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زبانهای اروپایی

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16.09.2024

## The Gaza war is an environmental catastrophe

*Toxic waste, water-borne diseases, vast carbon emissions: Dr. Mariam Abd El Hay describes the myriad harms of Israel's assault to the region's ecosystems.*

By [Nathalie Rozanes](#) September 5, 2024



Displaced Palestinians near the sea in Deir al-Balah, June 20, 2024. (Abed Rahim Khatib/Flash90)

“Ever-worsening shortages of water and electricity. Catastrophic flooding in dense urban areas. Food insecurity exacerbated by drastic temperature increases, reduction in overall rainfall, and the long-term impact of toxic chemicals.”

This is what climate researchers Khalil Abu Yahia, Natasha Westheimer, and Mor Gilboa, [writing in +972 Magazine](#) more than two years ago, predicted was in store for Gaza's near-term future. Israel's ceaseless bombardment of the Strip over the past 11 months has caused unspeakable humanitarian consequences, but it will also have dramatic and lasting

effects on Gaza’s already imperiled natural environment — and indeed, that of the entire region.

“It is near impossible to think about the climate crisis amongst this much death and destruction,” Westheimer [wrote](#) this past November, after Abu Yahia was [killed in an Israeli airstrike](#). “But the reality is, this last month has set Gaza even deeper into a humanitarian crisis, and its two million residents are more vulnerable to the impacts of climate change than ever.”

In June, the Center for Applied Environmental Diplomacy at the Arava Institute for Environmental Studies published an [extensive new report](#) on the environmental impact of Israel’s ongoing assault on Gaza. The report covers myriad [environmental harms of the war](#) — from the vast amount of toxic dust released by bombing buildings, to the breakdown of waste management, and the destruction of water treatment facilities and proliferation of water-borne illnesses.

While it is Palestinians in Gaza who face the most severe threat, the report makes clear that the entire territory between the Jordan River and the Mediterranean Sea is part of one ecosystem, in which health and environment are interconnected in a vulnerable equilibrium. This was made particularly evident by the [recent discovery of poliovirus](#) in Gaza’s wastewater. The Israeli army set about delivering Polio booster shots to Israeli soldiers, before eventually agreeing to a [vaccination campaign](#) for Palestinian children in the territory under the age of 10; Israel has also taken a sudden interest in [reconstructing the wastewater management](#) infrastructure that it destroyed.



Health workers vaccinate Palestinian children against polio virus in Deir al-Balah, September 1, 2024. (Abed Rahim Khatib/Flash90)

The report also highlights the link between armed conflict and global warming. On July 21, the planet experienced the [hottest day on record](#); in the Middle East, temperatures are rising on average twice as fast as the rest of the world.

To better understand the environmental impact of the war, +972 spoke with Dr. Mariam Abd El Hay, a researcher in social dynamics and the environmental impacts of conflicts and a Palestinian citizen of Israel from the city of Tira. Abd El Hay is the author of the new report, to which Elaine Donderer and Dr. David Lehrer, the center's director, also contributed. The interview has been edited for length and clarity.

### **What is the environmental situation in Gaza right now?**

The situation is extremely alarming. Before October 7, Gaza's environment was already very precarious. Years of Israeli bombing campaigns, Israeli and Egyptian import restrictions, and dysfunctional governance had led to chronic electricity shortages and delayed the construction of essential facilities. Access to clean water was critically low, with Gaza dependent on three pipelines from Israel and 97 percent of drinking water was [contaminated and unsafe](#). Waste and water management infrastructure was already fragile, which resulted in uncontrolled burning of waste in landfills, polluted air and soil, and groundwater contamination from waste leakage.

But during the war, environmental degradation in Gaza has worsened exponentially: as Israel's bombardment destroys infrastructure, an inordinate amount of toxic dust has been released into the air, and wastewater management has entirely collapsed due to the shortage of fuel.

By April, the destruction of buildings throughout the Gaza Strip had produced an estimated 37 million tons of debris. As buildings are damaged or collapse, they release clouds of noxious smoke, toxic dust, and fumes into the environment.



Smoke rises after an Israeli airstrike in Gaza, seen from the Israeli side of the fence encaging the Strip, January 7, 2024. (Chaim Goldberg/Flash90)

Explosions crush building materials into tiny pieces, which releases toxic particles into the environment that are then absorbed by humans. Even though the highest exposure to these toxins occurs at the time of the explosion, the microparticles of dust and toxic ash are dispersed by wind, and picked up by footsteps and moving vehicles. The Israeli army has also used white phosphorus, an incendiary weapon which is highly toxic. As a result, while Gazans face the most dire health risks, Palestinians, Israelis, and all other living beings in the region will continue to suffer the consequences for years to come.

