



BLED DRY

**HOW WAR IN THE MIDDLE EAST IS BRINGING
THE REGION'S WATER SUPPLIES
TO BREAKING POINT.
AN ICRC REPORT.**



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Even without recent droughts and ongoing conflicts, many Middle Eastern States would be struggling to meet the basic water needs of growing urban populations and the demand from rising food production.

But the conflicts in Syria and in Israel and the occupied Palestinian territory, as well as the aftermath of conflict in Lebanon and nearly three decades of war and sanctions in Iraq, have helped push the region's water resources and delivery systems close to breaking point.

Throughout the Middle East, people are suffering from severe water shortages. This not only hinders agricultural production but also places limitations on domestic supply. The rising violence of the past few years and record-low rainfall have made access to an adequate quantity and quality of water increasingly difficult. In Syria for instance, the combined effects of a protracted conflict and consecutive drought years have hit many people very hard.

Many of the ageing water, sanitation and electrical systems that service the region's growing population were already struggling to keep up with demand even before the conflicts began. Now, with more than 7.5 million people displaced within Syria and some 4 million seeking safety elsewhere (mostly in neighbouring Iraq, Jordan, Lebanon and Turkey), along with another 2.5 million displaced due to fighting in Iraq, already fragile water systems in communities hosting displaced people are being pushed to the limit, and water quality continues to deteriorate. In Yemen, dwindling water supplies and years of civil war have had serious effects on food production and the local economy.

“In countries like Iraq, Syria, Jordan, Lebanon and Yemen, or in the occupied Palestinian territory (East Jerusalem, West Bank and Gaza), a lot of the infrastructure is very old,” says Michael Talhami, ICRC regional water and habitat adviser for the Near and Middle East. “And because of prolonged periods of conflict, or in some cases sanctions, or a lack of investment, the maintenance and renovation of these municipal systems have been neglected. Many of these water systems are therefore extremely inefficient — a lot of water is simply lost due to leakage in the water supply system.”

Heavy fighting using high-intensity, explosive weaponry means that many water, sanitation and electrical systems have suffered regular and serious damage. It has therefore become increasingly difficult to obtain water of adequate quality in sufficient quantity. In many cases, the rate of water loss due to damage is continuing to increase. As a result, even more of this precious resource is squandered, while wastewater often goes untreated.

The cost of water is also rising in many cases. Sometimes, this is due to municipal service providers having to run generators because they do not have access to the electricity network. In other instances, it is the result of people having to purchase water from private vendors who sell water from trucks.

The ICRC has also observed a disturbing trend in which water supply, sanitation and electrical infrastructure are being directly targeted by warring parties. In other instances, parties to a conflict that have control over essential service infrastructure are using access to water and electricity as weapons or as bargaining chips in negotiations.

“Using access to water as a tactic or weapon during conflict, or targeting water or power facilities, has both an immediate and a long-term impact on public health for populations that are already very vulnerable,” says Robert Mardini, ICRC head of operations for the Near and Middle East.



“Such attacks are particularly harmful because water, sanitation and electricity supplies are intimately interconnected. So an attack on a power station, for example, could have an impact on sewage treatment, water availability, the quality of available water, or the functioning of health facilities. If this trend continues, the humanitarian community will not have the capacity to meet people’s needs by providing services or by continuing to offer quick fixes.”



LONG-TERM HEALTH AND HUMANITARIAN CONSEQUENCES

All these trends have devastating consequences for people who live in areas where it is difficult to obtain water of adequate quality in sufficient quantity. In many cases, the arrival of large numbers of refugees or internally displaced persons has worsened an existing water crisis.

Many Syrian refugees, for example, have little choice but to gather in camps or in host communities where water was already scarce, of poor quality, or expensive. In some cases, such scarcity is one of several issues creating tensions between the displaced and those hosting them, while in other cases it adds to mounting social grievances for which local authorities or government are blamed.

MAIN CHALLENGES

The challenges are common to most countries of the region, particularly those now coping with expanding refugee populations or large movements of people within their borders due to fighting.

Here are some of the other main issues that require immediate international attention and support:

- Municipal service provision in host communities is severely strained and scarce water supplies are stretched to the maximum.
- The increase in demand for water has resulted in over-pumping, which has in turn led to declining water table levels, higher pumping costs and increasing salinity.
- The size and scope of urban water, sanitation and power systems requiring maintenance and repair have greatly increased. Maintaining these large systems demands more time and resources, both during times of stability and during conflict. At the same time, in protracted conflicts there is all too often a brain-drain of skilled staff.
- Power shortages, intermittent supply and severe voltage fluctuations place significant constraints on the operation of municipal water and sanitation systems. As a result, less drinkable and domestic (household) water is available and less wastewater is treated.
- The lack of an adequate mains power supply means local authorities must increasingly resort to using generators, which raises the cost of water. As municipal services decline and economic hardship sets in during prolonged periods of conflict, people tend to stop paying for such services as water, sanitation and electricity. As a result, service providers have less revenue available for repairs and routine maintenance.
- Growing household (or domestic) water consumption by the region's rising population has meant more water is diverted from the agricultural sector, which is already under threat due to conflict. This leads to over-extraction of water resources to meet the demands of agricultural and domestic use. This endangers the sustainability of water resources. Consequently, many Middle Eastern countries are increasingly reliant on importing food, leaving local residents and refugees more vulnerable to fluctuations in international market prices.



