



EASTERN ALEPPO HOUSEHOLD ASSESSMENT: WATER SECURITY

SYRIA

PROFILE

AUGUST 2015

INTRODUCTION

This report summarises the WASH-related findings of a household-level humanitarian needs assessment conducted in Aleppo, Syria in March 2015. Focusing on measures of water security in those areas of eastern Aleppo that are accessible to international humanitarian agencies, the report aims to provide valid information on critical water-related needs in Syria's largest city. The indicators analysed were drawn from a multi-sectoral assessment administered by REACH that collected data on food security and livelihoods (FSL); water, sanitation and hygiene (WASH); shelter; non-food items (NFIs); education; and health.

While seeking to identify humanitarian needs related to water security, the assessment also aims to provide information that can be used to monitor the humanitarian situation in eastern Aleppo. Though the city has been the focus of prior humanitarian assessments, data related to the effects of the crisis on individual households is largely non-existent. This assessment has sought to fill some of those gaps, providing information on the WASH situation in eastern Aleppo that can serve as a baseline for future monitoring efforts.

BACKGROUND AND CONTEXT

The uprising against the Syrian government began on March 15, 2011, with conflict spreading to the countryside of Aleppo Governorate in February 2012 and arriving in the city five months later. Fighting for the city of Aleppo has been ongoing since then, with government and opposition forces waging a war of attrition, each seeking total control. As a result, Aleppo has fractured into a government-held "western" section and an opposition-controlled "eastern" section, with the population on both sides facing acute shortages of food, water, fuel, electricity, health care and public services. The vast majority of eastern Aleppo's inhabitants have fled, but the conflict continues to affect the lives of individuals and families who have remained, changing the ways in which they obtain food, employment, water, fuel, health care and education.

On the eve of the crisis, Aleppo was Syria's largest city with an estimated 3 million residents.¹ It had grown rapidly in the decades leading up to the conflict, with rural migrants responsible for a substantial increase in population.² Concentrated along the eastern, northern and southern perimeter of the city—areas that correspond closely to opposition-controlled eastern Aleppo—migrants often received little in the way of services or economic opportunities before the crisis.³ As a result, aid and recovery efforts will eventually need to confront massive damage to remaining infrastructure and services, much of which was already underdeveloped in these parts of the city prior to the crisis.

The city's water network has been particularly affected. By October 2014, REACH key informants estimated that 20-30% of eastern Aleppo's water infrastructure had been damaged or destroyed.⁴ Some neighbourhoods currently receive municipal water only once every five days.⁵ As a result, many residents rely on alternate water sources, including wells, boreholes, private vendors and public taps at mosques. Damage to sewage systems has resulted in extensive drinking water contamination, and despite warnings from local authorities to boil water, few households are able to sacrifice scarce and expensive fuel to do so.⁶ As a result, water-borne disease is present in many sources. Well and borehole water in particular has been described as "undrinkable" due to its increasing salinity and the inconsistent application of chlorine or other mechanisms of water treatment.⁷ As the water table recedes during the dry season, usable water points dry up and shortages become more dire.⁸

In addition, control of the water supply has been used as an instrument of war by all parties to the conflict. For two weeks in April and May 2014, Aleppo's sole remaining pumping station, Suleiman al-Halabi, was deliberately disabled, forcing 200,000 to 300,000 residents on both sides of the frontline to collect water

¹ [A look at Syria's Aleppo and the UN truce plan for the city](#) (Salon, February 18, 2015).

² *Ibid.*

³ [The Rise of Syria's Urban Poor](#) (Caerus Associates, January 2014), p. 37.

⁴ [Urban Area Humanitarian Profile: Eastern Aleppo](#) (REACH, October 2014), p. 14.

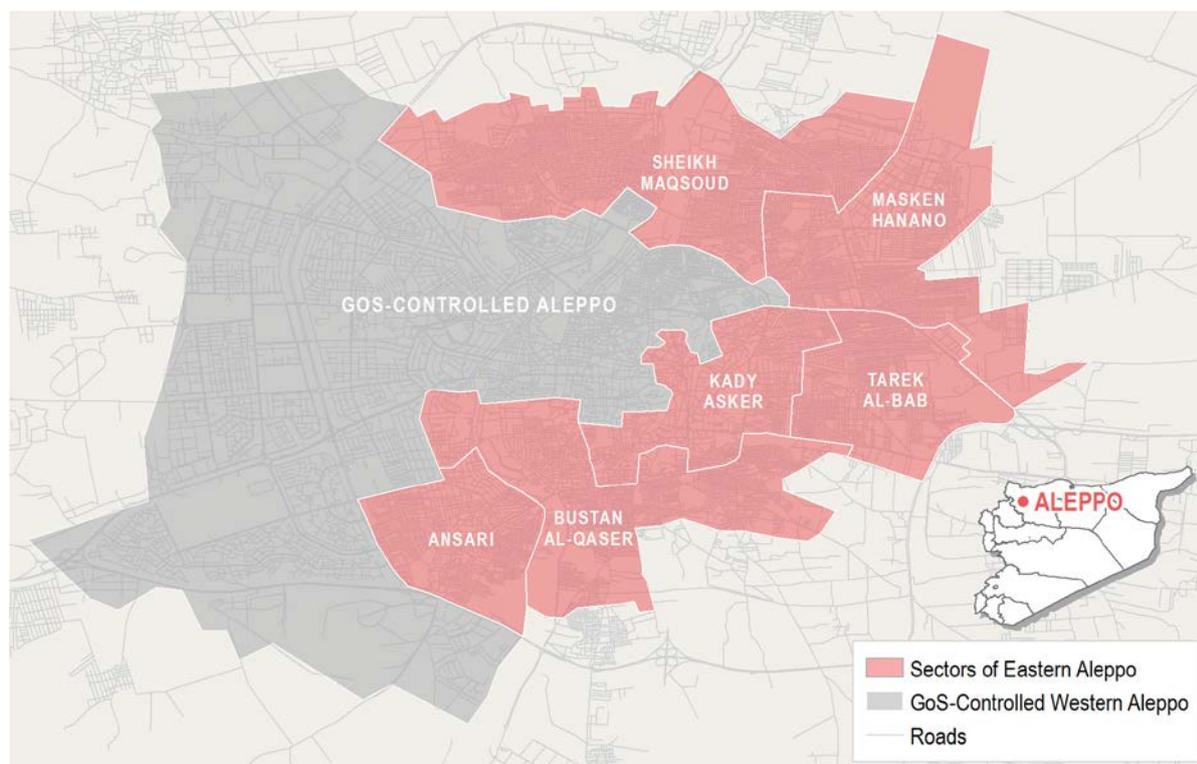
⁵ [Water, power return to Syria's Aleppo after three-week cut](#) (Reuters, 18 July 2015).

