Enhancing Access to Safe Drinking Water in Northwest Syria (**EWB-N**)

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In-depth Needs Assessment

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“Enhancing Access to Safe Drinking Water in Northwest Syria (EWB-N)”

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Executive Summary

This report provides a detailed assessment of the water situation in Azaz district, Northern Aleppo, Syria, conducted between February and March 2024. The primary objectives were to identify challenges within the water sector, assess water quality and accessibility, and quantify communities facing difficulties in accessing safe drinking water. Data collection methods included key informant interviews (KIIs) and secondary sources, with tools developed collaboratively by Indicators and Field Ready Turkiye Organization.

The country continues to grapple with multiple crises, including conflict, economic instability, and natural disasters. These factors have exacerbated existing challenges in the water sector, leading to water scarcity, deteriorating infrastructure, and increased reliance on unsafe water sources.

In Azaz District, the analysis reveals significant gaps in meeting basic water requirements, with per capita water allocation (22 L) falling far below minimum standards (35 L). Operational water stations (56) can't meet the water needs of population in Azaz district and face continuous maintenance issues, resulting rely on unsafe alternative water and health risks due to quality concerns related to the sediments and impurities (dust, sand, etc.). Moreover, waterborne diseases are prevalent (more than 50K cases in 2023), underscoring the urgent need for improved water quality management and sanitation practices.

Key stakeholders involved in water provision include the Water Directorate, local councils, NGOs, and camps management. However, the collaborative endeavors of various stakeholders are falling short in addressing the increasing demand for drinking water, primarily due to funding gaps and the absence of sustainable solutions.

In terms of expertise, there is a shortage of specialized engineers and technicians capable of managing water stations effectively, emphasizing the need for capacity building. While most equipment for water station operation is available locally, certain supplies and spare parts remain inaccessible, highlighting the necessity of enhancing the capabilities of local suppliers.

Overall, there is an urgent requirement for the rehabilitation or construction of new safe water filtration stations/systems in Azaz to adequately address the escalating demand for clean water and to improve water quality. The rising incidence of Waterborne Diseases (WBDs) underscores the necessity for such interventions. Moreover, there is a pressing need for locally sourced alternative spare parts and supplies, as well as skilled personnel capable of independently operating and maintaining water filtration systems. This strategic approach not only reduces costs but also promotes the sustainability of water provision efforts. By investing in infrastructure upgrades, local capacity building, and the local supplies, it can effectively address the water crisis in Azaz and ensure the long-term availability of safe drinking water for the community.

In conclusion, addressing the water challenges in Azaz District demands coordinated efforts from stakeholders, sustained funding, and investment in infrastructure and technical expertise. Urgent interventions are required to improve water quality, accessibility, and governance structures, ensuring the well-being and resilience of communities amidst ongoing crises. This report serves as a crucial foundation for informed decision-making and targeted interventions to alleviate the suffering of vulnerable populations in Azaz.

Key findings

Water Situation in Azaz District

- In the fourth quarter of 2023, the average per capita water allocation in Azaz District was 22 liters per day, this is way below the minimum standard of 35 liters per day as recommended by ACU for the last two years, indicating a shortfall in meeting basic water needs.
- 52% of the population rely on often unsafe alternative water supply modalities other than piped water to meet or complement their needs due to lack of or an inadequate quantity of safe water.
- Only 78% of functional water stations have implemented a cost recovery system, highlighting the need to extend this practice to ensure the sustainability of water supply amidst declining financial resources.
- Azaz District operates 56 functional water stations, while 15 remain suspended due to maintenance needs, those water stations can’t meet the growing water needs of population in the whole Azaz district.
- Azaz City primarily relies on groundwater from wells managed by the Water Directorate and Midanki Lake.
- Water undergoes treatment at Sharan Station before distribution through the community's networks.
- For camps, water is supplied from wells in the Shamareen area, and transported by tanker trucks to main storage tanks within camps.
- Challenges include the network's age, damage, need for expansion, and issues with some lines.
- Some neighborhoods lack a sewage network, relying on septic tanks for wastewater disposal, with most wastewater used for irrigation.

Access to drinking water

- Low available water quantity (22 liters per person per day) is a common challenge in both camps and Azaz City.
- Operational issues in the city's network water system led to unstable pumping schedules and low water availability per person per day.
- Dependence on water trucking adds financial burdens for residents.
- Inadequate infrastructure, particularly in camps, exacerbates challenges, especially for women who face risks fetching water.

- Regular maintenance, monitoring, and infrastructure investments are needed to improve water station quality.
- Rehabilitation, additional pumps, generator support, maintenance, and new equipment are suggested for various stations to enhance their efficiency and functionality.
- Interventions such as network expansion and maintenance are needed to improve functionality, especially in camps where networks are not fully covered.
- Expansion of networks, maintenance of main lines, and building new connections are suggested to enhance network quality.
- Testing for water quality in all wells is recommended by KIs.

Water Quality

- Surface water is highly susceptible to contamination, posing risks of diseases such as kidney diseases when used for drinking due to sedimentation.
- Groundwater in Azaz district as well as northern Aleppo is relatively in better quality compared to the surface water but still tends to be calcareous1 and occasionally polluted by sewage water, potentially causing cholera, especially for wells with depths ranging from 5 to 30 meters.
- NGOs involved in water trucking treat water with chlorine before delivering it to camps, enhancing its safety for consumption but the water still have other quality concerns related to the sediments and impurities (dust, sand, etc.).
- Water obtained through networks, originating from Medanki Lake through Sharan station, is disinfected and sediment-free but may still be calcareous, potentially leading to kidney diseases. Occasionally, the water may have a yellowish color and taste due to excessive chlorine use during treatment.
- Residents of Azaz City using network water for drinking due to its affordability comparing to the filtered water even though it is not in good quality.
- Camp residents prefer filtered water due to distrust of trucked water. However, many cannot afford filtered water and resort to using chlorine tablets to treat water before consumption.

