooking and washing. Only 16% reported spending money on water that should be used for other needs, highlighting the financial strain on respondents to switch to paid water sources (Graph 7).

Graph 7: Adaptation Strategies in Response to Water Shortages



Pressure

38% of surveyed households consider the water pressure from the WE network to be poor, describing it as weak and inconsistent, especially in multi-story buildings. Another 29.7% rated it as moderate.

When looking at results by governorate, 90% of households in the North described the WE network's water pressure as poor, followed by 51.3% in the South and 48.3% in Beqaa. In Beirut, 77.5% of residents rated the water pressure as moderate. Focus group participants on Beirut noted that water pressure is negatively affected by frequent power outages and the building's proximity to the water source - the closer the building, the lower the pressure, while buildings farther away often have better pressure. Factors like high demand, prioritization of distant buildings, obstructions in older infrastructure, and elevation differences also contribute to lower pressure in closer buildings.

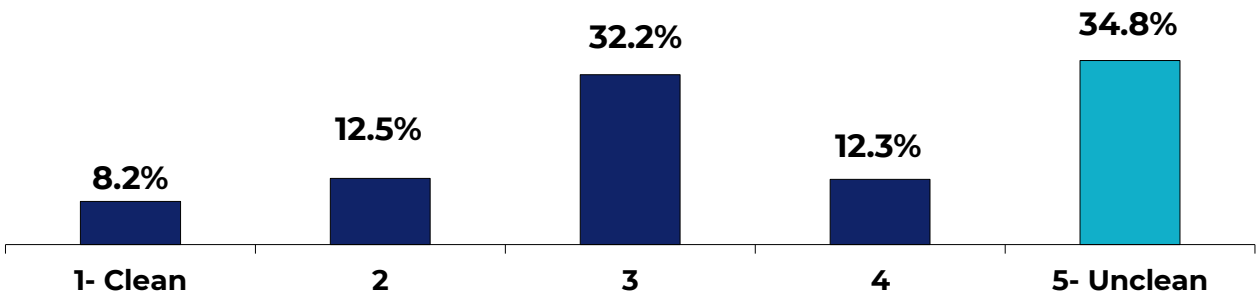
In Mount Lebanon, 70% of residents also rated the water pressure as moderate. Focus group participants mentioned that water pressure varies due to building construction and location. Buildings closer to the water source may experience lower pressure due to higher demand, pressure-reducing valves, and older infrastructure. Lower elevation buildings near the source might also receive less pressure compared to higher elevation buildings farther away.

In Akkar, 55% of residents rated the WE water pressure as good. Focus group participants highlighted the benefits of subscribing to WE, including consistent access to clean water and strong water pressure. This positive perception may be due to some confusion between the municipal and WE network, as various municipalities were managing the WE network in different areas of Akkar.

Cleanliness

Only 8.2% of respondents described WE water as clean—clear, colorless, free of visible particles or turbidity, and without any unpleasant odors or off-flavors. In contrast, 34.8% described it as unclean, noting issues like cloudiness, turbidity, unpleasant odors, and visible debris (Graph 8).

Graph 8: Water Cleanliness of the WE network

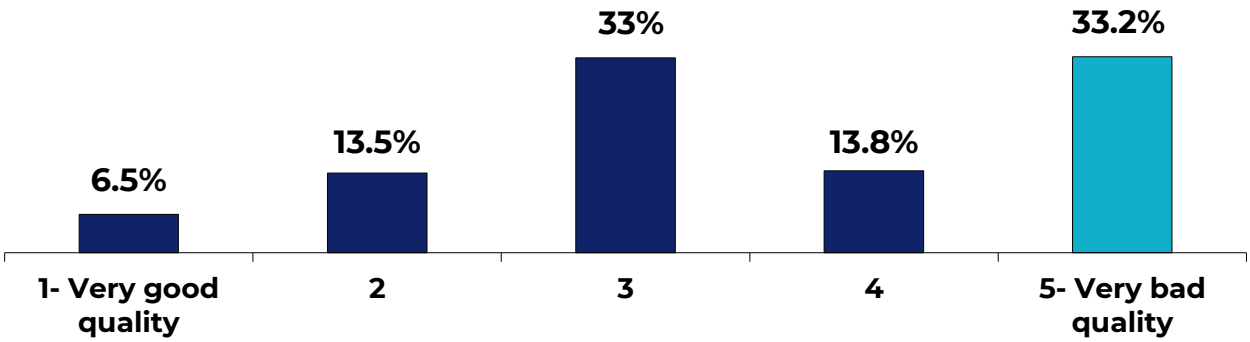


Most surveyed households in the North (97.5%) consider the WE network's water source to be unclean. Similarly, 45.8% of households in Beqaa and 41.3% in the South share this view. However, participants in the South FGD mentioned that while they perceive the WE water as clean, it remains undrinkable due to bacteria that can cause illnesses. On the other hand, 50% of residents in Akkar described the WE water as generally clean, and FGD participants highlighted the benefits of subscribing to WE for ensuring a fair supply of clean water.