⁶ [Syria faces an imminent food and water crisis](#) (Chatham House, 24 June 2014).

⁷ Tamer Osman, [Water Shortages Leave Syrians in Aleppo Thirsty and Desperate](#) (Syria Deeply, 14 July 2015).

⁸ [Urban Area Humanitarian Profile: Eastern Aleppo](#) (REACH, October 2014), p. 13.

Map 1: City sectors of eastern Aleppo



from contaminated wells, public fountains, rivers and storm drains.⁹ Similar problems lasted for three weeks in July 2015, when the station was taken offline due to a lack of both fuel and electricity to keep the pumps running. The municipal water network has been extensively damaged by the conflict, including in June 2014 when a bomb destroyed three of the city's four main pipelines.¹⁰ Water trucks and repair crews from the International Committee of the Red Cross (ICRC) and its partner the Syrian Arab Red Crescent (SARC), as well as by several other NGOs and agencies, have been vital in mitigating the effects of these shortages.¹¹

Over the past three years, eastern Aleppo's remaining inhabitants have shown extraordinary resilience, finding ways to make ends meet against tremendous odds. To date they have relied, with some success, on tenuous and improvised solutions designed to help cope with shortages. The ways in which they access basic goods and services, including water, have changed dramatically since just a few years ago. However, it is unlikely that they are capable of

withstanding further major shocks. Whether the status quo persists or the dynamics of the conflict shift drastically, humanitarian assistance will remain vital, and information regarding current or recent needs will be invaluable in guiding the humanitarian response.

METHODOLOGY

This assessment¹² was based on a stratified sample of six geographic divisions or "city sectors" in eastern Aleppo: Ansari, Bustan al-Qaser, Kady Asker, Tarek al-Bab, Masken Hanano and Sheikh Maqsoud (see Map 1). Prior to data collection, REACH conducted a participatory mapping exercise to devise a sampling framework for each city sector that took into account demographic changes resulting from the conflict. Enumerators were asked to identify areas within each sector that were currently unpopulated, inaccessible or both.¹³ Within the areas designated as both populated and accessible, REACH generated six sets of 100 geographic points randomly distributed throughout

⁹ [Syria Crisis: Aleppo City Key Informants Assessment Report](#) (REACH, June 2014), p. 12.

¹⁰ [Syria: Drinking water and war profiteers in Aleppo](#) (Al-Akbar, 15 June 2014).

¹¹ [Water, power return to Syria's Aleppo after three-week cut](#) (Reuters, 18 July 2015).

¹² For a fuller account of REACH's methodology for the Eastern Aleppo Household Assessment, see [Eastern Aleppo Food Security and Livelihoods Household Assessment](#) (REACH, July 2015), pp. 14-20.

¹³ Definitions of access may vary widely. Enumerators provided information on the areas that they, as inhabitants of eastern Aleppo, felt could not be safely reached.

each sector. Enumerators were directed to interview one household in the immediate vicinity of each random point.

The household questionnaire, designed by REACH in consultation with sectoral working groups, was divided into modules covering food security, livelihoods, nutrition, water and sanitation, access to social services, shelter, electricity and fuel.¹⁴ Data collection took place between 3 and 28 March 2015. Enumerators were organised into male-female teams and were supervised by an assessment coordinator in Turkey and a full-time field coordinator in Aleppo selected from amongst the enumerators. The survey was conducted using Android smartphones equipped with the data collection application KoBoCollect. On several occasions, data collection was delayed due to fighting, protests or other events that affected the security of enumerators.

Data on expenditures and income were collected in Syrian pounds (SYP) and converted to United States dollars (USD) using historical Aleppo exchange rates from the informal market.¹⁵ Records were categorised by sector, as well as by whether the interviewee reported that their household had been internally displaced. In each analysis, results for individual city sectors were weighted by population and mean household size to project potential caseloads for all of eastern Aleppo.

KEY FINDINGS: WATER SECURITY

The crisis in Syria has had an adverse effect on access to water, and eastern Aleppo's residents have faced periods of months during which clean water has not been available. Limited access to water, combined with the difficulty of solid waste management, has encouraged the spread of scabies and lice, both of which reached epidemic levels in December 2014.¹⁶ Damage to sewage systems has resulted in drinking water contamination, and despite warnings from local

authorities to boil water, few households are able to sacrifice scarce and expensive fuel to do so.¹⁷ Due to these issues, drinking water remains the primary unmet need for 38% of eastern Aleppo households; 63% list it among their top three needs.