Key players and stakeholders involved in the provision of drinking water

- Key informants identified several entities involved in the management of drinking water in the Azaz district. These include the Water Directorate in Azaz, the Local Council in Azaz, AFAD (Türkiye Disaster and Emergency Management Authority), Non-Governmental Organizations (NGOs) such as ACTED and World Vision International, and camps management.
- The collaborative endeavors of various stakeholders are falling short in addressing the increasing demand for drinking water, primarily due to funding gaps and the absence of sustainable solutions.

[1] Calcareous water is high in dissolved minerals, largely calcium and magnesium, and also a variety of other metals. When drinking calcareous water it may cause kidney disease.

- The efforts of multiple stakeholders are focusing on management provision of water (trucking and operating stations) without solving the water quality issues except using chlorine to treat water, no efforts were made to increase the quality of water through filtering systems.
- Unstable funding leads to unsustainable support by NGOs, resulting in gaps and unmet needs in water provision.
- Key informants highlighted the existence of basic laws governing water provision, including cost recovery systems, equal pumping of water to different neighborhoods in Azaz city, monitoring of water quality and quantities, and preventing the indiscriminate drilling of wells, however, those practices are not sustained due to unstable funding.

Availability of technical expertise

- 100% of key informants (KIs) noted the presence of needed expertise in the local market for basic water provision in camps, only 67% stated the same for Azaz City.
- The main challenge identified in Azaz city is the shortage of specialized engineers and technicians capable of managing water stations effectively.
- Despite challenges with expertise, most equipment needed for building, repairing, and operating water stations is available in the local market, except for the certain supplies and spare parts which are not available in the local market, this underscores the significance of enhancing the capabilities of local suppliers to secure the needed supplies.

Environmental and health impact of the current water provision methods

- Water scarcity has forced farmers to resort to using sewage water for irrigation, compromising crop quality and facilitating the spread of harmful pathogens and contaminants.
- The absence of unified local management has led to unregulated and haphazard digging of wells, resulting in a decline in both groundwater and surface water levels
- The use of tanker trucks for water transportation emits harmful pollutants, contributing to air pollution and posing risks to public health and environmental well-being
- Breakdowns and leaks in the water network infrastructure led to substantial water wastage, exacerbating water scarcity and lowering water levels in vital water bodies.
- Due to low quality of drinking water, waterborne diseases are prevalent in Azaz (more than 50K cases in 2023).

Recommendations

- Establishment of sustainable filtration systems to improve access to safe drinking water, water quality, and avoid the spread of WBD and to meet the growing demand for safe water.
- Emphasize on the reliance on localized solution/intervention to overcome the challenges related to funding, high-costs and potential non-renewal of the cross-border assistance.

- Enhance the capacity building of the technicians/engineers to polish up their technical knowledge to independently operate/maintain the water filtering stations and cut cost.
- Focus on the sustainability of these water filtering stations by establishing or extending partnerships, as many water stations face a decrease in funding support, posing a threat to their continued operation and maintenance.
- It's strongly recommended to implement an effective water chlorination system in all water stations, as non-functional water chlorination means that the pumped water is unsafe and people who drink it are at risk of contracting many serious diseases that can be transmitted through water.
- Repairing current water networks and stations, ensuring their safety, and reducing the loss of water transported within these networks to its minimum limits.
- Conduct a comprehensive assessment of the current sewage system and develop it, to ensure that it does not pollute groundwater, water bodies, or crops.
- Establishing an engineering body whose mission is to develop a plan for studied urban expansion, prepare the necessary infrastructure for it, and place restrictions on construction operations that take place on agricultural lands.
- Funding projects that use modern irrigation technologies, extending drip or sprinkler irrigation networks, etc.

Methodology

Assessment objectives

This needs assessment report focuses on evaluating the water situation in Azaz district, Northern Aleppo, Syria. The objectives include identifying challenges within the water sector, particularly regarding safe drinking water in Azaz, and concerning water sources, quality, and accessibility, moreover, the assessment identifying key stakeholders involved in water provision, in addition to exploring the local market to identify water facility maintenance and equipment suppliers, quantifying communities facing challenges in accessing safe drinking water.

Furthermore, the assessment covers understanding local preferences regarding water accessibility and identifying relevant regulations and governance structures, Ultimately, the report provides well-founded recommendations based on assessment and data analysis, coupled with actionable strategies to address water challenges and improve accessibility.

Assessment Scope

- Timeframe: the assessment was conducted during February and March 2024, the data collection took place between the 20th of February and to 1st of March 2024, while the initial draft report was submitted on the 06th of March 2024.
- Geographic Scope: the assessment covers the district of Azaz in Aleppo governorate in northern Syria, the primary data was collected from Azaz city and 5 other camps in the district (Alsalama old, ALsalama new, Alnur, Ahl Alsham, Sejo caravans).

Data sources

- Primary data: through KIIs with water experts, local authorities, water suppliers, NGOs operating from Türkiye, and community representatives at the targeted district.
- Secondary data: collected through a desk review of the reports and assessments conducted by entities including UN agencies, NGOs, and researchers related to water provision.