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- There is a general lack of respect among warring parties for the protected status of water installations. The ICRC has observed a troubling trend in which water and sanitation infrastructure is being destroyed through deliberate targeting or collateral damage, and in some instances water infrastructure is being used as a political or military bargaining chip. International humanitarian law clearly prohibits, whatever the motive, the attacking, destroying, removing, or rendering useless of “objects indispensable to the survival” of civilian populations, such as “foodstuffs, agricultural areas for the production of foodstuffs, crops, livestock, drinking water installations and supplies, and irrigation works.”
- Fighting makes it difficult for us to reach the areas where we need to operate if we are to ensure access to essential services that are critical to maintaining public health, such as water, sanitation and power.
- Support in terms of water, sanitation and habitat is greatly needed in all of the conflict-affected countries and in those countries where people have sought refuge from the conflict in Syria.

A NETWORK OF PROBLEMS

A drying climate

Record-low rainfalls, disappearing rivers, shrinking reservoirs and lowered water tables have made clean water increasingly difficult to come by.

Broken systems

Due to years of conflict, water and electrical systems in numerous countries are badly damaged or in poor repair. This reduces water quality and quantity while requiring more water to be pumped from ground sources, rivers and reservoirs.

Direct attack: a disturbing trend

Warring parties sometimes intentionally target water and electrical systems, or interrupt service, as a military or political tactic. This not only violates the laws that govern armed conflict, it puts the health of thousands at risk.

Breeding grounds

Wastewater and sewage-treatment plants and pipe networks have also been damaged by fighting, or have stopped functioning due to power outages, placing already vulnerable communities at great risk of infectious diseases.

Overwhelming demand

Forced to flee their homes due to the Syrian conflict, more than 12 million are now living in camps and communities where water resources were already stretched to the limit.

WHAT WE CAN DO ABOUT THEM

Meet immediate needs

In order to avert greater humanitarian tragedy, the immediate needs of millions of people in desperate situations must be met. This will allow them to stay healthy, avoid contaminated water sources that lead to illness and allow them someday to live full productive lives.

Tap new sources

Where possible, the ICRC and others must continue to work with local communities to find new sources of clean water that can be sustained by the local environment.

Stop the leaks

A significant amount of water can be 'found' simply by upgrading and repairing damaged and aging systems so that less water is wasted. In some cases, conflict has created situations in which half the water that is pumped is lost on the way to the tap.

Step up the pressure

Exert more influence on armed actors to allow free access to neutral humanitarians working to restore vital services and to stop using water and electricity as weapons. They must respect international humanitarian law and the health of people who need these services to live.

Keeping it flowing

Simply digging new wells or pumping more water is not a solution if water sources are not replenished at the same rate. We must work together therefore to come up with long-term solutions even as we work to meet the immediate needs of millions of suffering people. This is a complex problem that belongs to everyone in the region.

Despite the dire situation, there are positive steps that can be taken:

- With sufficient resources and coordination with local water authorities, considerable improvements can be made to existing urban services (water, sanitation and power) that could greatly improve access to water of adequate quality, in sufficient quantity.
- By working with local partners such as the National Red Cross and Red Crescent Societies, and with local water, sanitation and power providers in all of the affected countries, the ICRC has made considerable progress in addressing some of the most serious needs, and in developing dialogue with all parties to a conflict.
- There have been numerous cases in which the ICRC has observed that warring parties have respected civilian infrastructure and the proper operation of essential services. This indicates that there are opportunities for productive engagement aimed at fostering greater respect and understanding on this issue.

**What we are doing about it:
ICRC water-related action in the Middle East in 2014**

9.5 million people benefited from emergency water supply repairs and renovation.

600,000 people in the region received water provided by the ICRC and delivered by truck.

1.1 million people benefited from improvements to water storage or distribution facilities.

A DESERT REGION WITH A GROWING POPULATION

Nowhere on earth is the intersection between conflict and water more evident than in the Middle East. Even before the conflicts of recent decades, water use was already at unsustainable levels in many countries in the region.

“This is an area that relies heavily on agriculture and food production, and demands a lot of water,” notes Guillaume Pierrehumbert, ICRC water and habitat coordinator in Israel and the occupied Palestinian territory, who has worked in several countries throughout the region. “It’s not just about water for drinking, which represents only a small percentage of the need.”

Over the years, the populations of most countries have grown rapidly, and people’s expectations regarding the quality of services have also risen. As in other water-stressed regions, this has created competition for water between sectors (agriculture versus domestic, and/or urban versus rural).

In many water-rich countries, agriculture makes up 80 to 90 percent of total water use. With sufficient water available, they can direct a high percentage of water toward growing crops, while still having enough for domestic consumption.

Most water-poor countries, however, can only allocate 50 to 60 percent of their water resources to growing food. “As their populations grew, they either had to re-allocate water from the agricultural sector to the domestic sector or run the risk of over-using their already scarce water resources,” Talhami notes.



VIRTUAL WATER

This leaves water-poor countries vulnerable during times of drought and conflict. "Countries in this region have increasingly made up for their water deficit by importing food that is grown with water elsewhere, typically in water-rich countries," says Talhami. "This is commonly referred to among water experts as 'virtual water.'"

This trend is aggravated by conflict and climate change in the region. A case in point has been the recent drought, which had a dramatic impact on wheat production in Syria. "Wheat is primarily grown in rain-fed areas in the north-eastern part of Syria," explains Talhami. Last year, due to conflict and drought, wheat production was low. "This means that Syria could become even more reliant on imported food, and will therefore be acutely vulnerable to any spike in world food prices. This would exacerbate the difficulties many people already face as they try to obtain food at a price they can afford."

Meanwhile, successive droughts, unsustainable water management practices and increased urbanization in countries such as Syria are also endangering the sustainability of water resources and the ability to meet the mounting need for both water and food. "As an example, there was a river that used to flow through Damascus, the Barada, which was feeding the entire city until the 1960s and 1970s," notes David Kaelin, ICRC water and habitat coordinator for Syria.

"Damascus increased its population even more than the rest of the country, probably 10 times over the past 60 years or so. As a result of this, along with increased use of this water for agriculture, the river literally stopped flowing," Kaelin says. "Today, there is hardly any water in the Barada River in Damascus. Before the crisis, almost all this water was used for the population and for agriculture."

