

# Water Under Fire

VOLUME 3

Attacks on water and sanitation services in armed conflict and the impacts on children

**Cover:** Attacks on water and sanitation services have been a signature of the armed conflict in Syria which is entering its tenth year. In the picture, a girl is carrying jerrycans of water and is walking past a pile of debris on a street in Aleppo, capital of the north-western Aleppo Governorate. Aleppo has been exposed to prolonged fighting during the conflict and has experienced frequent interruptions in its water supply.

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VOLUME 3

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## Other titles in this series

*Water Under Fire: For every child, water and sanitation in complex emergencies*, Advocacy alert, March 2019, <[www.unicef.org/reports/water-under-fire-2019](http://www.unicef.org/reports/water-under-fire-2019)>

*Water Under Fire Volume 1: Emergencies, development and peace in fragile and conflict-affected contexts*, August 2019, <[www.unicef.org/reports/emergencies-development-peace-in-fragile-and-conflict-affected-contexts-2019](http://www.unicef.org/reports/emergencies-development-peace-in-fragile-and-conflict-affected-contexts-2019)>

*Water Under Fire Volume 2: Strengthening sector capacity for a predictable, quality humanitarian response*, November 2020, <<https://www.unicef.org/reports/strengthening-sector-capacity-for-quality-humanitarian-response-2020>>

# Contents

<b>Foreword</b>	<b>v</b>
<b>Executive summary</b>	<b>vii</b>
<b>1. Introduction</b>	<b>1</b>
<b>2. International legal frameworks that address the protection of and access to water and sanitation services in armed conflict</b>	<b>7</b>
2.1 International humanitarian law (IHL)	7
2.2 International human rights law (IHRL)	10
<b>3. The impact of armed conflict on water and sanitation services</b>	<b>15</b>
3.1 Complexity and interdependence of water and sanitation services	15
3.2 Direct impacts on water and sanitation infrastructure and personnel	21
3.3 Systematic destruction of water systems in rural areas	25
3.4 Humanitarian water and sanitation programme challenges and uncontrollable consequences	25
<b>4. The impacts on children</b>	<b>29</b>
4.1 Risks posed to children by attacks on water and sanitation services	29
4.2 Direct impacts on children's health and survival	30
4.3 Alternative modes and coping mechanisms	31
<b>5. Change agenda</b>	<b>37</b>
<b>6. Conclusion: End attacks on water and sanitation services</b>	<b>43</b>
<b>Endnotes</b>	<b>44</b>





# Foreword

The human dependence on water has been exploited all too often during conflict. Nearly every conflict-related emergency where UNICEF has responded in recent years has involved some form of attack hindering access to water, whether directed against water infrastructure or through incidental harm or tactic used by a party to the conflict to limit water supply to populations.<sup>1</sup> Where there has been conflict, water has been part of the battleground.

There is no war that does not affect children. Children suffer not only when their lives, health, education, families and communities come under attack, but also when their support structures, schools and hospitals that exist to help them grow and flourish are attacked. Less widely discussed to date are the impacts on children of attacks on water and sanitation services.

UNICEF launched the Water Under Fire campaign on 22 March 2019 to draw global attention to three fundamental areas where change is urgently needed to secure access to safe and sustainable water supply and sanitation in fragile contexts. The first volume of the report series focuses on action across the humanitarian–development–peace nexus to strengthen water, sanitation and hygiene (WASH) sector resilience in fragile and conflict-affected contexts. The second volume is dedicated to the WASH sector’s capacity to deliver a predictable, quality humanitarian WASH response. This third volume in the series focuses on ending attacks on water and sanitation services in armed conflict and the impact on children.

For the purposes of this report, attacks on water and sanitation systems are defined as all ground, sea and aerial acts, which may affect the civilian population and civilian objects including through the use of munitions and unexploded ordnance. Attacks also refer to cutting off water services to civilians and targeting of water service providers that operate and maintain this infrastructure, including the denial of access to spare parts needed for repairs and consumables required to run systems.

Children rely on safe and sufficient water and sanitation for their survival and development. When children’s access to water and sanitation services is cut off during conflict, they are forced to rely on unsafe water that may threaten their lives. When the flow of safe water stops, children – especially the youngest – suffer diseases that may have fatal outcomes. Diarrhoeal disease linked to unsafe water and sanitation kills more children than violence in conflict.<sup>2</sup>

During war, it is not uncommon for children to be tasked with fetching water, which can expose them to sexual violence and abuse, and deadly harm. In addition, lack of access to water has an impact on access to education for children, especially girls, and may have other longer-term impacts on a child’s development.<sup>3</sup> For these reasons, UNICEF recognizes that attacks on water and sanitation infrastructure are attacks on children.

The global coronavirus disease 2019 (COVID-19) pandemic has acutely demonstrated to the world the fundamental importance of access to safe and sufficient water for hygiene and survival. It has also reminded us that in conflict-affected contexts, where water may already be scarce, everything possible must be done to protect water and sanitation personnel, systems and services.

Access to safe water and sanitation for all has perhaps never been more urgent. And it is achievable – provided we work together, respect the rules of war and hold each other to account when systems fail.



**Manuel Fontaine**

Director, Office of Emergency Programmes,  
UNICEF







# Executive summary

Air strikes, artillery fire and improvised explosive devices are known to injure and kill children during war. But children are also severely affected, both in the short and long term, when water and sanitation infrastructure is attacked during armed conflicts, regardless of whether this occurs through direct attacks or incidental harm. In the same vein, hindering access to water and sanitation services during war can be just as devastating to children's survival, health and development. Children rely on safe and sufficient water and sanitation for their survival and development. When their human rights to safe water and sanitation are denied, children can carry the consequences for the rest of their lives.<sup>4</sup>

If safe alternatives to access water are unavailable, impacts on children's health, in the form of disease outbreaks, can occur within days. Long-term harm caused by repeated disruptions or lower-quality services leads to various impacts, such as serious health effects and reduced or even discontinued access to school and health facilities. It can also cause reduced household and community prosperity and lead to massive displacement.

For young children especially, the consequences of these disruptions can be deadly: diarrhoeal disease is the second leading cause of death in children under 5 years of age.<sup>5</sup> In protracted conflicts, children under 5 are more than 20 times more likely to die from diarrhoeal disease linked to unsafe water and sanitation than violence in conflict.<sup>6</sup>

This is one of few reports to focus on the specific impacts on children when access to water and sanitation is hindered by:

- attacks on water and sanitation infrastructure and service provider staff
- the misuse of water and sanitation services during armed conflict
- the obstruction of humanitarian access.

It is not a lack of legal framework that allows these attacks to continue. The report highlights that the basic principles of international humanitarian law (IHL) and international human rights law (IHRL) are clear. And yet the report also describes many instances of such attacks and their impacts on wider service delivery and on some of the most vulnerable and marginalized individuals anywhere – the children who endure armed conflict.

Examples are included from some current and former armed conflicts around the world that involve several types of attacks on water and sanitation infrastructure in a range of geographic regions – the Middle East, Africa, and Central and Eastern Europe. The report focuses, however, on five countries affected by armed conflict where systematic attacks on water and sanitation services, as well as misuse of infrastructure and denial of access for staff, have all had a devastating impact on children.

Parties to conflict, humanitarian actors, states, the United Nations Security Council and donors must undertake measures to ensure that children, civilians and water and sanitation services are better protected during armed conflicts.

UNICEF calls on all actors to acknowledge that attacks on essential infrastructure, such as water and sanitation infrastructure, disproportionately affect the most vulnerable, including children. It must be recognized that such attacks may result in impacts on civilian populations – and that children will not only bear the short-term effects of attacks, but also carry the long-term consequences for a lifetime.

All actors are called on to support the following change agenda to protect water and sanitation systems and services, to establish better monitoring and reporting of attacks, and to improve advocacy that can end these violations.

## **Parties to conflict are called on to:<sup>7</sup>**

- adhere to their responsibilities under international humanitarian law and international human rights law
- take into account all foreseeable harm to civilians and the reverberating effects before carrying out attacks
- allow and facilitate access for the purpose of delivering relief, and allow safe and unimpeded access for humanitarian personnel to advocate with relevant actors, including non-state armed groups about their responsibilities under IHL, regardless of their designation under sanctions or counter-terrorism measures
- set up after-action reviews of all alleged attacks on water and sanitation infrastructure and personnel
- ensure that those engaged in combat are sensitized to all feasible precautions they should take before launching or responding to an attack

- refrain from the misuse and denial of water and sanitation services and infrastructure, from looting and from taking any steps that could lead to attacks on infrastructure
- express a clear and unequivocal commitment to avoid the use of explosive weapons with wide area effects in populated areas, and develop operational policy based on a presumption against such use.

#### **Humanitarian actors and humanitarian response mechanisms are called on to:**<sup>8</sup>

- ensure that attacks and incidents of the misuse of water and sanitation are consistently documented
- equip their personnel and partners with the required tools and skills to identify where attacks have occurred and to better understand the humanitarian consequences of the attacks
- ensure that data collected are systematic, reliable and verifiable, and that their collection is guided by professionals with specialist skills, by continuously building capacity in data collection to ensure accurate attribution of destruction to specific attacks
- mainstream reporting on attacks into other relevant existing humanitarian reporting mechanisms
- ensure collaboration with appropriate actors to harness opportunities to collect data on the short- and long-term impacts on children that result from attacks against water and sanitation services.

#### **States are called on to:**<sup>9</sup>

- ensure that all parties to armed conflict comply fully with their obligations under international law, including IHRL, as applicable, and IHL
- strongly condemn attacks against water and sanitation services and personnel in conflict situations, demand respect for international law, and demand an end to impunity for those responsible for attacks
- minimize the humanitarian impact, on water and sanitation services and on children, of the use of explosive weapons with wide area effects and look at provisions to limit their use

- ensure that all decisions that affect children take into account the child's best interests
- provide support to service providers to maintain essential service delivery in accordance with the appropriate standards; to improve the protection of service provider and humanitarian personnel; and to share elements of policies and good practices aimed at preventing attacks on water and sanitation services
- ensure child protection and IHL and IHRL training for all troops and police that are contributed by countries to peacekeeping missions and other multinational forces
- avoid legislation that criminalizes organizations that operate in certain areas to deliver humanitarian services or which engage with non-state armed actors for exclusively humanitarian purposes
- consider developing standardized humanitarian exemptions or exceptions to sanction regimes and counterterrorism measures.

#### **The United Nations Security Council is called on to:**<sup>10</sup>

- demand that all parties to armed conflict comply fully with their obligations under international law, including IHRL, as applicable, and IHL
- recognize the links between attacks against water and sanitation services, the detrimental impacts on children's rights, including the right to life and health, and the subsequent negative effects on international peace and security
- emphasize that sanctions can have a significant negative impact on humanitarian activities, including the provision of essential service delivery
- consider the adoption, as appropriate, of resolutions or presidential statements and press statements when water and sanitation services have been attacked or misused, and call for the protection of the personnel dedicated to their operation, maintenance and repair.

**Donors are called on to:**<sup>11</sup>

- acknowledge that attacks against water and sanitation services can have long-term impacts on children – allocation of predictable, long-term, flexible and adequate resources to support appropriate measures is required to respond to the magnitude of the challenges
- avoid donor conditionalities that may impede children's access to water – maintaining water and sanitation systems saves lives and should be acknowledged as a humanitarian intervention
- refrain from imposing conditionalities that lead to discrimination and exclusion of children and families based on political or other considerations
- ensure, in post-conflict reconstruction, that any reconstruction strategies integrate all concurring complex challenges such as good governance of water resources and essential services
- support engagement and partnership among local actors, and among a wider range of actors, including water and sanitation service providers, international organizations and non-governmental organizations
- continue to assist in mitigating the effects of conflict on water and sanitation services.









# 1. Introduction<sup>12</sup>

**Even the most resilient water and sanitation systems can fail in the face of attacks, leaving previously realized development gains among the rubble. Millions of children around the world suffer the worst consequences of armed conflict, paying a steep and unjust price when parties to conflict fail to respect and protect essential services.**

During armed conflict, children's fight for survival escalates when the water and sanitation services they desperately need are denied and when essential infrastructure is damaged or destroyed. The destruction of water and sanitation infrastructure – witnessed repeatedly in today's most violent conflicts – hinders children's access to a life-saving resource at the time when they need it most.

Not only are children in extremely fragile contexts often more than eight times worse off across water, sanitation and hygiene (WASH) indicators than children born into a stable, protected and developed country context. Children also fare just as badly on health, nutrition, education and other WASH-related indicators.<sup>13</sup> When the most vulnerable children in the world are denied their fundamental human rights to water and sanitation, realization of their rights to life, survival and development is also under threat.<sup>14</sup>

Attacks on water and sanitation systems are attacks on children. They are attacks on their rights, communities and networks, and on the facilities required for their health and well-being, protection and education.

When the flow of safe water stops, children are forced to rely on unsafe water that puts their lives at risk from disease, or to go out in search of new sources – a potentially fatal endeavour during armed conflict. Damaged and destroyed infrastructure makes already vulnerable populations more vulnerable, rapidly depleting their coping mechanisms.<sup>15</sup> Families may have to reduce or ration their water supplies, or instead purchase water that is excessively expensive.

For young children especially, the consequences of these disruptions can be deadly: diarrhoeal disease is the second leading cause of death in children under 5 years of age.<sup>16</sup> In protracted conflicts, children under 5 are more than 20 times more likely to die from diarrhoeal disease linked to unsafe water and sanitation than violence in conflict.<sup>17</sup>

## An alarming trend

Water resources and the systems required to deliver drinking water have been attacked for centuries. All too often, the human dependence on water has been exploited during conflict. Nearly all of the conflict-related emergencies where UNICEF has responded in recent years have involved some form of attack hindering access to water, whether directed against water infrastructure or through incidental harm or tactic used by a party to the conflict to limit water supply to conflict-affected populations.<sup>18</sup> Where there has been conflict, water has been part of the battleground – whether explicitly targeted or incidentally affected by actions or conduct during armed conflict.

## Urbanization meets armed conflict

The trend of rapid urbanization has accompanied shifts in the conduct of armed conflict.<sup>19</sup> Battles are now increasingly fought in population centres, primarily as a result of the prevalence of non-international armed conflicts between states and non-state armed groups, which exposes children to greater risk.

A surge in armed conflict, both in terms of scale and casualties, has been witnessed since 2010.<sup>20</sup> Armed conflicts have become complex and protracted, involving more non-state armed groups as well as states, and often linked to changes in the global landscape – ranging from climate change-related risks to advances in technology and interconnectivity that facilitate transnational organized crime.<sup>21</sup> In 2015, some 50 million people worldwide were affected by armed conflict in urban centers,<sup>22</sup> and conflicts are lasting longer. *Pathways for Peace: Inclusive approaches to preventing violent conflict*, a joint United Nations and World Bank study published in 2018, states that major violent conflicts have tripled in number since 2010.<sup>23</sup>

With these shifts, the use of explosive weapons in populated areas has increased.<sup>24</sup> Designed for open battlefields,<sup>25</sup> such weapons cause tremendous harm in densely populated areas. Even when used against lawful targets, there is an increased likelihood of casualties and civilian harm. Civilians account for 90 per cent of fatalities when explosive weapons are used in populated areas.<sup>26</sup> And the suffering caused to survivors by the destruction is immense. Such actions are associated with a disproportionately high impact on children, placing explosive weapons among the worst enemies of children today.<sup>27</sup>

During war, when explosive weapons destroy and disable critical water and sanitation infrastructure, the impacts on children may be immediate. If safe alternatives to access water are unavailable, impacts on children's health, in the form of disease outbreaks, can occur within days. The disruption of access to essential water and sanitation services can also force children to carry the consequences of conflict for the rest of their lives. Long-term harm caused by repeated disruptions or receiving services of a consistently lower quality leads to various impacts, including, but not limited to, a range of serious health effects such as malnutrition, delayed physical and mental development, reduced levels of education, and diminished household and community prosperity.

### **A stalemate in development progress**

During attacks, decades of investment in water and sanitation sector strengthening and important development gains can disappear in seconds. This includes exceptional progress achieved in some contexts towards meeting Sustainable Development Goal 6: Ensure availability and sustainable management of water and sanitation for all.<sup>28</sup>

Previously high levels of access to water and sanitation can be reduced to nothing following air strikes. For example, the Aleppo offensive of 2016, known to have had devastating direct impacts on children – injuring 223 and killing 96 children in less than one week<sup>29</sup> – also caused widespread damage to the city's main water network.<sup>30</sup> A World Bank damage assessment from March 2017 reported that since January 2017, none of Aleppo's remaining residents had been able to access public network services; instead, they relied wholly on public and private wells.<sup>31</sup>

Before the Syrian conflict, Multiple Indicator Cluster Survey data show that Aleppo had very high access to networked water, and public water utilities and companies were highly functional, providing safe and drinkable water on a regular and reliable basis, with 74.1 per cent of the urban population receiving piped water into their homes.<sup>32</sup> Despite enormous challenges, the city's water service provider had largely maintained the supply of water intact throughout the conflict, with partial stoppages due to power outages and disruption. That was until the offensive, when the service provider was stripped of its ability to supply water. Even the most resilient systems can fail in the face of attacks, leaving previously realized development gains among the rubble.

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## **When water and sanitation infrastructure is repeatedly damaged by war, the disturbances create a collective challenge.**

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When such attacks on water and sanitation services occur, the effect of essential services not being provided can exacerbate tensions and distrust in the authorities and institutions mandated to provide such services. This can happen in particular when water crises arise but fail to be managed by the authorities. Even in post-conflict situations, uprisings can be attributed to these collective feelings of dissatisfaction. The *Pathways for Peace* report shows that such situations can be fuelled by "subjective feelings of decline in life satisfaction, driven by perceived declining living standards ... and dissatisfaction with the quality of public services".<sup>33</sup>

When water and sanitation infrastructure is repeatedly damaged by war, the disturbances create a collective challenge. The scale and complexity of works necessary amplifies the response required of water and sanitation sector actors – local governments, water service providers, and the humanitarian actors that help to restore service delivery. This complexity is in part due to the interconnectedness of infrastructure: providing water and sanitation services is dependent on power supplies, but power systems are also damaged during armed conflict.

When actors' immediate focus must turn to the repair, replacement or mitigation of the risks of destroyed infrastructure, other consequential sector-building activities are left behind. Attacks undermine investment for rebuilding in fragile contexts (where war has occurred) or lead to the financing of short-term solutions (e.g., water trucking) where rebuilding more sustainable water and sanitation services and providing assistance to rebuild the water and sanitation sector would be much more valuable but is not feasible in the short term.

### **A rare report focusing on the impacts on children**

This final volume in the *Water Under Fire* series examines the tremendous challenges that children face when attacks on water and sanitation infrastructure take place during



armed conflict. It is one of few reports to focus on the particular impacts on children when access to water and sanitation is hindered by:

- attacks on water and sanitation infrastructure and service provider staff
- the misuse of water and sanitation services during armed conflict
- the obstruction of humanitarian access.

The report describes the impacts on wider service delivery and on some of the most vulnerable and marginalized individuals anywhere – the children who endure armed conflict. It adds the voice of UNICEF to the growing number of witnesses that document such attacks – the international community that systematically observes attacks at close hand and condemns these actions. The report aims to generate greater political support for upholding international humanitarian law (IHL) and international human rights law (IHRL), including the human rights to water and sanitation, during times of armed conflict.

Respect for the rules of war has also been expressed as one of the core responsibilities of the United Nations Secretary-General's Agenda for Humanity, which builds upon the 2030 Agenda for Sustainable Development and links to the United Nations sustaining peace agenda.<sup>34</sup> As stated in *One Humanity: Shared responsibility*, "People want to be safe: free from violence, oppression, persecution and fear. Without physical security, none of their other needs, rights and aspirations can be met. Services cannot be accessed, livelihoods and education cannot continue and prosperity cannot be achieved."<sup>35</sup>

Attacks on and misuse of water and sanitation systems in conflict must end. This report aims to galvanize action around the UNICEF WASH humanitarian change agenda to protect water and sanitation systems and services, to establish better monitoring and reporting of attacks, and to improve advocacy to end these violations.

As well as describing the situations that characterize attacks on water and sanitation infrastructure and service provider staff, the report describes the effects on children's rights and well-being. Advocacy and policy recommendations to protect children's access to water and sanitation are set out for decision makers and all stakeholders in armed conflict.

