Gaza on the Edge: The Water & Energy Crisis in Gaza

The Gaza Strip is facing a dire humanitarian crisis with potentially devastating implications. Lack of clean water for domestic use and unsafe sanitary conditions pose a serious public health threat to the two million people living in the Gaza Strip. By now, large amounts of untreated wastewater have already transcended Gaza's borders, and have created additional repercussions for several neighboring communities in Egypt and Israel, the latter having been forced to close two of its beaches at the beginning of the summer.

A UN report deemed the issues of water and sanitation in Gaza as problems of primary concern, and concluded that by 2020 the Gaza Strip will be uninhabitable.\(^1\) This has alarming implications not only for the Palestinian population of Gaza but also for the whole region, as echoed by Israeli PM Benjamin Netanyahu in a June 2016 press statement: “When there is not enough water in Gaza, and Gaza is in the process of gradually drying up, the aquifers become polluted and when the aquifers become polluted, this is not limited to the Gaza side of the aquifer. Therefore, it is in Israel's clear interest to deal with the water problem in the Gaza Strip. When there is not enough electricity, various problems arise, including those having to do with sanitation, and when there are outbreaks (of pandemic disease), the outbreaks do not stop at the fences. This is both a humanitarian interest and an outstanding Israeli interest.”\(^2\)

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\(^2\) Israel Ministry of Foreign Affairs, *PM Netanyahu's statement at his press conference in Rome* (June 2016).
The current humanitarian crisis in Gaza is a product of a number of interconnected factors, including failed governance of the Hamas leadership and its lack of cooperation with the Palestinian Authority (PA), the severe restrictions imposed by the Israeli siege, and Gaza's over-dependence on the donor community. The crisis has raised serious concerns and attracted media attention. Organizations of the civil society, the donor community and even part of the Israeli establishment have issued alarming reports, warning the parties of the necessity to take immediate actions to alleviate the crisis.

Still, a sense of urgency seems to be missing among the parties concerned, and while the crisis is rapidly deteriorating, the required actions are hindered by the political stalemate. If the situation is not duly addressed, it could have devastating consequences on regional stability, including the outbreak of pandemic disease and a new escalation of hostilities between Hamas and Israel.

The depletion of Gaza’s water resources

The coastal aquifer, which is located under the coastal plain of Israel and the Gaza Strip, is the only source of natural water in Gaza. Due to rapid population growth, which in the last decade increased from nearly 1.5 million in 2007 to more than 2 million today, the demand for water in the Gaza Strip has surged.

The increased water needs alongside the scarcity of alternative sources of water have led to the extreme over use of the coastal aquifer. Years of protracted over-extraction from the aquifer have led to the infiltration of sea-water, raising the levels of salinity far beyond WHO health regulations. According to a 2016 report by the Palestinian Water Authority (PWA), water extracted from more than 80% of the existing wells, namely 201 out of 249, contains concentrations of Chloride, Cl (indicator of salinity) higher than the WHO limit of 250 mg/L. High levels of salinity in the groundwater may decrease crop production and may also have a direct impact on human health, including increased blood pressure and frequent diarrhea. In addition, research indicates that the
cholera pathogen shows higher resistance in saline water, thereby increasing the risk of cholera infections and possible epidemics.³

The discharge of untreated sewage generated by the two million inhabitants, either into the Mediterranean Sea or into shallow pounds – which eventually percolates into the aquifer – has caused alarming levels of Nitrate (NO3). The report reveals that large parts of the coastal aquifer exhibit Nitrate levels ranging from 100-200 mg/l, up to four times higher than the 50 mg/l limit set by the WHO. The presence of nitrates can trigger water borne diseases such as methemoglobinemia, a severe blood disease, as well as a related disease also known as the blue baby syndrome, which has already spread among Gaza's population. According to the report, 96.4% of the natural water extracted from the Coastal Aquifer is unfit for human consumption by WHO standard.

![96.4% of Gaza's coastal aquifer water is non-potable water](image1)

![80% of wells contain chloride (CL) with a concentration >250mg/l (WHO limit)](image2)

![100-200mg/l of nitrate (NO3) in most of the aquifer (2-4 times the WHO limit)](image3)

The chronic shortage of water has led Gaza’s residents to be increasingly dependent on small-scale desalination of brackish water. While these small desalination plants reduce salinity, they do not effectively remove the pollutants, and the water is sold by private vendors with little supervision from health authorities. In addition, desalination plants as well as wastewater treatment plants require electricity, which is currently highly limited.

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³ Potsdam Institute for Climate Impact Research and Climate Analytics, *Turn Down the Heat: Climate Extremes, Regional Impacts, and the Case for Resilience* (Washington: The World Bank: June 2013)
Water Policies

As of 2005, the coastal aquifer alone supplied almost the totality of the water consumed in the Gaza Strip. A decade later the aquifer still contributes to roughly 90% of the total water supply for domestic use. As of 2015 the total water supply for domestic use in the Gaza Strip amounted to 95 mcm/y, of which 86% comes from municipal groundwater wells; 3% from UNRWA wells; 4% from desalination; and 7% from Mekorot, the Israeli Water Company.