Quality

Good quality water is perceived as being free from harmful substances like heavy metals, bacteria and parasites. It is clear water without turbidity and has no unusual color or odor. Responses were almost equally split between households who perceive the quality of the WE network water as very bad and those who rate it as moderate (33.2% and 33% respectively). Only 6.5% of respondents regard the WE water quality as very good (Graph 9).

Graph 9: Water Quality of the WE network

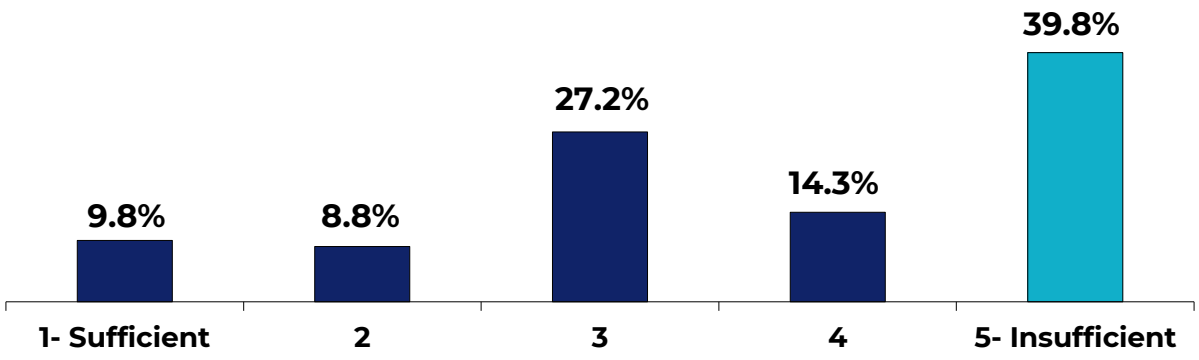


In the North, 97.5% of households describe the quality of WE network water as very bad, compared to 43.3% in Beqaa. In contrast, 72.5% of households in Beirut and 75% in Mount Lebanon perceive the water quality as average. Participants in the Beirut FGD noted that while the water quality from the source is decent, the lack of proper filtration in residential buildings affects the quality of the water they receive. In the Mount Lebanon FGD, some participants had a positive view of WE water, highlighting its cleanliness and consistency especially in their village homes. In contrast, some mentioned not benefiting from WE water despite being subscribed. Meanwhile, 41.3% of households in Akkar, along with FGD participants, rated the water quality as good or very good.

Quantity

39.8% consider the amount of water they receive from the WE network as insufficient for domestic consumption, while 27.2% rate it as average, with only 9.8% reporting it to be sufficient (Graph 10).

Graph 10: Water Quantity the WE network



In the North, 95% of respondents, and 50.8% in Beqaa, reported an inadequate water supply from the WE network. Beqaa focus group participants noted that many residents choose not to subscribe to the WE network due to inconsistent water delivery, with some neighborhoods lacking any connection. This problem is often due to new constructions not yet connected to WE or remote locations.

In East Zahle, the water supply is particularly low, forcing some residents to connect to neighboring villages' water networks. Many people avoid subscribing to the WE network due to low water quantity and opt to purchasing private tanks.

In contrast, 48.8% of respondents in Akkar reported sufficient water supply from the WE network. Focus group participants in Akkar emphasized the benefits of subscribing to the WE, including reliable access to affordable water. The cost of WE water is valued during frequent power outages, as operating generators to extract water from artesian wells has become very expensive due to the fuel crisis, prompting many to switch to the public network.