UNICEF's and partners humanitarian WASH programmes have been implemented in a range of situations where attacks on water and sanitation services have threatened access for populations, and so the report also contributes operational experiences to the evidence base.

While the report refers to a broader spectrum of issues, including the general deterioration of water and sanitation services in fragile contexts during armed conflict, it will focus on the most alarming trends that are most harmful to children.<sup>36</sup> There are, however, wider issues affecting access to water and sanitation beyond those covered in this report, such as the long-term, cumulative deterioration of water and sanitation services that occurs in fragile contexts. *Water Under Fire Volume 1: Emergencies, development and peace in fragile and conflict-affected contexts*, which focuses on the humanitarian–development–peace nexus, explores how to both prevent system collapse and use WASH services as a platform for peacebuilding.<sup>37</sup>

The report also highlights that while water and sanitation services are well protected by IHL, the lack of respect for IHL and its basic principles of distinction, proportionality and precaution, and rules relating to humanitarian access remain a major impediment for the protection of civilians and civilian objects in today's armed conflicts. Attacks on water and sanitation services – whether against the civilians who operate the services or civilian objects such as water, sanitation and energy infrastructure – often violate IHL. The deprivation of basic necessities of life and the denial of humanitarian relief can contravene the human rights to water and sanitation<sup>38</sup> – applicable during humanitarian crises<sup>39</sup> – as well as customary IHL, which binds all parties to a conflict. Intentional denial of services and misuse of water services and infrastructure can also constitute violations of IHL. Parties to the conflict need to factor into proportionality assessments the reasonably foreseeable effects of an attack and must take into account the basic principles of IHL.

Examples are included from some current and former armed conflicts around the world that involve several types of attacks on water and sanitation infrastructure in a range of geographic regions – the Middle East, Africa, and Central and Eastern Europe. The report primarily focuses, however, on five countries affected by armed conflict that have documented frequent systematic attacks on water and sanitation services, as well as misuse of infrastructure and denial of access for staff, which have all had a devastating impact on children: State of Palestine, Syrian Arab Republic, Iraq, Ukraine and Yemen.

# FIVE ARMED CONFLICT CONTEXTS

## WHERE ATTACKS ON WATER AND SANITATION SERVICES ARE FREQUENT

### Syrian Arab Republic

**4.7 million**  
children  
are in need



**15.5 million people**  
were in need of water,  
sanitation and hygiene in 2019,  
partly due to heavy  
infrastructure damage.



**More than  
5 million people**  
faced potentially life-threatening  
water shortages in 2015 alone  
as a result of the conflict.



In 2019, the United Nations  
documented and verified  
**46 attacks** on water facilities  
in Syria.

### Yemen

**12.2 million**  
children  
are in need



An estimated  
**24 million people**  
(85% of the population)  
were in need of humanitarian  
assistance or protection in 2019.



After more than 5 years of  
deadly fighting, **Yemen remains**  
**the locus of the world's  
largest humanitarian crisis.**



There have been at least  
**122 incidents** air strikes  
on water and sanitation  
infrastructure between 25 March  
2015 and 28 February 2020.



The cholera epidemic, which  
erupted in 2017, continues, with  
**more than 10,000 cases**  
**reported weekly** in 2019.

### Ukraine

**430,000**  
children  
are in need



**5.2 million people**  
are affected by the armed  
conflict, now in its 6th year in  
the east of the country.



**2.8 million people**  
(54% of the population)  
in the Donetsk and Luhansk  
oblasts need water and  
sanitation assistance.



88 conflict-related water and  
sanitation incidents were  
reported in 2019 alone, leading  
to 44 days of water supply  
stoppages.



Since 2017 there has been  
**380 attacks** on water, with 4  
incidents already taken place in  
2021. Every 4 days on average,  
conflict-related incidents affect water  
infrastructure near the front line.

## State of Palestine

**1 million children are in need**



Some **817,000 children** in the State of Palestine have inadequate access to WASH services.



The cumulative effect of 3 recent wars in the Gaza strip has led to a severe deterioration of water and sanitation services.



The 2014 war caused **US\$34 million in damage** to water and sanitation systems, according to Gaza's water utility.



Since 2019, **95 attacks** against 142 WASH structures have occurred in the State of Palestine (94 in the West Bank and one in the Gaza Strip), affecting 67,349 people (37,394 people in the West Bank and 30,000 in the Gaza Strip).

## Iraq

**1.9 million children are in need**



**4.6 million people** who have returned to conflict-affected areas face risks of lack of access to basic services.



After 40 years of conflict, **4.1 million people** in Iraq are in need of humanitarian assistance.



The protracted conflict in Iraq has resulted in **massive damage** to the water and sanitation infrastructure.



Fighting has damaged water systems and entire districts have had their **water supply networks cut off** by armed groups.

**Source:** Syrian Arab Republic: United Nations Children's Fund, 'Humanitarian Action for Children: Syrian Arab Republic', UNICEF, 2020, <<https://www.unicef.org/media/77411/file/2020-HAC-Syria.pdf>>, accessed 6 November 2020; United Nations Office for the Coordination of Humanitarian Affairs, *Syrian Arab Republic Humanitarian Needs Overview 2019*, OCHA, March 2019, <[https://hno-syria.org/data/downloads/en/full\\_hno\\_2019.pdf](https://hno-syria.org/data/downloads/en/full_hno_2019.pdf)>, accessed 29 May 2020; United Nations Children's Fund, 'Water Restored to Aleppo after a 48-days Deliberate Shutdown of Water Facility', UNICEF, 6 March 2016, <<https://reliefweb.int/report/syrian-arab-republic/water-restored-aleppo-after-48-days-deliberate-shutdown-water-facility>>, accessed 29 May 2020; General Assembly Security Council, *Children and Armed Conflict: Report of the Secretary-General*, 9 June 2020, A/74/845-S/2020/525, p. 180, <[www.un.org/ga/search/view\\_doc.asp?symbol=S/2020/525&Lang=E&Area=UNDOC](http://www.un.org/ga/search/view_doc.asp?symbol=S/2020/525&Lang=E&Area=UNDOC)>, accessed 21 October 2020.

Yemen: The figure of 12.2 million children in need is provisional, see: United Nations Office for the Coordination of Humanitarian Affairs, 'Yemen Humanitarian Needs Overview 2020' (draft), OCHA, cited at United Nations Children's Fund, 'Yemen Appeal: Humanitarian Action Appeal', <[www.unicef.org/appeals/yemen.html#14](http://www.unicef.org/appeals/yemen.html#14)>, accessed 29 May 2020; European Commission, European Civil Protection and Humanitarian Aid Operations, 'Yemen' (factsheet), December 2019, <[https://ec.europa.eu/echo/where/middle-east/yemen\\_en](https://ec.europa.eu/echo/where/middle-east/yemen_en)>, accessed 29 May 2020; data from Yemen Data Project, <[www.yemendatapoint.org](http://www.yemendatapoint.org)>, accessed 29 May 2020.

Ukraine: 'UNICEF Ukraine: 2020 Humanitarian Needs Overview'; United Nations Office for the Coordination of Humanitarian Affairs, 'Ukraine', <[www.unocha.org/ukraine](http://www.unocha.org/ukraine)>, accessed 29 May 2020; <<https://www.humanitarianresponse.info/en/operations/ukraine>> <<https://www.humanitarianresponse.info/en/operations/ukraine>> WASH Cluster, '2019 analysis' (internal document); WASH Cluster, 'Water and Sanitation in Eastern Ukraine', PowerPoint presentation, September 2019; Ukraine WASH Cluster, 'Attacks on water and sanitation in Ukraine', email from Ukraine WASH Cluster UNICEF The Office of Emergency Programmes (EMOPS), 25 March 2021.

State of Palestine: The figure of 1 million children in need is provisional, see: United Nations Office for the Coordination of Humanitarian Affairs, 'State of Palestine Humanitarian Needs Overview 2020' (draft), OCHA, cited at United Nations Children's Fund, 'State of Palestine Appeal: Humanitarian Action Appeal', <[www.unicef.org/appeals/state\\_of\\_palestine.html#6](http://www.unicef.org/appeals/state_of_palestine.html#6)>, accessed 29 May 2020; United Nations Office for the Coordination of Humanitarian Affairs, occupied Palestinian territory, 'Gaza Strip: WASH damage and estimated number of people with no access to clean water (5 September 2014)', fact sheet, <[www.ochaopt.org/content/gaza-strip-wash-damage-and-estimated-number-people-no-access-clean-water-5-september-2014](http://www.ochaopt.org/content/gaza-strip-wash-damage-and-estimated-number-people-no-access-clean-water-5-september-2014)>, accessed 29 May 2020; key informant interview with WASH sector professional, 2020; Manenti, Ambrogio, et al., 'Report of a Field Assessment of Health Conditions in the Occupied Palestinian Territory', World Health Organization, February 2016, p. 7, <[http://apps.who.int/gb/Statements/Report\\_Palestinian\\_territory/Report\\_Palestinian\\_territory-en.pdf](http://apps.who.int/gb/Statements/Report_Palestinian_territory/Report_Palestinian_territory-en.pdf)>, accessed 12 June 2020; United Nations Office for the Coordination of Humanitarian Affairs, 'Breakdown of Data on Demolition and Displacement in the West Bank', <<https://app.powerbi.com/view?r=eyJrJmMjZGRhYWQkODk0MS00MjZGNjIjLVjYQxNmU2ZGM3MCIslmMiOjB9>> accessed 23 April 2021; United Nations Office for the Coordination of Humanitarian Affairs, 'Gaza Strip: Snapshot | February 2020', <<https://www.ochaopt.org/content/gaza-strip-snapshot-february-2020>> accessed 23 April 2021.

Iraq: The figure of 1.9 million children in need is provisional (and calculated based on children comprising 47 per cent of the population according to Ministry of Planning Central Statistics Office demographic data), see: United Nations Office for the Coordination of Humanitarian Affairs, 'Iraq Humanitarian Needs Overview 2020' (draft), OCHA, cited at United Nations Children's Fund, 'HAC 2020: Iraq', <[www.unicef.org/media/76651/file/2020-HAC-Iraq-revised-3.30.pdf](https://www.unicef.org/media/76651/file/2020-HAC-Iraq-revised-3.30.pdf)>, accessed 6 November 2020; United Nations Office for the Coordination of Humanitarian Affairs, 'Humanitarian Bulletin: Iraq, December 2019', OCHA Iraq, 31 December 2019, <<https://reliefweb.int/report/iraq/iraq-humanitarian-bulletin-december-2019>>, accessed 29 May 2020; United Nations Office for the Coordination of Humanitarian Affairs, *Iraq Humanitarian Needs Overview 2019*, OCHA, November 2018, <<https://data2.unhcr.org/en/documents/download/67416>>, accessed 29 May 2020.





## 2. International legal frameworks that address the protection of and access to water and sanitation services in armed conflict

Children in situations of armed conflict rely on the international legal frameworks that protect water and sanitation services, and their rights to access such services. These frameworks exist to prevent harm to services and preserve the ability of civilians, including children, to meet their basic needs.

Supporting the provision of water and sanitation services is central to the UNICEF policy of protecting children in humanitarian situations, as mandated by its Core Commitments for Children in Humanitarian Action. The Core Commitments for Children are in turn guided by IHL and IHRL, particularly the United Nations Convention on the Rights of the Child, which applies at all times, to all children, in all situations.

IHL is a set of rules that seeks to limit the effects of armed conflict. It protects people who are not, or are no longer, participating in the hostilities, including children, and restricts the means and methods of warfare available to

parties to the conflict.<sup>40</sup> Violations of IHL occur through a range of tactics, illustrated in section 3 of this report (*for a summary, see Box 1*). These cases demonstrate the need for actions to strengthen compliance.

### 2.1 International humanitarian law (IHL)

The relevant IHL provisions are found in the Geneva Conventions of 1949 and their Additional Protocols of 1977, as well as in customary IHL, as reflected in the International Committee of the Red Cross (ICRC) study on the subject.<sup>41</sup> *The Geneva List of Principles on the Protection of Water Infrastructure*, published by the Geneva Water Hub, also provides extensive information and references to specific principles applicable to the protection of water and water infrastructure.<sup>42</sup>

Set out below are some of the basic customary IHL rules applicable to the protection of water infrastructure in armed conflict.

### Box 1. Impacts of armed conflict on water and sanitation services

The impacts of armed conflict on water and sanitation services can take different forms. In the most immediate sense, an attack can cause **direct impacts** on water and sanitation infrastructure, on supplies or on the staff essential to manage or operate the infrastructure. The term ‘direct impacts’ describes the immediate and physical harm (damage or destruction) caused directly to such structures, items and people. Direct impacts on water and sanitation infrastructure can result from attacks directed at it.

‘**Incidental impacts**’ on water and sanitation infrastructure can result from attacks directed at military objectives in the vicinity of, or connected to, such infrastructure.

Infrastructure and services can also be **misused**, for instance, where facilities are used or services withheld for

military purposes, including when a party to the conflict deliberately shuts down water supply serving populations under the control of the enemy. When water and sanitation services are disrupted during conflict, humanitarian action may be required to repair infrastructure or provide alternative water sources. **Humanitarian access** might be denied, preventing the passage of humanitarian workers to maintain or repair water infrastructure or the passage of supplies needed for repairs (including chemical reagents and spare parts), as a means of military or political gain. Denial of humanitarian access can also involve interference with, or impediments to, the provision of water on an ad hoc basis, whether through water-trucking operations or other short-term solutions.



## IHL rules governing attacks

The rules of distinction, proportionality, and precautions in, and against the effects of, attack are particularly critical for the protection of water and sanitation infrastructure.<sup>43</sup>

### Distinction

Attacks must not be directed at civilian objects; only military objectives may be directly attacked. Objects considered military objectives are “those objects which by their nature, location, purpose or use make an effective contribution to military action and whose total or partial destruction, capture or neutralization, in the circumstances ruling at the time, offers a definite military advantage.”<sup>44</sup> All other objects are civilian objects. Equally, “attacks which do not or cannot distinguish between military objectives and civilian objects, including water infrastructure and water-related infrastructure, are prohibited.”<sup>45</sup>

IHL also sets out more specific rules to protect essential objects on which civilians rely for their survival (discussed in more detail below). Attacking, destroying, removing or rendering useless objects indispensable to the survival of the civilian population is prohibited.<sup>46</sup> Indispensable objects

include foodstuffs, agricultural areas for the production of foodstuffs, crops, livestock, drinking water installations and supplies, and irrigation works. This list is not exhaustive, and it should be interpreted based on the context.<sup>47</sup>

IHL also prohibits attacks directed at civilians. Civilians lose their protection against attack when they directly participate in hostilities. Civilian personnel responsible for the operation and maintenance (O&M), assessment, repair and rehabilitation of water infrastructure must not be attacked. This includes the personnel of civil defence organizations and humanitarian actors involved in such tasks.<sup>48</sup>

### Proportionality

Even if an attack is directed at a military objective, the principle of proportionality prohibits the launch of any attack “which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated.”<sup>49</sup>

When applying the proportionality principle to an attack that may incidentally harm civilian water infrastructure, the attacking party must consider the **reverberating effects of the attack**





as well as the expected material harm to the infrastructure. Reverberating effects can be described as the indirect disruption of essential services that may be caused by damage to infrastructure, including water facilities and supply networks.

Water infrastructure in densely populated areas is especially vulnerable to attacks, even if it is not directly targeted.<sup>50</sup> For example, following the detonation of an explosive weapon in a populated area, the incidental damage or destruction caused to water infrastructure also leads to indirect, reverberating effects such as the disruption of water services, potentially resulting in disease and death.<sup>51</sup>

Reverberating effects can be amplified or dampened depending on the resilience of the water service prior to the attack – known as **baseline service resilience**.<sup>52</sup> To prevent disproportionate effects, attacking parties should consider baseline service resilience among the factors determining proportionality (and precautions, as set out below).<sup>53</sup> This means that the vulnerability of already fragile water services should be taken into account to the extent possible when considering whether an attack expected to cause incidental harm to water infrastructure meets the proportionality test.

These aspects are especially significant in urban areas, where explosive weapons with wide area effects cause extensive material damage.<sup>54</sup> The reverberating effects of harm to water infrastructure can lead to malnutrition, epidemics (especially of waterborne diseases) and displacement.<sup>55</sup> Many of these foreseeable impacts affect children more acutely, particularly children under the age of 5 who are exceptionally vulnerable to diseases related to unsafe water and sanitation.<sup>56</sup> Because the water supply in urban areas may be part of a larger, interconnected system of essential infrastructure, the impact of an attack can be amplified by the disruption of other essential services: effects on one component of an interconnected set of services can directly affect the functionality of another component.

A proportionality assessment in urban environments is therefore crucial. When these consequences – malnutrition, epidemics, displacement – are reasonably foreseeable given the circumstances at the time of an attack, they should be taken into account when applying the proportionality principle.<sup>57</sup>

### **Precautions in, and against the effects of, attack**

In the conduct of military operations, constant care must be taken to spare the civilian population, including children,

and civilian objects. Precautions in attack include doing everything feasible to verify that targets are military objectives. They also include taking all feasible precautions in the choice of means and methods of warfare with a view to avoiding and, in any event, minimizing incidental civilian casualties and damage to civilian objects.<sup>58</sup>

From an IHL perspective, special attention must be paid to the type of weapons and munitions used in densely populated areas, to spare civilians and civilian infrastructure.<sup>59</sup> During military operations, parties to the conflict must therefore take all feasible precautions to avoid and minimize the destruction of or damage to water infrastructure indispensable to the survival of the civilian population, such as systems of water supply, purification and distribution.<sup>60</sup>

Parties to the conflict must also take all feasible precautions to protect the civilian population and civilian objects under their control against the effects of attacks.<sup>61</sup> Such precautions may include avoiding the placement of military objectives in the vicinity of water infrastructure, or clearly identifying such infrastructure with markings. Establishing protected zones around water infrastructure with the agreement of all parties is also encouraged.<sup>62</sup>

## **IHL rules governing essentials for survival**

There are more specific rules to protect objects essential to the survival of civilians and access to these objects. First, each state has the responsibility to meet the basic needs, including water, of people in its territory or under its control, while “organized armed groups also have the responsibility to meet the needs of civilians under their control when the State has not done so.”<sup>63</sup>

Under the Fourth Geneva Convention, an occupying power has the “duty of ensuring the food and medical supplies of the population.”<sup>64</sup> It also has, “to the fullest extent of the means available to it ... the duty of ensuring and maintaining, with the cooperation of national and local authorities, the medical and hospital establishments and services, public health and hygiene in the occupied territory, with particular reference to the adoption and application of the prophylactic and preventive measures necessary to combat the spread of contagious diseases and epidemics.”<sup>65</sup>

Similarly, concerning displacement, “all possible measures must be taken in order that the civilians concerned are received under satisfactory conditions of shelter, hygiene, health, safety and nutrition.”<sup>66</sup>

IHL prohibits the starvation of civilians as a method of warfare – a prohibition that extends to water since it encompasses all essentials for survival.<sup>67</sup>

Further, there is recognition under IHL that impartial humanitarian actors can offer their services to parties to an armed conflict for the benefit of people who are not fighting. Once the consent of the state is obtained for such humanitarian services, it is the duty of all parties to the conflict to allow and facilitate the rapid and unimpeded passage of humanitarian relief for civilians in need.<sup>68</sup> The parties must also ensure the freedom of movement of authorized humanitarian relief personnel essential to the exercise of their functions.<sup>69</sup> Only in case of imperative military necessity may their movements be temporarily restricted. This duty encompasses the movement of personnel and equipment for the O&M, assessment, repair and rehabilitation of water infrastructure.<sup>70</sup>

Rapid and unimpeded passage of humanitarian aid and personnel goes hand in hand with the prohibition of starvation, as “denying access of humanitarian aid intended for civilians in need, including deliberately impeding humanitarian aid ... or restricting the freedom of movement of humanitarian relief personnel ... may constitute violations of the prohibition of starvation.”<sup>71</sup>

In addition, “parties to an armed conflict must respect and protect humanitarian relief personnel and objects used for relief operations. It is prohibited to attack, harass, intimidate or arbitrarily detain personnel, or to attack, destroy, misappropriate or loot relief supplies, installations, material, units or vehicles.”<sup>72</sup>

## 2.2 International human rights law (IHRL)

The human rights to water and sanitation are not only distinct rights but are also critical to the realization of other fundamental human rights. Without access to safe water and sanitation, children’s rights to life, to the enjoyment of the highest attainable standard of health, to an adequate standard of living, to education and to dignity can all be undermined.