Tools development

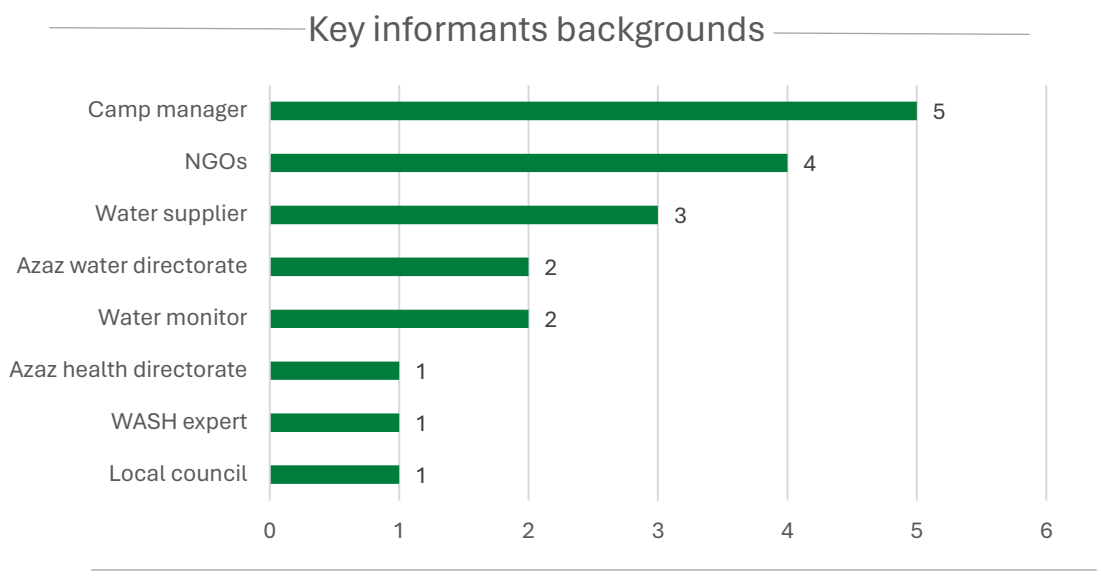
An unstructured questionnaire (Open-ended questions) was developed in cooperation between Indicators and Field Ready Turkiye Organization, as an inception meeting was held at the beginning of the project to determine the assessment topics and the information required to be obtained, then, the consultants in Indicators prepared the initial drafts of the tools and presented them to the technical specialists in Field Ready Turkiye Organization for approval and feedback regarding any required amendments or additions, and then efforts were exerted to phrase the final version of the tool.

Data collection and analysis

After the development of study tools, a training session was organized for the data collectors. This session included a comprehensive overview of the project objectives and the identified target sample. Subsequently, the study tools were presented and discussed with the five data collectors. Following the training session, fieldwork was conducted from February 15th to March 1st, 2024, involving visits to Türkiye, Azaz City and the designated camps for data collection. Face-to-face interviews with key informants were carried out using paper forms. Enumerators then forwarded these forms to the data quality officer for revision and verification. The collected data was manually entered into a Microsoft Excel database for further analysis prior to report generation.

Sampling

A purposive (selective) sampling method was used for data collection, 20 KIIs were conducted, and the experts were selected from different backgrounds related to water provision, the following chart demonstrates the interviewed key informants:



Moreover, 8 KIs were conducted in Azaz city, 4 in Türkiye with KIs form NGOs (ACU, Bahar, Ihsan, and Takaful Alsham), 5 were in camps, while the remaining 3 interviews were conducted with water suppliers.

Challenges

- The data collection process faced challenges related to the availability of the key informants to conduct the interviews, some KIs were contacted several times in order to obtain an appointment to conduct the interviews causing some delays.

Context overview

In 2024, 16.7 million people (8.4 million female, 8.3 million male) are assessed to need humanitarian assistance across Syria, up from 15.3 million in 2023. Of the 16.7 million people in need, 5.5 million are displaced, including over 2 million who live in last resort sites. After 12 years of hostilities and persistent economic crisis, people in Syria saw their situation worsen when a series of earthquakes hit northern Syria and Türkiye on 6 and 20 February 2023. The earthquakes uprooted hundreds of thousands of families, resulted in almost 5,900 deaths and more than 12,800 people injured in Syria, and severely damaged infrastructures already weakened by the conflict. Many families lost their main breadwinner due to death or injury, at a time when the economic situation was already dire, increasing the vulnerability of millions of people previously unable to meet their basic needs.[2]

WASH is a major factor that threatens the populations living in camps. The reliability and efficiency of water systems have sharply decreased for the first time since 2016. a further downturn for an already vulnerable population. The 2022 outbreak of cholera in Syria, the first Syria has seen in decades, is a direct result of the deteriorating water situation, Lack of or an inadequate quantity of safe water is leading people to revert to unsafe water sources, threatening lives, and resulting in up to 52% of the population relying on often unsafe

[2] Summary of Humanitarian needs overview, UNOCHA, 2024 LINK

alternative water supply modalities other than piped water to meet or complement their needs. Economic conditions remain a challenge for vulnerable communities and households to access safe and equitable WASH services and hygiene items, notably for those who must purchase services like water from private water trucking vendors. Significant numbers of Syrian families continue to reside in overcrowded displacement sites, critically bad sanitation conditions, poor hygiene practices, and a deterioration in water quality have a direct impact on increasing public health risks, including the new rise of AWD/cholera, malnutrition, and COVID-19, which have an additional impact on the livelihood and protection of households.[3]

The water problem in Syria has one of an ongoing issue even before 2011; Syria was classified among the countries suffering from water scarcity and shortage, in addition to the high rates of water wastage and pollution due to problems in the deteriorating sewage system, which led to water pollution and harmed plant and animal life forms. Moreover, the unregulated and random drilling of wells has increased in response to new human, agricultural, and industrial needs, leading to the depletion of the surface groundwater layer and a decrease in the water level inside the wells below the expected level. This has necessitated the re-drilling of some wells to greater depths, resulting in increased water extraction costs.

The absence or destruction of the required sewage infrastructure, along with the absence of treatment stations, has caused the pollution of some water bodies and increased environmental pollution. Additionally, random construction and reliance on artisanal drilling in some camps or residential areas that did not meet standard specifications have increased the possibility of groundwater pollution by sewage water. Moreover, untreated water is sometimes used for irrigation purposes.