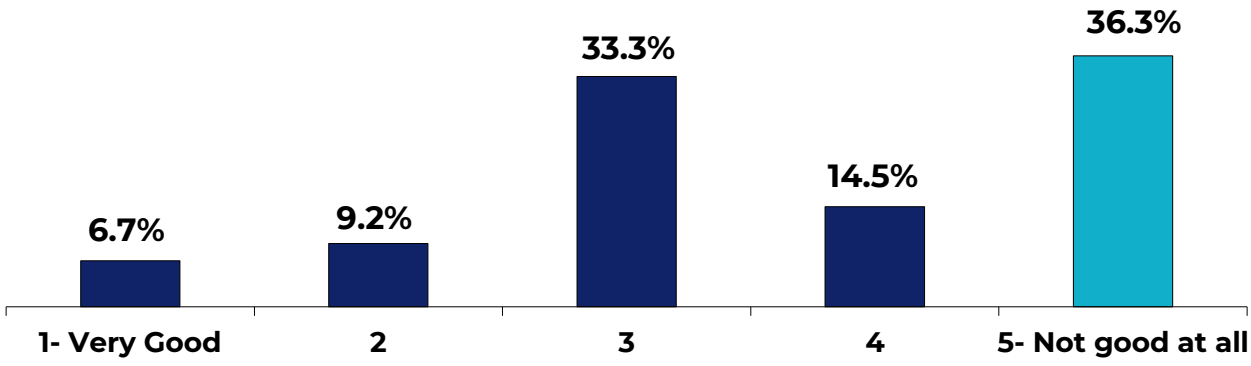
In Beirut and Mount Lebanon, 65% of residents rated the quantity of WE water as moderate. Participants in Mount Lebanon's focus group highlighted that issues with the electrical supply often reduce water quantity due to electricity challenges.

Reliability

The reliability of water refers to its consistent availability and adequacy for intended purposes over time. It encompasses the dependability of water sources, systems, and infrastructure to deliver enough water that meets specified quality standards without

interruption or failure. Close perceptions of water reliability were reported among households, with 36.3% rating the reliability of the water they receive from the WE network as not good at all and another 33.3% rating it as average. Only 6.7% rated it as very good (Graph 11).

Graph 11: Reliability of Water Supply from the WE Network

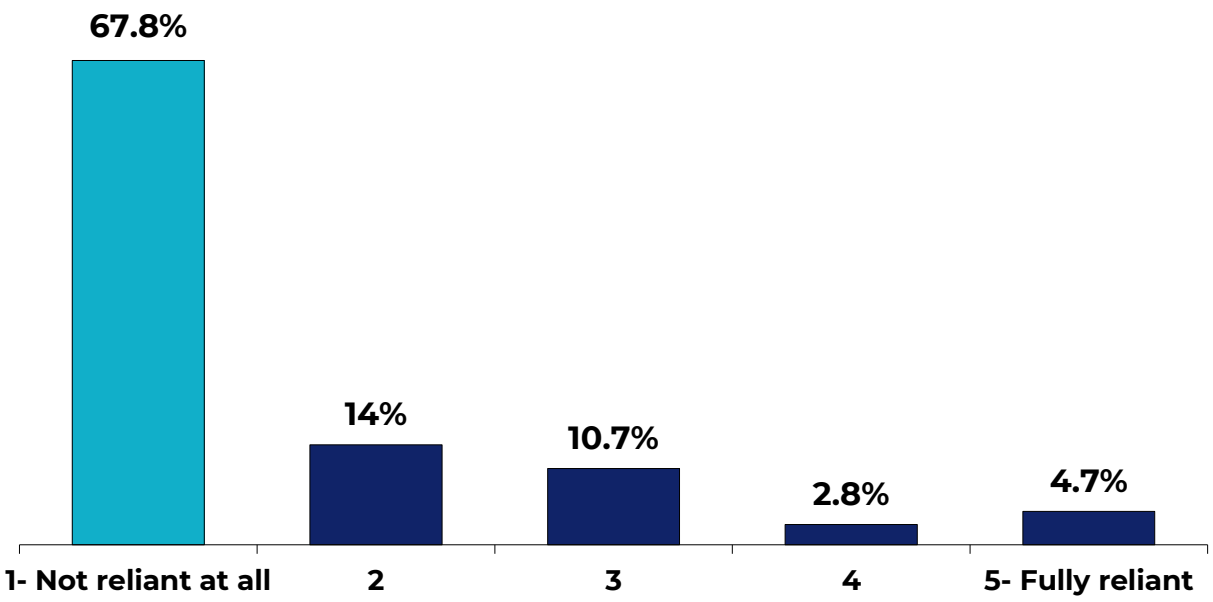


In the North, the most critical assessment of WE water reliability was observed, with 95% rating the reliability of their water from the WE network as very poor. In Beirut and Mount Lebanon, most residents (76.3% and 75% respectively) rated the reliability of WE water as average. Participants in the Beirut focus group discussions noted that the reasons to non-subscription to WE are the perceived reliability of nearby illegal commercial networks. The unauthorized distribution systems, which supply water to homes upon request, are a primary water source for many residents, especially in the summer when WE water availability is inconsistent.