The Convention on the Rights of the Child is the most widely ratified human rights treaty in history. It addresses the rights to water and sanitation in article 24, which requires States parties to recognize the right of the child to the enjoyment of the highest attainable standard of health through appropriate measures, including “through the

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**Without access to safe water and sanitation, children’s rights to life, to the enjoyment of the highest attainable standard of health, to an adequate standard of living, to education and to dignity can all be undermined.**

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provision of adequate nutritious foods and clean drinking-water.”<sup>73</sup> The Committee on the Rights of the Child has also noted the importance of access to safe water and sanitation for the youngest children, in the context of early childhood development, and for adolescents, at school.<sup>74</sup>

Similar provisions recognizing the human rights to water and sanitation are also included in the United Nations Convention on the Elimination of all Forms of Discrimination against Women, and the right to clean water in the United Nations Convention on the Rights of Persons with Disabilities.

The right to water entitles children to “sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses”, regardless of the conditions.<sup>75</sup> The right to sanitation entitles children “to have physical and affordable access to sanitation, in all spheres of life, that is safe, hygienic, secure, socially and culturally acceptable and that provides privacy and ensures dignity”.<sup>76</sup> The human rights to water and sanitation continue to apply in situations of armed conflict, including through States parties’ obligation to respect the rights to water and sanitation by refraining from “limiting access to, or destroying, water services and infrastructure as a punitive measure, for example, during armed conflicts in violation of international humanitarian law.”<sup>77</sup>

Not only are the rights to water and sanitation clearly established in treaty law, but the United Nations General Assembly also recognized in 2010, in its resolution 64/292, “the right to safe and clean drinking water and sanitation as a human right that is essential for the full enjoyment of life and all human rights.”<sup>78</sup> While the United Nations Human Rights Council had previously issued resolutions on human rights and access to safe drinking water, the General



Assembly resolution indicated growing global recognition of these fundamental rights to water and sanitation.<sup>79</sup>

States bear the primary responsibility to respect and ensure the human rights of all individuals within their territory and subject to their jurisdiction. Non-state armed groups are increasingly recognized as also having human rights responsibilities, particularly when they exercise de facto control of a territory.<sup>80</sup> Indeed, as a recent conference room paper of the Independent International Commission of Inquiry on the Syrian Arab Republic notes, while an armed group cannot formally become party to international human rights treaties, armed groups are “nevertheless obligated to

respect fundamental human rights norms, which form part of customary international law in territory where such actors exercised de facto control.”<sup>81</sup>

The responsibility of non-state armed groups to respect international human rights norms has also been acknowledged by the Inter-Agency Standing Committee, which observes that “de facto authorities or non-state armed groups that exercise government-like functions and control over territory are increasingly expected to respect international human rights norms and standards when their conduct affects the human rights of individuals under their control.”<sup>82</sup>





## Case study

# Application of international humanitarian and human rights law in the Syrian Arab Republic: The case of Wadi Barada



**Throughout the Syrian conflict, damage caused to water systems has deprived millions of children of their right to clean water for drinking and domestic uses.<sup>83</sup>**

Tactics used by parties to the Syrian conflict have included shutting off water at the source, air strikes and ground attacks on water facilities, and hindering access for essential personnel to repair and operate facilities. Water has also been contaminated during the hostilities, further restricting children's access to a safe supply. In 2019, the United Nations documented and verified 46 attacks on water facilities in Syria.<sup>84</sup>

In February 2014, leading United Nations independent experts – including on the human rights to food, health, housing, water and sanitation – called on parties to the Syrian conflict to try to minimize civilian suffering.<sup>85</sup> In the statement, the group said: “Depriving people of their access to food and water, impeding their access to health service and wantonly destroying their housing constitute clear violations of the human rights to food, to water, to sanitation, to housing, to health, and to freedom from inhumane treatment, protected under international human rights treaties.”<sup>86</sup>

The Independent International Commission of Inquiry on the Syrian Arab Republic reported to the Human Rights Council the results of an investigation into human rights abuses and international humanitarian law (IHL) violations committed during the Syrian conflict.<sup>87</sup> The extent of the damage and widespread suffering caused in the Syrian Arab Republic in 2016 was investigated by a team reporting on wider human rights abuses to the thirty-fourth session of the Human Rights Council.

Fighting broke out in December 2016 in Wadi Barada, just outside Damascus city, the location of three primary water sources including the al-Feijeh spring, the source of 70 per cent of all Damascus water.<sup>88</sup> Armed groups had held the area under siege since late 2013, and had threatened to cut off the water on several occasions, effectively preventing attacks by exerting their control over the springs.





**Syria**

**The investigation by the Independent International Commission of Inquiry on the Syrian Arab Republic concluded that the al-Feijeh spring was “purposely targeted” and that the damage to the water source had a “devastating impact” on the millions of civilians.**

On 23 December, day two of the government offensive, extensive damage was inflicted upon the al-Feijeh spring by aerial bombing, with at least one armed group fighter killed.<sup>89</sup> On the same day, the Damascus water authority declared that it had cut off water supplies due to their contamination with fuel by armed groups: 5.5 million people were deprived of regular access to potable water for over a month as a result.<sup>90</sup> This pushed a significant part of the population to resort to alternative and often unsafe water sources, such as using shallow wells and water trucking, to meet or complement their water needs, thereby increasing the risk of contracting water-related diseases.

The Commission’s investigation concluded that the al-Feijeh spring was “purposely targeted” and that the damage to the water source had a “devastating impact” on the millions of civilians – across government- and opposition-controlled areas – deprived of access to water.<sup>91</sup> The report concluded that the damage to the spring was “grossly disproportionate to the military advantage anticipated or achieved. The attack amounts to the war crime of attacking objects indispensable for the survival of the civilian population, and further violated the principle of proportionality in attacks.”<sup>92</sup>



Extensive damage was inflicted upon al-Feijeh spring, the source of  
**70%**  
of all Damascus water.



**5.5 million**  
**people were deprived** of regular access to potable water for over a month as a result.

*First picture on the facing page*

*A water worker in Syria shows damaged water pipes ready to be disposed of, following fighting and attacks in the area.*

*Second picture on the facing page*

*9-year-old Abdulghani (left) and his brother Hassan, 6, wait for their turn to fill the empty jerry cans from a local water well in eastern Aleppo in the Syrian Arab Republic. When water is cut from the main network in eastern Aleppo, around 270,000 people, including 100,000 children, are forced to drink water from unreliable sources including contaminated wells.*







# 3. The impact of armed conflict on water and sanitation services

**Armed conflict in urban and rural settings can disrupt access to water and sanitation services and lead to misuse of these essential services. Denial of access to operate services and facilitate repairs presents challenges. And incidental impacts to the interconnected systems can cause as much harm as direct impacts.**

## 3.1 Complexity and interdependence of water and sanitation services

Water and sanitation services, particularly in urban centres, are characterized by their complexity and interconnectedness.<sup>93</sup> Water supply is run by service providers (of which water utilities are one example), usually decentralized companies or public entities responsible for the safe distribution of water and related services such as wastewater collection, treatment and disposal. To ensure continuity in service delivery, service providers require more than just infrastructure alone. They also need a diverse range of staff, including personnel who have the capacity to carry out operation and maintenance (O&M); access to spare parts and consumables; and the recurrent finances required to keep services running.

**Water supply** infrastructure typically includes a source of surface water or groundwater, the subsurface elements of which include the piped networks that connect the various parts of the system. To keep services functioning, water systems are linked to a broader set of associated systems. A continuous supply of electricity is needed to operate both water and sanitation infrastructure. A reliable supply of consumables, including chlorine for water disinfection, is also necessary for water supply. Without a reliable chlorine supply, the quality of piped water leaving water treatment facilities is threatened.

**Sanitation** is vital to promote health and prevent the spread of disease caused by the release of untreated wastewater into the general environment. To protect public health and the environment, typically in more densely populated urban areas, **wastewater treatment** – a process intimately connected to water supply processes and often provided by the same service providers – is necessary to remove contaminants. Wastewater, which includes household sewage and grey water (i.e., water from basins and showers), is passed through multiple treatment processes before its safe return to the water source or

its safe distribution for reuse. When damage is caused to wastewater treatment works sited close to water supply infrastructure, serious consequences can result. Cross-contamination from wastewater to water supply networks creates a major risk of water contamination and associated disease outbreaks.

Complex infrastructure systems that typically serve urban populations can be located outside of cities, in rural areas, therefore the impacts of protracted conflict extend to rural areas where urban and rural locations are linked through such *upstream–downstream* patterns of water and sanitation infrastructure. The linkages between the upstream elements of water supply (typically the water source and its associated infrastructure), land use, other activities and other processes influence the downstream flow to water users.<sup>94</sup>

The spatial dimensions of water supply are unique. Water sources relied upon for urban water supply are typically situated outside the city – sometimes hundreds of kilometres away – with the water routed through a series of pipelines to supply the city's residents.<sup>95</sup> Energy (in the form of hydroelectric power), water supply and sanitation infrastructure may also draw upon the same natural water source to provide their services, creating an interdependence of these essential services on a particular water source. When an attack has led to contamination of the water source, competition for the use of the remaining scarce water may arise.

In a spatial sense, there are also both visible and hidden elements of water supply. An above-ground water treatment facility is more obvious than underground elements of the infrastructure such as the pipelines. The spatial dimensions can drive methods of warfare. In Iraq, where the degree of security is low outside of Baghdad, armed parties to the conflict have seized opportunities to control water infrastructure in locations that are distant from urban centres.<sup>96</sup>

Attacks on any area of infrastructure – for example, energy infrastructure – can have effects on water, sanitation and other services. Interdependency among critical infrastructure represents a risk multiplier, with the potential for an attack on a critical subcomponent to affect resilience and thus potentially lead to associated and spiralling failures.<sup>97</sup> As a result of these spiralling failures, impacts may increase over time, rather than decrease, and require more resources to effect control over them.<sup>98</sup> It is this

interdependence of services that drives vulnerability in armed conflict, as the initial effects of explosive weapons can cause severe humanitarian consequences extending far beyond the site of impact.<sup>99</sup> There are many different pathways. For instance, attacks on, or incidental damage to, extractive mines and chemical facilities in the vicinity of a water supply can lead to water, soil and land contamination.

Water and sanitation have a common reliance on **electrical power**, provided by power plants, distribution/transmission lines and substations, or, in the absence of a grid electricity supply, by generators and fuel. A continuous power supply is required for all components of water and sanitation systems to function. Any attack on, or shutdown of, the power supply can disrupt water and sanitation services. When power systems are attacked and wastewater treatment is affected, raw sewage cannot be treated or held and can flow to low-lying areas where it may contaminate surface water bodies, infiltrate groundwater or even mix with piped water supply.

In October 2019, Alouk water station in the Syrian Arab Republic stopped pumping life-saving water to over 460,000 people, as the two main electricity lines had been damaged during the conflict. Alouk water station is the main water source for Al-Hasakeh city, Tel Tamer town and the Al Hol and Areesha camps. While some repairs have been undertaken these have not been sufficient; on 13 August 2020, the water supply was disrupted for the thirteenth time since January. These disruptions force civilians to rely on unsafe water which exposes people, particularly children, to contracting waterborne diseases. During August 2020 alone, over a thousand cases of diarrhoea were reported, along with a rapid increase in the spread of coronavirus disease 2019 (COVID-19) in north-east Syria.<sup>100</sup>

UNICEF humanitarian programmes have contended with many examples of attacks on elements of the electrical grid leading to a loss of water supply. In the 2009 response to armed insecurity in the north-west of Pakistan, where armed conflict and insecurity had displaced 3 million people,<sup>101</sup> a party to the conflict launched a rocket attack

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on the electrical grid.<sup>102</sup> This led to an immediate disruption to the functioning of 36 bore-holes that supplied water to Mingora town. Citizens resorted to collecting water from contaminated surface-water sources, resulting in an immediate outbreak of diarrhoeal disease.

The Gaza Strip has been under a closure for 13 years, and during escalations of conflict between Israeli armed forces and armed groups, the entry of fuel into the Gaza Strip is often constrained. This has led to the Gaza Power Plant requiring to limit its electricity output to only 4 hours per day. In August 2020, this caused deterioration in water quality and safe drinking-water shortages in the Gaza Strip, due to electricity cuts necessary to power water and sewage pumping stations. As a consequence, 1.6 million people living in the Gaza Strip, including more than 700,000 children, had their access to water and sanitation affected. Emergency generators are used, but there is often a significant shortage of sustainable fuel supplies. Some wastewater facilities that are affected by electricity shortages are large pieces of critical infrastructure which, when not operational, can potentially lead to serious public health concerns, as untreated sewage overflows onto streets. Moreover, water availability has dropped during these power cuts from 100 litres per day to below 50 litres, which is less than half of the World Health Organization (WHO) minimum daily water requirements.<sup>103</sup>







## Case study

# The risks of interdependence of essential services in Ukraine



**The interdependence between the essential services gives rise to great risks in Ukraine: a single attack has the potential to affect millions of people with displacement or disease.**

In the conflict-affected Donetsk and Luhansk oblasts in eastern Ukraine, essential services are highly centralized, with linkages between water and power systems and heating systems.

Citizens are heavily dependent on these systems: 3.2 million people are connected to the main Voda Donbasa water system, which twice crosses the 'contact line' between government-controlled areas and non-government-controlled areas. Water sources that supply the water infrastructure are also used to generate electrical power and heating in Donetsk and Luhansk. The outdated infrastructure, built in the 1960s, makes for highly energy intensive and inefficient services (average water losses of over 50 per cent, rising to 80 per cent on occasion), worsened by a lack of investment over the past three decades.<sup>104</sup> Attacks from heavy artillery are frequent along the contact line. Shelling, shooting and other conflict-related incidents have affected water infrastructure near the contact line every four days on average since 2016.<sup>105</sup> Since 2017 there has been 380 attacks on water, with 4 incidents already taken place in 2021.<sup>106</sup>

The interdependence of this highly complex infrastructure means that disruption of any single component can have enormous, multiple, cascading consequences. Major risks related to attacks on the interconnected infrastructure include outbreaks of waterborne diseases, the release of chlorine gas and displacement on a massive scale. Shelling of the water system in turn affects heating systems, and a long disruption to heating in the bitter winter months could displace an estimated 1 million to 3 million people.<sup>107</sup>





**Ukraine**

**Major risks related to attacks on the interconnected infrastructure include outbreaks of waterborne diseases, the release of chlorine gas and displacement on a massive scale.**

Contingency estimates predict that it could take no more than three days for heating systems to freeze following an attack that disables the interconnected infrastructure.

Water treatment processes use liquefied chlorine gas to disinfect water and to treat sewage. The compound is a health risk – exposure to chlorine gas in large quantities can harm the respiratory system and may even be fatal. In November 2017, the Donetsk Filter Station was shelled at least three times, and a backup chlorine pipeline feeding Donetsk Filter Station was damaged.<sup>108</sup> In 2017 alone, chlorine gas release was a real risk on nine different occasions during the conflict in Donetsk because of shelling near to where the gas was stored.<sup>109</sup>

Water and sanitation personnel are frequently subject to sniper shooting or shelling despite being clearly identifiable when working in the field to repair damaged systems. From the onset of the conflict in 2014 until April 2018, some 30 personnel were injured and 9 killed while on duty.<sup>110</sup> Personnel at work in the water and sanitation facilities are often obliged to take shelter in underground bunkers, which consequently results in lack of heating, poor quality of and access to water for the civilian population.



**3.2 million**

**people** are connected to the main Voda Donbasa water system.



On **9 occasions** in 2017, **chlorine gas was a real risk** during the conflict in Donetsk.



Shelling of the water system affects heating systems, and could displace

**1 million to 3 million**

**people** in the bitter winter months.

#### **First picture on the facing page**

*Illia, from the small village of Nyzhnia Olkhova near the 'contact line', had to walk to a well three times a day to enable his mother to cook and do laundry. Every day, hundreds of families in Luhansk region were forced to decide whether to risk fetching drinking water from neighbouring villages or use dirty water from their wells.*

#### **Second picture on the facing page**

*Yuri Zelensky, 64, maintains pipes and pumps at the main water-pumping station in Toretsk, Donetsk Oblast. "I feel like I'm one of the guards of the city," Mr Zelensky said, "When there is no water, there is no heating." In often uncertain security situations, including shelling, he has not been deterred from his work at the station, which he sees as more than a job – he feels he is providing a vital service for the people of this region.*





## Case study

# The direct impact of attacks on water services in Yemen



**Direct impacts caused by air strikes on elements of water and sanitation infrastructure form some of the most visible and acute impacts of conflict on water services.**

In Yemen, many cases of attacks on water and sanitation infrastructure have been logged over the course of the war. In 2018 alone, air strikes were responsible for over three quarters (76 per cent) of incidents that affected

infrastructure, causing significant damage.<sup>111</sup> At least 122 air strikes on water and sanitation infrastructure were recorded from 25 March 2015 to 28 February 2021.<sup>112</sup> Water networks in both urban and rural areas have deteriorated considerably, and local water corporations are prevented from servicing the infrastructure.

An earlier estimate, released by the Ministry of Water and Environment concerning the damages to water infrastructure as of February 2016, suggested that the total costs may surpass US\$170 million.<sup>113</sup> A damage needs assessment by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) indicates, however, that direct damage caused to water infrastructure (distribution systems, pumping stations, water tanks, well fields) during the conflict differs in magnitude across individual governorates, notably disrupting water supply in conflict-affected areas of Aden, Sa'ada and Sana'a.<sup>114</sup> The damage needs assessment reports widespread physical damage and pillaging due to the conflict, with many wells put out of operation and widespread destruction of networks. The private water-trucking business has been flourishing since the conflict began, filling the service gap but charging high prices for water, in part due to the scarcity of fuel.

In June 2018, through its partners UNICEF launched the







## Yemen

Nushor water project to implement a sustainable water system – involving three main water tanks, two solar water systems and pump rooms with pipeline, plus borehole rehabilitation – to serve As-Safra and Ketaf districts in the conflict-affected area of Nushor in Sa'ada governorate.<sup>115</sup> The project aimed to serve a vulnerable local population of about 12,000 people largely reliant on collecting water from distant and unsafe shallow wells (80 per cent of the population) and on water trucking. The United Nations notified the parties to the conflict of the civilian nature of the Nushor water system. Despite this, the water system was attacked by air strikes three times on 22 July 2018 – one month after its construction – with damage to its main solar water system, pipeline, generator and borehole.<sup>116</sup>

UNICEF and partners, with donor support, reconstructed the water system by August 2019. It was attacked again in October 2019, although this time the water system continued to function following the attack.



In 2018 alone, air strikes were responsible for

# 76%

**of incidents that affected infrastructure**



An estimate concerning the damages to water infrastructure as at February 2016 suggested the **total costs may surpass**

# \$170 million

### *First picture on the facing page*

*A little boy waiting for his turn to fill his jerrycans with water from a water tank proved by UNICEF, in Sana'a.*

### *Second picture on the facing page*

*A girl pushes two younger children – a boy and a girl – in a wheelbarrow that also bears several jerrycans in Sana'a, the capital of Yemen.*

## 3.2 Direct impacts on water and sanitation infrastructure and personnel

Water and sanitation services suffer **direct impacts** during armed conflicts. These are typically immediate, physical impacts to water and sanitation infrastructure, often taking place in populated areas. The attacks that cause them strike predominately from the air (e.g., air strikes using large bombs or missiles, rocket and drone attacks) or from ground operations (commonly used explosive weapons include indirect fire weapon systems such as mortars, rockets and artillery, multi-barrel rocket launchers and certain types of improvised explosive devices).

Direct impacts can result from any military action undertaken by a party to the conflict that, for the purpose of military or political advantage, damages or destroys infrastructure or renders it inoperable. Attacks can cause direct impacts on any aspect of the infrastructure, equipment or consumables necessary to run systems, or on the staff who operate and manage the systems. During war, parties to the conflict have disrupted and disabled water and sanitation services by looting parts, consumables or fuel required to keep systems running.