In the meantime, the city's main wastewater-treatment facility, situated on the front lines between the warring parties, has been severely damaged and is no longer operating. This greatly increases the risk of groundwater contamination, which in turn could pose a serious threat to public health.

"So in Syria today there is demographic pressure, a water-scarce environment and climatic events all coming together," says Kaelin. "And you top it off with a very intense, widespread conflict that touches every part of the country, and what you have is a recipe for disaster."

The water crisis in Syria is not exceptional in the region. "Water can play an indirect role in exacerbating existing conflicts, tensions or social grievances," says Talhami. "For instance, during the political upheavals of the so-called 'Arab Spring,' water-related issues formed part of a complex set of variables that ultimately led to civil unrest."

SYRIA: BRINGING WATER TO PEOPLE IN DESPERATE NEED

Effects of conflict: Water in Syria

- *In 2014, local officials estimated they lost 60 per cent of the available water to leaks in the network. These leaks were caused partly by conflict-related damage and partly by the ageing infrastructure not being managed or maintained properly.*
- *Damage to water, sanitation and electrical infrastructure is widespread.*
- *There is a risk of severe health problems, both because people do not have access to enough water of adequate quality and because of exposure to untreated wastewater.*
- *Maintenance and renovation of essential infrastructure proceed slowly, because humanitarian workers, service provider technicians and contractors can not access facilities safely.*

At a centre for people displaced by fighting in the governorate of Sweida, in Syria's southern tip, Ibrahim Taih Assaadun says he has come all the way from the north-eastern governorate of Hassakeh to escape the fighting.

But life at the centre is still extremely hard. "We lack everything, especially water," he says. "We have to pay for water, except when it is on free distribution, but that's not enough for 350 people."

In centres like this one, the Syrian Arab Red Crescent (SARC), a key partner in ICRC operations within Syria, has recently completed an assessment that led to the installation of several tanks in order to increase water storage capacity.

"There is mutual respect and trust between the Syrian Arab Red Crescent and the ICRC," says Reem Alamer, a SARC volunteer who is working on the project. "The ICRC depends on the information gathered by our teams. Following our visits to the displacement centres that we support, the solutions we suggest on the basis of our assessments are often put into practice, especially when it comes to water." ([Click here to watch a video about ICRC and SARC water operations](#))

This is just one example of how the ICRC works with the SARC and other partners, including local power authorities and water boards, to take thousands of steps — large and small — in communities and centres for displaced people throughout the country. "By working alongside the Syrian Arab Red Crescent, training their volunteers on water and habitat in emergencies and supporting local water boards, we are improving access to clean water for millions of people all over Syria," says Talhami.

A MASSIVE DEMAND

But in a nation where upwards of 7 million people have been displaced to other parts of the country, and the damage and neglect of infrastructure is so extensive, these humanitarian activities cannot keep up with demand. "The war is putting everything under pressure," says Kaelin. "The very tricky management of what were already scarce water resources, which was carried out very reliably and carefully before the crisis, has gone down the drain. Now we're in a critical emergency situation."

It's an uphill struggle, as water authorities are often forced to meet greater demand with severely damaged networks, which in some areas lose more water to leaks than they deliver. This is the case in the suburbs of Damascus. "The network is severely damaged in every corner of the city, so you have leaks everywhere," he says. "But having no alternative sources, they over-pump knowing that they're going to lose 60 to 70 per cent of this water. The problem is that much of that water is coming from sources where there is not believed to be a deep reserve. No one can tell how long it will last," says Kaelin.

A QUESTION OF TIME AND CONTAMINATION

One of the greatest concerns is that untreated wastewater might seep into local aquifers, contaminating water supplies and leaving an already vulnerable population more susceptible to water-borne diseases.

"The two main wastewater treatment plants in the country, for Aleppo and Damascus, are so badly damaged that they are out of service," Kaelin notes, adding that both treatment plants are now being completely bypassed. "Sewage goes untreated and is discharged into the local environment, where it poses a risk of contamination to the groundwater, and hence to potential water supplies."

"Through its programmes, the ICRC is supporting the disinfection of close to 80 per cent of all water that is produced in Syria. If that system collapses, there is the risk of epidemics of water-borne diseases. Then we would be looking at a whole new stage of the crisis."

Talhami shares his concern. "In conflict settings, sanitation is all too often relegated to a lower priority," says Talhami. "It is also most often true that it is a 'ticking time bomb' in terms of its impact on the general environment, water resources (surface and groundwater) and, by extension, on human health."



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What we have done about it / Syria 2014

15 million people benefited from improved water supplies and sanitation due to large-scale ICRC emergency support in cooperation with local water boards. This work was facilitated by various parties including the Ministry of Water Resources and the Syrian Arab Red Crescent.

6.3 million people regained access to clean water following repairs to damaged infrastructure.

370,000 people displaced within Syria received water via truck deliveries.

160,000 displaced people benefited from repaired and upgraded hosting centres and water/sanitation facilities.

170,000 displaced people received bottled water.

The ICRC also helped bring even more potable water to people living in cities and towns where water supply systems were functioning, but needed repairs, spare parts, water-treatment chemicals or other supplies needed to operate water treatment plants.

All these efforts were made possible by working in cooperation with Syrian Arab Red Crescent staff and volunteers.

JORDAN: HUGE DEMANDS PLACED ON AN AGEING SYSTEM

Effects of conflict: Water in Jordan

- *10 per cent increase in population over four years.*
- *Severely strained water systems (doubling of service use in some areas).*
- *Reduced levels of water availability and water quality.*
- *Increase in cost of water bought from private suppliers, such as tanker truck operators.*
- *Mounting social grievances among Syrian refugees and host communities over access to water and competition for electricity, food, schooling, housing and health care.*

Prior to the conflict in Syria and the influx of refugees into Jordan, water use in the country was already unsustainable.