Mekorot started selling water to Gaza in 1980. Following the establishment of the PA, a memorandum of understanding was signed to confirm the continuation of this arrangement. The amount agreed was 5 mcm annually, but the volume has varied during the years. In March 2015 the Israeli government committed to double the amount of water sold to Gaza from 5 to 10 mcm per year. Due to lack of storage capacity, only 8 mcm were provided until early 2017, when the completion of some infrastructural work allowed the 10 mcm to flow into Gaza.
Following an EcoPeace briefing held in the U.S. Congress in March 2017, a second letter, a first one being sent to Israeli ministers in 2016, was signed by a bipartisan group of members of the U.S. Congress, urging President Trump and his administration to take the lead on finding solutions to the water and sanitation crisis in Gaza.

American leadership has indeed proven effective and on July 13th 2017, under the auspices of U.S. Middle East Envoy Jason Greenblatt, Israel and the PA agreed on the sale of 10 additional mcm of water to alleviate the situation, a deal that was struck as part of a revised version of the Red-Dead Canal project. Once the agreement comes into effect, Gaza will purchase a total amount of 20 mcm from Israel per year, which is said to double once it is blended with the water from the aquifer, ultimately providing the Strip with 40 mcm of potable water annually.

At the time of writing, Gaza should be receiving 10 mcm of water from Israel, and based on the current capacity of the pipeline 5 mcm of the additional 10 can be supplied immediately. However, a new water pipeline to convey the additional water from Israel to Gaza, additional storage capacity, and urgent investment in Gaza network, where losses are estimated at up to 50%, are needed.

Although this does give some ephemeral relief to the people of Gaza, it should be considered an emergency solution only, which does not provide adequate answers to the core problems of water scarcity and water contamination in the Gaza Strip. Rather, to address Gaza's water problem at its roots, the PA and Israel need to think about viable long-term solutions. Plans for the construction of desalination and wastewater treatment plants are underway.

**The collapse of the WASH⁴ infrastructure**

Following the damage inflicted by the 2008-09 conflict, the Gaza Coastal Municipal

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⁴ Water, Sanitation and Hygiene
Water Utility (CMWU, 2009) warned about the risks of an impending water and sanitation crisis, including a growing danger of the spreading of infectious diseases among the population. Gaza’s water infrastructure suffered additional damages during the 2012 conflict and again in 2014.

In the aftermath of the 2014 conflict, lice, scabies and diarrhea were reported to have spread in particular among children. The damage to the water and sanitation system was estimated at around $30 million, while the investment needed in large-scale water sector was estimated at over $900 million. The donor community gathered at the “Conference on Palestine - Reconstructing Gaza” in Cairo, where it pledged aid to rebuild Gaza.

Massive investments were channeled in the reconstruction of the civilian infrastructure, through the establishment of the Gaza Reconstruction Mechanism. This mechanism has facilitated the entry of materials, which would not have not been allowed otherwise, and now most of the rehabilitation of water and sanitation facilities damaged in the conflict has been completed.

Additional longer term investments in the WASH sector are urgently needed, but are hindered by the severe constraints imposed by Israel, regarding the entry of dual use items, and the internal Palestinian divide between the authorities in the West Bank and the de facto authorities in the Gaza Strip.

When the construction of new facilities is possible, the main obstacle remains the lack of electricity to power such facilities. These include a desalination plant recently built with the support of the EU and UNICEF, which relies on generators working with imported fuel; and the Northern Gaza Emergency Sewage Treatment (NGEST) plant, a project led by the World Bank, meant to operate by the end of 2017.

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The Energy Crisis and its implications on sanitation and hygiene

In recent years, periodic interruptions of energy supply have had a direct impact on the delivery of water and sanitation services. Already in 2006, the deficit of fuel supply affected the operations of water pumping stations and sewage treatment plants.

In the first quarter of 2016, the Ashkelon Desalination Plant, which supplies 15-20% of Israel’s drinking water, had been shut down twice due to sewage discharge into the Mediterranean Sea from Gaza. The news was released to the media following a confirmation obtained by EcoPeace Middle East under a Freedom of Information request. Moreover, in the same period, the Gaza sewage system completely collapsed and raw sewage from Beit Lahiya, about 200 meters from the border with Israel, reached along the coast the water reservoir of the Hof Ashkelon Regional Council.

The incident encouraged 14 members of the U.S. Congress, Democrats and Republicans equally, to send a letter (July 13, 2016) to Israeli Minister of Defense, Avigdor Lieberman; and Israeli Minister of National Infrastructure, Energy and Water Resources, Yuval Steinitz, urging them to take due measures to guarantee additional supply of electricity to the new Gaza waste water treatment plant. As a result, Israel approved the construction of a new dedicated power line from Israel to NGEST specifically or, as an alternative, a larger 161K line to Gaza.

At the time of writing, negotiations related to the construction of a dedicated power line are underway, but seem to be impeded by the Palestinian internal dispute concerning the payment of the electricity bills.