Humanitarian personnel, service provider personnel and local contractors around the world are often at risk when working in conflict-affected contexts. Personnel may be injured or killed while operating, maintaining or repairing critical water and sanitation infrastructure. Attacks on the people who operate essential services can be part of a larger tactic to disable or degrade the civilian population's previous entitlements, or may occur when reckless bombardment affects civilians in the vicinity. Staff have been caught in the crossfire as they try to make critical repairs or carry out O&M, and they have been directly targeted by snipers when crossing contact lines and entering territories under the control of armed parties to the conflict. Assaults on staff and staff fatalities can result in fewer staff reporting to work and a fear that engaging in critical routine O&M could lead to death.<sup>117</sup>

In Libya, staff of the Man-made River Project, the major supplier of water for domestic use, have been subjected to kidnapping, and have been forced to leave worksites during the armed conflict.<sup>118</sup> The General Company for Water and Wastewater in Libya has suffered similar restrictions on the movement of personnel, with staff denied access to operate and maintain infrastructure and to collect revenues.<sup>119</sup> Even

the threat of attack can deter O&M, damage assessments and functional repairs, ultimately leading to a community that lacks safe water.

In the Syrian Arab Republic, the sector is adversely affected by the 'brain drain': approximately 40 per cent of staff (especially in middle management roles) have left the public service over the last eight years. This has led to the promotion of lower-level staff to higher posts even though they lack the necessary training. As a result, the capacity for O&M of water and sanitation infrastructure is significantly hindered.

In Ukraine, attacks on personnel have become more common. In eastern Ukraine, Donetsk Filter Station and the first lift pumping station in Donetsk have been subjected to numerous attacks in recent years, including some on workers repairing infrastructure. In 2018, a bus carrying personnel from the filter station during a shift change came under small arms fire, which left five workers injured.<sup>120</sup> The filter station supplies water to more than 378,000 people; ensuring continuous O&M for the lift pumping station is absolutely critical – there is no backup.

At the start of 2019, three people working for Voda Donbasa, the water company that supplies both government-controlled and non-government-controlled areas in Ukraine, were attacked while clearing snow on the road to the facility.<sup>121</sup> During four separate incidents in 2018, staff from the same water company experienced a total of nine injuries, typically from small arms fire or suspected use of grenades, and were sometimes at risk of injury by heavy artillery.<sup>122</sup> The Voda Donbasa water supply serves 3.9 million people, of which 3.2 million rely on a single water system. This demonstrates the potentially vast scale of the human consequences following an attack on its infrastructure or personnel.

Impacts on affected populations can take many more forms than those previously mentioned that result from aerial and ground attacks. Wartime actions, as witnessed by UNICEF humanitarian programmes and partners, ultimately have an impact on households' access to safe water.

Water infrastructure is also **misused** in conflict, with grave impacts on the civilian population. For example, water facilities are misused for military purposes when a party to the conflict exploits water as an element of broader strategies. A number of tactics have been demonstrated

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**Water infrastructure is also misused in conflict, with grave impacts on the civilian population. For example, water facilities are misused for military purposes when a party to the conflict exploits water as an element of broader strategies.**

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by parties to conflict, including deliberately shutting down the water supply after residing in water treatment buildings and grounds, and deliberately forcing legitimate service provider personnel to vacate water facilities. When a party to the conflict has ambitions to govern an area, it can use infrastructure for military gain and to exert control over a population. Even if the water continues to flow in such a situation, the water service is nevertheless being misused for military purposes – to control civilians.

Parties to the conflict that control water resources sometimes seek to gain control of cities or to manipulate populations by threatening to contaminate water supplies. Humanitarian programmes have witnessed parties to the conflict deliberately contaminating water sources – by introducing chemicals, biological agents or oil into water used for drinking – to make people evacuate an area. In more rural settings, including during the Central African Republic conflict, this tactic has on occasion involved the throwing of decomposing bodies into wells to deny a community access to safe water.<sup>123</sup>

In Iraq, armed parties – typically non-state armed groups – have throughout the conflict used water facilities as a 'soft target', either to push people to leave an area or to change their area of residence; they have also used the physical structures as a safe haven for fighters, in the belief they would not be shelled.<sup>124</sup> Some tactics used by armed parties have formed part of wider aims to control oil fields.

Oil pipelines have been targeted frequently during the Iraq conflict; when breached, they have created huge spills, causing toxic pollutants to enter water resources and render supplies unfit for human use.<sup>125</sup> In 2016, explosives were placed around the strategic Baiji oil refinery to the north of Baghdad.<sup>126</sup> Armed groups broke the main

pipes to the refinery and then diverted the outflow to the Tigris River, flowing towards Baghdad; six downstream governorates, including Baghdad, were affected by the oil pollution, resulting in the shutdown of water supply in those governorates. Throughout the recent conflict in Iraq, the deliberate contamination of water sources – the poisoning of lakes, rivers and streams with chemicals, dead animals, human bodies, industrial disposal or oil – has rendered the water toxic for the civilians who depend on it.<sup>127</sup>

Water shutdowns during armed conflict cause suffering on a wide scale. Shutdowns have occurred frequently in the Syrian crisis, often with conflicting allegations regarding which party to the conflict was responsible for the action. In Aleppo governorate, the shutdown of the al-Khafseh facility in early 2016 affected 2 million people.<sup>128</sup> The facility, one of the most important in the Syrian Arab Republic, draws from the Euphrates River to produce 400 million litres of clean water per day on average.<sup>129</sup> It is Aleppo's only source of drinking water and also supplies the governorate's eastern areas. Consequently, many people, including children, were forced to seek alternative water sources to meet their daily water consumption needs, which exposed them to contracting water-related diseases.

Following the shutdown, UNICEF reported: "One million children rely on this facility for safe drinking water essential for preventing waterborne diseases which can be life-threatening and in extreme cases deadly for children."<sup>130</sup> Demonstrating the unremitting nature of such actions during armed conflict, the same water facility had previously been shut down by an air strike in November 2015, causing disruption of the water supply for millions of people.<sup>131</sup>

When water and sanitation infrastructure is destroyed during conflict, **denial of humanitarian access** or 'no decision' on the facilitation of humanitarian access (i.e., where requests go unanswered) often occurs. Humanitarian workers, as well as service provider staff, and supplies may be refused access to areas in need of assistance, for example, to maintain the water supply or repair damaged infrastructure.

This tactic can include denying access to, or imposing restrictions on, essential equipment, spare parts and consumables necessary to run water and sanitation systems. Such restrictions, often known as 'dual-use item restrictions', ban the movement of items needed for civilian use that could also be used for military purposes. Again, the denial of access





for military or political gain creates negative consequences for running water and sanitation services. A contract to supply Iraq with more than 1,000 water tankers, as well as vehicles with equipment for wastewater evacuation, was denied by invoking dual-use restrictions – because the tanks in both cases had stainless steel linings.<sup>132</sup> The control of entry into Gaza, State of Palestine, of dual-use items desperately needed to reconstruct its water and sanitation sector, which has been exacerbated by a 10-year closure, has led to a major water and sanitation crisis in Gaza.<sup>133</sup> The consequences for children are an increased potential risk of waterborne diseases, particularly diarrheal diseases. With the failure of key wastewater treatment infrastructure and pumping stations, over 300,000 people are put at immediate risk as raw sewage overflows onto streets.

When done for military or political gain during a conflict, the systematic use of restrictions to impede access to

water and sanitation infrastructure – thus preventing repairs after a direct attack, for instance – also has an impact on the fulfilment of children's rights to water and sanitation. Particularly in besieged cities, such as Mosul in 2017, Aleppo in 2016 and Aden in 2015, repairs are hindered. In hard-to-reach or besieged areas, the impact extends to the lack of essential items such as water storage containers, as has been reported in the Syrian Arab Republic.<sup>134</sup>

### 3.3 Systematic destruction of water systems in rural areas

The impacts created by attacks can be widespread, with an explosive weapon affecting millions of people in an urban centre, or limited, affecting a single family. While an air strike on a water treatment plant can, in seconds, disrupt access to water for an entire urban centre, many of the tactics in conflict take effect gradually and out of sight



of the public. Systematic attacks on **smaller systems**, typically private wells or small networked systems serving a household or small group of households in rural or peri-urban areas, can be just as devastating if made on a widespread basis.

In Iraq, the deliberate targeting of the rural environment by parties to the conflict has led to widespread damage to agriculture-based livelihoods and, by extension, to the water resources needed for domestic water use by rural households. Such violence has been facilitated by an ineffective security environment in rural areas, where a government presence and the rule of law have typically been weak. Parts of Iraq's rural population remain highly dependent on agricultural wells for drinking-water use: more than 237,000 rural residents still take their drinking-water from open wells and other unprotected sources.<sup>135</sup> Rural populations often rely on a patchwork of different systems: household or community water reservoirs and other small storage systems are built to provide a water supply when taps run dry.<sup>136</sup>

During the recent armed conflict in Iraq, rural wells were often sabotaged with foreign objects such as rubble and oil, and the theft of components of the pump's electrical system.<sup>137</sup> When parties to the conflict systematically control or destroy small infrastructure over a long period, the impacts on rural populations can be huge. For farmers, such actions remove the prospect of a traditional, agriculture-based livelihood and the opportunity to return to their farms following displacement.<sup>138</sup>

### 3.4 Humanitarian water and sanitation programme challenges and uncontrollable consequences

Humanitarian actors and local stakeholders, including governments and service provider staff, are significantly challenged in their responses to attacks on water and sanitation infrastructure and misuse of infrastructure and services. When attacks occur, service providers work in various ways to ensure immediate access to water and sanitation for highly vulnerable populations.

The response consists of more than just rebuilding. Without strengthening the resilience of the water and sanitation sector, in the manner set out in the first volume of the *Water Under Fire* series, restoring the previous state of affairs is almost impossible in protracted conflict settings.

Actors require financial investments, human resource capacity and humanitarian access, all of which are unlikely to be easily available. Local service providers do not have the human resource capacity, with many staff choosing or forced to leave, and local capacity-building is difficult both during and immediately after conflict. Interventions in high security locations must be coordinated remotely by the humanitarian community, and the water and sanitation sector increasingly relies on local actors to implement activities in otherwise inaccessible areas. As discussed in the second volume of the series, localization is crucial, particularly to support vulnerable children and families in hard-to-reach areas. Local actors are central to the water and sanitation response and contribute to sustainable and effective results due to their knowledge of the contexts and their access.<sup>139</sup>

The al-Rustamiya wastewater treatment plant, the largest such plant serving Baghdad – originally designed to meet the needs of a population of 1.5 million – is a case in point.<sup>140</sup> The plant suffered widespread looting of equipment when armed groups took over the area, which lies outside of Baghdad, in 2003 and on subsequent occasions.<sup>141</sup> Armed actors occupied the plant at certain points in the conflict and were known to train fighters there, planting the area with unexploded ordnance.<sup>142</sup>

UNICEF has since faced difficulties in its attempts to rehabilitate the wastewater treatment plant. Although the initial focus was the rehabilitation of the system and network, including pumps and sedimentation tanks, working with the local authority and water utility has presented major challenges. First, the government needed to re-establish a presence and the rule of law in the area to secure the plant, its personnel and contractors; second, demining of unexploded ordnance had to be completed before rehabilitation efforts could commence. Government staff became afraid to travel to the insecure area, and the capacity of government partners has deteriorated with the 'brain drain' as staff left the area due to security concerns. Most technical staff were deployed to other, more secure sites or brought back to Baghdad. Attacks on water and sanitation services can invalidate decades of investment in fragile contexts. Often there is no option but to implement short-term, suboptimal solutions, such as water trucking, instead of the more durable solution of supporting the service provider to rehabilitate infrastructure or even rebuild. For instance, if a water treatment plant is directly hit and acutely damaged, the efforts required to rebuild to completely restore pre-crisis service delivery go far beyond what is needed





to make the immediate repairs necessary to ensure continuity of service.

Urban water and wastewater treatment systems are highly complex, and the parts and machinery required to ensure the continued functioning of the infrastructure are often barred from entry to conflict-affected areas by sanctions and other restrictions. Drilling a new bore-hole, which is often necessary to restore a system, is a complicated process. To locate potential drilling sites, experienced contractors must be found and a complex set of geophysical surveys undertaken. If pumping machinery is damaged and spare parts or equipment are required, humanitarian water and sanitation programmes must typically order these from overseas, commissioned to a particular design specification. The process of procurement, design, manufacture and import is complex and difficult to achieve in conflict-affected settings. For instance, in Aleppo, following damage to

a water treatment plant, it took six months to order and receive a temporary compact water treatment plant.<sup>143</sup> Water trucking is typically implemented in the interim. When provided through humanitarian actors, adequate water quality is more likely to be assured, but water trucking is expensive compared with longer-term options. It is also difficult to manage and monitor, and creates dependencies on alternative provision, which can compromise more durable solutions.<sup>144</sup>

Humanitarian water and sanitation programmes find it extremely difficult to address looting, as mitigation activities – such as added protections and development of boundary walls and signposts – are largely ineffective in armed conflict.<sup>145</sup> Activities that attempt to mitigate attacks and stop water infrastructure from being bombed by warring parties can also prove difficult to implement. To prevent future attacks in Yemen, for instance, activities that notify



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**Urban water and wastewater treatment systems are highly complex, and the parts and machinery required to ensure the continued functioning of the infrastructure are often barred from entry to conflict-affected areas by sanctions and other restrictions.**

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parties to the conflict of humanitarian movements are being undertaken alongside the mapping of essential water points. Also taking place are 'buffer' activities to mitigate the impact of conflict, such as enhancing fuel storage capacity from one week to one month. Implementing such activities is logistically difficult, and an estimated monthly budget of US\$3 million is required for fuel contingency activities, provided through World Food Programme supply chains.<sup>146</sup> To repair and reconstruct water and sanitation infrastructure damaged by direct attacks requires enormous amounts of funding as well as effort. The investment needed to develop urban systems in the first

place takes decades of concerted action that focuses not only on infrastructure but also on sector strengthening and institution building. Protracted emergencies can attract low levels of funding, and funding levels are often insufficient to rebuild. The *Global Humanitarian Overview 2020* highlights 54 per cent coverage of humanitarian requirements in 2019, with conflict the main driver of humanitarian needs.<sup>147</sup> Inoperative infrastructure is a key reason why displaced populations cannot return home, even when conditions are otherwise safe enough to allow them to do so.

Even where funding is available, rebuilding programmes face technical challenges and can take a long time to become operational. For instance, in Iraq, following decades of conflict, the Government and the World Bank have estimated that Iraq's recovery and reconstruction needs total 104,309 billion Iraqi dinars (US\$88,248 million) – including 2,886 billion Iraqi dinars (US\$2,442 million) for the water, sanitation and hygiene (WASH) sector – across the seven directly affected governorates over five years.<sup>148</sup> A WASH sector needs analysis from 2017 highlights major challenges in acquiring funding to improve service delivery, and found that insufficient funds are inhibiting adequate wastewater management in camps for displaced persons.<sup>149</sup> A lack of safe water and sanitation can have disastrous consequences on the rights and well-being of the most vulnerable, including children and their families.







# 4. The impacts on children

**Air strikes, artillery fire and improvised explosive devices clearly have the power to injure and kill children. By disabling or denying water and sanitation services, they can also directly affect children's rights to life, survival and development in myriad other ways.**

Access to water and sanitation are human rights to which all children are entitled. When essential services become targets during conflict, the critical infrastructure required for the realization of these and other child rights is damaged, destroyed or disabled. Children suffer the gravest consequences of such attacks. Not only do water and sanitation services diminish or cease altogether, but without these essential services children's rights to health, nutrition, protection and education are also at risk.

## 4.1 Risks posed to children by attacks on water and sanitation services

All children need access to safe water and sanitation as well as sufficient nutritious food, quality health care and protection from violence to survive and develop into healthy adults. Armed conflict has a significant impact on children, threatening their survival, health and development. And when children are displaced by conflict, the systems that would usually work to keep them safe – in their homes, schools and communities – are often completely compromised.

When water and sanitation services are taken away, children and their families are forced to resort to an inadequate water supply that is less safe to drink both at the point of supply and at the point of use. This opens the way to health consequences now and in future. Cutting off a safe water supply during conflict causes sanitation and health crises. Faecally transmitted infections such as cholera and diarrhoeal diseases are still the second most common cause of morbidity and mortality among children under 5 years of age – and poor water, sanitation and hygiene is the main cause of such infections.<sup>150</sup> For example, the World Health Organization has stated that “297 000 children – more than 800 every day – under five ... die annually from diarrhoeal diseases due to poor sanitation, poor hygiene, or unsafe drinking water.”<sup>151</sup>

A lack of safe drinking water generally makes children more vulnerable to disease than adults: with their underdeveloped immune systems and detoxification mechanisms, children typically cannot respond as well to a waterborne infection.<sup>152</sup>

While there is limited evidence of the positive impact of water, sanitation and hygiene services on nutrition outcomes, observational data often find a link between water, sanitation and hygiene factors and chronic malnutrition such as stunting, with a growing body of evidence supporting links with acute malnutrition.<sup>153</sup>

But infection and disease are only part of the problem. Hospitals and community clinics struggle to function when access to safe water is compromised by damaged infrastructure. And in places where the destruction of water and sanitation facilities occurs alongside the destruction of health-care facilities, disease outbreaks can swell beyond containment. Many children caught up in armed conflict cannot access the treatment and health care they need when they contract a disease, and their ability to recover in hospitals is hindered. As people who endure complex emergencies are vulnerable to epidemics such as cholera,<sup>154</sup> an attack on water and sanitation infrastructure can create risks that lead to or exacerbate outbreaks of epidemics, with consequences that gravely affect children.

Even one incident that disrupts the water supply can have enormous consequences for health. Evidence shows that a single brief disruption – lasting one day or one week, for instance – to an otherwise reliable drinking-water supply can heighten the risk of contracting a disease present in the environment.<sup>155</sup> Just a few days of resorting to drinking raw water can all but eradicate the health benefits attained over the course of a year by accessing an improved supply.<sup>156</sup> This particularly affects very young children, for whom infection presents the greatest risk of death.<sup>157</sup> However, “the cumulative impact of protracted armed conflict on public health is much more difficult to track than its impact on the quality or coverage of any essential service.”<sup>158</sup>

When water and sanitation services are disabled or denied during conflict, children's lives are greatly affected not only by their reduced health status, but also by the effects on their education and protection.

Access to education is affected when household access to water is lost and the responsibility for collecting water from alternative sources falls to children, limiting their opportunity to attend lessons even when school is still running. When water and sanitation facilities in schools are destroyed, children face security risks and difficulties managing menstrual hygiene – dangers that can interfere with their enrolment, attendance and success in school.



Without safe water, sanitation and hygiene services, children are vulnerable to sexual and gender-based violence as they collect water or venture out to use communal latrines, and they deal with affronts to their dignity as they bathe and manage menstrual hygiene. In situations of armed conflict, venturing into dangerous territory in search of water can have immediate consequences for a child's safety and well-being.

## 4.2 Direct impacts on children's health and survival

Attacks on water and sanitation services can create immediate impacts on children's health and survival, with vulnerable and marginalized children's health put at risk when safe water and sanitation services are taken away. Attacks on systems and infrastructure that are integral to safeguarding the population's health and protecting the environment can potentially have catastrophic impacts on the health of children. For example, chemical disasters from impacts to toxic industrial chemicals (including, but not limited to, chlorine storage), damage to wastewater treatment plants and deliberate contamination of water sources can all cause widespread direct health impacts that threaten the survival of children during armed conflict.

### Impacts relating to wastewater and sewage

Direct impacts on wastewater treatment plants and associated infrastructure (e.g., wastewater pumping or lift stations) can have catastrophic health consequences for children and their families. If such plants are rendered inoperable, untreated wastewater has nowhere to go, flooding built-up areas and posing risks to public health and the environment. Sewage from damaged storage can flood nearby settlements and contaminate water sources, including groundwater, creating a high risk of waterborne diseases.

Untreated sewage, when discharged into water sources, can be the cause of numerous health problems for children. They can be affected by preventable diseases such as diarrhoea, hepatitis, typhoid, cholera and polio by drinking contaminated water. Children's smaller body mass means that waterborne chemicals and toxins may be dangerous at a concentration that is relatively harmless to an adult.