WATER SOURCES

At the time of data collection, less than half (42%) of eastern Aleppo residents obtained their drinking water primarily from the municipal network via in-home pipelines (see Table 1), compared to 62% in May 2014 and a near-universal 94% before the start of the conflict.¹⁸ As the city's water network has deteriorated, residents have begun to obtain water from other sources. Approximately 32% of residents had begun to rely primarily on boreholes for their drinking water, and another 21% primarily purchased it from private vendors, generally water truck operators contracted to serve individual buildings or households. The percentage of households that relied primarily on humanitarian assistance was negligible, as was that of households relying on other sources, including public taps, wells and bottled water from stores.

The eastern Aleppo percentage breakdown was nearly the same for drinking water and water intended for domestic use, i.e. that used for cleaning, cooking, bathing and all other household uses aside from direct consumption. In both cases, IDP households were more likely to rely on a functioning municipal pipeline and notably less likely to purchase water from private vendors.

The primary sources of both drinking water and domestic water, however, varied widely by city sector. In Sheikh Maq̄soud, for instance, 46% of respondents got their drinking water primarily from the municipal network, with another 44% relying on boreholes instead. For domestic uses, however, nearly 72% of respondents reported being able to rely primarily on municipal pipelines, which may suggest that while the water infrastructure in Sheikh Maq̄soud may be functional, it often delivers non-potable water. The situation was quite different in Ansari, where roughly equal percentages of households sourced their drinking and domestic water from in-home pipelines, boreholes and private vendors, possibly suggesting

¹⁴ In this assessment, households were defined as "a group of people who routinely eat out of the same pot and live on the same compound (or physical location) and share the same budget that is managed by the household head. It is possible that they may live in different structures."

¹⁵ Rates used were obtained from [Syrian Pound Today](#). Because questions regarding household spending and income requested figures for a period of one month prior to the survey date, REACH used the February 28 Aleppo exchange rate (250 SYP/USD). It is worth noting that informal market rates differ markedly from the official exchange rate, which has been fixed at 188.822 SYP/USD since late January 2015.

¹⁶ [Scabies, lice ravage Aleppo neighbourhoods](#) (Al-Monitor, 14 December 2014).

¹⁷ [Syria faces an imminent food and water crisis](#) (Chatham House, 24 June 2014).

¹⁸ [City Profile: Aleppo – Multi-Sector Assessment](#) (UN-Habitat, May 2014), pp. 4, 6.

Table 1: Primary sources of drinking water and water for domestic use

	Ansari	Bustan al-Qaser	Kady Asker	Masken Hanano	Sheikh Maqsoud	Tarek al-Bab	IDP	Non-IDP	Eastern Aleppo
Primary Source of Drinking Water									
In-home municipal pipeline	32.0%	39.0%	54.6%	55.2%	46.2%	38.8%	48.3%	41.5%	42.0%
Borehole	25.2%	31.0%	25.9%	38.1%	44.2%	23.5%	31.1%	29.6%	31.5%
Private water truck	36.9%	19.0%	16.7%	2.9%	8.7%	33.7%	15.7%	24.5%	21.2%
Humanitarian assistance	1.0%	1.0%	2.8%	3.8%	0.0%	4.1%	2.6%	1.6%	1.3%
Other	4.9%	10.0%	0.0%	0.0%	1.0%	0.0%	2.3%	2.8%	4.1%
Primary Source of Water for Household Use									
In-home municipal pipeline	30.1%	30.0%	54.6%	63.8%	71.6%	38.8%	51.3%	45.4%	45.2%
Borehole	35.9%	48.0%	25.9%	20.0%	14.7%	29.6%	29.9%	27.3%	31.7%
Private water truck	27.2%	17.0%	16.7%	9.5%	8.4%	26.5%	15.1%	20.1%	17.9%
Humanitarian assistance	1.9%	0.0%	2.8%	4.8%	2.1%	3.1%	1.7%	3.6%	1.8%
Other	4.9%	5.0%	0.0%	1.9%	3.2%	2.0%	2.0%	3.6%	3.4%

that none of these sources was sufficiently reliable to support the needs of most Ansari respondents.

A single water source often proved insufficient to meet all of a household's needs. For example, 42% of eastern Aleppo residents used in-home pipelines as their primary source of drinking water; however, only 26% of respondents could rely on these pipelines for both drinking water and for the additional water they needed for domestic use. Across all sectors and all water sources, only 45% of respondents reported being able to primarily use a single source for all of their household's needs, with 55% reporting they had to obtain drinking water and domestic water from two or more different sources. By definition, a household's primary water source is the one that offers it the most advantageous balance of availability, reliability and ease of access. However, in order to achieve a minimum level of water security, many eastern Aleppo households must rely heavily on secondary and tertiary sources; these may often be less preferred due to their expense, their inconsistent availability, their distance from the household or the health risks they may pose, among other reasons.

Due to the dangerous security context and the widespread destruction of infrastructure, no water source in eastern Aleppo can be considered