The drought wave that hit the region over the past two years has significantly impacted the water security of the region, manifesting itself in a drinking water crisis - especially in northern rural Aleppo - and the drying up of several wells that supply several local communities. The per capita water share has decreased to below the minimum required to maintain individual health and dignity, and water tank prices have risen due to the fuel crisis and increased demand.[4]

Female-headed households often experience more evident water insufficiency compared to households headed by males. In northern Syria, 19.2 percent of female-headed households compared with 11.5 percent of male-headed reported not having access to sufficient water for more than 20 days per month. For women and girls, obtaining water on credit can lead to higher risks of GBV and SEA. Meanwhile, adjusting hygiene practices due to water scarcity, especially concerning menstrual hygiene management, poses significant health challenges, while often negatively impacting the person's dignity and reducing freedom of movement and access to opportunities and services, including education and job opportunities.[5]

On the other hand, there are 756 Water stations in NWS of which 424 (56 %) are functional while the rest (44 %) are unfunctional. 87 water stations need operational costs, 55 water stations requires light and medium maintenance and 73 stations need complete rehabilitation

[3] Humanitarian needs overview, UNOCHA, 2023. LINK
[4] Water Security: A Crisis Threatening Stability in Northern Syria, LINK
[5] Humanitarian needs overview, UNOCHA, 2024. LINK

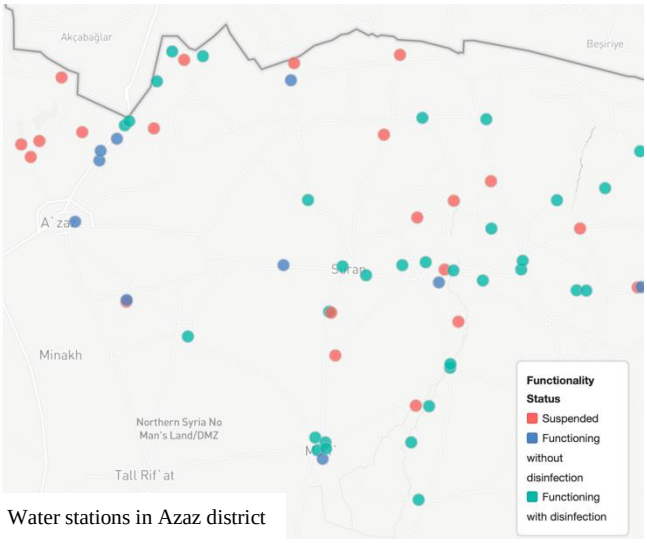
to be operated. Out of the 424 functional stations, there are 109 stations where water is not chlorinated due to the lack of needed chlorine and chlorination equipment (pumps).[6]

Water Situation in Azaz District:

The analysis of water data collected by the WASH cluster in Türkiye reveals significant challenges in the water sector within Azaz District.

In the fourth quarter of 2023, the average per capita water allocation in Azaz District was recorded at 22 liters per day, falling below the minimum standard of 35 liters per day as recommended by ACU in the last two years. This indicates a deficiency in meeting the basic water requirements of the population. Moreover, only 78% of the functional water stations have implemented a cost-recovery system7. It is crucial to extend this practice to all operational water stations to ensure the sustainability of water supply, especially given the declining financial resources.

Azaz District currently operates 56 functional water stations, while 15 stations remain suspended due to the need for maintenance. Furthermore, among the operational water stations, 53 are chlorinated, while 3 lack chlorination due to a shortage of chlorine and equipment. This poses a significant health risk to the consumers, as untreated water may contain contaminants, leading to the spread of water-borne diseases. Those functional water stations don't meet the water needs in Azaz district, as the capita share is only 22 Liters per person per day.



Water stations in Azaz district

Azaz District experiences a higher proportion of waterborne diseases compared to other regions in Northern Western Syria (NWS), underscoring the urgent need for improved water quality management and sanitation practices.

Key informant interviews (KIIs) revealed that Azaz city relies on two primary water sources. Groundwater from wells managed by the Water Directorate serves Azaz city, while the second source is Midanki Lake. Both sources undergo water treatment at Sharan Station before distribution through the community's water networks. Additionally, for the camps, water is supplied from wells located in the Shamareen area. This water is transported via tanker trucks to the main storage tank within the camp, facilitating distribution through the camp's water network.

[6] Highlights on the reality of Water Systems, Drinking-water Availability - Water-borne Diseases North Syria, ACU, Q4 2022. LINK

[7] Cost recovery system: it's fees calculated according to the consumption aims to maintain the sustainability of the service through collecting the operational cost from the beneficiaries.

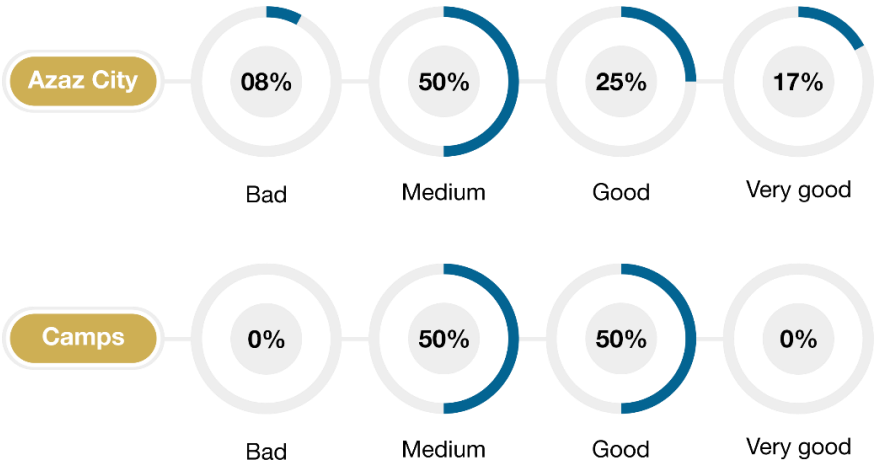
The sewage network in the city of Azaz is in average technical condition (the network is relatively old, has been damaged, needs expansion, and there are problems with some lines). It covers 80% of the city's population, and wastewater flows to the south of the city, in addition to the presence of some neighborhoods in which there is no network, residents rely on septic tanks to dispose of wastewater. Currently, most of the wastewater generated from the city of Azaz is used to irrigate vegetables and trees.[8]