Damage from explosive weapons and subsequent poor maintenance (or an inability to address the damage adequately) can lead to a risk of infrastructure collapse, with

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**Untreated sewage, when discharged into water sources, can be the cause of numerous health problems for children. They can be affected by preventable diseases such as diarrhoea, hepatitis, typhoid, cholera and polio by drinking contaminated water.**

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health consequences for children. In Novhorodske, Ukraine, a sludge collector at a phenol plant – vital to a critical process in faecal sludge management – had been damaged following hostilities.<sup>159</sup> A technical report examining risks that could arise from the conflict in this particular area of the Siverskyi Donets Basin outlines the potential environmental risk of contamination from wastewater entering the drinking-water at the intake in the Kryvyi Torets River that could occur as a result of military operations.<sup>160</sup>

In the Gaza Strip, State of Palestine, public health hazards for children and their families are potentially linked to inadequate wastewater treatment. This situation worsens during escalation of armed conflicts, with significant problems caused by damaged and deteriorating infrastructure and the restrictions over the import of water and sanitation-related equipment and fuel.<sup>161</sup>

Gaza's coastal aquifer, its sole water source, was generally deemed unfit for human consumption: 90 to 95 per cent of the water source had chloride and nitrate levels in excess of World Health Organization guidelines – up to six times the recommended level.<sup>162</sup> This has a significant impact on children. Hepatitis, typhoid and other waterborne diseases are also a risk to public health in the Gaza strip, as sewage contamination of the aquifer is likely given its shallow depth.

Developing sufficient wastewater treatment creates instant benefits for children's health and the environment. For example, following the development of a wastewater treatment plant in the Gaza Strip (the Northern Gaza Wastewater Treatment Plant), 64 per cent of surveyed residents reported a reduced incidence of waterborne diseases and reduced spending on water and sanitation-related items. This has decreased the financial burden



on impacted families who used to pay 210 Israeli shekels (approximately US\$62) for the vacuuming of their full or flooded septic tank, mitigating health concerns and financial pressures.<sup>163</sup>

### Impacts related to the use of explosive remnants of war

The use of explosive weapons results in explosive remnants of war that remain in the area long after the attack is over. Landmines and explosive remnants of war can indirectly undermine the health of children, and potentially their protection and education, by hindering access to safe water for rural populations – including people who have recently returned home having been displaced by conflict – and creating a reliance on alternative sources.

For example, when reliable water sources are thought to be surrounded by explosive remnants of war, people seek water from alternative sources that are perhaps further away and less safe for drinking.<sup>164</sup> The impacts on children

are diverse as it is often children who must collect the water. The further they must travel to alternative sources, the greater their vulnerability to violence and the more likely they are to miss school – all to collect water that may be unsafe to drink.

### 4.3 Alternative modes and coping mechanisms

A child's survival is at risk from both the immediate action, when water and sanitation services are disabled or denied, and the chain of actions that follows such disruption.

When water and sanitation services are disrupted or infrastructure is destroyed during armed conflict, the health impacts arise from multiple risk pathways in the chain of actions that affected populations undertake to regain access to water. These actions form part of the reverberating effects that follow damage to critical water systems – for instance, families with insufficient water to meet their basic needs often have no choice but to resort,

for their survival, to coping strategies that carry their own set of health risks.

Various impacts are associated with the coping mechanisms. Particularly in urban areas, children and families are vulnerable because of their reliance on public services such as water supply – they have few or no alternatives when those services are disrupted. Many of the coping mechanisms described below are more expensive, degrade household resilience by decreasing purchasing power, and affect livelihoods; they also have higher opportunity costs in terms of time and effort, and present a greater risk to health.

Where water systems are completely destroyed or become unusable, or where access to water services is not possible, humanitarian water and sanitation programmes typically observe populations engaging in the following modes of access:

- **Use of alternative water sources:** Accessing water from alternative providers; from unprotected wells, ditches or channels; or from public water distribution points, which may not be monitored for quality. In urban areas, people purchase water from private water-trucking operators. Protection concerns, such as conflict-related sexual violence, killing and maiming, trafficking, abduction, and recruitment and use, also arise where it is children who are typically tasked with searching for and accessing alternative sources.
- **Changed patterns of household water use:** Water rationing at the household level reduces quantities to unsafe levels for drinking and hygiene which could result in decrease in bathing and hand washing, leading to increase in skin disease; and faecal-oral transmission due to poor hand-washing practices at critical times, which is especially prevalent among women and children. Lack of access to sufficient water for sanitation also poses a threat via the spread of COVID-19. Hand washing with soap is critical to combat the spread of deadly diseases.<sup>165</sup>
- **Displacement:** Where there are major patterns of destruction of water infrastructure, populations may be forced to displace. This creates different patterns of health impacts, loss of education, and protection concerns.

## Unreliable access, alternative sources

A common response of families who lack reliable access to water services is to purchase water from unregulated water trucks, generally through informal private sector actors that run services to fill the supply gap.

Private water trucking is associated with a range of risks because both the quality and the price of water are unregulated. Prices to purchase water are prohibitively high, but families whose livelihood options are reduced, and whose coping mechanisms are eroding fast, often have no choice but to purchase water, increasing household vulnerability. Serious levels of poverty and desperation can lead to the negative livelihood strategies that are a common outcome of conflict situations. In places where the rule of law is absent, 'water cartels' can dominate water points, their practices often fuelling still greater insecurity. The rise of water trucking leads to increased costs for families, which is particularly challenging when household incomes decline. Children are often tasked with collecting water, not only from water trucking, but also when household income declines and the family can no longer afford it – children then seek alternative options that can expose them to protection risks. Children suffer disproportionately when household incomes decline since their well-being is exposed and they are at greater risk for protection concerns.

The rise of water-trucking prices in the State of Palestine, for example, has placed additional financial burdens on families, particularly since the onset of the COVID-19 pandemic and subsequent lockdown. Due to the pandemic, families have increasingly lost their livelihoods or had their income severely diminished. Most families not connected to water networks cannot afford to pay for trucked water from private vendors, which has forced families to send their children to fetch water from unreliable water sources.

Children will also collect water from public standpoints or from more distant open wells, both of which raise quality concerns. In the absence of licensed, legitimate actors, wells are drilled using inexpert techniques, with whatever local materials and equipment are available, to access shallow aquifers that can become easily and heavily contaminated.

In the Syrian Arab Republic, when the conflict damaged urban water services and power systems, humanitarian water and sanitation programmes have reported urban residents developing their own solutions – such as



handpumps made by residents themselves – to access shallow water.<sup>166</sup> A World Bank damage assessment in the Syrian Arab Republic found that whole neighbourhoods of Aleppo had lost access to the public water network owing to damage wreaked by conflict.<sup>167</sup> Water from the alternative sources used instead – wells and water trucking – was found to cost much more than piped water, while the reportedly polluted and untreated well water also carried the risk of infection with waterborne diseases.<sup>168</sup> A survey conducted in southern Syria in 2016 and 2017 revealed that households were using 20 per cent of their income on water, and that hygiene items were unaffordable.<sup>169</sup>

### Protection concerns around the use of alternative sources

Such temporary solutions are not only unsustainable and expensive for vulnerable populations that cannot afford them, but they can also be dangerous. Where water is collected from distribution points, or from distant unprotected sources, children are vulnerable since they are often tasked with water collection when systems break down.

Children must carry heavy loads – a hazardous chore – yet even then can only carry so much weight, limiting the quantity of water available for the household's use. Children have been killed by shelling while collecting water during armed conflict. In other locations, landmines may be planted around wells or on pathways between settlements and water sources. In the Syrian Arab Republic, where children are often tasked with collecting water, they may spend up to two hours queuing, at times in freezing conditions, to collect water from a mosque or public water point that has already taken them 30 minutes or more to reach.<sup>170</sup>

For women and girls especially, the impacts on safety are compounded by the threat of sexual violence. In fact, gender-based violence in all its forms is known to increase in situations of armed conflict.<sup>171</sup> When walking long distances to collect water, or to defecate in the absence of gender-appropriate sanitation facilities, women and girls are exposed to the risk of rape and other forms of sexual violence, particularly when living in conditions of constant danger and insecurity. The prosecutor of the International Criminal Court advised the United Nations Security Council in June 2015 that her office had received more allegations of sexual violence by armed militias in Darfur, the Sudan, than ever before.<sup>172</sup> Most allegations concerned the gang rape of individuals, including when collecting water.

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## Families often ration water – borrowing and bartering when necessary – paying less attention to hygiene, or recycling the same water for different uses.

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### Household rationing

When water is not provided regularly, general water consumption usually decreases. Families often ration water – borrowing and bartering when necessary – paying less attention to hygiene, or recycling the same water for different uses. When households survive on reduced quantities of water, children's hygiene and bathing are often overlooked, which increases the risk of skin disease, deadly diseases, faecal-oral transmission due to poor hand-washing practices and the spread of COVID-19.<sup>173</sup>

A March 2017 assessment of hard-to-reach areas in the Syrian Arab Republic reported that households lacking enough water to meet their needs typically limited how much water was consumed for any purpose besides drinking, and adjusted their hygiene practices.<sup>174</sup> According to the World Health Organization, people need 50 to 100 litres of water each day to be able to meet most basic needs and ensure that few health concerns arise.<sup>175</sup> Access to around 20 litres per person per day represents a minimum quantity – that is, basic access – but this amount raises health concerns because it is insufficient to meet most basic hygiene and consumption requirements.<sup>176</sup>

At the household level, an unreliable water service opens up the potential for household contamination, since households are more susceptible to poor water storage. Household water treatment and safe storage is one of the temporary, targeted measures expected to improve children's health until such time as every household has safe piped water.<sup>177</sup> Household water treatment and safe storage is critically important to control the risk of outbreaks of diarrhoeal diseases. In Ukraine, a water, sanitation and hygiene (WASH) cluster study found that, at the household level, boiling water before consumption is unlikely as most families cannot afford to buy sufficient fuel to boil all of their drinking-water.<sup>178</sup>

Chemical contamination of water – which cannot be treated simply by boiling the water – is also prevalent in industrialized urban areas.

## Displacement

The changing nature of armed conflict is resulting in urban displacement, whereby the majority of displaced people flee to cities from rural areas or from other urban areas. In contrast to traditional camp settings, host communities in urban contexts face particular challenges around the strain put upon urban services by influxes of displaced people. A large proportion of urban displaced are children and young people – older adults tend to remain in rural locations – and young people are less likely to return home even if it is safe to do so, choosing instead to continue integrating into their new environment.

People caught up in armed conflict decide to flee for a variety of reasons, with violence – or the threat of violence – one of the most critical concerns.<sup>179</sup> Lack of water and sanitation services is a very strong contributing factor, however. Damaged or destroyed critical water infrastructure, particularly in urban areas where populations are highly dependent on essential services and where reasonable alternative services are lacking, leads to populations having no choice but to flee. In Ukraine, the risk of displacement following infrastructure damage caused by conflict is high. Current water, sanitation and hygiene (WASH) cluster contingency plans state that any disruption to the interconnected power, water and heating systems can cause a cascading chain of events; in the winter, a single shell to the power or water system has the potential to displace up to 3 million people in a matter of weeks.<sup>180</sup> Another example is the forced displacement caused in the State of Palestine by demolitions of water infrastructure in East Jerusalem and Area C communities in the West Bank.<sup>181</sup> Since 2019, 95 attacks against 142 WASH structures have occurred in the State of Palestine (94 in the West Bank and one in the Gaza Strip), affecting 67,349 people (37,394 people in the West Bank and 30,000 in the Gaza Strip).<sup>182</sup>

Displacement itself is particularly traumatic for children, causing a range of psychosocial impacts, since they are at increased risk of physical and sexual violence, disease and malnutrition. Displacement can become protracted, compounding the vulnerability of those affected, with

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children uprooted for long periods at a time when they need stability, affecting their long-term well-being. Waterborne diseases present a much higher risk in areas of displacement than in development contexts. In urban contexts, displaced people settling in cities put pressure on water and sanitation infrastructure that was not designed for such large influxes of people, and thus they may not receive sufficient water supply.

Camp settings may provide a lower standard of service than typically available in homes and communities. Camp settings can also present a range of immediate risks to children. In Za'atari refugee camp in Jordan, which hosts Syrian refugees, children died after being run over by the frequent water-trucking operations that took place in the early stages of the camp's existence, before the installation of a water network.<sup>183</sup> Children in camps may have limited access to health care and education, and camps can also create a range of protection risks, including exposing children to the risk of recruitment and use in conflict.

Once a population is displaced, the destroyed infrastructure that led to its flight can become a reason to not return, condemning generations of children to grow up in camps that were only ever meant to be temporary. In Iraq, while many people affected by conflict have returned to their places of origin, the number of people still internally displaced was estimated at 1.5 million by the *Iraq Humanitarian Needs Overview 2020*.<sup>184</sup> Another Iraq situation report in 2018 examined why returns had taken place at an unexpectedly slow pace, and found a combination of factors at work, including damaged infrastructure, a lack of basic services, and explosive hazard contamination.<sup>185</sup> For these millions of people, and millions more besides, the impact of conflict has created a permanent state of displacement.









# 5. Change agenda

**Children will always suffer during war, especially when parties to conflict fail to adhere to the rules that should protect all children without discrimination. But a mixture of approaches can be taken at different levels both to increase respect for the applicable laws and to limit the negative effects on children.**

Humanitarian actors and their partners will continue to document and analyse the impacts of attacks on water and sanitation infrastructure, on service provider staff and on supplies as well as the impacts of the misuse of services. And humanitarian actors and their partners will continue to advocate for the protection of children, families and communities affected by these impacts. But the responsibility to respect the rules designed to protect civilians and civilian objects and mitigate the consequences of war lies with the parties to the conflict, while authority to end conflict lies with the political leadership of the opposing parties.

Collectively, parties to conflict, humanitarian actors, states, the United Nations Security Council and donors must undertake measures to ensure that children, civilians and water and sanitation services are better protected during war and protracted conflicts. UNICEF calls on all actors to acknowledge that attacks on essential infrastructure disproportionately affect the most vulnerable, including children. All actors must recognize that such attacks may result in impacts on civilian populations – and that children will not only bear the short-term effects of attacks, but also carry the long-term consequences for a lifetime.

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**The responsibility to respect the rules designed to protect civilians and civilian objects and mitigate the consequences of war lies with the parties to the conflict, while authority to end conflict lies with the political leadership of the opposing parties.**

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### Parties to conflict are called on to:<sup>186</sup>

- **Adhere to their responsibilities under international humanitarian law and international human rights law.** Parties to conflict must conduct a review of policy and doctrine to ensure that all procedures and processes protect water and sanitation services and personnel from attacks. Parties to conflict must also comply with the IHL rules and principles relevant to the conduct of hostilities, including, but not limited to, the principles of distinction, proportionality and to take all necessary precautions required to protect the civilian population and civilian objects.
- **Take into account all foreseeable harm to civilians and the reverberating effects before carrying out attacks.** Parties to conflict must acknowledge that attacks harming water and sanitation services disproportionately affect the most vulnerable including children, and that these effects may not be immediately visible despite their gravity.
- **Allow and facilitate access for the purpose of delivering relief, and allow safe and unimpeded access for humanitarian personnel to advocate with relevant actors, including non-state armed groups about their responsibilities under IHL,** regardless of their designation under sanctions or counter-terrorism measures. States that are party to a conflict should facilitate all exclusively humanitarian dialogue between humanitarian personnel and non-state armed groups.
- **Set up after-action reviews of all alleged attacks on water and sanitation infrastructure and personnel.** Parties to conflict should conduct in-depth, independent and impartial investigations into serious violations allegedly committed, and if the allegations are substantiated, take appropriate measures against those found to be responsible. Appropriate measures should include, but not be limited to, trial and punishment under the applicable national law in domestic systems.
- **Ensure that those engaged in combat are sensitized about all feasible precautions** they should take before launching or responding to an attack. In particular, those taking an active part in

hostilities should be made aware of the reverberating effects of attacks that may harm water and sanitation infrastructure and the impacts on children. The impacts of military operations on children and on water and sanitation infrastructure and personnel should be considered as part of military training.

- **Refrain from the misuse and denial of water and sanitation services and infrastructure,** from looting and from taking any steps that could lead to attacks on infrastructure, such as using infrastructure to store weapons or military material, using it as a hideout or base, or occupying areas or premises in close proximity to such water and sanitation infrastructure.
- **Express a clear and unequivocal commitment to avoid the use of explosive weapons with wide area effects in populated areas,** and develop operational policy based on a presumption against such use, as recommended by the United Nations Secretary-General.<sup>187</sup>

### Humanitarian actors and humanitarian response mechanisms are called on to:<sup>188</sup>

- **Ensure that attacks and incidents of the misuse of water and sanitation are consistently documented,** including considering documenting incidents as denial of humanitarian access in the context of the children and armed conflict agenda where relevant.
- **Equip their personnel and partners with the required tools and skills** to identify where attacks have occurred and to better understand the humanitarian consequences of the attacks .
- **Ensure that data collected are systematic, reliable and verifiable, and that their collection is guided by professionals with specialist skills,** by continuously building capacity in data collection to ensure accurate attribution of destruction to specific attacks. Data should be readily available for targeted advocacy purposes. Multisectoral collaboration, across organizations and with local actors, should occur. Data collection processes should ensure that practices take place without undermining human rights principles or jeopardizing humanitarian standards, personnel and presence in countries.



- **Mainstream reporting on attacks into other relevant existing humanitarian reporting mechanisms**, such as humanitarian and protection analyses. Reporting on attacks should inform advisories by humanitarian actors and mediation with military actors to prevent or resolve conflicts. Where possible, advocacy statements should be issued calling for the protection of water infrastructure and reminding parties to the conflict about their obligations under IHL and IHRL.
- **Ensure collaboration with appropriate actors to harness opportunities to collect data on the short- and long-term impacts on children** – including those from the most vulnerable and marginalized communities – that result from attacks against water and sanitation services, to form a better understanding of the outcomes for children in armed conflict, including in protracted situations.

#### States are called on to:<sup>189</sup>

- **Ensure that all parties to armed conflict comply fully with their obligations under international law**, including IHRL, as applicable, and IHL, in particular their obligations under the Geneva Conventions of 1949 and their Additional Protocols of 1977 and 2005. States should demand that all parties to armed conflict facilitate safe and unimpeded passage for water and sanitation sector and humanitarian personnel.
- **Strongly condemn attacks against water and sanitation services and personnel in conflict situations**, demand respect for international law by all parties to the conflict, and demand an end to impunity for those responsible for attacks. States should call on their own obligations to prosecute the alleged offenders, applying national legislation in domestic courts. A state should consider using its influence on justice mechanisms, both domestically and internationally, to end impunity and increase respect for applicable laws when other states are unwilling or unable to investigate and prosecute violations of IHL.
- **Minimize the humanitarian impact, on water and sanitation services and on children, of the use of explosive weapons with wide area effects** and look at provisions to limit their use. Political declarations

must recognize that a failure to do so is a failure to protect children living in armed conflicts.

- **Ensure that all decisions that affect children take into account the child's best interests.** Member States of the United Nations should adhere to this principle and put the needs and best interests of children at the heart of any issue affecting them.
- **Provide support to service providers** to maintain essential service delivery in accordance with the appropriate standards; to improve the protection of service provider and humanitarian personnel; and to share elements of policies and good practices aimed at preventing attacks on water and sanitation services to better protect civilians, especially children.
- **Ensure child protection and IHL and IHRL training** for all troops and police that are contributed by countries to peacekeeping missions and other multinational forces, including peacekeeping forces of the United Nations. Ensure that troops and police also have specific contextual knowledge of the impacts that attacks on water and sanitation infrastructure have on their areas of operation.
- **Avoid legislation that criminalizes organizations that operate in certain areas to deliver humanitarian services** or which engage with non-state armed actors for exclusively humanitarian purposes.
- **Consider developing standardized humanitarian exemptions or exceptions to sanction regimes and counterterrorism measures**, and ensure that such regimes and measures do not impede the ability of humanitarian organizations and water and sanitation service providers to obtain equipment, spare parts and consumables required to restore and maintain water and sanitation services.

#### The United Nations Security Council is called on to:<sup>190</sup>

- **Demand that all parties to armed conflict comply fully with their obligations under international law**, including IHRL, as applicable, and IHL, in particular their obligations under the Geneva Conventions of 1949 and

their Additional Protocols of 1977 and 2005. It should demand that all parties to armed conflict facilitate safe and unimpeded passage for water and sanitation sector and humanitarian personnel.

- **Recognize the links between attacks against water and sanitation services, the detrimental impacts on children's rights, including the right to life and health, and the subsequent negative effects on international peace and security.** For this reason, the Security Council should consider encouraging the Secretary-General to include in thematic and country-specific reports language on attacks on water and sanitation services and the impacts on civilians, notably children.
- **Emphasize that sanctions can have a significant negative impact on humanitarian activities, including the provision of essential service delivery. Consider developing standardized humanitarian exceptions or exemptions to sanction regimes and counter-terrorism measures.** These would protect humanitarian actors and enable their continued operation in affected areas – including areas controlled by designated entities – to provide principled humanitarian assistance such as technical expertise for the repair and rehabilitation of water and sanitation infrastructure.
- **Consider the adoption, as appropriate, of resolutions or presidential statements and press statements when water and sanitation services have been attacked or misused,** and call for the protection of the personnel dedicated to their operation, maintenance and repair.