In many parts of the country, the local authorities were dealing with declining water table levels, increasing pumping costs and an increase in the salinity of groundwater. Before the conflict, agriculture accounted for roughly 65 percent of water use.

At the same time, the water infrastructure in many parts of Jordan was ageing, and was unable to handle demand efficiently. The north of Jordan had the highest rate of water loss, some of the lowest water consumption rates and problems with water quality and consistency in supply.

In this context, Jordan has absorbed an unprecedented number of refugees fleeing from the most recent conflict in Syria, which comes on top of waves of refugees from previous conflicts in Iraq and Palestine. Some 80 per cent of Syrian refugees reside in host communities, while 20 per cent live in camps.

In particular, the two largest camps – Zaatari and Azraq – are both located in heavily water-stressed parts of Jordan. When one takes account of those Syrian refugees who have found refuge among host communities, the challenge of ensuring an adequate water supply for Jordanians and Syrian refugees alike has risen drastically. This is especially true in the north of Jordan (e.g. in Mafraq and Irbid). Here, ageing municipal water supply infrastructure (up to 30 years old in some cases) had already placed these governorates well below the national average prior to the onset of the conflict in terms of water lost (up to 60 per cent in some cases) and water consumption rates.

Over four years into the Syrian crisis, these water-related problems in certain parts of Mafraq and Irbid have been further exacerbated by an average 25 per cent increase in the local population due to the Syrian refugee crisis. As a result, water consumption has continued to decline and competition for scarce water resources has become increasingly prevalent. Other governorates have experienced a similar situation to varying degrees, most notably Jerash, Ajloun and Balqa.

“Much of the region depends on ageing infrastructure that requires considerable maintenance,” says Michael Talhami “In Jordan, one of the most water-scarce countries in the world, the demand for water, both from residents and from the refugees who have arrived over the years, has been growing significantly.”

This is why, in places such as North Badia, the ICRC is endeavouring to ensure adequate access to water in coordination with the local authorities. At the same time, the ICRC is providing support in coordination with the authorities for Syrian refugees arriving at certain sites where people cross the north-eastern border with Syria. Water, sanitation, shelter and other basic necessities have been made available for Syrian refugees at these sites.

The significant stress on accommodation and the delivery of essential services, together with a lack of jobs, has resulted in mounting social grievances. In Bustanah, a village in North Badia, local residents have lodged numerous complaints with the local service provider and even threatened to block the main highway connecting Jordan with Iraq if their water situation did not improve. The ICRC is therefore endeavouring to improve water and sanitation services within communities that are hosting large numbers of refugees.

What we are doing about it / Jordan 2014

16,000 people living in shelter caravans on Jordan’s eastern border benefited from regular maintenance and cleaning of toilets and showers by the ICRC and/or local contractors. ICRC maintenance increased the capacity of water, sanitation and septic systems.

150,000 people – both Syrian refugees and Jordanians from the host community – benefited from repairs to critical water infrastructure at eight locations in the North Badia region of Mafraq Governorate.

200,000 litres of water can be stored in 4 concrete tanks erected as part of ICRC water projects in North Badia and Mafraq. The projects also included 4 pumping stations, transmission and distribution pipelines in 3 villages, 2 water treatment plants and 5 wells (replaced or refurbished).

'Finding' new water through conservation

When looking to make more water available in arid areas, the answer is frequently not to sink another borehole. "Often, the knee-jerk reaction is to drill," notes Talhami. "Local authorities often ask for that, but in the Middle East, where we've had a really long presence, we have a responsibility to understand the water-related situation prior to the conflict just as much as during the conflict."

"We can't just work on the supply side options — i.e. drilling more boreholes to extract more water. That would make the water crisis even worse," Talhami says. "Wherever possible, we need to shift to managing demand and helping to conserve water, by reducing losses and improving the efficiency of the whole water supply system, from the source to the consumer."

"In North Badia in northern Jordan, this is exactly what we're striving to do," says Talhami. "By upgrading ageing infrastructure we can significantly reduce the losses in the system and hence make room for considerable gains in water delivery."

"We have focused on the critical infrastructure to start with, for instance by repairing existing boreholes," he continues. "In addition, we may either build or repair water treatment plants, pumping stations, water reservoirs and tanks, or main transmission lines that take the water from the source to the actual village, before it enters the village's internal water distribution network."

"Our priority has been to reinforce critical infrastructure serving a group of towns that are experiencing the most strain on their water supply systems due to the sharp increase in population," he says.

In the next phase, in 2015, teams will begin looking at internal distribution systems within these towns and trying to mobilize potentially interested donors. Talhami says there is a real potential to dramatically improve water delivery in the area.

"The shortfall in cost recovery is significant. As a result, service providers often can't maintain the infrastructure, so service declines and collection rates drop still further. A vicious circle. Service decline is all too often the result of poor management and maintenance over an extended period. In the end, the population receives a poorer service, in terms of both quantity and quality, and is either unable or unwilling to pay."

A question of quality

The region's water problems involve not only quantity but also quality. "Water sources are degrading to a huge extent, which is having a big impact on water quality," says Thomas Batardy, the ICRC's water and habitat coordinator for Lebanon. "The lack of sewage networks, plus uncontrolled discharge of wastewater from industries and the lack of protection for water sources, all translate into major degradation of water sources."

Talhami agrees: "The more water resources in the region are overused beyond the point of their annual replenishment from rain, the more severe the deterioration in water quality. This then has repercussions on how you can use that water, and makes it more difficult and more expensive to treat the water for specific uses."