Access to drinking water

On the other hand, 100% of the interviewed KIs stated that people are facing challenges access safe drink water, the common challenge in both camps and Azaz city is the low available water quantity, and the reasons vary according to the water source, as for the network water in the city, the high operational cost and lack of support causing unstable pumping schedule causing the low water share per person per day, thus people depends on water trucking which will add additional cost to access water, while in the camps, not all the camps are provided with central large tanks and distribution network, even when it's available, it doesn't cover the whole camps (for example in Alsalama camp the network covers only 20% of the camp), so people depends on water trucking to access their needs, which cause additional financial burdens and become more suffering in winter due to bad roads, those challenges and more suffering for women who find it hard to bring water to their tents, leaving them facing many risks on the way to access safe water.

In terms of water stations quality, when asking the KIs to give their evaluation for the stations' status, they reported that none of the water stations in camps are classified as "Very good," while 50% are labeled as "Good," and the remaining 50% fall under the category of "Medium." Conversely, Azaz city exhibits a higher proportion of water stations categorized as "Very good" and "Good," with approximately 16.67% and 25%, respectively. And 50% of the stations were labeled as "medium". However, there are few water stations in the city classified as "Bad," comprising around 8.33% of the total. It's worth mentioning that some stations need maintenance and new equipment which decreases the efficiency of operating those stations. Regular maintenance, monitoring, infrastructure investments, and enhancing the capabilities of local market could contribute to achieving improved water station quality across both settings.

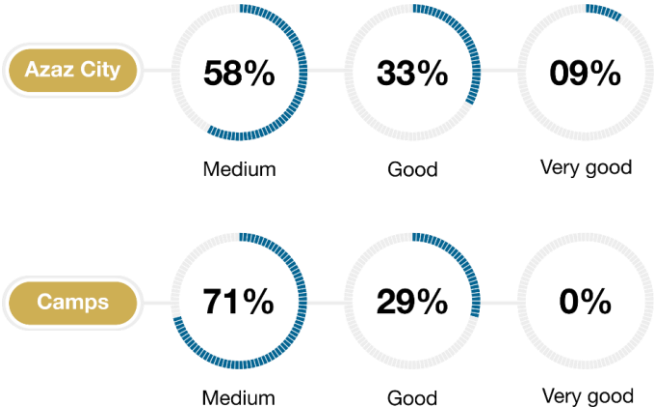
[8] Cholera Investigation Report, ACU, 2024. LINK



The interviewed KIs suggested the following interventions to enhance the stations status:

- Ma'rin station needs full rehabilitation.
- Sejo camp station needs another pump.
- Kaljebin station needs a support generator during winter as it runs using solar power.
- The main station in Azaz needs full maintenance.
- Yazibag stations need chlorine system and solar power system.
- Midanki station does not work in full capacity.
- The Qastal station needs a chlorine system.

In terms of water networks, in camps, the majority of water networks, comprising 71.43%, are classified as "Medium," indicating an average level of functionality. Meanwhile, 28.57% of the networks are deemed "Good," reflecting a satisfactory performance. Notably, there are no water networks in camps classified as "Very good." In contrast, Azaz City showcases a slightly different distribution, with 58.33% of networks categorized as "Medium" and 33.33% as "Good." Moreover, a small percentage, approximately 8.33%, of networks in the city are classified as "Very good.", the reasons behind low quality of the networks are 1) the network in Azaz is old and doesn't have the capacity to cover the needs, 2) the network in the camps is not covered (on the ground) and not connected to the whole camp.

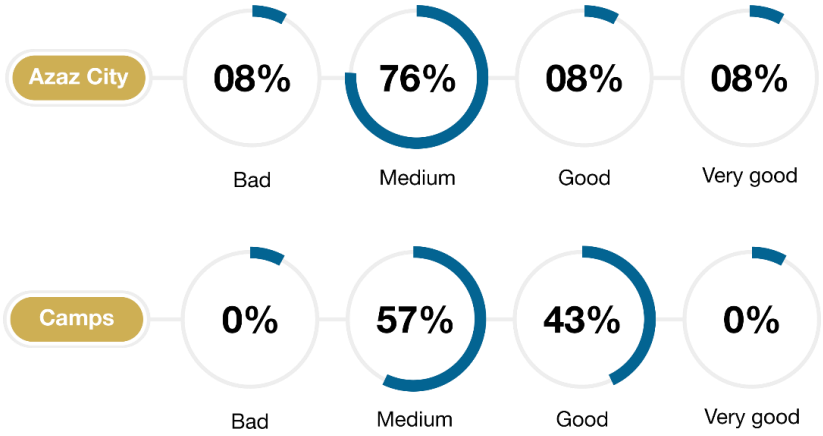


The suggested interventions to enhance the water network quality were as follow:

- In Alsalama camps: expand the network to cover the whole camp.

- In Alnur camp: the main line needs maintenance, no possibility to expand the network due to private land ownership.
- Ahl Alsham camp: build a line to connect with Yazbag station.
- In Azaz City: the network needs expansion as 40% of the city is not covered by the network, this intervention should be coordinated with the water directorate in Azaz as they have detailed diagrams for the network situation.

Wells are also one of the main sources of drinking water for people in Azaz district, in camps, the majority of wells, accounting for 57.14%, are classified as "Medium,". Additionally, 42.86% of wells are deemed "Good,", in Azaz City, the majority of the wells, comprising 75.00%, fall under the category of "Medium,", while there are smaller proportions of wells classified as "Good" (8.33%), "Very Good" (8.33%), and "Bad" (8.33%). This analysis suggests that wells in both camps and Azaz City predominantly exhibit a medium level of functionality, and the reasons behind that are 1) drought and low levels of water in wells especially during summer, and 2) the mixed water between wells and sewage systems.