**Donors are called on to:**<sup>191</sup>

- **Acknowledge that attacks against water and sanitation services can have long-term impacts on children.** The allocation of predictable, long-term,

flexible and adequate resources to support appropriate measures (which includes durable solutions) is required to respond to the magnitude of the challenges presented, particularly given the protracted nature of conflicts.

- **Avoid donor conditionalities that may impede children's access to water** – maintaining water and sanitation systems saves lives and should be acknowledged as a humanitarian intervention. Funding should address the scale of response needed to address damaged and destroyed water and sanitation infrastructure. This should include allowing the flexibility necessary to ensure continued access to safe water and sanitation for affected populations, among which children are particularly vulnerable.
- **Refrain from imposing conditionalities that lead to discrimination and exclusion of children and families** based on political or other considerations.
- **Ensure, in post-conflict reconstruction, that any reconstruction strategies integrate all concurring complex challenges** such as good governance of water resources and essential services, to promote equitable and transparent management of such natural resources and services.
- **Support engagement and partnership** among local actors, and among a wider range of actors, including water and sanitation service providers, international organizations and non-governmental organizations.
- **Continue to assist in mitigating the effects of conflict on water and sanitation services,** including through the development of innovations and technologies that mitigate the impact of conflict on water and sanitation systems. Donors should support investment in the human capital needed to provide water and sanitation in complex and protracted armed conflicts.











# 6. Conclusion: End attacks on water and sanitation services

**Attacks on water and sanitation services disproportionately affect the most vulnerable groups of the population. And children are uniquely affected by such attacks, carrying the long-term consequences for a lifetime.**

The world is witnessing a disregard for the rules intended to protect children during armed conflicts. Children's access to water and sanitation is protected under both international humanitarian law (IHL) and international human rights law. IHL also protects water and sanitation service providers, as civilians, and water and sanitation infrastructure, as a civilian object<sup>192</sup> – and, in particular, as an object indispensable for the survival of the civilian population. Yet indiscriminate attacks on, incidental harm to and misuse of infrastructure nevertheless occur, as the case studies in this report have shown all too clearly.

Even lawful attacks have a severe negative impact on children – particularly those involving the use of explosive weapons in populated areas against lawful targets. Explosive weapons are a prominent driver of the destruction of water infrastructure in armed conflicts, and they cause excessive harm to civilians. For those children who survive such attacks, immense suffering ensues from the destruction wreaked by the explosive weapons. Indeed, such weapons are considered among the worst enemies of children today.

Air strikes, artillery fire and improvised explosive devices are known to injure and kill children. And this report has shown how hindering access to water and sanitation services can be just as devastating to children's survival, health and development. The change agenda calls on parties to conflict, humanitarian actors, states, the United Nations Security Council and donors to act decisively and urgently to end attacks on water and sanitation services, so that children are protected.

Children caught up in conflict should not live in fear of bullets and bombs. And nor should they suffer for a lifetime by being denied access to water and sanitation services in childhood.

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**Air strikes, artillery fire and improvised explosive devices are known to injure and kill children. And this report has shown how hindering access to water and sanitation services can be just as devastating to children's survival, health and development.**

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# Endnotes

- 1 This statement was determined following a review of major conflict-related emergencies from the Humanitarian Action for Children 2019 crisis appeal countries where UNICEF has responded in 2019 as well as research on evidence of incidents using the framework for this report (summarized in Box 1). UNICEF responded to 16 major armed conflicts in 2019: twelve of the affected contexts have in recent years experienced a form of attack on water or the use of water as a tactic in armed conflict.
- 2 United Nations Children's Fund, *Water Under Fire: For every child, water and sanitation in complex emergencies*, Advocacy alert, UNICEF, New York, March 2019, <[www.unicef.org/reports/water-under-fire-2019](http://www.unicef.org/reports/water-under-fire-2019)>, accessed 19 May 2020.
- 3 Alderman, Harold, and Derek Headey, 'The Timing of Growth Faltering has Important Implications for Observational Analyses of the Underlying Determinants of Nutrition Outcomes', *PLoS ONE*, vol. 13, no. 4, 25 April 2018, e0195904, <<https://doi.org/10.1371/journal.pone.0195904>>, accessed 1 July 2019.
- 4 Access to water and sanitation is a human right for all, including children, and this continues to apply during situations of armed conflict.
- 5 This mostly results from drinking contaminated water, which often occurs in emergency situations where safe water is unavailable. World Health Organization, 'Diarrhoeal Disease', Fact sheet, WHO, Geneva, 2 May 2017, <[www.who.int/news-room/fact-sheets/detail/diarrhoeal-disease](http://www.who.int/news-room/fact-sheets/detail/diarrhoeal-disease)>, accessed 24 April 2020.
- 6 *Water Under Fire: For every child, water and sanitation in complex emergencies*.
- 7 For the purpose of this report and these recommendations, the term 'parties to conflict' encapsulates all those actors – individuals, groups (including non-state armed groups) and states – engaged in an armed conflict. These recommendations are directed to these actors.
- 8 For the purpose of this report and these recommendations, the terms 'humanitarian actors and humanitarian response mechanism' encapsulate all those humanitarian actors that comply with and meet the humanitarian principles of impartiality, neutrality, independence and humanity, including, but not limited to, international, national and local humanitarian organizations and United Nations agencies. These recommendations are directed to these actors.
- 9 For the purpose of this report and these recommendations, states should be understood as any part of a legislative, executive and/or judicial body of a country, whether or not the state is a Member State of the United Nations. These recommendations are directed to states and set out what action each state should undertake in its own capacity, whether within the structure of the United Nations, within the international arena or internally/domestically.
- 10 For the purpose of this report and these recommendations, the United Nations Security Council should be understood as a body of the United Nations, to which Member States belong. These recommendations are directed to the United Nations Security Council.
- 11 For the purpose of this report and these recommendations, donors should be understood as any private, public or multilateral actor belonging to the international donor community. These recommendations are directed to these actors and set out what action each donor should undertake in its capacity as such.
- 12 This report has been informed by 20 key informant interviews conducted with the WASH cluster, UNICEF staff and the wider humanitarian community. In addition, a variety of sources have been used to inform this report such as international humanitarian law, international humanitarian rights law and official reports on the situation of attacks on water and sanitation. Furthermore, invaluable inputs have been provided by an external steering committee comprised by leading water and sanitation experts, including legal experts on international humanitarian law and human rights law, from both academia and humanitarian organizations.
- 13 United Nations Children's Fund, *Water Under Fire Volume 1: Emergencies, development and peace in fragile and conflict-affected contexts*, UNICEF, New York, 2019, p. vii, <[www.unicef.org/reports/emergencies-development-peace-in-fragile-and-conflict-affected-contexts-2019](http://www.unicef.org/reports/emergencies-development-peace-in-fragile-and-conflict-affected-contexts-2019)>, accessed 24 April 2020. The States of Fragility Framework 2018 lists 58 fragile contexts, 15 of them classified as 'extremely fragile' – of these 15 contexts, 9 are affected by conflict: Organisation for Economic Co-operation and Development, *States of Fragility 2018*, OECD Publishing, Paris, 2018, <[www.oecd-ilibrary.org/development/states-of-fragility-2018\\_9789264302075-en](http://www.oecd-ilibrary.org/development/states-of-fragility-2018_9789264302075-en)>, accessed 6 November 2020.
- 14 Access to water and sanitation is a human right for all, including children, and this continues to apply during situations of armed conflict.
- 15 The United Nations Committee on Economic, Social and Cultural Rights, in its General Comment No. 15, refers explicitly to the right of all human beings to water that is sufficient, safe, acceptable, physically accessible and affordable, and that this right should be respected, protected and fulfilled in a non-discriminatory manner. United Nations Committee on Economic, Social and Cultural Rights, General Comment No. 15: The Right to Water (Arts. 11 and 12 of the International Covenant on Economic, Social and Cultural Rights), E/C.12/2002/11, 20 January 2003, <[www.refworld.org/docid/4538838d11.html](http://www.refworld.org/docid/4538838d11.html)>, accessed 24 April 2020.
- 16 This mostly results from drinking contaminated water, which often occurs in emergency situations where safe water is unavailable. 'Diarrhoeal Disease'.
- 17 *Water Under Fire: For every child, water and sanitation in complex emergencies*.
- 18 This statement was determined following a review of major conflict-related emergencies from the Humanitarian Action for Children 2019 crisis appeal countries where UNICEF has responded in 2019 as well as research on evidence of incidents using the framework for this report (summarized in Box 1). UNICEF responded to 16 major armed conflicts in 2019: twelve of the affected contexts have in recent years experienced a form of attack on water or the use of water as a tactic in armed conflict.
- 19 The world's urban population has grown from 751 million in 1950 to 4.2 billion in 2018. United Nations, Department of Economic and Social Affairs, Population Division, *World Urbanization Prospects 2018: Highlights* (ST.ESA/SER.A/421), United Nations, New York, 2019, <<https://population.un.org/wup/Publications/Files/WUP2018-Highlights.pdf>>, accessed 24 April 2020.
- 20 United Nations and World Bank, *Pathways for Peace: Inclusive approaches to preventing violent conflict*, World Bank, Washington, D.C., 2018, <<https://openknowledge.worldbank.org/handle/10986/28337>>, accessed 24 April 2020.
- 21 Ibid.
- 22 International Committee of the Red Cross, *Urban Services During Protracted Armed Conflict: A call for a better approach to assisting affected people*, ICRC, Geneva, October 2015, p. 5, <[www.icrc.org/en/document/urban-services-protracted-conflict-report](http://www.icrc.org/en/document/urban-services-protracted-conflict-report)>, accessed 24 April 2020.
- 23 United Nations and World Bank, *Pathways for Peace: Inclusive approaches to preventing violent conflict – Main messages and emerging policy directions*, World Bank, Washington, D.C., 2018, p. 1, para. 1, <<https://openknowledge.worldbank.org/handle/10986/28337>>, accessed 24 April 2020.
- 24 For further information about the use of explosive weapons in populated areas, see: United Nations Office for the Coordination of Humanitarian Affairs, *Compilation of Military Policy and Practice: Reducing the humanitarian impact of the use of explosive weapons in populated areas*, OCHA Policy and Studies Series, OCHA, New York, 2017, <[www.unocha.org/fr/themes/explosive-weapons-populated-areas](http://www.unocha.org/fr/themes/explosive-weapons-populated-areas)>, accessed 24 April 2020; United Nations, Security Council, Report of the Secretary-General, 'Protection of Civilians in Armed Conflict', S/2019/373, 7 May 2019, <<https://undocs.org/S/2019/373>>, accessed 24 April 2020; United Nations Secretary-General, 'Joint Appeal by the UN Secretary-General and the President of the International Committee of the Red Cross on the Use of Explosive Weapons in Cities', Statement, 18 September 2019, <[www.un.org/sg/en/content/sg/note-correspondents/2019-09-18/note-correspondents-joint-appeal-the-un-secretary-general-and-the-president-of-the-international-committee-of-the-red-cross-the-use-of-explosive-weapons](http://www.un.org/sg/en/content/sg/note-correspondents/2019-09-18/note-correspondents-joint-appeal-the-un-secretary-general-and-the-president-of-the-international-committee-of-the-red-cross-the-use-of-explosive-weapons)>, accessed 24 April 2020.
- 25 International Committee of the Red Cross, *Explosive Weapons in Populated Areas: Humanitarian, legal, technical and military aspects*, Report of the expert meeting held in Chavannes-de-Bogis, 24–25 February 2015, ICRC, Geneva, June 2015, <[www.icrc.org/en/publication/4244-explosive-weapons-populated-areas-expert-meeting](http://www.icrc.org/en/publication/4244-explosive-weapons-populated-areas-expert-meeting)>, accessed 24 April 2020.
- 26 According to Action on Armed Violence (AOAV) figures for 2011–2019. Note: "AOAV does not attempt to comprehensively capture all incidents of explosive violence around the world but to serve as a useful indicator of the scale and pattern of harm." Action on Armed Violence, <<https://aoav.org.uk>>, accessed 24 April 2020.
- 27 Statement made by Michael Copland, Coordinator, Global Child Protection Area of Responsibility, UNICEF, at the Vienna Conference on Protecting Civilians in Urban Warfare, Vienna, 2 October 2019.
- 28 Sustainable Development Goal Target 6.1 targets the achievement of universal and equitable access to safe and affordable drinking water for all by 2030; Target 6.2 targets the achievement of access to adequate and equitable sanitation and hygiene for all, and an end to open defecation, by 2030.
- 29 United Nations Children's Fund, Statement by Deputy Executive Director Justin Forsyth, September 2016, cited in United Nations Children's Fund, *Hitting Rock Bottom: How 2016 became the worst year for Syria's children*, UNICEF Regional Office for the Middle East and North Africa, Amman, March 2017, <[www.unicef.org/mena/reports/hitting-rock-bottom](http://www.unicef.org/mena/reports/hitting-rock-bottom)>, accessed 25 April 2020.
- 30 United Nations Office for the Coordination of Humanitarian Affairs, 'Turkey | Syria: Flash update – Eastern Aleppo City (as of 25 February)', OCHA, 2016, <[https://reliefweb.int/sites/reliefweb.int/files/resources/final\\_aleppo\\_update\\_feb\\_25.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/final_aleppo_update_feb_25.pdf)>, accessed 25 April 2020.
- 31 Arshad, Raja Rehan, and Joy-Fares Aoun, *Syria Damage Assessment of Selected Cities Aleppo, Hama and Idlib (English)*, World Bank, Washington, D.C., 2017, p. viii, <<http://documents.worldbank.org/curated/en/530541512657033401/Syria-damage-assessment-of-selected-cities-Aleppo-Hama-Idlib>>, accessed 25 April 2020; according to key informant interviews (KIs) for the present report, many Aleppo residents had already left for various reasons, including the lack of water services (KI 18).
- 32 Central Bureau of Statistics, Pan-Arab Project for Family Health/League of Arab States and United Nations Children's Fund, *Syrian Arab Republic Multiple Indicator Cluster Survey 2006*, Final Report, 2006, Table EN.1, <<https://microdata.worldbank.org/index.php/catalog/53>>, accessed 25 April 2020.
- 33 *Pathways for Peace: Inclusive approaches to preventing violent conflict*, p. 123.