LEBANON: REDUCING THE PRESSURES AND LOSSES OF CONFLICT

The effects of conflict: Water in Lebanon

- *The conflict in neighbouring Syria has caused a 25 per cent increase in population over four years.*
- *This dramatic growth in population has severely strained overused and ageing local water systems.*
- *The result is reduced levels of water availability and quality, and increases in the price of water purchased from private sources such as tanker trucks.*

In Bekaa and North Lebanon, the percentage of homes connected to the local water network was well below the national average when the Syrian conflict erupted. The area also suffered from some of the highest rates of 'unaccounted for' water in the country, meaning a large percentage of the water pumped from the ground was lost before it reached the tap. Meanwhile, problems of continuity of supply and water quality continue to plague the system.

On top of this, a particularly dry winter in 2013-2014, in which there was relatively little snow in the mountains, led to sustained drought conditions. Local aquifers were not able to recharge at their usual rate. To meet agricultural demand, and with domestic use far above normal, groundwater has been over-utilized, which in combination with low annual rainfall has led to a reduction in the water coming from springs.

Against this backdrop, both Bekaa and northern Lebanon have absorbed a large number of refugees from Syria, increasing demand on local water supplies. As water production decreases, however, the public water supply becomes more intermittent. In some areas, water is supplied every other day. In others, water might only be available once a week, depending on the local situation. This pushes citizens to purchase water from private operators, creating extra costs for both Lebanese and Syrian refugees. Increased demand has driven up water prices, which especially affect refugees not connected to the city supply, while quality cannot be guaranteed as private sector water trucks are under no public supervision.

Intermittent electrical power, along with the absence of water metering and the largely unchallenged illegal exploitation of water resources, mean that the water sector lacks the resources to address the current drought.

And there are other costs. “Where the electricity from the public system is less reliable, there are more private generators,” notes Batardy. “That doubles the cost of water for people who have to pay their electricity bill plus the cost of fuel to run their generators.”

For the water providers, there are many financial challenges. “There is the whole issue of cost recovery,” says Batardy. “The service is not constant so people don’t pay their bills. As people don’t pay their bills, the service gets worse and people pay even less. The question is how to get out of that cycle”

The growing number of refugees has imposed an additional stress factor. How can local authorities manage cost recovery for a refugee population that already has difficulty paying rent? Installing water meters in camps is controversial, because that gives the impression that the camps are not temporary.

In response, the ICRC has worked with local water providers and municipalities to mitigate the water crisis in the areas most affected by the Syrian refugee influx. Work includes digging new boreholes and establishing or repairing wells and pumping stations, to augment the existing supply by bringing more water online and by improving the efficiency of existing water sources. In other cases, the ICRC has provided generators and fuel, or worked on power infrastructure, to ensure that local communities have the electricity they need to pump water from existing wells. A key part of the ICRC’s strategy is to improve water and sanitation services within communities that are hosting large numbers of refugees.

What we are doing about it / Lebanon 2014

Boosting resilience and easing tensions

The ICRC continued working with the regional and local authorities to improve the availability of water for both refugees and host communities. This reduced the pressure on residents and the potential for tension, and helped communities boost their resilience against the effects of drought.

380,000 people benefited from 16 projects that have improved water access or living conditions in settlements housing Syrian refugees, Lebanese residents and a smaller number of Palestinian refugees.

370,000 people will benefit from 20 projects currently under way or under assessment.

800 Syrian refugees living in informal settlements in the north and in Bekaa received ad hoc water supply support and site improvement from the ICRC and the Lebanese Red Cross.



IRAQ: THREE DECADES OF WAR TAKE A TOLL

Effects of conflict: Water in Iraq

- *More than three decades of war and sanctions have seriously damaged the country's water, sanitation and power infrastructure.*
- *The displacement of over 2.5 million people within Iraq due to fighting has exacerbated the strain on the country's already dilapidated water systems.*
- *Most of Iraq's water supply comes from surface water such as rivers. Reductions in surface water from ever greater upstream use, variation in rainfall and the inefficient distribution of water for agricultural and domestic uses have significantly worsened the water crisis in the past decade.*
- *Continued depletion of aquifers is a serious concern as more boreholes are drilled to meet demand.*

In the 1970s, Iraq had one of the most developed water and electrical networks in the region, with services at a similar level to many European countries at that time.

Since then, successive wars have led to a dramatic deterioration in Iraq's infrastructure. There was the Iran-Iraq war in the 1980s, the first Gulf War in 1990 and 1991 and then a decade of sanctions. The second Gulf War in 2003 was followed by an internal armed conflict.

In the meantime, the consecutive years of drought that hit Iraq and neighbouring countries from 2007 worsened the already dire situation of the country's water reserves. For instance, the flow of water in the Euphrates has decreased and the quality of water has continued to deteriorate over the past decade. Developments upstream in Turkey, Syria and Iran have led to reduced flows and lower water quality in both the Tigris and Euphrates when they reach Iraq.

This has significant implications for the economy, as some 15 percent of the workforce makes their living from the agricultural sector. Faced with reduced water flows on its two main rivers, the government has drilled new wells, extracting greater amounts of groundwater at a time when reduced rainfall and river flows have not been replenishing Iraq's aquifers at nearly the same rate as before.

Iraqi society continues to consume water and electricity at a high rate, despite the damage to its infrastructure. "Damage to the electricity and

water networks, coupled with consistently high demand, results in a serious deficiency in supply," says Ishfaq Khan, the ICRC's deputy head of delegation, who oversees all assistance programmes in Iraq. "The drop in electricity production has a negative effect on water treatment and pumping, which in turn decreases access to clean water."

This has disrupted water pumping and wastewater treatment in many areas, resulting in inadequate supplies of safe drinking water. At the same time, the government faces shortages of electricity, fuel, chemicals and spare parts that could reduce capacity still further.