The KIs also stated that all the wells need to be tested for water quality.

Water Quality

In terms of water quality, the KIs stated that surface water is highly susceptible to contamination and can lead to diseases such as kidney diseases when used for drinking due to sedimentation., As for groundwater, it is relatively in better quality compared to the surface water but still tends to be calcareous and sometimes polluted by the sewage water which may cause cholera, especially for those wells with 5 M to 30 M depth, however, the NGOs working in water trucking are using chlorine to treat water before delivering it to the camps but the water still have other quality concerns related to the sediments and impurities (dust, sand, etc.).
Regarding drinking water obtained through the networks (from Medanki Lake through Sharan station), it is largely disinfected and free from sediments, but it can still be calcareous potentially causing kidney diseases such as kidney stones or sand, and sometimes the color of the water become litter yellow and have some taste due to large quantity of chlorine used for water treatment.

Another KI stated that people in Azaz camps don't trust the source of water, so they don't use it for drinking, and forced to buy filtered water which increase the financial burdens (0.16 USD for 1.5 L bottle). While the water is being tasted by simple devices which are not accurate and may not present the real situation of the water.
Regarding people's preferences for drinking water, the residents of Azaz City are using network water for drinking due to affordable prices compared to filtered water even though it is not in good quality, while people in the camps prefer to use filtered water for drinking as they don't trust the available trucked water, however, most of the people in the camps can't afford to buy filtered water and tend to use chlorine tablets to treat water before drinking it.

Key players and stakeholders involved in the provision of drinking water

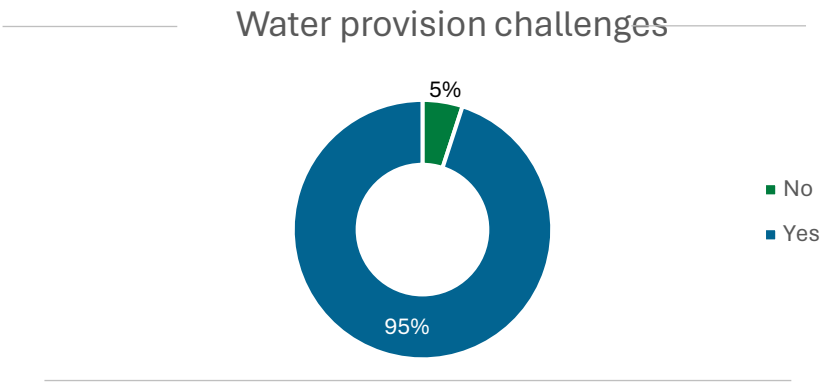
When asking the Key informants about `the key players and stakeholders involved in the management of provision of drinking water, they mentioned the following entities:

- Water directorate in Azaz: take the lead and main role in overseeing water provision through administrating the water network, water sources, cost recovery system, water monitoring, and testing.
- Local council in Azaz: has a supervision role in administrating the wells and coordinating the efforts of non-governmental organizations working in water trucking and support, however, their resources and efforts are very limited compared to the increased needs.
- AFAD (Türkiye Disaster and Emergency Management Authority): coordinate with the NGO to ensure effective and smooth execution of the WASH projects in the region.
- Non-governmental organizations: implementing projects supporting the maintenance and running cost of water stations, wells pumps, water trucking, water monitoring, and treatment, the KIs mentioned the following NGOs implementing WASH projects in Azaz district:
    - ACTED organization: intervening in Alsalama (old and new), Alnur, and Ahl Alsham camps.
    - World Vision International: intervening in Sejo caravan's camp.
- Camp management: facilitating the service provision within the camps with very limited resources and voluntary efforts.

The efforts of multiple stakeholders are focusing on management provision of water (trucking and operating stations) without solving the water quality issues except using chlorine to treat water, no efforts were made to increase the quality of water through filtering systems, also those efforts have proven insufficient in adequately addressing the escalating demand for drinking water. This inadequacy is predominantly attributed to significant gaps in funding and the absence of sustainable solutions. Despite collective engagement, the current strategies and resources allocated have been unable to keep pace with the growing needs of communities reliant on access to safe drinking water. As a result, there is a pressing need for alternative localized and innovative approaches to ensure the provision of sustainable water solutions that can effectively meet the rising demand with minimal breakdowns and longer sustainability.

On the other hand, 95% of the KIs stated that those entities are facing challenges during the provision of water, those challenges related to:

- Drought and the decrease in water levels in the wells.
- Unstable funding causes unsustainable support by the NGO creating gaps and unmet needs.
- Long distance of water trucking due to unavailability of main water channels which causes increase in the aggregated price of water.
- The security situation and clashes in the area causing damage to the available network.
- Pollution of the wells and mixing with the sewage system.
- The increase in running cost of water provision due to an increase in fuel and equipment prices which triggers the need to rely on cheap and clean energy sources like solar energy for sustainability.