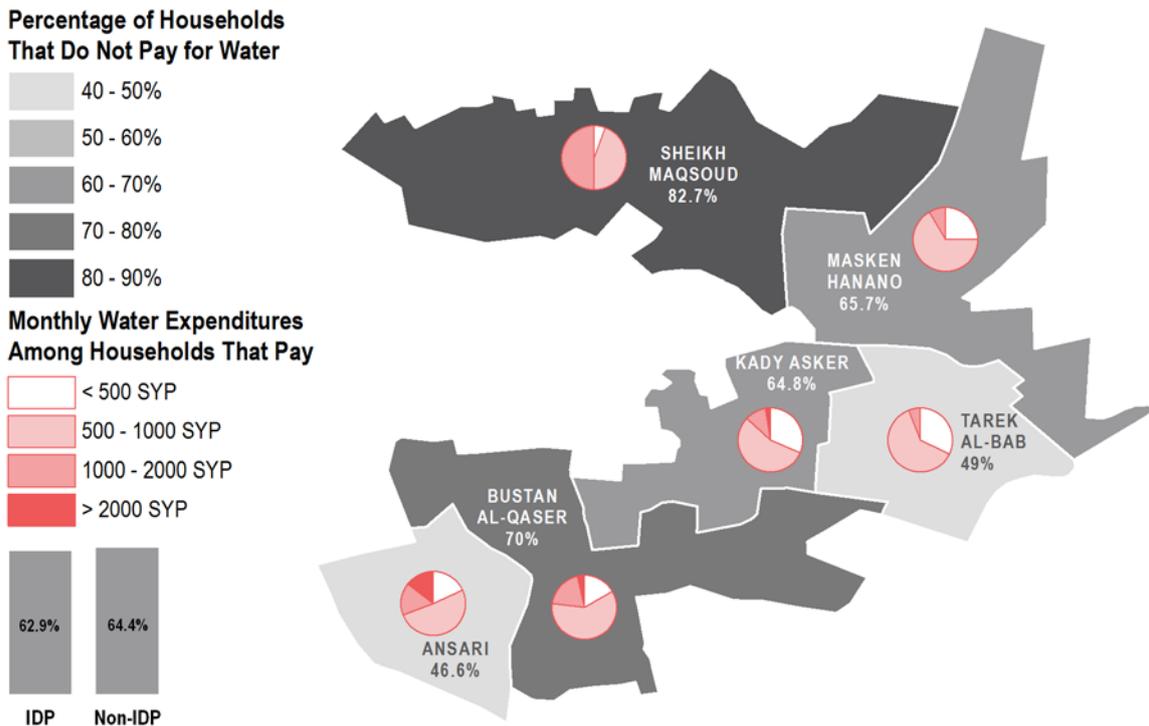
consistently adequate or reliable. The municipal network is heavily damaged and vulnerable to appropriation as a military target; well and borehole water tends to be saline and improperly purified; private water tankers are sometimes contaminated by waste water and can spread disease;¹⁹ and aid distributions are subject to inconsistent humanitarian access. Humanitarian actors that intend to address issues of water supply must adopt a strongly localised approach to account for variation across the sectors.

WATER EXPENDITURES

Respondents were asked to report how much money their household had spent on water, both for consumption and for household use, during the previous month. The average reported household water expenditure, weighted by sector household size, was 470 SYP (1.88 USD), which represents less than 3% of an average household's total monthly expenditure. However, this number was influenced greatly by the fact that 65% of eastern Aleppo residents did not need to pay for water at all. Residents who reported no water expenditures in the previous month formed large majorities of users of most water sources (from 69% for boreholes to 82%

¹⁹ [Syria Crisis: Aleppo City Key Informants Assessment Report](#) (REACH, June 2014), p. 12.

Map 2: Water expenditures across eastern Aleppo



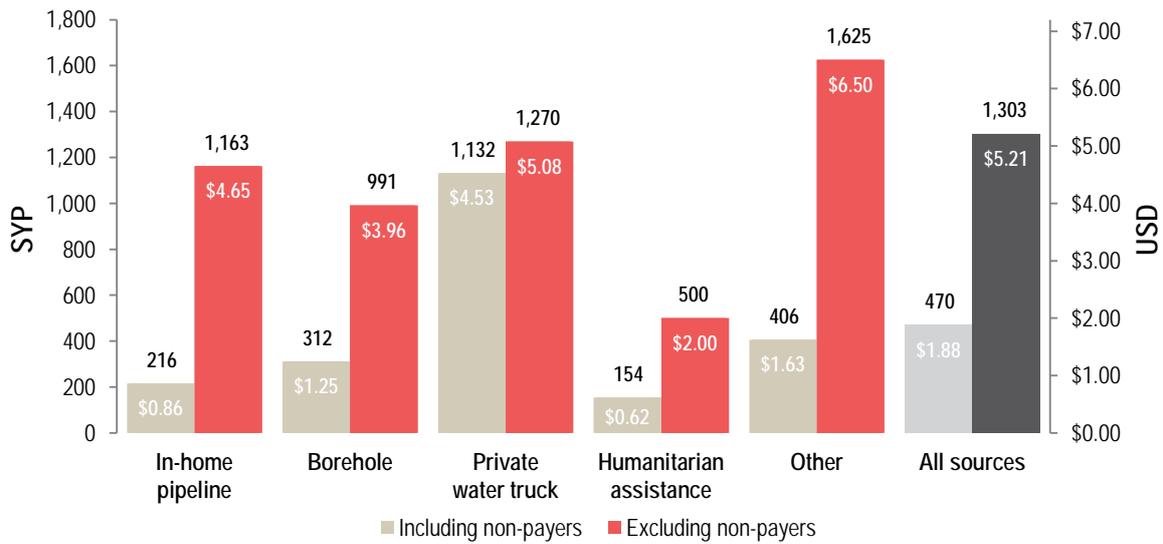
for private taps). This was not true of respondents who relied primarily on private trucks to deliver their water, only 11% of whom reported that they did not have to pay for the service.

The large number of non-payers is partly explained by the fact that in conflict-torn eastern Aleppo, many of the financial mechanisms by which the Syrian state once regulated the distribution of water have broken down. Some water-related transactions have moved to the private sector, including the purchase of water from private vendors or neighbouring households. Those that have not, including the regular payment of water bills to the Syrian authorities, often do not take place at all. The fact that a household primarily relies on a “free” water source does not necessarily imply that it does not pay for water. It may still be charged for access to secondary water sources or to “free” primary sources controlled by others, such as commercially operated boreholes or neighbours’ in-home pipelines.