In Gaza, asbestos, which is highly carcinogenic in the form of dust, is commonly used in construction, further elevating the risk of cancer through inhalation. It was already found in toxic dust following Israel's bombardment of the Strip in 2021.

Due to the ongoing war, it is impossible to validate our findings in the field, but we can estimate the type and amount of chemicals released into Gaza's environment from extensive bombardment using our knowledge of local building materials, historical data from conflict areas, and past incidents such as the attacks of September 11 in New York. Over two decades later, people are still grappling with health issues related to the debris and dust, which include aerodigestive diseases and cancers.

**What are the environmental and health concerns associated with the collapse of Gaza's waste management infrastructure?**

Tens of thousands of tons of residential waste have been accumulating in the streets and informal dumpsites, due to the shortage of fuel needed to operate waste management

machinery. This can lead to soil and groundwater pollution, as well as contribute to excessive algae blooms along the coast, endangering marine life and bathers.

Inadequate waste management is also attracting animals, such as rats, that can transmit diseases to humans. The high temperatures and humidity in our region in the summer also create perfect conditions for the growth and reproduction of bacteria.



Garbage piles up near tents in Deir al-Balah, August 17, 2024. (Abed Rahim Khatib/Flash90)

With the [collapse of Gaza's healthcare system](#), Palestinians have been [unable to seek proper care](#) since the outbreak of the war. It is a miracle that we are not yet seeing even worse epidemics in Gaza and throughout Israel-Palestine, but it is bound to happen.

### **Do we know how much toxic waste has been produced?**

It is projected that the current war already yielded a minimum of 900,000 tons of toxic waste. These pollutants — which include radioactive and carcinogenic materials, heavy metals, pesticides, and other chemicals, emitted both through the use of military munitions and in the destruction of buildings — persist in the environment, posing a threat to all forms of life, including animals and vegetation. They contaminate soil, air, and water sources, endangering ecosystems.

One ecosystem that is particularly threatened by toxic waste runoff is [Wadi Gaza](#), a nature reserve within the Strip. Rich in biodiversity, this nine-kilometer-wide stretch of land runs westward from the border fence to the sea. It is an extension of the Besor Stream, which flows from Hebron in the West Bank through Be'er Sheva in Israel, into the Mediterranean Sea. Local water birds and migratory birds traveling across continents both rely on the coastal wetlands in this area as their habitat.

### **Can you say more about the status of water treatment in Gaza?**

The situation was already extremely fragile given that Israel has long controlled Gaza's water supply, but it has been severely worsened by the war. The now damaged or destroyed infrastructure includes drinking water wells, water networks such as pumps and towers, sanitation and hygiene facilities, sewage networks, desalination plants, stormwater infrastructure, marine sewage outlets, and wastewater treatment plants. Furthermore, by mid-November, the lack of fuel made it inevitable that all five of Gaza's wastewater treatment plants and most of its 65 sewage pumping stations would close, as Oxfam [reported](#).

Before the war, [13,000 cubic meters](#) of raw sewage flowed into the sea from Gaza every day. But now, the United Nations Environment Programme (UNEP) estimates that this figure has skyrocketed to [130,000 cubic meters daily](#). And due to the breakdown of the wastewater treatment facilities, people are forced to consume brackish and contaminated water and use it for cooking, cleaning, and personal hygiene.



Palestinians walk next to destroyed buildings and pools of stagnant water in Khan Yunis, July 19, 2024. (Abed Rahim Khatib/Flash90)

The health consequences of drinking contaminated water are disastrous — especially for children, who comprise 47 percent of Gaza's population. It significantly increases the risk of cholera, typhoid, polio, and other water-related diseases. Even in November, the World Health Organization [warned](#) that infectious diseases associated with water scarcity and contamination may eventually kill more people in Gaza than military violence.

In addition, researchers and medical professionals have recently [raised concerns](#) about the emergence and spread of bacteria resistant to antibiotic treatment, or antimicrobial resistance

(AMR). Contaminated water can also facilitate contact between bacteria and the heavy metals released from explosives, which are a contributing factor to AMR.

### **How are these water-borne illnesses spread?**

The bacteria causing these illnesses can live in brackish water streams and coastal waters, and once transmitted to humans, are spread by consuming water or food that is contaminated by an infected person's feces.

Sewage permeates roadways and water streams and is seeping into the soil, contaminating food and crossing the fence between Israel and Gaza through Wadi Gaza, the Mediterranean Sea and the coastal aquifer, an underground water source spanning from Egypt's Sinai Peninsula to Israel's eastern Mediterranean coast. The aquifer is permeable, shallow and unconfined, with groundwater flowing from the hinterland to the Mediterranean Sea.