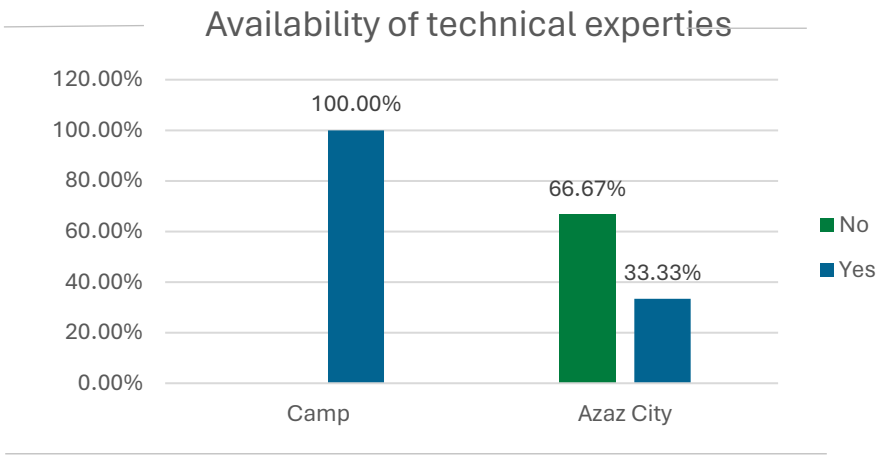


In terms of governance and laws controlling the provision of water, the KIs stated some basic laws in place such as cost recovery systems, equality of pumping the water to the different neighborhoods in Azaz city, and monitoring water quality and quantities in addition to some lows preventing drilling wells.

Availability of technical expertise

The interviewed KIs reported the availability of technical expertise needed for the provision and monitoring the water in general, however, their answers vary when disaggregating the data between the camps and Azaz city, however, as the provision of water in the camps is basic and mostly is water trucking and small networks, 100% of the KIs stated that the local market has all the needed expertise, while in Azaz city the provision of water follows more systematic methods (water network within the city, treatment and pumping stations, and cost recovery) there is a need for more expertise may not be available in the local market, 67% of the KIs stated that those expertise are not available in the local market, mainly due to lack of specialized engineers who have to capabilities to run water stations and the available technicians who do not possess the fundamental and advanced skills necessary to manage the intricate operations and maintenance of water filtration stations which enable the sustainability of these stations.

Moreover, the low incentives provided make it hard to maintain the skilled human resources at those stations.

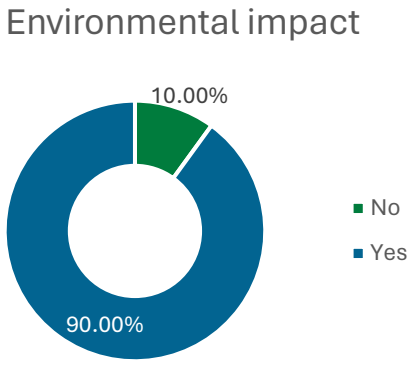


Moreover, the KIs provided examples of the malfunctions that can't be repaired without the assistance of external expertise such as:

- The problem of mixed water between the drinking water walls and the sewage system.
- In case of any leak happening in the water network, there will be no way to discover that and there will be a huge waste of water.
- Electrical and mechanical issues may happen in the pumping station.

On the other hand, most of the equipment needed to build, repair, and operate the water stations are available in the local market except for the certain supplies and spare parts which are not available in the local market, this underscores the significance of enhancing the capabilities of local suppliers to secure the needed supplies, however, the main challenge is still the high cost and lack of fund needed to improve and expand the water management system to meet the increased demand as reported by the interviewed experts.

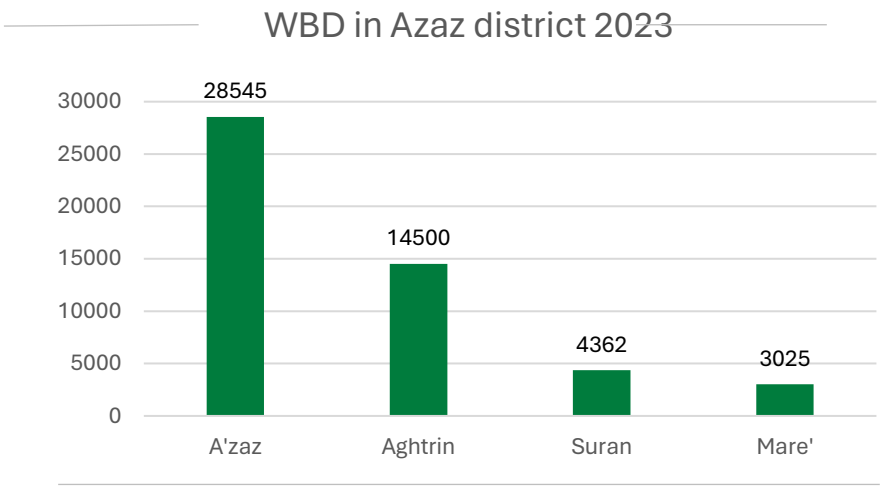
Environmental and health impact of the current water provision methods



The provided results highlight several significant environmental impacts stemming from the current method of water provision in Azaz district, as outlined by the key informants. One of the foremost concerns raised is the absence of the unified local management, which has led to unregulated and haphazard digging of wells. This indiscriminate practice has had detrimental consequences, notably causing a decline in both groundwater and surface water levels. As a result, the region is experiencing water scarcity, exacerbating the challenge of meeting the water needs of the population. Consequently, this decline in groundwater levels has adverse repercussions, particularly for agricultural activities dependent on adequate water supply. The situation has forced farmers to resort to using sewage water for irrigation, a practice that not only compromises crop quality and yield but also

facilitates the spread of harmful pathogens and contaminants. Moreover, this diminished water availability has driven up the costs associated with procuring water, posing financial burdens on residents and authorities alike.
Furthermore, the reliance on tanker trucks for water transportation introduces additional environmental concerns. These vehicles emit harmful pollutants, contributing to air pollution and posing risks to public health and environmental well-being. The emission of pollutants from transport vehicles underscores the need for sustainable and environmentally friendly transportation solutions to mitigate these adverse effects.
Moreover, the report underscores a critical environmental risk associated with the water network infrastructure. The occurrence of breakdowns and leaks in the network leads to substantial water wastage. This wastage not only exacerbates water scarcity but also contributes to the lowering of water levels in vital water bodies such as Midanki Lake and groundwater reserves. Such depletion of water resources has far-reaching implications for ecosystem health, biodiversity, and the sustainability of water-dependent ecosystems in the region.