In April 2017, after having sent a first letter 3 months earlier, the Coordinator of Government Activities in the Territories (COGAT) sent a second letter to international representatives in Israel. In this letter, COGAT warned about the consequences of the water and energy crisis in Gaza, and asked for immediate actions to be taken by the donor community to alleviate the situation.
Soon after, the Gaza Power Plant (GPP), which had been operating since 2002, shut down due to a lack of fuel, depriving Gaza's population of roughly 30% of the energy usually available. Prior to this cut, the available electricity in Gaza was already less than half of the estimated requirement.

Against an estimated demand of 350 to 450 MW/d, Gaza’s electrical grid normally provides 208 MW/d, of which 120 MW/d are sold and supplied by Israel, 60 MW/d are produced by the GPP (with fuel imported through Israel), and 28 MW/d are sold by Egypt.6

In response to a previous energy crisis in January 2017, which had caused a wave of social unrest against Hamas, Turkey and Qatar intervened to mitigate the crisis. Turkey offered 15,000 tons of diesel fuel to operate Gaza's power station, while Qatar transferred $12 million to the Palestinian Energy Authority in Ramallah to purchase the large quantities of diesel fuel needed to run the Gaza power station.

However, three months later, Gaza's funds allocated by Turkey and Qatar had already been depleted, leaving the Strip in a critical situation. Gaza's humanitarian crisis became entangled with a political dispute between the PA and the de facto Hamas authorities over fuel taxation, which led the PA to announce that it will no longer pay the costs of Israel's electricity import, unless Hamas return the tax revenues collected from the Palestinians in the Gaza Strip.

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To make matters worse, Egypt's contribution of electricity, around 10% of Gaza's total supply, had also been compromised temporarily after all of Egypt’s electricity lines feeding the southern Gaza Strip broke down in late April. In general Egypt’s supply is provided on an irregular basis, due to frequent infrastructural problems, and therefore cannot be considered a reliable source.

Even at full capacity, Israeli and Egyptian electricity supply together with Gaza's only power plant fail to cover the Strip’s energy need. This underlines the necessity to look at long-term solutions instead of emergency measures, and to undergo a complete revision of the strategies that have so far been adopted towards Gaza.

In June 2017, Israel has agreed to side by the Palestinian Authority and to reduce the electricity supply to Gaza by some 42 MW/d. Although the dispute regarding Gaza’s electricity bill is perceived as an inner Palestinian issue, it has many implications in regards to Israel. Indeed, the Israeli Cabinet’s decision to reduce the power supply, was highly debated.

During the first week of July, at the height of the bathing season, the Zikim beach in...
Ashkelon had to be closed to the public due to high levels of contamination. Israeli officials have confirmed that the contamination is a result of untreated sewage from Gaza’s wastewater treatment plants, which due to the electricity crisis are unable to operate.

To maintain a minimum level of continuity of critical services, electricity providers are now relying heavily on backup generators. The main donors – UNRWA, OCHA, UNICEF, and WHO – are coordinating the entry and distribution of emergency fuel operations to priority health, water and sanitation facilities to keep these back-up generators running.

The lack of energy impacts several sectors in Gaza. Hospitals are running at minimal capacity, with sterilization and cleaning services reduced, giving rise to infection rates and an increasing number of patients referred to Israel. Small scale desalination plants are not operating at full capacity, with the result that water supply has been reduced, increasing the reliance on private and uncontrolled water suppliers with low hygiene standards. Wastewater plants are not fully operating and around 110,000 cubic meters of raw or poorly treated sewage is now being discharged into the sea daily. In addition, numerous wastewater pumping stations are now at increased risk of flooding, overflow and contamination.

110,000 m3/d of poorly treated sewage discharged into the sea

At the time of writing, discussions are ongoing with regard to the construction of a dedicate line to power the NGEST, which alone could threat one third of the sewage produced in the Strip.
Recommendations

Despite this positive development, we are highly concerned that the parties involved lack a sense of urgency in translating these and other measures into practice. Bureaucratic impediments, lack of coordination among the parties, as well as among the different actors involved within each party, often result in prolonged times of implementation, which do not respond to the current state of emergency in Gaza.

Building on these concerns we recommend the following actions to be considered as high priorities by all parties:

• Supply the first 5 mcm of water of the additional 10 mcm agreed upon by the parties immediately, according to existing pipelines capacity.
• Build a new water pipeline from Israel to Gaza in order to provide the remainder 5 mcm of water.
• Rehabilitate key water infrastructures in order to both receive and blend the water and minimize the loss in the distribution network.
• Remove all bureaucratic obstacles related to the completion of the NGEST, including facilitate the import of the necessary material for its construction.
• Accelerate the negotiations among the parties related to the construction of the dedicated power line to operate the NGEST, which will treat one third of Gaza’s sewage (including the sewage crossing to Israel). In particular, 18 MW of electricity are required to operate the treatment plant; the recovery wells; the re-use component.
Reference List


United Nations Office for the Coordination of Humanitarian Affairs (OCHA)