The flow of coastal water is also important here: due to the Mediterranean currents, wastewater that reaches Gaza's coast flows southward, and can infect people along the Egyptian coast.



Displaced Palestinians in tents next to sewage water, near the sea in Deir al-Balah, August 19, 2024. (Abed Rahim Khatib/Flash90)

### **Can you explain how war and greenhouse gas emissions are related?**

Our planet simply cannot sustain armed conflict. The use of weapons themselves and the detonation of explosives release large amounts of greenhouse gasses — the main driver of climate change — and particulate matter into the atmosphere. An estimated 5.5 percent of the world's greenhouse gas emissions is the result of military activity.

On the day of October 7 alone, the Hamas attack emitted around 646 metric tons of carbon dioxide. Then, in just the first two months of the war, Israel's aerial bombardment and ground invasion of Gaza emitted approximately 281,000 metric tons of carbon dioxide.

This volume of emissions caused by the Israeli army in those first two months equates to burning around 150,000 tons of coal. I did a quick calculation so that we can visualize something concrete: burning that amount of coal represents about 24,772 years of electricity usage for one household.

In addition, according to Israel's Nature and Parks Authority, Hezbollah strikes from across the Lebanese border — over 7,500 rockets, missiles, and drones since October 7 — have resulted in 8,700 hectares burned in northern Israel as a result of more than 700 wildfires. This is an area 12 times larger than previous years' wildfires, in a region that already burns more frequently every summer.

These forests and agricultural land are home to rare animals and plants, which absorb an estimated seven tons of carbon dioxide per hectare per year — roughly equivalent to the emissions from one and a half cars in an average year. So we already lost an absorption capacity equivalent to the average annual emissions produced by 5,800 cars.



View of a wildfire following a missile attack from Lebanon, near Kibbutz Ayelet HaShahar, northern Israel, August 17, 2024. (Ayal Margolin/Flash90)

According to the Land and Natural Resources program at the University of Balamand, Israeli strikes in southern Lebanon have burned about 4,000 hectares — meaning the loss of an absorption capacity equivalent to the emissions from roughly an additional 2,600 cars. For comparison, each of the two previous years, the total area burned by wildfires in Lebanon



was 500 to 600 hectares. With the threat of further escalation on the Israeli-Lebanese border, this could be only the beginning.

**When we think of cars it seems clear how emissions are produced. How does the military produce such high emissions?**

The sources of those emissions include the manufacturing and detonation of explosives, artillery, rockets, as well as aircraft operations, tank maneuvers and vehicle fuel consumption. From October 7 to the end of December alone — and we are now eight months of bombardment later — Israeli forces dropped over 89,000 tons of explosives on the Gaza Strip. In addition, 254,650 military flights took place during those first three months.

**As Amitav Gosh has [argued](#), “in the era of global warming, nothing is really far away.” How will the effects of climate change and global warming be felt across Israel-Palestine and the wider region?**

Over the next 50 years, hotter temperatures combined with higher levels of humidity are predicted to make large areas of the globe impossible to live in, among them parts of the Middle East, which is warming twice as fast as the global average. The Israeli Environment Ministry [forecasted](#) a 4 degree rise in average temperatures by the end of the century.



Palestinians collect drinking water in Khan Yunis, July 6, 2024. (Abed Rahim Khatib/Flash90)

Those who are displaced and seeking shelter somewhere in Gaza are now less prepared than ever to face higher temperatures in the summer and floods in the winter. But even in Israel, the effects of climate change are already felt to a certain extent. For example, the [West Nile Virus](#) has already killed at least 440 people in Israel this summer. The virus, which is spread

by migratory birds all over the world and transferred to humans by mosquitoes, and can be deadly for the elderly and immunocompromised, is a direct result of the higher temperatures and humidity of this past spring.

**What are the anticipated environmental consequences of the effort required to rebuild Gaza?**

An additional estimated 30 million metric tons of greenhouse gasses are predicted to be produced during the anticipated postwar construction needed in Gaza to repair 100,000 damaged buildings. The construction industry worldwide is responsible for about 11 percent of global carbon dioxide emissions and encompasses activities such as producing concrete and steel, material transportation, machinery operation, and building demolition.



**Why did a British Jewish newspaper publish fake Israeli intelligence?**



### **‘Lavender’: The AI machine directing Israel’s bombing spree in Gaza**



### **Under cover of war, Israel is demolishing home after home in Silwan**

The Jumpstarting Hope in Gaza initiative, a coalition of NGOs and private sector entities led by Damour for Community Development in Gaza and supported by the Arava Institute, has published a [plan](#) for localized provision of sustainable energy and materials to minimize additional externalities. One idea, for example, is to make bricks out of the existing rubble. But all this, of course, requires a lasting ceasefire.

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