On the other hand, as a result of polluted water, water-borne diseases are widely spread as more than 50K cases were reported in 2023 in Azaz district only, most of those cases are in Azaz city, the following chart shows the number of WBD reported in Azaz district in 2023 disaggregated by sub-district[9]:



Examples of Drinking water filtration systems:

The following table shows examples of the available filtration stations in the Azaz district:

Location	Sharan station	Yazibag station chlorination devices	Alnur Camp chlorination devices	Shamarin wells
Filter size	1000 m3 per hour	400 m3 per hour	46 m3 per hour	400 m3 per hour
Filter age	16 years	N/A	6 years	6 years
The number of beneficiaries	650K	Azaz Camps	10K	Azaz Camps
Water condition	Good	Medium	Good	Medium

[9] Water-borne diseases dashboard, EWARN, ACU. LINK

Diseases related to drinking contaminated water in the region	Kidney disease	Kidney disease	Kidney disease	Kidney disease
Water source	Medanki lake	Yazibag station	wells in Shamarin	wells in Shamarin
How to bring water from the filter directly to the beneficiaries	water pumps	water trucking	Water Station	water Trucking
Challenges faced by the filtration system (technical, maintenance, operational, financial, etc.)	operating costs	operating costs	operating costs	no main water channel
The entity that owns the filter	local council	local council	ACTED	ACTED
The entity responsible for the operation	local council	local council	ACTED	ACTED
The required intervention	Repair the filter at Sharan station or replace it with an ozone filter	Increase filters capacity	Increase filters capacity	Increase filters capacity
Availability of materials required for this intervention in the local market	partly available, some have to be imported from Türkiye or locally manufacture them.	Available	Available	Available
Availability of local expertise to implement the required intervention	Available	Available	Available	Available
Entities that may be interested in participating in or supporting the filtering system	local Councils and NGOs	local Councils and NGOs	local Councils and NGOs	local Councils and NGOs

In light of the need of filtration systems, the KIs suggested the following locations to implement interventions related to the establishment of filtration systems:

Location where there is a need for a filtering system	Ahl Alsham Camp	Azaz Camps[10]	New Alsalama camp	Sejo caravans camp	Araai city
Diseases related to drinking contaminated water in the area	Kidney disease	Cholera, hepatitis, and kidney disease	Kidney disease	Kidney disease and cholera	Cholera diarrhea kidney disease
Required filter size	50 m3 Per hour	1 m3 per hour for each camp	5m3 per hour	2 m3 per hour	1k m3 per hour
Expected number of beneficiaries	10k	7k in each camp	6.5k	8k	200k
Water source	Yazibag station	water trucking	Shamarin wells	Yazibag station	Alsajour lake
Water condition	Low to moderate	Low to moderate	Low to moderate	Low to moderate	Low to moderate * (need laboratory test to confirm)

[10] According to ACU, there are 87 camps in Azaz district with 229,540 individuals.

intervention required	establishment of a filtering system	RO filter for each camp	establishment of a filtering system	establishment of a filtering system	establishment of a filtering system
Availability of materials required	Available	Available	Available	Available	partly available, some have to be imported from Türkiye
Availability of local expertise	Available	Available	Available	Available	Available
Entities that may be interested	NOGs	NOGs	NOGs	NOGs	NOGs

The Key Informants (KIs) also elucidated various challenges encountering the establishment of filtering systems, highlighting issues such as weak water network infrastructure, limited access to some necessary equipment and materials, and logistical hurdles in setting up and maintaining filtration systems, especially with the continuous funding gaps.

Recommended interventions with possible innovative approaches

The interviewed KIs suggested the following interventions:

Intervention	covered Area	expected number of Beneficiaries	priority (1 most urgent)
Expanding the public network - supporting the Azaz water directorate with pumping costs	Azaz District	100K	1
Establishing a pumping line from the pumping station to the camp	Ahl Alsham Camp	10K	1
Rehabilitation and maintenance of the well	The northern side of Azaz city	8K	1
Establishing filtration stations on wells within the Azaz area	Azaz District	230K	1
Establishing a water analysis laboratory	Sejo caravans' camps	8K	1
Securing 8 reverse osmosis (RO) stations	Azaz District	250K	1
A sustainable project through the installation of a groundwater network powered by solar energy and all other necessary equipment	Azaz District	160K	1
Increasing the efficiency of the treatment station and increasing the capacity of the pumping station	Azaz city	245k	1
Providing electricity for water stations	Azaz District	250K	2
Completing the water network inside the camp	New Alsalama Camp	6,5K	2
Serving Maidanki Dam with solar energy through floating panels on the surface of the water	Azaz District	100K	3
Providing residents with water tanks	Ahl Alsham Camp	10K	3
Building a high-water tank	Azaz Camps	200K	3
A solar energy field at the Sharan station with a capacity of 1 megawatt	Azaz and Afrin Districts	650K	4

Conclusion

In summary, the assessment conducted on the water situation in Azaz district unveils a myriad of critical challenges plaguing the region. These include not only the scarcity of water but also its declining quality and operational hurdles, all of which are further compounded by the ongoing conflict and environmental pressures. Despite the involvement of various stakeholders, these persistent challenges underscore the urgent need for concerted action.

To effectively tackle these issues, there is a pressing need for:

1. Provision of new water filtering stations to meet the growing demand for safe water in Azaz district.
2. Rehabilitation and increase of the existing water filtering stations to meet the growing needs.
3. Rehabilitation of the water networks especially in the camps.
4. Increase knowledge and build capacity of technical skills of locals to independently run and look after the more sophisticated water filtering stations including good command on the latest technologies, maintenance, testing, etc.
5. Reliance on localization including making needed parts locally from the local market.
6. Foster the sustainability of the water filtering stations with trainings, deploying renewable and sustainable energy alternative like solar energy and eventually supporting partnerships to ensure sustainable solutions in the future.