- 34 United Nations, Agenda for Humanity, 'About the Agenda for Humanity', <[www.agendaforhumanity.org/agendaforhumanity?referer=home](http://www.agendaforhumanity.org/agendaforhumanity?referer=home)>, accessed 19 May 2020. For more on the sustaining peace agenda, see: Resolution adopted by the United Nations General Assembly, 'Review of the United Nations Peacebuilding Architecture', A/RES/70/262, 27 April 2016, <<https://undocs.org/A/RES/70/262>>, accessed 19 May 2020; United Nations, Security Council Resolution S/RES/2282, United Nations, New York, 27 April 2016, <<https://sgreport.worldhumanitarianismsummit.org/>>, accessed 19 May 2020.
- 35 United Nations, 'One Humanity: Shared responsibility', Report of the Secretary-General for the World Humanitarian Summit, A/70/709, 2 February 2016, p. 5, <[www.agendaforhumanity.org/sites/default/files/IA-70-709%20Secretary-General's%20Report%20for%20WHS.pdf](http://www.agendaforhumanity.org/sites/default/files/IA-70-709%20Secretary-General's%20Report%20for%20WHS.pdf)>, accessed 5 November 2020.
- 36 General deterioration may occur as a result of declining capacities and resources, and restrictions placed on required supplies.
- 37 *Water Under Fire Volume 1: Emergencies, development and peace in fragile and conflict-affected contexts*.
- 38 As set out in: United Nations, International Covenant on Economic, Social and Cultural Rights, United Nations, New York, 16 December 1966; United Nations Committee on Economic, Social and Cultural Rights, General Comment No. 15: The Right to Water (Arts. 11 and 12 of the International Covenant on Economic, Social and Cultural Rights), E/C.12/2002/11, 20 January 2003, <[www2.ohchr.org/english/issues/water/docs/CESCR\\_GC\\_15.pdf](http://www2.ohchr.org/english/issues/water/docs/CESCR_GC_15.pdf)>, accessed 27 April 2020; Resolution adopted by the United Nations General Assembly, 'The Human Right to Water and Sanitation', A/RES/64/292, 28 July 2010, <<https://undocs.org/en/A/RES/64/292>>, accessed 27 April 2020; Resolution adopted by the United Nations Human Rights Council, 'Promotion and Protection of All Human Rights, Civil, Political, Economic, Social and Cultural Rights, Including the Right to Development', A/HRC/RES/12/8, 12 October 2009, <[www.un.org/development/desa/disabilities/promotion-and-protection-of-all-human-rights-civil-political-economic-social-and-cultural-rights-including-the-right-to-development.html](http://www.un.org/development/desa/disabilities/promotion-and-protection-of-all-human-rights-civil-political-economic-social-and-cultural-rights-including-the-right-to-development.html)>, accessed 2 November 2020; United Nations, Convention on the Rights of the Child, United Nations, New York, 20 November 1989; United Nations Committee on the Rights of the Child, General Comment No. 15 on the Right of the Child to the Enjoyment of the Highest Attainable Standard of Health (art. 24), CRC/C/GC/15, 17 April 2013.
- 39 Action Against Hunger France on behalf of the Global WASH Cluster, *The Human Right to Water and Sanitation in Emergency Situations: The legal framework and a guide to advocacy*, First trial edition, GWC, New York, February 2009, p. 13, <[www.worldwatercouncil.org/fileadmin/wwwc/Right\\_to\\_Water/Project\\_8\\_HRTWS\\_in\\_Emergencies\\_Handbook.pdf](http://www.worldwatercouncil.org/fileadmin/wwwc/Right_to_Water/Project_8_HRTWS_in_Emergencies_Handbook.pdf)>, accessed 25 April 2020.
- 40 Children are entitled to special protection, special respect, and the care and aid they require. International Committee of the Red Cross, Customary IHL Database, 'Rule 135. Children', <[https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1\\_rul\\_rule135](https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_rul_rule135)>, accessed 25 April 2020; Federal Ministry for European and International Affairs, Republic of Austria, 'Vienna Conference on Protecting Civilians in Urban Warfare, 1–2 October 2019, Issues Paper', <[www.bmeia.gv.at/fileadmin/user\\_upload/Zentrale/Aussenpolitik/Abruestung/POC19/POC19VIE\\_Issues\\_Paper.pdf](http://www.bmeia.gv.at/fileadmin/user_upload/Zentrale/Aussenpolitik/Abruestung/POC19/POC19VIE_Issues_Paper.pdf)>, accessed 25 April 2020.
- 41 For relevant practice supporting the rules, see: Customary IHL Database, <<https://ihl-databases.icrc.org/customary-ihl/eng/docs/home>>, accessed 25 April 2020. The database is based on an earlier, two-volume ICRC study: Henckaerts, Jean-Marie, and Louise Doswald-Beck, *Customary International Humanitarian Law. Volume I: Rules*, International Committee of the Red Cross, 2005, <[www.icrc.org/en/doc/assets/files/other/customary-international-humanitarian-law-i-icrc-eng.pdf](http://www.icrc.org/en/doc/assets/files/other/customary-international-humanitarian-law-i-icrc-eng.pdf)>, accessed 27 April 2020; and Henckaerts, Jean-Marie, and Louise Doswald-Beck, eds., *Customary International Humanitarian Law. Volume II: Practice – Parts I and II*, International Committee of the Red Cross, 2005, <[www.icrc.org/en/doc/assets/files/other/customary-international-humanitarian-law-ii-icrc-eng.pdf](http://www.icrc.org/en/doc/assets/files/other/customary-international-humanitarian-law-ii-icrc-eng.pdf)>, accessed 27 April 2020.
- 42 Geneva Water Hub, *The Geneva List of Principles on the Protection of Water Infrastructure*, Geneva, 2019, <[www.genevawaterhub.org/sites/default/files/atoms/files/gva\\_list\\_of\\_principles\\_protection\\_water\\_infra\\_www.pdf](http://www.genevawaterhub.org/sites/default/files/atoms/files/gva_list_of_principles_protection_water_infra_www.pdf)>, accessed 25 April 2020.
- 43 Customary IHL Database, 'Rule 1. The Principle of Distinction between Civilians and Combatants', <[https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1\\_rul\\_rule1](https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_rul_rule1)>, accessed 25 April 2020; Customary IHL Database, 'Rule 14. Proportionality in Attack', <[https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1\\_rul\\_rule14](https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_rul_rule14)>, accessed 25 April 2020; Customary IHL Database, 'Rule 2. Violence Aimed at Spreading Terror among the Civilian Population', <[https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1\\_rul\\_rule2](https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_rul_rule2)>, accessed 25 April 2020; *International Humanitarian Law and the Challenges of Contemporary Armed Conflicts: Recommitting to protection in armed conflict on the 70th anniversary of the Geneva Conventions*, Report prepared for the 33rd International Conference of the Red Cross and Red Crescent, ICRC, Geneva, October 2019, <[www.icrc.org/en/document/icrc-report-ihl-and-challenges-contemporary-armed-conflicts](http://www.icrc.org/en/document/icrc-report-ihl-and-challenges-contemporary-armed-conflicts)>, accessed 25 April 2020.
- 44 Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, article 52(2).
- 45 *The Geneva List of Principles on the Protection of Water Infrastructure*, principle 8, p. 33.
- 46 Protocol I, article 54(2).
- 47 United Nations Office for the Coordination of Humanitarian Affairs, 'Hunger and Armed Conflict: IHL framework', Fact sheet, OCHA, January 2019, <[www.unocha.org/sites/unocha/files/Fact-Sheet\\_Hunger%20and%20armed%20conflict%20-%20January%202019%20FINAL.pdf](http://www.unocha.org/sites/unocha/files/Fact-Sheet_Hunger%20and%20armed%20conflict%20-%20January%202019%20FINAL.pdf)>, accessed 6 November 2020.
- 48 *The Geneva List of Principles on the Protection of Water Infrastructure*, principle 7; "Civilians working for or at the water infrastructure, including but not necessarily limited to engineers, technical staff, operators, repair and construction crews, administrative staff and other personnel must be protected against attack unless and for such time as they take a direct part in hostilities", Protocol I, art. 51(3); Customary IHL Database, 'Rule 6. Civilians' Loss of Protection from Attack', <[https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1\\_rul\\_rule6](https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_rul_rule6)>, accessed 20 May 2020. For further discussion of the notion of direct participation in hostilities, see: International Committee of the Red Cross, *Interpretative Guidance on the Notion of Direct Participation in Hostilities under International Humanitarian Law*, Reference Document, ICRC, Geneva, 2009, <[www.icrc.org/en/doc/assets/files/other/icrc-002-0990.pdf](http://www.icrc.org/en/doc/assets/files/other/icrc-002-0990.pdf)>, accessed 25 April 2020.
- 49 Protocol I, article 51(5)(b). See also article 57(2)(b).
- 50 For the purposes of international humanitarian law, a densely populated area "should be understood as synonymous with 'concentration of civilians', defined in international humanitarian law as 'a city, town, village or other area containing a similar concentration of civilians or civilian objects'." International Committee of the Red Cross, 'The Use of Explosive Weapons in Densely Populated Areas', ICRC, 18 January 2016, <[www.icrc.org/en/use-explosive-weapons-populated-areas](http://www.icrc.org/en/use-explosive-weapons-populated-areas)>, accessed 25 April 2020.
- 51 Direct impacts can combine with indirect impacts that occur as an indirect result of the conflict. According to ICRC, "Indirect impact is understood to derive from direct impact, affecting an associated component of a system, usually in the short to medium term." *Urban Services During Protracted Armed Conflict*, p. 21.
- 52 Zeitoun, Mark, and Michael Talhami, 'The Impact of Explosive Weapons on Urban Services: Direct and reverberating effects across space and time', *International Review of the Red Cross*, vol. 98, no. 1, 2016, pp. 53–70, p. 64, <[https://international-review.icrc.org/sites/default/files/irc\\_97\\_901-6.pdf](http://international-review.icrc.org/sites/default/files/irc_97_901-6.pdf)>, accessed 25 April 2020.
- 53 Robinson, Isabel, and Ellen Nohle, 'Proportionality and Precautions in Attack: The reverberating effects of using explosive weapons in populated areas', *International Review of the Red Cross*, vol. 98, no. 1, 2016, pp. 107–145, cited in Zeitoun and Talhami, 'The Impact of Explosive Weapons on Urban Services'.
- 54 While the use of explosive weapons is not prohibited per se, their use should be avoided in densely populated areas to avoid harm to essential infrastructure on which the civilian population depends. *International Humanitarian Law and the Challenges of Contemporary Armed Conflicts*. There is growing concern about the use of explosive weapons in populated areas also in state practice. See, for example: Joint Statement on Explosive Weapons in Populated Areas made on behalf on 50 states by Ambassador Geraldine Byrne Nason, Permanent Representative of Ireland to the United Nations, at the Seventy-third Session of the United Nations General Assembly, October 2018, <[www.dfa.ie/media/dfa/ourrole/policies/peaceandsecurity/Joint-Statement-on-EWIPA-delivered-by-Amb-Byrne-Nason.pdf](http://www.dfa.ie/media/dfa/ourrole/policies/peaceandsecurity/Joint-Statement-on-EWIPA-delivered-by-Amb-Byrne-Nason.pdf)>, accessed 25 April 2020. Significantly, the Joint Statement affirms that: "The use of explosive weapons in populated areas has been shown to cause long-term humanitarian harm, which far outlasts the conflicts in which they are used. Beyond the immediate injuries and deaths caused, the destruction of housing, schools, hospitals, water and sanitation systems and other crucial infrastructure means that the civilian population is severely affected over the longer term" (para. 4).
- 55 *The Geneva List of Principles on the Protection of Water Infrastructure*, principle 9, para. 6.
- 56 Children under 5 are more than 20 times more likely to die from diarrhoeal disease linked to unsafe water and sanitation than violence in conflict. *Water Under Fire: For every child, water and sanitation in complex emergencies*.
- 57 *International Humanitarian Law and the Challenges of Contemporary Armed Conflicts*, p. 52; International Committee of the Red Cross, *The Principle of Proportionality in the Rules Governing the Conduct of Hostilities under International Humanitarian Law*, Report of the international expert meeting held in Quebec, 22–23 June 2016, ICRC, Geneva, August 2018, p. 46, <[www.icrc.org/en/document/international-expert-meeting-report-principle-proportionality?platform=hootsuite](http://www.icrc.org/en/document/international-expert-meeting-report-principle-proportionality?platform=hootsuite)>, accessed 25 April 2020.
- 58 Protocol I, article 57.
- 59 From the perspective of international organizations such as the United Nations and Inter-Agency Standing Committee, the goal is to prevent the normalization of the use of explosive weapons in populated areas, and thus strictly apply IHL; the goal is to go beyond IHL and ensure parties avoid the use of explosive weapons in populated areas.
- 60 Resolution 2 of the 26th International Conference of the Red Cross and Red Crescent, 'Protection of the Civilian Population in Period of Armed Conflict', Geneva, 7 December 1995.

- 61 Customary IHL Database, 'Rule 22. Principle of Precautions against the Effects of Attacks', <[https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1\\_rul\\_rule22](https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_rul_rule22)>, accessed 25 April 2020.
- 62 Protocol I, articles 59–60; Customary IHL Database, 'Rule 36. Demilitarized Zones', <[https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1\\_rul\\_rule36](https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_rul_rule36)>, accessed 20 May 2020; Customary IHL Database, 'Rule 37. Open Towns and Non-defended Localities', <[https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1\\_rul\\_rule37](https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_rul_rule37)>, accessed 20 May 2020.
- 63 United Nations Office for the Coordination of Humanitarian Affairs, 'Humanitarian Relief Operations in Armed Conflict: IHL framework', Fact sheet, OCHA, January 2019, p. 1, <[www.unocha.org/sites/unocha/files/Fact-Sheet\\_Humanitarian\\_Relief\\_Operations%20-%20January%202019.pdf](http://www.unocha.org/sites/unocha/files/Fact-Sheet_Humanitarian_Relief_Operations%20-%20January%202019.pdf)>, accessed 5 November 2020.
- 64 Geneva Convention Relative to the Protection of Civilian Persons in Time of War, of 12 August 1949 (Geneva Convention IV), article 55. See: *The Geneva List of Principles on the Protection of Water Infrastructure*.
- 65 Geneva Convention IV, article 56. See: *The Geneva List of Principles on the Protection of Water Infrastructure*.
- 66 Customary IHL Database, 'Rule 131. Treatment of Displaced Persons', <[https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1\\_rul\\_rule131](https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_rul_rule131)>, accessed 25 April 2020.
- 67 Customary IHL Database, 'Rule 53. Starvation as a Method of Warfare', <[https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1\\_rul\\_rule53](https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_rul_rule53)>, accessed 25 April 2020.
- 68 'Humanitarian Relief Operations in Armed Conflict: IHL framework'.
- 69 Customary IHL Database, 'Rule 56. Freedom of Movement of Humanitarian Relief Personnel', <[https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1\\_rul\\_rule56](https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_rul_rule56)>, accessed 5 June 2020.
- 70 Customary IHL Database, 'Rule 55. Access for Humanitarian Relief to Civilians in Need', <[https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1\\_rul\\_rule55](https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_rul_rule55)>, accessed 25 April 2020.
- 71 Customary IHL Database, 'Rule 53. Starvation as a Method of Warfare'.
- 72 'Humanitarian Relief Operations in Armed Conflict: IHL framework', p. 2. See also: Customary IHL Database, 'Rule 31. Humanitarian Relief Personnel', <[https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1\\_rul\\_rule31](https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_rul_rule31)>, accessed 5 June 2020; Customary IHL Database, 'Rule 32. Humanitarian Relief Objects', <[https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1\\_rul\\_rule32](https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_rul_rule32)>, accessed 5 June 2020.
- 73 Convention on the Rights of the Child, article 24(2)(c).
- 74 United Nations Committee on the Rights of the Child, General Comment No. 7, 'Implementing Child Rights in Early Childhood', CRC/C/GC/7/Rev.120, September 2006, <<http://docstore.ohchr.org/SelfServices/FilesHandler.ashx?enc=6QkG1d%2fPPRiCAqhKb7yhsqkirKQZLK2M58RF%2f5F0vFbt3FEUw5MPwUGL3wWtvx4j73rex5qxa3VhfNzYn7%2bdXmEE6x0AhrdwGxiZZx%2fVZnfHRL2pLxnWBNTLj6tdt2>>, accessed 27 April 2020; United Nations Committee on the Rights of the Child, General Comment No. 4, 'Adolescent Health and Development in the Context of the Convention on the Rights of the Child', CRC/C/GC/2003/41, July 2003, <<http://docstore.ohchr.org/SelfServices/FilesHandler.ashx?enc=6QkG1d%2fPPRiCAqhKb7yhsqkirKQZLK2M58RF%2f5F0vFbt3FEUw5MPwUGL3wWtvx4j73rex5qxa3VhfNzYn7%2bdXmEE6x0AhrdwGxiZZx%2fVZnfHRL2pLxnWBNTLj6tdt2>>, accessed 27 April 2020.
- 75 United Nations Committee on Economic, Social and Cultural Rights, General Comment No. 15: 'The Right to Water', p. 2.
- 76 Resolution adopted by the United Nations General Assembly, 'The Human Rights to Safe Drinking Water and Sanitation', A/RES/70/169, 22 February 2016, p. 4, <[www.un.org/en/ga/search/view\\_doc.asp?symbol=A/RES/70/169](http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/70/169)>, accessed 19 May 2020.
- 77 Ibid., para. 21.
- 78 Resolution adopted by the United Nations General Assembly, 'The Human Right to Water and Sanitation', A/RES/64/292, 28 July 2010, p. 2.
- 79 Resolution adopted by the United Nations Human Rights Council, 'Human Rights and Access to Safe Drinking Water and Sanitation', A/HRC/RES/7/22, 28 March 2008, <[https://ap.ohchr.org/documents/E/HRC/resolutions/A\\_HRC\\_RES\\_7\\_22.pdf](https://ap.ohchr.org/documents/E/HRC/resolutions/A_HRC_RES_7_22.pdf)>, accessed 11 May 2020; Resolution adopted by the United Nations Human Rights Council, 'Promotion and Protection of All Human Rights, Civil, Political, Economic, Social and Cultural Rights, Including the Right to Development', A/HRC/RES/12/8, 12 October 2009.
- 80 According to the Independent International Commission of Inquiry on the Syrian Arab Republic: "A growing corpus of both treaty-based and customary international law, including international human rights law ... outline obligations on parties to an armed conflict, including non-state actors, which govern the treatment and protection of children. The applicability of international humanitarian law does not replace existing obligations under international human rights law." United Nations Human Rights Council, "'They Have Erased the Dreams of My Children': Children's rights in the Syrian Arab Republic", Conference room paper of the Independent International Commission of Inquiry on the Syrian Arab Republic, A/HRC/43/CRP.6, 13 January 2020, para. 8, <<https://reliefweb.int/report/syrian-arab-republic/they-have-erased-dreams-my-children-children-s-rights-syrian-arab>>, accessed 27 April 2020.
- 81 Ibid., para. 12.
- 82 Inter-Agency Standing Committee, *Policy on Protection in Humanitarian Action*, IASC, 2016, p. 1, <[https://interagencystandingcommittee.org/system/files/iasc\\_policy\\_on\\_protection\\_in\\_humanitarian\\_action.pdf](https://interagencystandingcommittee.org/system/files/iasc_policy_on_protection_in_humanitarian_action.pdf)>, accessed 27 April 2020.
- 83 United Nations Children's Fund, *Hitting Rock Bottom: How 2016 became the worst year for Syria's children*, UNICEF Regional Office for the Middle East and North Africa, Amman, March 2017, p. 2, <[www.unicef.org/mena/reports/hitting-rock-bottom](http://www.unicef.org/mena/reports/hitting-rock-bottom)>, accessed 25 April 2020.
- 84 General Assembly Security Council, 'Children and Armed Conflict: Report of the Secretary-General', 9 June 2020, A/74/845–S/2020/525, p. 180, <[www.un.org/ga/search/view\\_doc.asp?symbol=S/2020/525&Lang=E&Area=UNDOC](http://www.un.org/ga/search/view_doc.asp?symbol=S/2020/525&Lang=E&Area=UNDOC)>, accessed 21 October 2020.
- 85 United Nations Human Rights Officer of the High Commissioner, 'Deprivation of Food, Water, Shelter and Medical Care – A method of war in Syria, and a crime against humanity', OHCHR, 6 February 2014, <[www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=14224&LangID=E](http://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=14224&LangID=E)> accessed 21 October 2020.
- 86 Ibid.
- 87 United Nations Human Rights Council, 'Human Rights Abuses and International Humanitarian Law Violations in the Syrian Arab Republic', 21 July 2016–28 February 2017, A/HRC/34/CRP.3, 10 March 2017, <[www.refworld.org/docid/58c80d884.html](http://www.refworld.org/docid/58c80d884.html)>, accessed 25 April 2020.
- 88 Ibid., para. 32.
- 89 Ibid., para. 33.
- 90 Ibid.
- 91 Ibid., para. 37.
- 92 Ibid.
- 93 Such distinctions are not clear-cut. Rapid urbanization and inequality in many cities around the world have meant that large, complex infrastructure comprising interconnected water supply services and wastewater collection and disposal do not serve large parts of the urban population. In certain countries, such as Ukraine, large infrastructure projects also serve rural areas.
- 94 Typically, these other activities and processes would include climatic and geological conditions; in the context of this publication, such conditions would include warfare and other activities relating to armed conflict.
- 95 This may be surface water collected in dams or reservoirs, or groundwater contained in a series of groundwater wells.
- 96 KII – WASH sector professional.
- 97 Petit, Frédéric, and Duane Verner, 'Critical Infrastructure Interdependencies Assessment', United States, 2016, p. 1, <[www.osti.gov/servlets/purl/1400396](http://www.osti.gov/servlets/purl/1400396)>, accessed 25 April 2020.
- 98 United Nations Office for Disaster Risk Reduction, 'Cross-sectoral and Multi-risk Approach to Cascading Disasters', section C in *Words into Action Guidelines: National disaster risk assessment – Special topics*, UNISDR, 2017, <[www.preventionweb.net/files/52828\\_nationaldisasterriskassessmentwiagu.pdf](http://www.preventionweb.net/files/52828_nationaldisasterriskassessmentwiagu.pdf)>, accessed 5 November 2020.
- 99 International Committee of the Red Cross, *Explosive Weapons in Populated Areas: Humanitarian, legal, technical and military aspects*, Report of the expert meeting held in Chavannes-de-Bogis, 24–25 February 2015, ICRC, Geneva, June 2015, <[www.icrc.org/en/publication/4244-explosive-weapons-populated-areas-expert-meeting](http://www.icrc.org/en/publication/4244-explosive-weapons-populated-areas-expert-meeting)>, accessed 24 April 2020.
- 100 United Nations Office for the Coordination of Humanitarian Affairs, 'OCHA Syria | Situation Report #2 Alouk Water Station', OCHA, 28 August 2020, <[https://reliefweb.int/sites/reliefweb.int/files/resources/OCHA%20Syria\\_SitRep%20%232\\_Alouk%20Water%20Station\\_28Aug2020\\_FINAL.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/OCHA%20Syria_SitRep%20%232_Alouk%20Water%20Station_28Aug2020_FINAL.pdf)> accessed 21 October 2021.
- 101 United Nations Office for the Coordination of Humanitarian Affairs, 'About OCHA Pakistan', OCHA, <[www.unocha.org/pakistan/about-ocha-pakistan](http://www.unocha.org/pakistan/about-ocha-pakistan)>, accessed 25 April 2020.
- 102 KII 8 – WASH programme professional.
- 103 Data shared by municipal authority with WASH Cluster in State of Palestine, September 2020.
- 104 KII 4; Kashka, Erich, 'Risk Assessment of the "Voda Donbasa" Water System – 2017. Risk Assessment Report', prepared for UNICEF, September 2019.
- 105 WASH Cluster Ukraine, 'Water and Sanitation in Eastern Ukraine', PowerPoint presentation, September 2019.