There was significant variation across city sectors in the proportion of residents who did not need to pay for water, from a high of 83% in Sheikh Maqsood to lows of 47% and 49% in Ansari and Tarek al-Bab, respectively (see Map 2). The sectors with the lowest rates of non-payment were also the sectors that reported the most difficulty accessing water, as well as those with the highest percentages of households relying on private vendors.

Among households that did pay for water during the month prior to the assessment, the average expenditure was 1,303 SYP, or 5.21 USD (see Chart 1). Respondents who primarily relied on in-home municipal pipelines for their drinking water reported paying an average of 216 SYP per month (0.86 USD), a figure that included those who reported paying nothing for water. When non-paying households were excluded, the average monthly expenditure jumped to 1,163 SYP (4.65 USD).

Chart 1: Average household water expenditure by primary drinking water source



Among households that did pay for water during the month prior to the assessment, the average expenditure was 1,303 SYP (5.21 USD) (see Chart 1). Respondents who primarily relied on in-home municipal pipelines for their drinking water reported paying an average of 216 SYP per month (0.86 USD), a figure that included those who reported paying nothing for water. When non-paying households were excluded, the average monthly expenditure jumped to 1,163 SYP (4.65 USD).

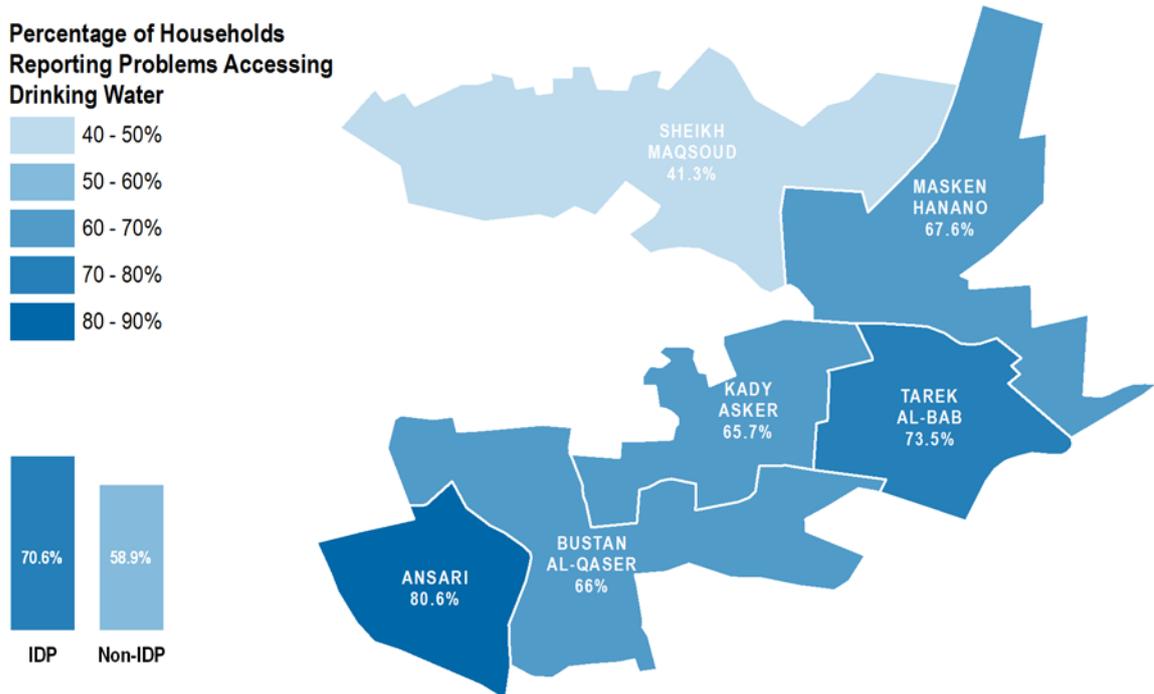
On average, water was the fifth-largest expenditure category for eastern Aleppo households, following food, fuel, electricity and NFIs.

ACCESS AND AVAILABILITY

Nearly two-thirds (66%) of eastern Aleppo residents faced difficulties accessing drinking water at least once during the 30 days prior to the survey. A similar number, 62%, had problems accessing water for household purposes. IDP households faced more frequent issues obtaining both types of water.

In general, access was most difficult in Ansari, with 81% of households there reporting problems accessing drinking water and 75% reporting problems accessing water for domestic use (see Maps 3 and 4). By contrast, residents of Sheikh Maqsood were least likely to report issues, with corresponding percentages of 41% and 47% for drinking water and domestic water, respectively.

Map 3: Percentage of households reporting problems accessing drinking water in the previous 30 days



Map 4: Percentage of households reporting problems accessing water for domestic use in the previous 30 days