"The quality of the water provided is decreasing day by day," says Khan. "Water treatment plants are adapting to alternative methods, such as using chlorine powder, but some only filter the water without any proper treatment."

Against this backdrop, the displacement of over 2.5 million people in Iraq has exacerbated the pressure on local sources of water and water treatment plants. Now, with armed conflict spreading within Iraq, there are additional challenges in maintaining access to key water sources, electrical substations, pumping stations and waste-treatment facilities.

What we are doing about it / Iraq 2014

2 million people received drinkable water following the construction or repair of 89 water supply facilities and 5 irrigation canals. These irrigation canals benefited over 30,000 people in Babil, Diyala, Kirkuk and Sulaymania provinces.

127 technicians were trained by the ICRC to operate and manage these facilities independently.

68 emergency repairs were carried out by the ICRC, at times remotely through local contractors, in coordination with water authorities.

4,000 detainees benefited from the ICRC-led renovation of the water supply system in 5 prisons in Babil, Baghdad, Basra and Nineveh.

ISRAEL AND THE OCCUPIED PALESTINIAN TERRITORY

Effects of conflict: Israel and the occupied Palestinian territory

- *Water, sanitation and energy infrastructure in Gaza suffered extensive damage.*
- *There is a risk of further groundwater contamination because of damage to sanitation infrastructure, including water treatment plants, pipe networks and pumping stations.*
- *Long-term renovation and development of water, sanitation and energy infrastructure will be required to meet the basic needs of Gaza's population.*
- *14 technicians from the water and energy sector were killed during the conflict in 2014, at least eight while undertaking emergency repairs in conflict areas.*

HOW THE ICRC'S NEUTRALITY AND TECHNICAL SUPPORT HELPED LOCAL WATER BOARDS AS THEY WORKED TO KEEP THE WATER FLOWING DURING CONFLICT

In the midst of conflict, ICRC water and habitat engineers often spend as much time on the phone negotiating safe access for engineers and technicians of local service providers and contractors as they do overseeing critical repairs to damaged water or electrical systems.

"Our main role during the recent conflict in 2014 was trying to ensure technicians could safely go to inspect damage and repair it, restoring services for the population," says the ICRC's Guillaume Pierrehumbert.

"It was a bit like negotiating mini-ceasefires for very specific cases or places in the midst of the fighting," he says. "It was mostly coordinating through phone calls. I would say: 'The teams absolutely need to go there, and we need to make sure that they won't be hit while they are doing the repairs.'"

This kind of dual role of engineer and negotiator — usually undertaken in coordination with delegates in the ICRC's protection division — speaks of the unique work that the ICRC can accomplish due to its neutral, impartial and independent standing. Maintaining trust on all sides is critical as often, when repairs of this kind are at stake, time is of the essence. (See 'Hardhat Diplomacy' below).

"If a wastewater line is hit we'll want to repair it quickly, so that the discharge of sewage into the environment doesn't pose a risk to people in the vicinity," says the ICRC's Michael Talhami. "It's also a risk to groundwater. The fact that Gaza has

no adequate wastewater treatment facilities means that a lot of wastewater goes untreated and either seeps into the groundwater or is discharged to the sea. In the latter case this poses a risk to both the Gazan population and to Israel, since the current in the Mediterranean flows to the north.”

At the same time, it would not be possible for the ICRC to do this work on its own. The ICRC therefore works closely with the Coastal Municipalities Water Utility (CMWU), municipal water departments, the utility company (GEDCo) and the Energy Authority — all of which are accustomed to solving complex technical problems across political and conflict lines. In Gaza, the ICRC is the main organization carrying out coordination with the parties to the conflict during hostilities. This covers water and sanitation in particular, but also includes electricity. The aim is to ensure safe access for personnel conducting assessments and carrying out repairs

“When hostilities are taking place, we work closely with our local partners to identify and assess emergency water, sanitation and power needs. We then prioritize the work that has to be done and coordinate with the parties to the conflict in order to obtain safe access,” Talhami says. “If need be, once access has been granted, we accompany the technicians from the CMWU, municipal water departments and contractors as they conduct repairs.”

The death of 14 technicians during the conflict — eight of whom were killed while performing emergency repairs — is not only tragic for their families and friends. The entire population suffers, as these workers have a high degree of technical skill and extensive knowledge of complex local power and water systems. Those skills and knowledge are extremely difficult to replace.

The ICRC continues to raise water-related issues with the authorities in diplomatic representations in Gaza, the West Bank and Tel Aviv, paying particular attention to Israel’s responsibilities under international law as an occupying force.

REBUILDING: AN URGENT MATTER OF COMMUNITY HEALTH

In Gaza, attention has turned to reconstruction. While this is clearly a long-term proposition, it is also a matter of urgency. In some areas, the damage caused to water supply systems by successive rounds of fighting has seriously reduced water storage capacity (i.e. reservoirs and water tanks) and caused significant wastewater leakage, which threatens the very source of water that Gazans use for domestic and agricultural purposes.

In Beit Hanoun, a town of 50,000 people in northern Gaza, damage to sewage and water infrastructure poses a serious health risk to residents. At the same time, cuts in power and water supplies have become much worse.

“In the past, we had water for two hours each day,” says Mohamed Jarad, a Beit Hanoun resident. He also mentions that although water is available, power cuts of up to six hours mean there is no electricity to pump it. “The kids can’t drink or take showers. As for the sewage system, the pipelines broke during the war. The sewage flooded, bringing mosquitos. Our kids can’t sleep at night.”

Standing next to a pool of stagnant water and sewage that has seeped from a broken sewage pipe, ICRC water and habitat engineer Sara Badiei says the current conditions are “a breeding ground for disease.”

“In a populated area, this creates a serious threat to health,” she says. “When you consider this is happening in an area where there are broken water pipes, that means there is mixing going on between sewage systems and the water supply.”