- 106 Ukraine WASH Cluster, 'Attacks on water and sanitation in Ukraine', email from Ukraine WASH Cluster UNICEF The Office of Emergency Programmes (EMOPS), 25 March 2021
- 107 WASH cluster estimate supplied by WASH sector professional in Ukraine, January 2020.
- 108 United Nations Children's Fund/WASH Cluster, 'WASH Cluster Ukraine Alert Bulletin. 1 September – 31 October 2017. Issue 11', UNICEF, 21 November 2017, <[www.humanitarianresponse.info/en/operations/ukraine/document/11-wash-cluster-alert-bulletin-01-september-31-october-2017-issue-11](http://www.humanitarianresponse.info/en/operations/ukraine/document/11-wash-cluster-alert-bulletin-01-september-31-october-2017-issue-11)>, accessed 25 April 2020.
- 109 United Nations Children's Fund/WASH Cluster, 'WASH Cluster Ukraine Alert Bulletin. 1 November – 31 December 2017. Issue 12', UNICEF, 30 January 2018, <[www.humanitarianresponse.info/en/operations/ukraine/document/12-wash-cluster-alert-bulletin-01-november-31-december-2017-issue-12](http://www.humanitarianresponse.info/en/operations/ukraine/document/12-wash-cluster-alert-bulletin-01-november-31-december-2017-issue-12)>, accessed 25 April 2020.
- 110 United Nations Children's Fund/WASH Cluster, 'WASH Incident Report No. 122', UNICEF, 17 April 2018, <<https://reliefweb.int/report/ukraine/wash-cluster-incident-report-no-122-17042018>>, accessed 25 April 2020.
- 111 Protection Cluster/United Nations High Commissioner for Refugees, *Civilian Impact Monitoring Report. January–December 2018*, UNHCR, 31 December 2018, <<https://reliefweb.int/report/yemen/civilian-impact-monitoring-report-january-december-2018>>, accessed 25 April 2020.
- 112 Data from Yemen Data Project, <[www.yemendataproject.org](http://www.yemendataproject.org)>, accessed 29 May 2020
- 113 Ministry of Water and Environment, Republic of Yemen, 'The Impact of Armed Conflict on Basic Services Including Water', 2016, cited in: World Bank, *Dire Straits: The crisis surrounding poverty, conflict and water in the Republic of Yemen*, WASH Poverty Diagnostic, World Bank, Washington, D.C., 2017, <<http://documents.worldbank.org/curated/en/429601499145081869/Dire-straits-the-crisis-surrounding-poverty-conflict-and-water-in-the-Republic-of-Yemen>>, accessed 25 April 2020.
- 114 Dorsch International Consultants, 'Yemen Water Sector: Damage assessment report of twelve water supply and sanitation local corporations (LCs) and their affiliated branch offices and utilities – Stage III', Deutsche Gesellschaft für Internationale Zusammenarbeit, May 2018.
- 115 This case study from KII 14.
- 116 The UNICEF Yemen Country Office states that the investment to construct the water system was valued at US\$600,000 and that funds were provided through the Department for International Development (United Kingdom of Great Britain and Northern Ireland).
- 117 *Urban Services During Protracted Armed Conflict*, p. 22.
- 118 AlKasaba Consulting, Technical Services and Training, 'UNICEF Capacity Assessment and Investment/Development Plans for Libya's Water Supply Institutions. Part I: Executive summary, key findings, challenges, recommendations and investment/development plans', prepared for UNICEF Libya, July 2019.
- 119 Ibid.
- 120 'WASH Incident Report No. 122'.
- 121 United Nations Children's Fund/WASH Cluster, 'WASH Cluster Ukraine Alert Bulletin. 1 January – 30 September 2019. Issue 15', UNICEF.
- 122 United Nations Children's Fund/WASH Cluster, 'WASH Cluster Ukraine Alert Bulletin. 1 July – 31 December 2018. Issue 14', UNICEF, 13 March 2019, <[www.humanitarianresponse.info/en/operations/ukraine/document/14-wash-cluster-alert-bulletin-01-july-31-december-2018-issue-14](http://www.humanitarianresponse.info/en/operations/ukraine/document/14-wash-cluster-alert-bulletin-01-july-31-december-2018-issue-14)>, accessed 25 April 2020.
- 123 Ngueuleu Djeuga, Isidore Collins, 'The Janus Face of Water in Central African Republic (CAR): Towards an instrumentation of natural resources in armed conflict', *Les Cahiers d'Outre-Mer*, vol. 272, no. 4, 2015, pp. 577–594, <[www.cairn.info/revue-les-cahiers-d-outre-mer-2015-4-page-577.htm](http://www.cairn.info/revue-les-cahiers-d-outre-mer-2015-4-page-577.htm)>, accessed 25 April 2020.
- 124 KII 10 – WASH sector professional.
- 125 Zwijnenburg, Wim, and Foeke Postma, *Living Under a Black Sky: Conflict pollution and environmental health concerns in Iraq*, PAX, Utrecht, 2017, p. 12, <[www.paxforpeace.nl/publications/all-publications/living-under-a-black-sky](http://www.paxforpeace.nl/publications/all-publications/living-under-a-black-sky)>, accessed 25 April 2020.
- 126 KII 10.
- 127 Zwijnenburg and Postma, *Living Under a Black Sky*, pp. 10–11.
- 128 United Nations Security Council, Implementation of Security Council Resolutions 2139 (2014), 2165 (2014), 2191 (2014) and 2258 (2015): Report of the Secretary-General, S/2016/156, 18 February 2016, para. 6, <[www.securitycouncilreport.org/atf/cf/%7B65B5F6C6-6D27-4E9C-8CD3-CF6E4FF96FF9%7D/s\\_2016\\_156.pdf](http://www.securitycouncilreport.org/atf/cf/%7B65B5F6C6-6D27-4E9C-8CD3-CF6E4FF96FF9%7D/s_2016_156.pdf)>, accessed 27 April 2020.
- 129 United Nations News, 'Syria: Water restored in Aleppo after a 48-day shutdown, UNICEF reports', United Nations, 7 March 2016, <<https://news.un.org/en/story/2016/03/523712-syria-water-restored-aleppo-after-48-day-shutdown-unicef-reports>> accessed 21 October 2020.
- 130 United Nations Children's Fund, 'Water Restored to Aleppo After a 48-day Deliberate Shutdown of Water Facility', Press release, UNICEF Damascus, 6 March 2016, <[www.unicef.org/media/media\\_90392.html](http://www.unicef.org/media/media_90392.html)>, accessed February 2019.
- 131 United Nations Children's Fund, 'Statement by Hanaa Singer, UNICEF Representative in Syria on Airstrikes Against the Al-Khafsa Water Treatment Facility in Aleppo', UNICEF, Damascus 1 December 2015, <[www.unicef.org/media/media\\_86402.html](http://www.unicef.org/media/media_86402.html)> accessed 21 October 2020.
- 132 Gordon, Joy, *Invisible War: The United States and the Iraq sanctions*, Harvard University Press, Cambridge, Mass., 2010, cited in: *Urban Services During Protracted Armed Conflict*, p. 30.
- 133 Martin, Alison, and Simone Klawitter, 'Treading Water: The worsening water crisis and the Gaza Reconstruction Mechanism', Oxfam Briefing Paper, Oxfam GB, Oxford, March 2017, <<https://policy-practice.oxfam.org.uk/publications/treading-water-the-worsening-water-crisis-and-the-gaza-reconstruction-mechanism-620218>>, accessed 25 April 2020.
- 134 United Nations High Commissioner for Refugees, Whole of Syria Shelter/NFI Sector and REACH, 'Shelter and NFI Assessment: Syria', Assessment Report, March 2017, <[https://reliefweb.int/sites/reliefweb.int/files/resources/reach\\_syr\\_unhcr\\_shelter\\_nfis\\_full\\_report\\_march\\_2017.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/reach_syr_unhcr_shelter_nfis_full_report_march_2017.pdf)>, accessed 27 April 2020.
- 135 According to Iraq's 2018 Multiple Indicator Cluster Survey, 2.1 per cent of the population are using unprotected dug wells, unprotected springs, surface water and 'other' sources. In 2018, the rural population of Iraq was 11.3 million, according to World Bank estimates (based on United Nations Population Division data) available at: World Bank Open Data, 'Rural Population – Iraq', <<https://data.worldbank.org/indicator/SP.RUR.TOTL?locations=IQ>>, accessed 11 May 2020.
- 136 KII 10.
- 137 Amnesty International, *Dead Land: Islamic State's deliberate destruction of Iraq's farmland*, Amnesty International, London, December 2018, <[www.amnesty.org/en/documents/mde14/9510/2018/en](http://www.amnesty.org/en/documents/mde14/9510/2018/en)>, accessed 25 April 2020.
- 138 Ibid.
- 139 United Nations Children's Fund, *Water Under Fire Volume 2: Strengthening sector capacity for a predictable, quality humanitarian response*, UNICEF, Geneva, 2020, <<https://www.unicef.org/reports/strengthening-sector-capacity-for-quality-humanitarian-response-2020>>, accessed 1 December 2020.
- 140 Ismail, Alhassan H., 'Cluster Analysis of Some Ecological Properties in Al-Rustamiah Wastewater Treatment Plant 3rd Expansion at Baghdad City, Iraq through (2006-2011)', *Journal of Kerbala University*, vol. 11, no. 1, 2013, <[www.academia.edu/6436709/Rustamiah\\_wastewater\\_treatment\\_plant\\_3rd\\_expansion\\_at\\_Baghdad\\_city\\_Iraq\\_through\\_2006-2011](http://www.academia.edu/6436709/Rustamiah_wastewater_treatment_plant_3rd_expansion_at_Baghdad_city_Iraq_through_2006-2011)>, accessed 11 May 2020.
- 141 KII 10.
- 142 KII 10.
- 143 KII 7.
- 144 When provided through non-humanitarian actors, the price of water and water quality is not always controlled as described in the following section.
- 145 KII 14.
- 146 KII 14 interview notes. Note: This figure represents a total requirement, however, the amount is not always funded.
- 147 United Nations Office for the Coordination of Humanitarian Affairs, *Global Humanitarian Overview 2020*, OCHA, n.d, <[www.unocha.org/global-humanitarian-overview-2020](http://www.unocha.org/global-humanitarian-overview-2020)>, accessed 11 May 2020.
- 148 World Bank, *Iraq: Reconstruction and Investment. Part 2: Damage and needs assessment of affected governorates*, World Bank, Washington, D.C., January 2018, <<http://documents.worldbank.org/curated/en/600181520000498420/pdf/123631-REVISED-Iraq-Reconstruction-and-Investment-Part-2-Damage-and-Needs-Assessment-of-Affected-Governorates.pdf>>, accessed 27 April 2020.
- 149 Regional Refugee and Resilience Plan 2017–2018 in Response to the Syria Crisis (3RP), 'Iraq Monthly Update: September 2017 – WASH', <<https://data2.unhcr.org/es/documents/download/61117>>, accessed 27 April 2020.
- 150 United Nations Children's Fund, *Strategy for Water, Sanitation and Hygiene 2016–2030*, UNICEF, New York, 2016, <[www.unicef.org/wash/files/UNICEF\\_Strategy\\_for\\_WASH\\_2016\\_2030.PDF](http://www.unicef.org/wash/files/UNICEF_Strategy_for_WASH_2016_2030.PDF)>, accessed 19 May 2020.
- 151 World Health Organization, 'Drinking-Water', 14 June 2020, <[www.who.int/news-room/fact-sheets/detail/drinking-water](http://www.who.int/news-room/fact-sheets/detail/drinking-water)> accessed 21 October 2020.
- 152 Office of the United Nations High Commissioner for Human Rights, 'The Right to Water. Fact sheet no. 35', OHCHR, Geneva, August 2010, <[www.refworld.org/docid/4ca45fed2.html](http://www.refworld.org/docid/4ca45fed2.html)>, accessed 27 April 2020.
- 153 Alderman, Harold, and Derek Headey, 'The Timing of Growth Faltering Has Important Implications for Observational Analyses of the Underlying Determinants of Nutrition Outcomes', *PLoS ONE*, vol. 13, no. 4, 25 April 2018,



- e0195904, <<https://doi.org/10.1371/journal.pone.0195904>>, accessed 1 July 2019.
- 154 Spiegel, Paul B., Phuoc Le, Mija-Tesse Ververs and Peter Salama, 'Occurrence and Overlap of Natural Disasters, Complex Emergencies and Epidemics During the Past Decade (1995–2004)', *Conflict and Health*, vol. 1, no. 2, 1 March 2007, <<https://doi.org/10.1186/1752-1505-1-2>>, accessed 3 November 2020.
  - 155 Hunter, Paul R., Denis Zmirou-Navier and Philippe Hartemann, 'Estimating the Impact on Health of Poor Reliability of Drinking Water Interventions in Developing Countries', *Science of the Total Environment*, vol. 407, 2009, pp. 2621–2624, cited in: *Urban Services During Protracted Armed Conflict*, p. 32.
  - 156 Ibid.
  - 157 Ibid.
  - 158 *Urban Services During Protracted Armed Conflict*, p. 32.
  - 159 United Nations Office for the Coordination of Humanitarian Affairs, Under-Secretary-General for Humanitarian Affairs and Emergency Relief Coordinator Stephen O'Brien, 'Statement to the Security Council on the Humanitarian Situation in Ukraine', New York, 2 February 2017, <[https://reliefweb.int/sites/reliefweb.int/files/resources/ERC\\_USG%20Stephen%20O%27Brien%20Statement%20on%20UKRAINE%20to%20SecCo%202FEB2017%20CAD.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/ERC_USG%20Stephen%20O%27Brien%20Statement%20on%20UKRAINE%20to%20SecCo%202FEB2017%20CAD.pdf)>, accessed 19 May 2020.
  - 160 Denisov, N., *State of the Siverskyi Donets Basin and Related Risks Under Military Operations. Technical report*, Organization for Security and Co-operation in Europe (OSCE) Project Co-ordinator in Ukraine, 2018, p. 33, <[www.osce.org/project-coordinator-in-ukraine/419459?download=true](http://www.osce.org/project-coordinator-in-ukraine/419459?download=true)>, accessed 11 May 2020.
  - 161 Efron, Shira, et al., *The Public Health Impacts of Gaza's Water Crisis*, RAND Corporation, 2018, Santa Monica, Calif., <<https://doi.org/10.7249/RR2515>>, accessed 27 April 2020.
  - 162 United Nations, The Question of Palestine, 'Water, Sanitation and Hygiene Household Survey Gaza', Survey report, 30 April 2020, <[www.un.org/unispal/document/auto-insert-209510](http://www.un.org/unispal/document/auto-insert-209510)>, accessed 11 May 2020.
  - 163 World Bank, 'Wastewater Management Project Mitigates Health and Environmental Threats in the West Bank and Gaza', Results brief, World Bank, 9 October 2019, <[www.worldbank.org/en/results/2019/10/09/wastewater-management-project-mitigates-health-and-environmental-threats-in-the-west-bank-and-gaza](http://www.worldbank.org/en/results/2019/10/09/wastewater-management-project-mitigates-health-and-environmental-threats-in-the-west-bank-and-gaza)>, accessed 27 April 2020. XE Currency Converter, 'Live Rates', 21 October 2020, <[www.xe.com/currencyconverter/](http://www.xe.com/currencyconverter/)>, accessed 21 October 2020.
  - 164 Kakar, Faiz, Fabrizio Bassani, C.J. Romer and S.W.A. Gunn, 'The Consequence of Land Mines on Public Health', *Prehospital and Disaster Medicine*, vol. 11, no. 1, March 1996, pp. 2–10, <<https://doi.org/10.1017/S1049023X00042278>>, accessed 27 April 2020.
  - 165 United Nations Water, 'Handwashing/Hand Hygiene', United Nations, <[www.unwater.org/water-facts/handhygiene/](http://www.unwater.org/water-facts/handhygiene/)>, accessed 21 October 2020.
  - 166 KII 5.
  - 167 Arshad and Aoun, *Syria Damage Assessment of Selected Cities Aleppo, Hama and Idlib*.
  - 168 Ibid., p. viii.
  - 169 Sikder, Mustafa, Umar Daraz, Daniele Lantagne and Roberto Saltori, 'Water, Sanitation, and Hygiene Access in Southern Syria: Analysis of survey data and recommendations for response', *Conflict and Health*, vol. 12, no. 17, 23 April 2018, <<https://pubmed.ncbi.nlm.nih.gov/29713372/>>, accessed 21 October 2020.
  - 170 United Nations Children's Fund, 'Update on Water Cuts in Syria', Press release, 6 January 2017, <[www.unicef.org/press-releases/update-water-cuts-syria](http://www.unicef.org/press-releases/update-water-cuts-syria)>, accessed 5 November 2020.
  - 171 United Nations Entity for Gender Equality and the Empowerment of Women, *Preventing Conflict, Transforming Justice, Securing the Peace. A global study on the implementation of the United Nations Security Council resolution 1325*, UN Women, 2015, p. 68, <<https://reliefweb.int/sites/reliefweb.int/files/resources/UNW-GLOBAL-STUDY-1325-2015.pdf>>, accessed 27 April 2020.
  - 172 Ibid., p. 68.
  - 173 'Handwashing/Hand Hygiene'.
  - 174 'Shelter and NFI Assessment: Syria', p. 81.
  - 175 UN-Water Decade Programme on Advocacy and Communication, and Water Supply and Sanitation Collaborative Council, 'The Human Right to Water and Sanitation', Media brief, UNW-DPAC/WSSCC, n.d., <[www.un.org/waterforlifedecade/pdf/human\\_right\\_to\\_water\\_and\\_sanitation\\_media\\_brief.pdf](http://www.un.org/waterforlifedecade/pdf/human_right_to_water_and_sanitation_media_brief.pdf)>, accessed 27 April 2020.
  - 176 Howard, Guy, and Jamie Bartram, 'Domestic Water Quantity, Service Level and Health', World Health Organization, 2003, p. 22, <<https://apps.who.int/iris/handle/10665/67884>>, accessed 27 April 2020.
  - 177 Clasen, Thomas J.D., 'Household Water Treatment and Safe Storage to Prevent Diarrheal Disease in Developing Countries', *Current Environmental Health Reports*, vol. 2, 2015, pp. 69–74, introduction, <<https://doi.org/10.1007/s40572-014-0033-9>>, accessed 27 April 2020.
  - 178 KII 6.
  - 179 International Committee of the Red Cross, *Displacement in Times of Armed Conflict: How international humanitarian law protects in war, and why it matters*, ICRC, Geneva, April 2019, <[www.icrc.org/en/document/ihl-displacement](http://www.icrc.org/en/document/ihl-displacement)>, accessed 27 April 2020.
  - 180 KII 6.
  - 181 United Nations, The Question of Palestine, 'Humanitarian Action for Children 2017 – State of Palestine – UNICEF Appeal', <[www.un.org/unispal/document/auto-insert-200910](http://www.un.org/unispal/document/auto-insert-200910)>, accessed 27 April 2020.
  - 182 United Nations Office for the Coordination of Humanitarian Affairs, 'Breakdown of Data on Demolition and Displacement in the West Bank', <<https://app.powerbi.com/view?r=eyJrJmMjZGRhYWQ0ODk0MS00MjVJkLWI2NTktMDQ1NGJlMGNiY2Y3IiwidCl6IjBmOWUzNWRiLU0NGYtNGY2MC1iZGNIJlTViYQxNmU2ZGM3MCIsmMiOjh9>> accessed 23 April 2021; United Nations Office for the Coordination of Humanitarian Affairs, 'Gaza Strip: Snapshot | February 2020', <<https://www.ochaopt.org/content/gaza-strip-snapshot-february-2020>> accessed 23 April 2021.
  - 183 KII 7.
  - 184 United Nations Office for the Coordination of Humanitarian Affairs, *Iraq Humanitarian Needs Overview: Humanitarian programme cycle 2020*, OCHA, November 2019, p. 5, <[https://reliefweb.int/sites/reliefweb.int/files/resources/iraq\\_hno\\_2020.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/iraq_hno_2020.pdf)>, accessed 19 May 2020.
  - 185 United Nations Office for the Coordination of Humanitarian Affairs, 'Humanitarian Bulletin: Iraq, August 2018', OCHA Iraq, 31 August 2018, p. 2, <<https://reliefweb.int/sites/reliefweb.int/files/resources/OCHA%20Iraq%20Humanitarian%20Bulletin%20-%20August%202018.pdf>>, accessed 27 April 2020.
  - 186 For the purpose of this report and these recommendations, the term 'parties to conflict' encapsulates all those actors – individuals, groups (including non-state armed groups) and states – engaged in an armed conflict. These recommendations are directed to these actors.
  - 187 Protecting Civilians in Urban Warfare, Towards a Political Declaration to Address the Humanitarian Harm Arising from the Use of Explosive Weapons in Populated Areas, Geneva Consultations, 18 November 2019, 'Statement delivered by the United Nations Office of Humanitarian Affairs on behalf of the United Nations and other organizations engaged in humanitarian action', <[https://reachingcriticalwill.org/images/documents/Disarmament-fora/ewipa/declaration/statements/18Nov\\_UNOCHA.pdf](https://reachingcriticalwill.org/images/documents/Disarmament-fora/ewipa/declaration/statements/18Nov_UNOCHA.pdf)>, accessed 20 May 2020.
  - 188 For the purpose of this report and these recommendations, the terms 'humanitarian actors' and 'humanitarian response mechanism' encapsulate all those humanitarian actors that comply with and meet the humanitarian principles of impartiality, neutrality, independence and humanity, including, but not limited to, international, national and local humanitarian organizations and United Nations agencies. These recommendations are directed to these actors.
  - 189 For the purpose of this report and these recommendations, states should be understood as any part of a legislative, executive and/or judicial body of a country, whether or not the state is a Member State of the United Nations. These recommendations are directed to states and set out what action each state should undertake in its own capacity, whether within the structure of the United Nations, within the international arena or internally/domestically.
  - 190 For the purpose of this report and these recommendations, the United Nations Security Council should be understood as a body of the United Nations, to which Member States belong. These recommendations are directed to the United Nations Security Council.
  - 191 For the purpose of this report and these recommendations, donors should be understood as any private, public or multilateral actor belonging to the international donor community. These recommendations are directed to these actors and set out what action each donor should undertake in its capacity as such.
  - 192 Exception to this rule is when used for military purposes – in which then proportionality and precautions in attack still apply.



**Inside back cover:** On 23 April 2020, a child collects water in the Maarat Misrin camp north of Idlib, Syrian Arab Republic. At camps such as this, with large numbers of people using the same facilities and irregular cleaning and maintenance of the waterpoints, the arrival of a threat like COVID-19 could pose severe health risks to the community.

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