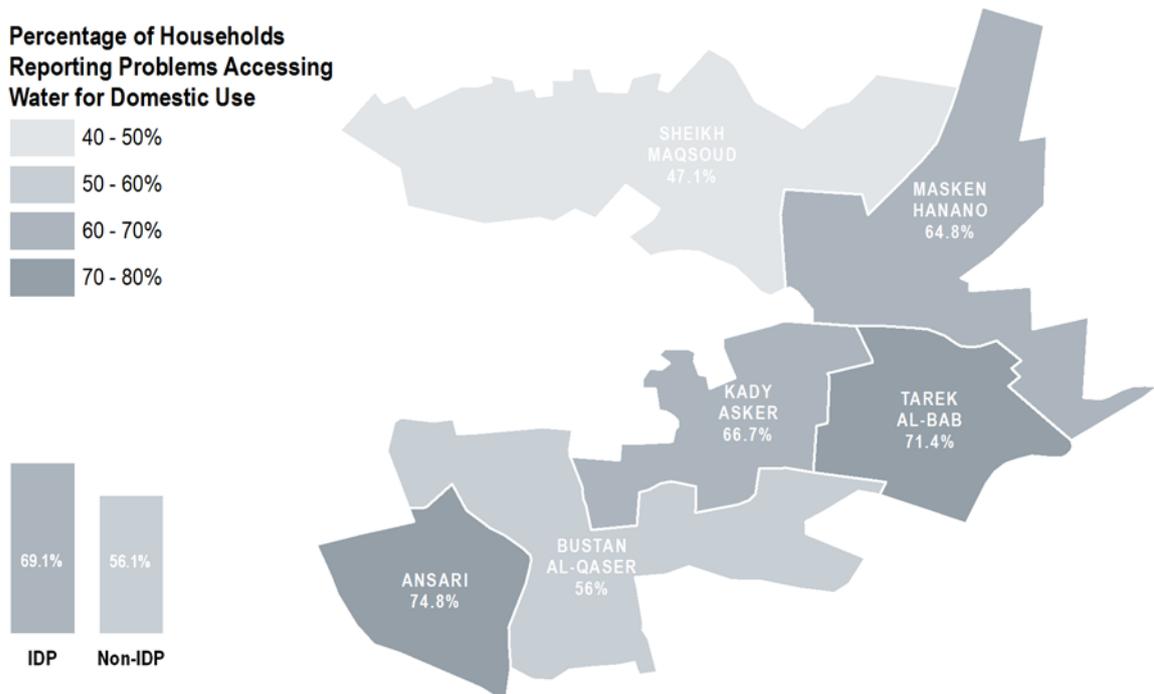
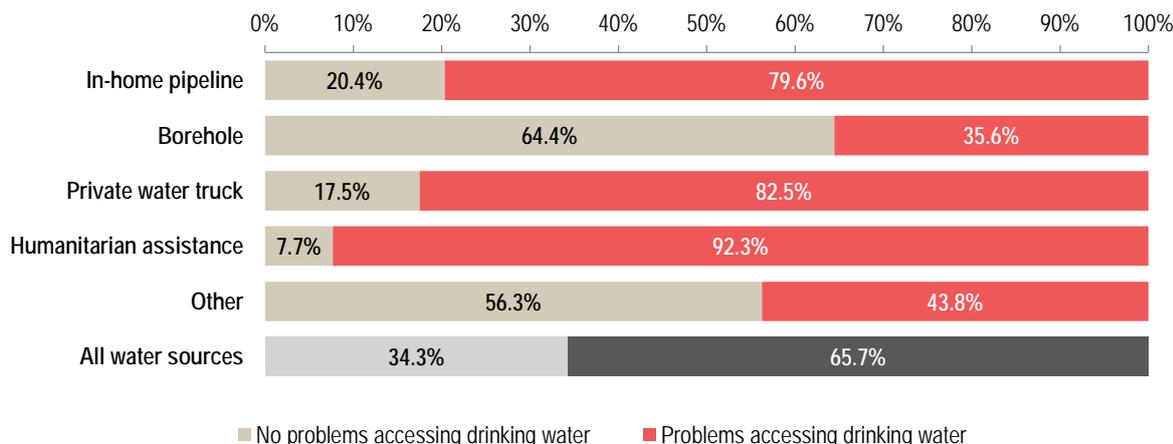


Chart 2: Nature of primary water source vs. difficulty of access



The likelihood that a household could access drinking water without difficulty varied widely based on their primary water source. Those relying primarily on boreholes were least likely to face problems, with only 36% reporting that they had been unable to access drinking water within the previous 30 days (see Chart 2). Access, however, is not enough, as the borehole water these households rely on is of uncertain quality and may have a negative impact on health.

Those relying primarily on other sources of water faced far more frequent problems. Nearly 80% of households that relied on in-home pipelines for drinking water reported that they had trouble obtaining it within the previous 30 days. Meanwhile, 83% of those reliant on private water trucks and 92% of those reliant on

humanitarian assistance reported similar access issues.

Predictably, a household's distance from the nearest water source was connected with how likely it was to report difficulties accessing drinking water (see Chart 3). Among those with a source of drinking water in the immediate vicinity of their home (10 to 25 meters away), 33% faced access issues, compared with 85% of those who live between 500 and 2,000 meters from the nearest water source. A slightly higher percentage of households with a water source between 0 and 10 meters away (42%) report access issues, which may be attributable to the large number of households in this category with unreliable in-home pipelines.