To restore these services and mitigate any further environmental harm, the ICRC is working with local authorities, service providers and contractors to repair three damaged pumping stations in Beit Hanoun, together with parts of the network of sewage and water pipes in the town. “When you look around Beit Hanoun you see how extensive the damage is,” Badiei says, standing in a field of bulldozed earth and concrete where roads and houses once stood. “The damage is far beyond what any one entity can fix, but there are so many places in addition to Beit Hanoun that need help and support.”

What we are doing about it / Israel and the occupied Palestinian territory 2014

1.28 million people in Gaza received water and sanitation services through the ICRC’s support for the emergency repair, renovation and maintenance of essential infrastructure during the seven-week long conflict.

6 million litres of water were delivered by truck to 73,000 people displaced by fighting.

400,000 people in the southern part of the Gaza strip received water from upgraded water networks.

300,000 people benefited from emergency repairs that brought water and sanitation services back to the pre-war level.

20 kilometres of water networks were repaired.

1,560 detainees benefited from improved conditions of detention (in terms of water supply, power supply and food storage) through the completion of 8 projects in the central prisons of the Gaza Strip.

LOCAL WATER BOARDS: PARTNERS IN SERVICE PROVISION

Gaza is not the only place where relationships with local providers play a critical role in restoring access to essential services (water, sanitation and power) during conflict. The personnel of these water boards know their own systems intimately, and they have a depth of technical knowledge, skill and experience that are a critical complement to the talents of ICRC engineering staff.

“We work extremely closely with these local service providers, sometimes on an hour-by-hour basis, to help determine which operations, projects or emergency responses need to happen first,” says Talhami.

Ideally, these relationships begin before the fighting starts, as was the case for Gaza. “Often, relationships have been developed over many, many years,” says Talhami. “They are strong because we’ve shown the commitment and wherewithal to be there during the most difficult times, working alongside them. Then afterwards we help to repair damaged infrastructure. But we also help to refine and improve our joint emergency response, on the basis of a thorough review of the lessons learnt, in case another round of hostilities erupts.”

The service providers are also critical to helping the ICRC assess the affected areas and understand the needs. In areas where the ICRC is not able to gain access itself, local water board technicians and contractors can carry out critical repairs on their own, with financial or logistical support from the ICRC.

“To be able to do the assessment, diagnose what the problems are and provide an adequate response, you must have safe access to the affected population and the infrastructure that serves them,” says Talhami. “With the difficulties in gaining safe access in many of the conflicts in the region, it’s not enough to say that we don’t have access so therefore we can’t do anything.”

“That’s when we rely on our relationships with the service providers — the central, legitimate water and power operators — but we also set up mechanisms for remote management where necessary,” says Talhami. That approach works best in areas where the ICRC has been able to build up relationships with local service providers over time. It is more difficult in places where that working relationship has not yet been forged.

When the Syria conflict erupted in 2011, for example, the ICRC lacked this kind of link with local service providers. “By 2012, when we really had to upscale to provide assistance to most of the governorates in Syria, these



relationships started to really develop,” says David Kaelin, ICRC water and habitat coordinator in Syria. “It took time to develop a relationship with each of the water boards and each of the governorates within Syria.”

“But now we have quite a well-developed relationship. We have regular communication with them, we know the types and quantities of spare parts that they need and we can ensure that they receive them. This ensures that they not only have the electricity to run the water and wastewater infrastructure, but above all that they can carry out water treatment.”

“The ICRC also aims to stabilize urban water services, in particular, in coordination with the authorities and local service providers,” Talhami says. “But in conflicts that become protracted, at some point you have to move beyond a reactive, emergency response, and become more proactive whenever possible in terms of preventative maintenance.”

HARDHAT DIPLOMACY: ENSURING SAFE PASSAGE

For the men and women of the ICRC's water and habitat unit, often the hardest and most time-consuming part of the job is not coordinating the repairs to damaged infrastructure. Rather it's the negotiations with all parties to the conflict to guarantee safe passage for engineers, technicians and contractors, so they can assess the damage and then make the necessary repairs.

"I spend most of my time on diplomacy and negotiation," says David Kaelin, ICRC water and habitat coordinator in Syria.

One case in point came after a main water transmission pipeline was damaged in the fighting. The pipeline supplies water to Hama, a city of almost 1.3 million people. The ICRC needed to go in with the water board to do an assessment, but it needed a guarantee of safety.

"It took almost three weeks to negotiate access," recalls Talhami. "Whereas it took less than one week to actually make the repairs. This is why we often say that emergency response is less about the technical side and the ability of the contractors to perform the work, and more about the politics and negotiations that are necessary to ensure that you have safe access."

For Kaelin, the best example of the ICRC's ability to negotiate access based on principles of neutrality, impartiality and independence is in the Syrian city of Aleppo. "Our engineers are able to cross front lines," he says. "On the one hand they work very closely with the water boards, which depend on the government. On the other hand they are also able to work with the service department of one of the opposition groups."

“The water board teams are allowed to come with us. We provide this service as a neutral intermediary. As a result of the negotiations we conduct, access for the engineers in charge is guaranteed and tolerated. Same with the Syrian Arab Red Crescent, who come on site with us and are allowed to perform maintenance and repairs.”

““Then there are some places where we work with proxies,” says Kaelin. “In areas controlled by opposition groups, we rely a lot on the volunteers of the Syrian Arab Red Crescent.

We now have about 150 volunteers who have been trained by us, and they have about 30-40 engineers. In cases where we still don’t have direct contact with armed opposition groups, they are the intermediaries. Because we have this neutral position, we can bring in material. Same for the government side, which also allows us to go into this area and cross lines.”