Level of Trust in WE Employees

When asked about their trust in WE employees to resolve problems with the public water supply, 67.8% of households said they do not rely on them at all. Only 4.7% of respondents stated that they fully rely on WE employees (Graph 13).

Graph 12: Level of Trust in WE employees in Solving Issues



In the North, 100% of respondents expressed complete distrust in WE employees' ability to resolve public water supply issues, finding them entirely unreliable. Participants in the Tripoli focus group mentioned that attempts to contact WE's maintenance service often led to unanswered calls, although in-person visits to WE offices sometimes resulted in cooperation from some departments.

High levels of distrust were also reported in Beirut (90%), Akkar (80%), the South (67.5%), Beqaa (56.7%), and Baalbek-Hermel (52.5%). In contrast, 42.5% of residents in Mount Lebanon expressed full reliance on WE employees, with an additional 35% rating their performance as average. Focus group participants on Mount Lebanon noted that while some employees were diligent, others responded selectively or only when having a personal connection with the customer.

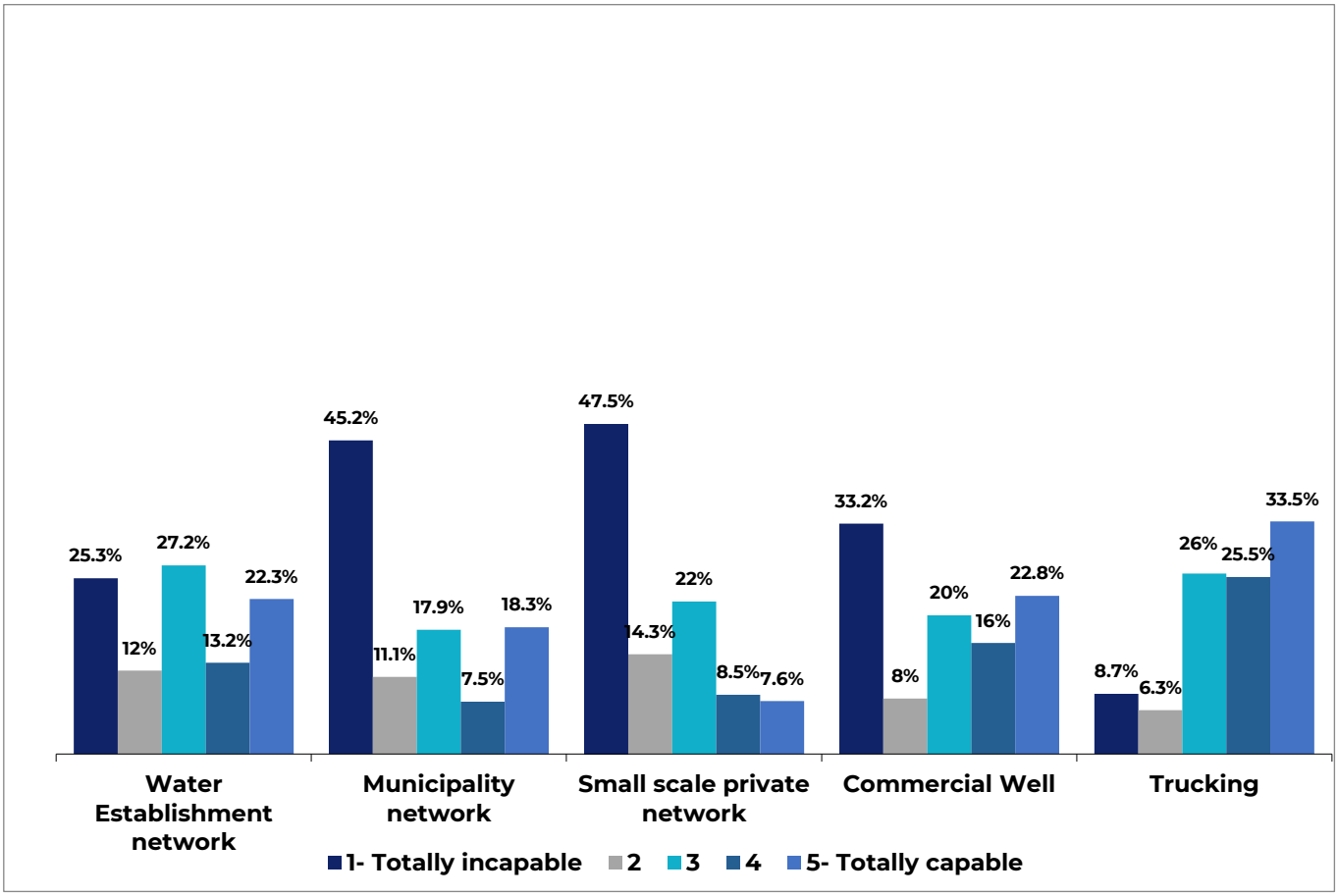
D. Capacity of Water Sources to Supply Household Needs