Chart 3: Distance of primary drinking water source vs. difficulty of access

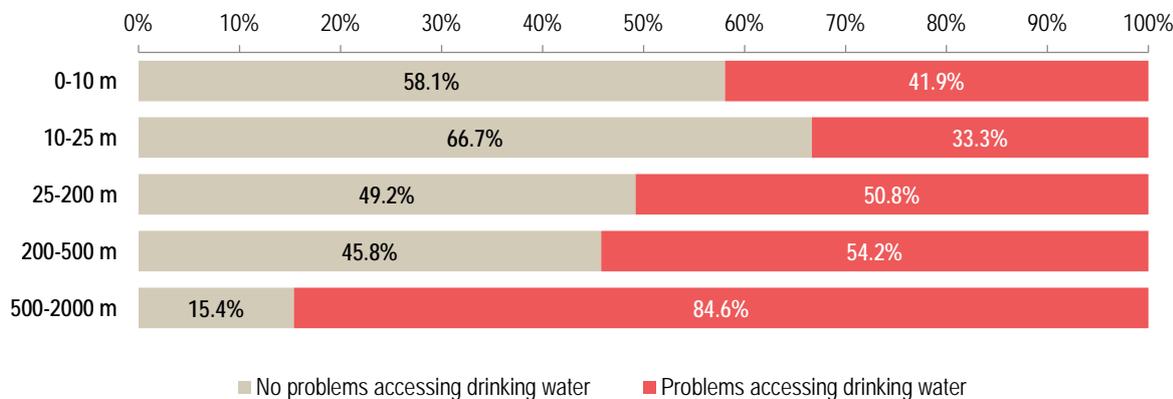
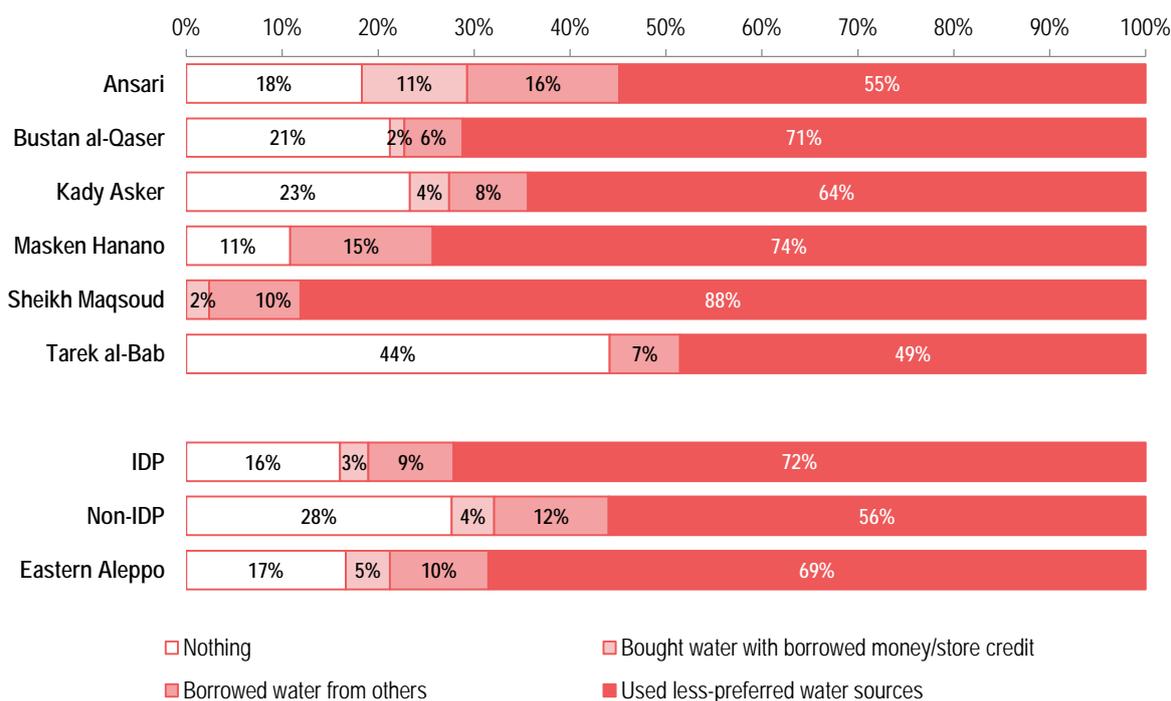


Chart 4: Coping strategies used when primary drinking water source is inaccessible or unavailable



If a household’s primary drinking water source becomes inaccessible or unavailable, there is little most can do to compensate. Across eastern Aleppo, over two-thirds of households (69%) coped with water shortages or a loss of access to their primary water source by switching to other less-preferred water sources (see Chart 4). The majority of these switched from in-home pipelines to boreholes or vice versa, with smaller numbers purchasing water from trucks when their primary water source was inaccessible. Reliance on less-preferred water sources is a matter of concern; poorer-quality water can put households at risk of disease, and more distant sources can put them at greater risk of violence or physical harm, especially if these alternate sources have become public gathering areas or are otherwise in exposed locations. A further 15% of households either borrowed water from others or purchased it using borrowed money or store credit. The final 17% used no coping strategies, instead opting to wait until access to their primary water source was restored.

Marked differences among sectors were evident. In Sheikh Maqsoud, 88% of respondents reported that they could deal with shortages by falling back on alternate water sources, and no respondents said that there was nothing they could do to cope. By contrast, in Tarek al-Bab, fully 44% of respondents reported that

they used no coping strategies at all. There were also notable differences between IDP and non-IDP households; interestingly, non-IDPs were less likely to report the use of coping strategies and more likely to go without drinking water during shortages or crises.

WATER-BORNE DISEASE AND HYGIENE

The deterioration of eastern Aleppo’s water network may have increased the risk of water-borne disease by forcing residents to rely on alternate water sources. Throughout eastern Aleppo, approximately 25% of households had at least one child under 18 who had contracted diarrhoea within the two weeks prior to the survey, and 12% had at least one adult who had suffered the same. Overall incidence rates for the disease were 12% among children and 8% among adults.

Residents of Ansari reported higher-than-average incidence rates (13% for children, 12% for adults), whereas rates in Sheikh Maqsoud (11% for children, 2% for adults) and Tarek al-Bab (10% for children, 2% for adults) were lower than average. IDP households were nearly twice as likely as non-IDP households to report at least one member suffering from diarrhoea. Incidence rates were 14% for children and 9% for adults among IDPs, but just 9% and 5%, respectively, in non-IDP households.