YEMEN: THE INTERSECTION OF CONFLICT AND WATER

The effects of conflict: Yemen

- *The government says more people have died in recent years due to clashes over water than in the civil unrest of 2011 and 2012.*
- *There is significant over-exploitation of groundwater resources, especially in the highlands.*
- *The cultivation of water-hungry qat, a plant chewed for its stimulant effects, now takes up a disproportionate amount of Yemen's irrigated land. Each year, the area irrigated for qat cultivation grows by roughly 9 per cent. Qat cultivation could end up so depleting groundwater resources as to wipe out the rural economy.*
- *Problems with the provision of basic services, such as water and energy, fuel widespread discontent and civil unrest. Unless the political and economic crisis is reversed, ecological destruction and water scarcity will continue to fuel local disputes over water resources and supplies.*

Of all the countries in the Middle East and Gulf region, Yemen may serve as the best case study in terms of what happens when overuse of water in an extremely arid area is not proactively tackled in a coordinated and sustainable manner. Today in Yemen, water scarcity is seen as one of the nation's number-one economic, health and national security issues.



“In Yemen, it’s predicted that by 2025 Sana’a the capital will have no more water,” says Caroline Pellaton, the ICRC’s water and habitat coordinator for Yemen. “The water table is dropping every year. So it’s becoming more and more difficult, and you’ll see more people migrating to urban areas. Boreholes have to be dug deeper and deeper, but there’s a limit to where you can go. So this is going to be the most crucial problem that Yemen must face in the near future.”

In 2009, the country’s minister of water and environment said that if water use continues unabated, the government will have to move Sana’a, the capital, to the coast. Otherwise there will be no way to meet the water needs of the population.

The ramifications of the water shortage include risks to public health, nutrition, economic development and social stability for a vast majority of the population. “The government often raises the point that although the civil unrest of 2011 and 2012 resulted in a significant number of deaths and injuries, during that same period there were more deaths related to local social conflicts over water and land,” says the ICRC’s Michael Talhami. “This is due to the severity of the competition between agricultural and domestic uses of water, and in some cases between urban and rural uses.”

There is a dispute over water resources in Abyan, on the Abyan Delta, which has an intricate network of wadis (dry riverbeds with intermittent water flows) running from the mountains to the sea. Farmers living on the upstream section of the wadis use dams to provide water for the irrigation of crops — mainly cash crops such as bananas. They use most of the water, leaving those downstream with insufficient supplies to sustain their agricultural production. This has triggered tensions among the villages and farmers in this area.

In response, the ICRC has begun to work with the Ministry of Agriculture to promote more sustainable irrigation techniques. In Saada, ICRC teams are working on the Ministry of Agriculture’s nursery farm to see whether water-saving “spate” or “drip” irrigation can be introduced. If water can be better conserved, it is hoped that there may be enough to cover the basic needs of most growers, and that tensions will diminish.

Similarly, the ICRC has started to implement rainwater harvesting projects, primarily for agricultural use. This is another attempt to augment the supply of water for farmers without further exacerbating the deteriorating groundwater situation. “Obviously, the scale at which the ICRC is operating will not end the water crisis in Yemen, but it could act as an example of good practice, which could then be replicated and expanded with funding from international donors in coordination with the authorities,” Talhami says.

“In Yemen, there is a clear relationship between water and social tension,” says Andrea Pascarelli, who served as water and habitat coordinator in Yemen for several years before moving to Kabul. “Yemen doesn’t have trans-boundary water issues as most of the other countries in the region do; these are internal matters.” Issues include disputes over water use between tribes, or between urban and rural communities, and between domestic and agricultural uses.

Those tensions are often not just about water. Often there are connections to local politics, tribal affiliation, economic hardship, the lack of livelihoods, and general community health. “The opportunity for the ICRC is therefore to be multi-disciplinary, to have both a protection and an assistance approach to these situations of violence,” says Pascarelli.

The solutions go well beyond engineering a more efficient water system. Often the ICRC does indeed take a multi-disciplinary approach, bringing together people with expertise in water, agriculture, economic security, health and protection. “The water and habitat people don’t work in isolation,” says Pellaton. “It’s often an integrated approach with economic security people, as well as people from health, communication and protection.”

The teams often represent a mix of staff from abroad as well as Yemeni staff who have considerable experience as engineers but who also understand the local language, customs and political environment.

“The problem in many areas, especially in the countryside, is that there’s a tribal layer, which is part of the equation,” notes Pascarelli. “It’s a big challenge, because disputes over water assets are quite common in rural areas, and they follow tribal lines rather than ethnic or political lines.”

This is yet another reason why the ICRC relies heavily on its Yemeni staff for their intimate knowledge of the local context. Yemen’s current water and habitat coordinator Pellaton says these staff members are critical in assessing and analysing local situations. They also play a key role in helping to establish the trust of local communities.

“If you work in the rural environment, you really have to gain the trust of the people you’re working with,” says Pellaton. “We work with a memorandum of understanding with the local service providers for the benefit of the communities, but it’s a never-ending discussion. If anything goes wrong during the implementation of these projects, the ICRC could lose access

to these sites and to the community in the future. So it's always a delicate balance."

Humanitarians seeking to mitigate the impacts of water scarcity also need to have an understanding of agricultural production and local markets. As water in Yemen has become scarcer, and the country produces cash crops at the expense of the staples required for nutrition, food security has deteriorated.

"Because of water scarcity, but also due to heavily favouring cash crops, many foodstuffs have to be imported from abroad," notes Talhami. "But these foods can be too expensive for the most marginalized members of society."

What we are doing about it / Yemen 2014

1 million people benefited from improvements to water storage and distribution facilities in the cities of Aden, Saada and Taiz, carried out in partnership with local water boards.

46,500 people in rural areas of Yemen received water through various initiatives, in partnership with local water boards.

450 people in Amran displaced due to the conflict in the northern, central and southern parts of the country received water via trucks.



ICRC