Findings on WE network's capacities highlight varying perceptions: 27.2% of respondents consider it moderately capable to supply water, 25.3% rate it as totally incapable, and 22.3% view it as totally capable. Trucking is the most trusted water source, with 33.5% rating it as totally capable, followed by commercial wells at 22.8%. In contrast, small-scale private water networks and municipal networks are often seen as totally incapable, with 47.5% and 45.2% of respondents, respectively (Graph 13).

Negative perceptions of municipal and private water networks stem from concerns regarding efficiency, reliability, and water quality. Municipalities are perceived as

struggling with outdated infrastructure, while issues such as corruption can result in diverted funds and inadequate maintenance. Private networks are often viewed unfavorably for their higher water prices, which can make them less affordable for many residents.

Graph 13: WE Network's Capacity to Supply Households



E. Alternative Water Sources to Water Establishment Subscriptions

Given the diverse topography and varying water availability across these areas, each region has specific recommendations and respective associated challenges regarding water sourcing (Table 4).

Table 4: Alternative Water Sources and Associated Challenges by Governorate

Area	Suggested Alternative	Challenges
Beirut	Private commercial artesian networks	Water salinity
	Water from cisterns	
Mount Lebanon	Private wells	Water salinity
	Artesian wells	
Beqaa	Unauthorized resource use	Drop in groundwater levels straining the already fragile water infrastructure
	Private wells and buying disposable water for use	
South	Water from cisterns	Water quality
	Private artesian wells	
Tripoli	Wells	Water pollution and salinity
	Water from cisterns	
Akkar	Artesian wells	Contamination risk, impact on surface water, sinking of the ground surface, interference with neighboring wells

In Beirut and Mount Lebanon, private artesian networks and wells are recommended alternatives, though both face salinity issues. In Beqaa, unauthorized resource use and private wells strain fragile infrastructure, while the South relies on cisterns and private wells, struggling with water quality. Tripoli residents also suggest wells and cisterns but deal with pollution and salinity. In Akkar, artesian wells are recommended but come with risks like contamination and ground subsidence.

F. Cooperating With Private Sector Companies as a Solution

Attitudes towards water management vary significantly across different regions of Lebanon, according to focus group discussions, as per the table below (Table 5).

Table 5: Private Sector Cooperation by Governorate

Area	Cooperation with Private Sector Companies
Beirut	Lack of private-public cooperation in water management
Mount Lebanon	WE management should remain in the public domain and strengthen partnerships with municipalities
Beqaa	Privatizing WEs for effective monetary collection, distribution, and maintenance
South	Strengthening WE's capacity and minimizing reliance on the private sector
Tripoli	Potential partnerships between local NGOs and private sector associations are seen as beneficial for community engagement and awareness-raising initiatives
Akkar	Trust in private sector management of water networks: improve fee collection, maintenance, and subscription processes

In Beqaa and Akkar, support for privatization or private sector involvement is prominent to improve fee collection and maintenance efficiency. Conversely, Mount Lebanon and the South advocate for maintaining public control and strengthening WEs, favoring public management with municipal partnerships. Tripoli sees benefits in NGO-private sector partnerships focused on community engagement and awareness. In Beirut, the

lack of private-public cooperation in water management highlights the potential for increased subscription rates through civic engagement efforts.

G. Affordability of New Revised Tariffs

In 2023, the Ministry of Energy and Water (MoEW) in Lebanon, with support from the European Union and UNICEF, launched the Water Sector Recovery Plan to rehabilitate water infrastructure and improve water quality amid ongoing crises. As part of this plan, the Ministry plans to increase water fees.