Table 2: Incidence of child diarrhoea vs. primary drinking water source among households with children

Primary Drinking Water Source					
	In-home pipeline	Borehole	Private water truck	Humanitarian assistance	Other
Percentage of households reporting the following number of child diarrhoea cases in the previous 2 weeks					
0	67.3%	89.8%	78.8%	58.3%	61.5%
1	20.3%	5.1%	8.1%	8.3%	23.1%
2 or more	12.4%	5.1%	13.1%	33.3%	15.4%
Child diarrhoea incidence rate by water source					
	14.1%	6.2%	13.1%	20.9%	17.9%

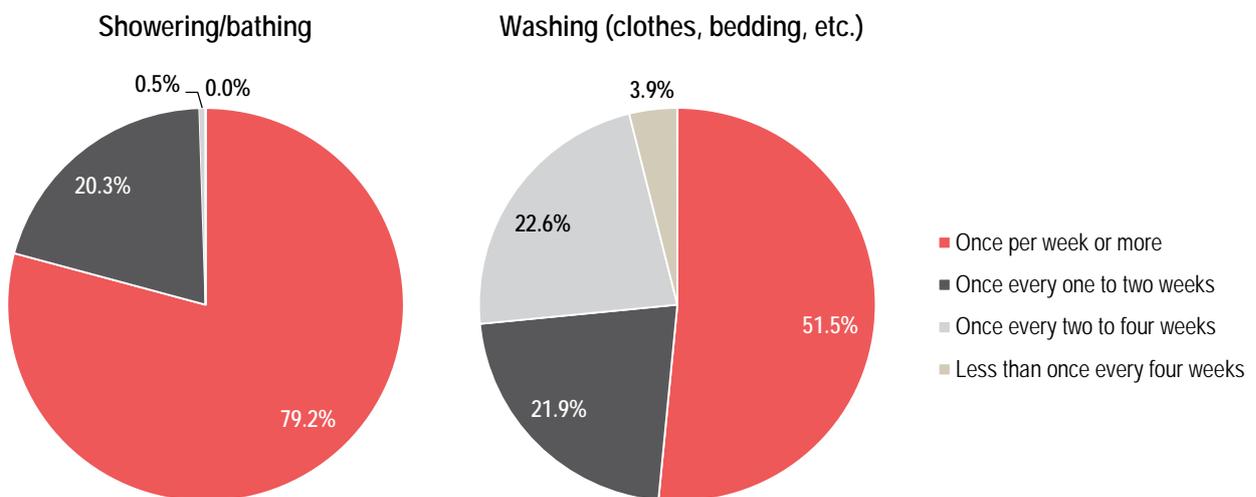
Rates of child diarrhoea varied according to the household's primary drinking water source. Households that primarily obtained water from boreholes were least likely to report cases of child diarrhoea, with an incidence rate of 6%. However, as discussed previously, water from boreholes and wells tends to be harmfully saline and puts users at risk of different health problems. Meanwhile, households that relied primarily on municipal pipelines reported a child diarrhoea incidence rate of 14%, implying that purification procedures are improper or non-existent at the city's only remaining pumping station.

Households relying on humanitarian assistance also reported a very high child diarrhoea incidence rate of 21%. This may be connected to the fact that humanitarian water distributions tend to be insufficient

to meet all household needs, and that households relying primarily on distributions are inherently less likely to have access to clean alternate water sources in their vicinity.

Furthermore, households that are unable to consistently access water often have difficulty maintaining a high level of hygiene. On average, eastern Aleppo respondents reported being able to shower once about every 7 days and to wash their clothes, bedding and other effects once every 11 days. Fully 79% of respondents took showers or baths on at least a weekly basis, with most of these bathing once per week. Meanwhile, just 52% of households were able to devote water to washing and cleaning once per week or more, and another 27% could do so less than once every two weeks.

Chart 5: Frequency of washing and bathing



CONCLUSION

Water security remains a critical issue in the neighbourhoods of eastern Aleppo. Access to water is challenging in an environment of constant shortages and conflict, and as a result, nearly two-fifths of respondents cited drinking water as their most urgent unmet need.

Though usage of Aleppo's municipal water network was nearly universal before the crisis, by the time of data collection, just 42% of eastern Aleppo households relied primarily on in-home pipelines for their drinking water. Households that obtained most of their water from these pipelines reported higher rates of adult and child diarrhoea than the rest of the population. Residents had thus turned to a variety of alternate water sources of inconsistent purity and safety, including boreholes, private water vendors, public taps and water distributions by humanitarian actors.

Nearly two-thirds of eastern Aleppo households faced difficulty accessing enough water to meet their daily needs. Those that primarily obtained their water via in-home pipelines, private vendors and humanitarian aid distributions were at particular risk of shortages and

inconsistent supplies, as were those without a water source in the immediate vicinity of their homes. Strategies for coping with periodic or frequent losses of access to water were often maladaptive or non-existent, with 85% of households either switching to less-preferred water sources or remaining unable to use any coping strategies at all.

Over the last three years, the Syrian conflict has dramatically altered the ways in which Aleppo residents access and utilise water. Many have found these changes difficult to cope with, and in light of this, humanitarian actors can play an important role in ensuring the water security of eastern Aleppo households. The continued distribution of drinking water is vital for those households that rely on it, but there are also major unmet needs for water quality monitoring, water purification projects and the treatment of water-borne diseases. This assessment has sought to fill information gaps that may hinder the implementation of these interventions. Further quantitative data on sanitation practices and challenges, as well as on the complete health profiles of responding households, would help provide humanitarian actors with a full-sector overview of the WASH-related needs of residents of eastern Aleppo.

Cover photo c/o United Kingdom Foreign & Commonwealth Office (UK FCO)

About REACH

REACH is a joint initiative of two international non-governmental organizations – ACTED and IMPACT Initiatives – and the UN Operational Satellite Applications Programme (UNOSAT). REACH's mission is to strengthen evidence-based decision-making by aid actors through efficient data collection, management and analysis before, during and after an emergency. By doing so, REACH contributes to ensuring that communities affected by emergencies receive the support they need. All REACH activities are conducted in support to and within the framework of inter-agency aid coordination mechanisms. All REACH resources are available on our resource centre: www.reachresourcecentre.info. To find out more information, please visit our website: www.reach-initiative.org

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