

War and environmental health in Gaza

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Many people have lost their lives, families or homes since the beginning of the current conflict in the Gaza Strip in October 2023. The conflict is a devastating humanitarian crisis in many aspects, including environmentally, which is usually less visible and more challenging to comprehend amidst the ongoing suffering.

Environment, in a broader sense, could be both a risk factor and the victim of conflicts, but it could also provide a means to build peace. Wars and armed conflicts have multiple, compound and overlapping environmental effects that threaten ecosystems, health, livelihoods, and sustainable development through their regional and global impact. Environmental impact may result from the toxic hazards from damaged infrastructure, effects of weapons and munitions, population displacement, and the disruption of water, sanitation and waste management systems. It could also arise from the deliberate targeting of natural resources and the use of destructive means to finance conflicts and war (1).

The population of the State of Palestine was 5.5 million, with a male to female ratio of 103.3 in 2023. Out of this, 2.2 million people lived in the Gaza Strip, and more than 40% were children aged 0–14 years (2). Today, the intensifying conflicts in Gaza and the West Bank continue to affect all components of health and health services. The United Nations Office for the Coordination of Humanitarian Affairs estimates that approximately 42 000 Palestinians have lost their lives and 97 700 have been injured since October 2023. In Gaza alone, more than 70 000 housing units have been damaged and 1.9 million people have been displaced (3). Millions of Palestinians now lack essential water, sanitation and health services. Acute malnutrition rate among under-2 children has exceeded 30%, reflecting the context of catastrophic hunger. Half of the region's agricultural lands have been destroyed and food security and safety will continue to be problematic due to soil and water pollution (4).

A preliminary assessment by the United Nations Environment Programme (UNEP) shows that drinking water, wastewater and sewage systems have been destroyed in the area, and diarrhoea cases have increased 25 times over the pre-conflict levels (5). Associated water and sanitation problems have caused infectious diseases to spread rapidly. A total of 40 000 cases of hepatitis A were reported in Gaza 10 months after the onset of the

war, and the weekly case notification was 800–1000 (6). Five of the 6 solid waste management facilities in Gaza have been damaged, contributing to the accumulation of 1200 tons of garbage daily around the camps and shelters. Burning wood, plastic and waste for food preparation due to fuel shortage causes fires and deteriorates air quality. There is no data on the region's air quality, although the dust coming from bombed buildings and the burning of waste are listed as the leading causes of air pollution (5,7).

The environmental indicators were alarming before the crisis, and the continued conflict has deepened the existing problems. Between October 2023 and February 2024, more than 25 000 tons of explosives were used in the Gaza Strip, which is equivalent to 2 nuclear bombs (8). The destruction due to the bombings resulted in more than 39 million tons of debris containing asbestos and unexploded ordnance. Munitions, including explosives, have direct immediate and long-term toxicity to organisms (5). Hazardous materials can be found in environments such as water and soil and may lead to chronic exposure through side mechanisms such as bioaccumulation. Pollutants that have toxic, teratogenic and carcinogenic effects can cause long-term health problems. In war and conflict zones, an increase in reproductive health problems and chronic diseases resulting from war remnants become noteworthy. The toxic effects of the released chemicals in Gaza, including heavy metals, can be expected to persist for decades. Studies have revealed the negative consequences of metal pollution, such as the increase in premature births and birth defects, as an impact of recurring conflicts in the region in the past decades (9,10).

Environmental pollution threatens the health system by damaging health infrastructure and increasing healthcare needs and burden. The environmental health risks will continue to multiply healthcare needs in the region unequivocally although the capacity of the health system is already damaged. As of July 2024, only 45 out of 105 primary health care facilities were functional (11). The war has already affected preventive medicine practices negatively, especially vaccination. Polio vaccination coverage (POL3), which reached 99% before the war, dropped to 89% in 2023 (11), and in 2024, variant poliovirus type 2 was detected in wastewater in environmental surveillance studies, which are still

Table 2. Pattern of traumatic injuries (n = 500)

	2023				2024		
	7 Dec.	11 Jan.	20 Feb.	25 Mar.	30 April	18 May	22 July
Partially functioning hospitals (%)	39	42	33	28	33	42	44
Functional primary health care facilities (%)	29	18	22.5	24.4	30	35	48
Total cases of diarrhoea*	94 858	152 734	213 085	318 926	381 487	441 970	562 753
Cases of diarrhoea among <5-year-olds*	48 698	81 466	104 213	99 581	106 545	111 070	122 338
Cases of jaundice*	1126	7276	8437	19 117	48 177	67 652	104 766
Cases of scabies and lice*	28 606	68 486	6425	81 259	87 800	92 288	103 385

Sourced from WHO. Gaza Hostilities 2023 / 2024 - Emergency Situation Reports. 2024. <https://www.emro.who.int/opt/information-resources/emergency-situation-reports.html>

*Data cover period from 16 October 2023.

partly carried out under challenging conditions. In June 2024, variant poliovirus type 2 was confirmed in 11 environmental samples and a 10-year-old child (12,13). Some of the selected health indicators presenting the striking effects of the conflict are presented in Table 1.

Loss of natural resources and vital ecosystem services, hazardous wastes and contamination, and marine environment disruptions associated with the conflict are adding new dimensions to the humanitarian crisis in Gaza. More than 25% of Wadi Gaza, one of the most vital coastal wetlands of the Eastern Mediterranean Basin, is destroyed, with environmental damages worth US\$ 411 million (14). The destruction of ecosystems and critical environmental infrastructure is intensifying in Gaza. The problems that existed before the conflict in the Occupied Palestinian Territories have deepened and these problems will persist for decades post-war. Long-term political stability and resources will be needed to make the area liveable again.

Environmental sustainability is critical for the creation of peaceful living environments. UNEP emphasizes that since the mid-20th Century, at least 40% of intra-State conflicts have been linked to the exploitation of natural resources, and that there are currently more than 2500 conflicts in the world caused by fossil fuels, water, food and land (15). Research shows that air quality, safe sanitation and drinking water are particularly prominent

topics in the relationship between environmental sustainability and peace (16).

Peace, stated as the top prerequisite for good health in the Ottawa Declaration, cannot remain in words (17). The right to health can only be realized if governments and the international community do not remain silent and if calls for an immediate ceasefire succeed. Being able to survive and live with dignity should not be a miracle, and a peaceful and healthy environment should be created for the people in Gaza. War is a public health problem and the burden is borne by civilians, especially children and women.

In Gaza, the environment could also be a source of peace. Environmental sustainability is an integral part of the Sustainable Development Agenda, and it includes the protection of ecosystems and the sustainability of resources to ensure the wellbeing of present and future generations; it is closely related to peace (18). Creating environmental sustainability while recovering from the detrimental effects of the conflict could be one of the starting points for the region. Thus, building back the war-torn Gaza with respect and dignity could provide the basis for a peaceful future.

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