Respondents were asked if they would pay various amounts for different levels of water service (2, 6, 12, or 24 hours per day). Most were willing to pay 100,000-150,000 LBP per month, though 27.3% refused to pay for just 2 hours of daily service, and 17.5% refused for 6 hours. When calculated annually, most respondents who agreed to pay 100,000-200,000 LBP per month were willing to pay the same rate. Higher refusal rates were noted for larger amounts, as many could not afford them. Regarding yearly subscriptions, about 84-86% of respondents were willing to pay, with the highest acceptance for subscriptions of 6,600,000 LBP (100%) and 1,800,000 LBP (97.6% to 100%).

5. Conclusion

Regional variations highlight differences and ongoing challenges in the provision of consistent and reliable public water supply. For instance, municipal networks and state artesian wells in Akkar are crucial for water distribution, showing localized responses to water scarcity. In the South, all households rely solely on WE, while in Beirut, many residents use trucked water as a supplement.

Primary barriers to subscribing to WE include irregular water delivery, high subscription costs, and poor water quality. Economic difficulties, along with high fees for subscriptions and connections, discourage many households from joining the WE network. Additionally, cultural attitudes towards defrauding the government and the prevalence of illegal water connections further weaken the public water system.

Overall, perceptions of WE services are unfavorable. Many households find the cost of WE water high and the quality and quantity insufficient. Trust in WE employees is notably low, with many respondents expressing doubts about their ability to resolve water supply issues. This lack of confidence is exacerbated by inconsistent service and poor customer service experiences.

Despite widespread dissatisfaction, many households are willing to pay for improved water services, provided that the quality and reliability are guaranteed. However, financial constraints mean that a significant number of households cannot afford higher fees. This indicates that plans to increase water tariffs must be accompanied by clear improvements in service delivery to gain public acceptance and ensure affordability.

6. Recommendations

The following recommendations address the survey's multifaceted challenges, aiming to enhance affordability, reliability, quality, and trust in Lebanon's water supply system

for sustainable and equitable access. The following recommendations, based on research findings, aim to drive positive outcomes for water management. The report should be widely disseminated, with clear consultative plans for stakeholders to implement the recommendations.

1. **Improve water supply reliability and quantity and adopt Integrated Water Resources Management (IWRM):**

    - **Invest and modernize infrastructure:** WEs must upgrade and expand water distribution systems, particularly in regions like the North and Beqaa to reduce leaks and inefficiencies.
    - **Conduct regular maintenance and upgrades:** Establishing long-term funding mechanisms to ensure consistent maintenance and upgrades of water systems, especially in underserved areas.
    - **Enforce construction laws:** Enacting laws that require building owners to install water meters. This allows the monitoring and management of water usage and ensures fair distribution and reduces wastage.
    - **Address regulatory barriers:** Reviewing and revising existing water resource management laws to ensure they are up-to-date and enforceable. Removing outdated or conflicting regulations and educating the public and stakeholders about the importance of compliance with these regulations.
    - **Increase supply hours:** Given that respondents are willing to pay for more water supply, a phased approach to extend water supply hours daily could be beneficial.

2. **Address affordability concerns:**

    - **Subsidization or financial support:** To address the high perceived cost of WE water, exploring options for subsidies or financial assistance would reduce subscription fees for low-income households.
    - **Transparent billing and pricing:** Providing clear information on how fees are calculated and what services are included can improve public perception and alleviate worries about hidden charges.

3. **Enhance water quality and safety:**

    - **Water treatment and monitoring:** Investing in advanced water treatment technologies and establishing rigorous monitoring systems to ensure high water quality and safety standards.
    - **Public Awareness Campaigns:** Launching campaigns to educate the public on the importance of clean water, conducting outreach programs to promote water conservation practices and encourage responsible water use behaviors.

4. **Customer service and trust building:**

    - **Improve responsiveness:** Enhancing the responsiveness of WE employees by establishing efficient customer service channels and providing adequate training.

- **Build community trust:** Fostering transparency and accountability by engaging with communities through regular updates, municipal meetings, and feedback sessions.
- **Implement smart meters:** Introducing smart meters in buildings and houses to enhance collection, subscription management, and billing efficiency.
- **Explore Public-Private Partnerships (PPP):** Developing partnerships with NGOs, local associations, and the private sector to improve service delivery, fee collection, and maintenance. Adapting successful models from other regions to the local context, as demonstrated in Zahle.
- **Promote responsible water use:** Conduct outreach programs to encourage water conservation and responsible use behaviors will enable effective resource management and promote sustainable practices.